PULELEHUA

Maui Oceanview LP Response to Land Use Commission Staff Comments
5/15/2019

Volume 1

PULELEHUA

Maui Oceanview LP Response to Land Use Commission Staff Comments
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Volume 2

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ATTORNEYS FOR PETITIONER
MAUI OCEANVIEW LP

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAII

IN THE MATTER OF THE PETITION OF MAUI LAND & PINEAPPLE COMPANY, INC., a Hawaii corporation, TO AMEND THE AGRICULTURAL DISTRICT BOUNDARY INTO THE URBAN LAND USE DISTRICT FOR APPROXIMATELY 310.440 ACRES OF LAND AT MAHINAHINA AND KAHANA, DISTRICT OF LAHAINA, MAUI, HAWAII, TAX MAP KEY NO. 4-3-01; POR. 31 AND 79	DOCKET NO. A04-751 SECOND SUPPLEMENTAL MEMORANDUM IN SUPPORT OF MOTION OF PETITIONER MAUI OCEANVIEW LP TO AMEND DECISION AND ORDER; DECLARATION OF PAUL CHENG; EXHIBITS A-1; H – Q-1; EXHIBIT R-1 [PROPOSED AMENDED DECISION AND ORDER]; EXHIBITS S-T; CERTIFICATE OF SERVICE

SECOND SUPPLEMENTAL MEMORANDUM IN SUPPORT OF
MOTION OF PETITIONER MAUI OCEANVIEW LP
TO AMEND DECISION AND ORDER

MAUI OCEANVIEW LP, Successor Petitioner ("Petitioner") to Maui Land & Pineapple Company, Inc. in the above-captioned docket, by and through its attorneys, moved the LAND USE COMMISSION of the State of Hawaii (the "Commission") to amend the decision and order of June 22, 2006 ("2006 D&O") pursuant to Hawaii Administrative Rules §§15-15-70 and 15-15-94. MAUI OCEANVIEW LP seeks amendments as follows to the following conditions of the 2006 D&O to reflect plans for its predominantly rental housing project:

> 1.a. Petitioner shall develop and offer for rent not less than 125 affordable housing units to qualified families or individuals to satisfy a condition imposed by the Commission in its approval of Petitioner's Kapalua Mauka development in LUC Docket No. A03-741. **Maui Oceanview LP acknowledges that it will fulfill this obligation of original Petitioner MLP.**
>
> 1.b. ~~**In addition, Petitioner**~~ **Maui Oceanview LP** shall develop and offer for ~~**sale**~~ **rent** not less than ~~**325**~~ **280** affordable housing units, **which total includes the 125 Kapalua Mauka units,** to low, low-moderate, and moderate income residents of Maui as a feature of Pulelehua **in accordance with the Residential Workforce Housing Policy, Chapter 2.96, Maui County Code and the executed Residential Workforce Housing Agreement Pulelehua Multi-Family Dwelling Units-Rental with Maui DHHC dated March 7, 2019.**
>
> 1.c. To ensure continued ~~**owner occupancy, rental and resale**~~ **rental** to qualified low,**low-moderate** and moderate income residents and maintain the affordable **rental** housing inventory within Pulelehua, ~~**Petitioner**~~ **Maui Oceanview LP** shall prior to the rental ~~**or sale**~~ of any affordable housing unit **comply** ~~**establish**~~ **with** County approved restrictions governing he rental, ~~**sale**~~ or transfer of all affordable housing units **as set out in the Residential Workforce Housing Agreement Pulelehua Multi-Family Dwelling Units-Rental with Maui DHHC.**
>
> 1.d. Subject to applicable laws, ~~**Petitioner**~~ **Maui Oceanview LP** shall establish at a minimum, qualifications for rental ~~**or purchase**~~ which specify that a renter ~~**or buyer**~~ must be currently employed in Maui, **be retired from employment in Maui; be a full-time student residing in Maui; be a disabled person residing in Maui and previously employed in Maui; be the parent or guardian of a disabled person residing in Maui; be the spouse or dependent of any such employee, retired person, student or disabled person, in the event of death of an employee retired person, student or disabled perso the spouse or dependent of any such person residing in Maui,** attain a minimum age of 18 years, demonstrate evidence of sufficient income, agree to physically reside in the affordable housing unit, and not already own a housing unit or other real property.
>
> . . .
>
> 3. **Wastewater Facilities.** ~~**Petitioner shall, upon connection, pay a fair share contribution to fund improvements to wastewater treatment facilities to serve the Petition Area if such facilities are approved and developed by the County of Maui prior to the issuance of building permits, and Petitioner shall receive wastewater treatment service for wastewater from the Petition Area from the County of Maui at the LWWRF. In the event connection is made to the LWWRF, Petitioner shall construct wasterwater transmission facilities to transport wastewater from the Petition Area to appropriate County wastewater transmission facilities leading to the LWWRF.**~~ **Maui Oceanview LP shall develop and construct a wastewater treatment facility for Pulelehua.**
>
> . . .

20. **Water Resources Allocation.** ~~**Petitioner**~~ **Maui Oceanview LP** shall provide adequate potable and non-potable water source, storage and transmission facilities and improvements ~~**to the satisfaction of the DWS**~~ to accommodate the proposed development on the Petition Area.

The parties, in accordance with Hawaii Administrative Rules §§ 15-15-70(e) and 15-15-42(a)(2), stipulated to extend the time for filing responses to the motion to and including, Monday, January 22, 2018, and subsequently stipulated to extend the time for filing responses to the motion to and including Wednesday, January 31, 2018.

On December 11, 2017, the Land Use Commission staff wrote to Petitioner, provided comments, and requested additional information. The parties stipulated that the time for filing responses to the motion is further extended to sixty (60) days following Petitioner submission of the additional information to the Commission, but no later than Friday, March 30, 2018. On February 23, 2018. Maui Oceanview LP, the Office of Planning and the Maui County Planning Department filed a third stipulation extending the time for responses to the motion by the State and the County of Maui.

Petitioner responds to the LUC staff request with the following information:

	EXHIBIT A-2	UPDATED and REVISED Pulelehua Conceptual Plan (with Live/Work Unit Locations)
ITEM 1	EXHIBIT H	Letter dated February 12, 2018 from David C. Goode, Director of Public Works and Authorization of Maui County Department of Public Works
ITEM 2		Maui Oceanview LP is the successor in interest to Maui Land & Pineapple Company, Inc.
ITEM 3	EXHIBITS I, J	Limited Warranty Deed with Reservations and Covenants from Maui Land and Pineapple Company, Inc., recorded in the Bureau of Conveyances of the State of Hawai'i on June 3, 2016 as Document No. A-59980843 (for TMK 4-3-01-82); and Limited Warranty Deed with Reservations and Covenants from Maui Land and Pineapple Company, Inc., recorded in the Bureau

		of Conveyances of the State of Hawai'i on June 3, 2016 as Document No. A-59980844 (for TMK 4-3-01-83)
ITEM 4	EXHIBITS K, L-3	Letter from Scott F. Brast/Senior Vice President of American National Insurance Company, and American National Insurance Company Annual Statement.
ITEM 5	EXHIBIT M-1	UPDATED and REVISED Traffic Impact Analysis Report
	EXHIBIT N-1, N-2	Agreement for Water Delivery (Pulelehua) between Maui Land & Pineapple Company, Inc. and Maui Oceanview LP dated June 3, 2016 First Amendment to Water Delivery Agreement (Pulelehua) between Maui Land & Pineapple Company, Inc. and Maui Oceanview LP dated September 1, 2017.
	EXHIBIT O-1	UPDATED CBRE Market Study, Economic Impact Analysis. And Public Fiscal Assessment Of The Proposed Pulelehua 900-Mixed-use Project
ITEM 6		Maui Oceanview LP is consulting with the Department of Transportation-Airports Division on whether the existing sound attenuation condition remains sufficient to address potential noise impacts to Pulelehua.
ITEM 7	EXHIBIT O-1	UPDATED CBRE Market Study, Economic Impact Analysis, And Public Fiscal Assessment Of The Proposed Pulelehua 900-Mix-Use Project
ITEM 8	EXHIBIT O-1	UPDATED CBRE Market Study, Economic Impact Analysis, And Public Fiscal Assessment Of The Proposed Pulelehua 900-Mixed-Use Project
ITEM 9		See below
ITEM 10	EXHIBIT P	Letter from T.H. Pritchett (Flora and Fauna; Agricultural Resources)
ITEM 11	EXHIBIT Q-1	Annual Report
ITEM 12	EXHIBIT R-1	Proposed Amended Decision and Order (in ramseyer format) in paper original (with paper copy and one electronic copy).

	EXHIBIT S	Agreement between Maui Land & Pineapple Company, Inc. and Maui Oceanview LP to provide 50 acre offsite park
	EXHIBIT T	Residential Workforce Housing Agreement Pulelehua Multi-Family Dwelling Units - Rental

With regard to ITEM 9, the proposed Decision and Order includes a discussion of conformance with the goals. objectives, and policies of the Hawai'i State Plan; relationship with applicable priority guidelines and functional plans, the Maui County General Plan, West Maui Community Plan, and the Project District Zoning adopted for Pulelehua. See Exhibit R-1.

In further response to ITEM 10, Maui Oceanview LP believes that there have been no changes to air quality, soil quality, and groundwater resources. The project area has not been in cultivation for at least ten years.

AIR QUALITY: Maui Oceanview LP believes that the air quality discussion in the original petition still applies. MLP consultant B.D. Neal & Associates prepared an air quality study of the Petition Area. Air quality in the region is relatively good. Existing impacts include distant volcanic emissions and possibly occasional localized impacts from traffic congestion. Ambient air quality of the Petition Area and the surrounding communities is anticipated to be adversely affected from fugitive dust during the construction phase of Pulelehua. While B.D. Neal at that time noted, "emissions of fugitive dust can occur during periods where agricultural operations and field activity expose soils," the proposed Project Area has not been in cultivation for many years and the land has lain fallow.

Maui Oceanview LP will comply with an effective dust control plan, which would include watering of active work areas and the use of windscreens in sensitive areas, will be implemented to ensure compliance with the State of Hawai'i Department of Health ("DOH") regulations. Following construction, motor vehicles entering, exiting, and transiting the Petition Area will result in a long-term increase in air pollution emissions on the Petition Area. To assess the impact of emissions, MLP undertook an air quality modeling to estimate then-current ambient concentrations of carbon monoxide at several intersections near the Petition Area and to predict future levels both within and outside the Petition Area. During worst-case conditions, model results indicated that 1-hour and 8-hour carbon monoxide concentrations will be within both State and Federal ambient air quality standards. Any impact development of Pulelehua is expected to have on ambient air quality will not be significant; therefore, implementing mitigation measures for traffic related air quality impacts is both unnecessary and unwarranted.

SOIL QUALITY: The Project Area has not been in cultivation for many years. At the time of the intial petition, MLP noted since approximately 1985, its subsidiary, Maui Pineapple, cultivated portions of the Petition Area in pineapple. In connection with its pineapple cultivation operations, Maui Pineapple applied various fertilizers, pesticides, and plant growth regulators. Petitioner will conduct appropriate assessment and soils analyses to determine the possible impact to human habitation of the Petition Area due to potential residues of fertilizers and pesticides that may be present in the soil of former pineapple fields. If necessary, Petitioner will undertake measures to abate and remove any hazardous materials identified. Since the granting of the original petition, MLP ceased pineapple operations. A lessee, Haliimaile Pineapple Company, Ltd., was allowed to harvest ratoon crops for a short period following the shut-down of Maui Pineapple.

GROUNDWATER RESOURCES: As MLP presented in the initial presentation, in the Lahaina region, the Honolua and Honokowai Aquifers serve as a source of water for area wells. Honolua Aquifer still has a sustainable yield of 8 million gallons per day ("MGD") while Honokowai Aquifer now has a sustainable yield of 6 MGD. The current pumpage from the aquifers by area wells remains below their sustainable yield. The Commission on Water Resource Management has not designated either aquifer as groundwater management areas.

With regard to RECREATIONAL RESOURCES, Maui Oceanview, LP has reached a general agreement with the Maui Department of Parks and Recreation ("Parks Department") to develop and dedicate to the County a 10-acre regional park. The park will be located at the southern boundary of the property, off Honoapiilani Highway, and will be accessed through the additional access requested from the Hawaii Department of Transportation. The Parks Department has indicated it has no comments on Maui Oceanview LP's project with regard to parks.

Maui Oceanview, LP will also develop a number of smaller privately maintained parks as part of the Pulelehua community. A trail system will connect all phases of Pulelehua.

The original Petitioner Maui Land and Pineapple Company, Inc. acknowledges that it retains an obligation to provide a 50-acre regional park to the County of Maui. See Exhibit S.

A proposed amendment of the 2006 Decision and Order in ramseyer format is attached as Exhibit R-1.

Since the filing of its motion, Maui Oceanview LP and its consultants have continued to meet with State and County agencies interested in certain portions and aspects of the proposed project, including the various divisions of the Hawaii Department of Transportation, the Maui Department of Planning, the Maui Department of Water Supply, the Maui Department of Environmental Management, and the Maui Department of Public Works.

Based on those discussions, the following summarizes Maui Oceanview LP's proposed project:

1. DENSITY: West Maui Project District No. 5 (Pulelehua) has an approved maximum density of "[no] more than one thousand two hundred dwellings or dwelling units, including accessory dwellings." Maui County Code §19.93.050 (emphasis added). The ordinance does not allow accessory dwellings on apartment lots. Maui County Code §19.93.040. Maui Oceanview LP will offer for rent 800 units in apartment buildings (including some live/work units in apartment buildings in close proximity to the proposed commercial areas) and will offer for sale 100single-family lots . See Exhibit A-2.

2. ECONOMIC ABILITY: Maui Oceanview LP is a partnership between ANICO-EAGLE and USA Infrastructure Investments, LP of Texas. ANICO-EAGLE is a subsidiary of the American National Insurance Company, based in Galveston, Texas and is a publicly held NASDAQ listed insurance company with over $26Billion in assets. See Declaration of Paul Cheng, ¶¶ 3-4. Maui Oceanview intends to finance the project's funding needs from internal or appropriate external resources as it arises. ANICO-EAGLE typically finances such construction needs with either construction financing or equity financing. See Exhibit K. A separate audited statement is not prepared for ANICO-EAGLE but the most recent statement [Exhibit L-3] is submitted for American National Insurance Company. Based on this information, Maui Oceanview LP has the necessary economic ability to carry out the development of the Project.

3. WORKFORCE HOUSING: In its amended proposal, Maui Oceanview proposes to address the rental housing needs of low income, low-moderate income, and moderate income, in a manner consistent with the Residential Workforce Housing

Policy, Chapter 2.96, Maui County Code and has entered into a Housing Agreement with the County of Maui Department of Housing and Human Concerns. See Exhibit T.

4. Maui Oceanview proposes to incorporate the Kapalua Mauka affordable rentals condition (125 workforce units) imposed on the original developer Maui Land and Pineapple within Pulelehua. With an allowed density of 900 units, Maui Oceanview LP proposes 100 single-family lots for sale , leaving 800 units for rental purposes. Reduced by the 125 Kapalua Mauka condition units, Maui Oceanview LP has a remaining density of 675 units. Under the Residential Workforce Housing Policy, Chapter 2.96, Maui County Code, Maui Oceanview LP is required to include 155 workforce rental units (25% of the 620 market rental units of the total density of 675 rental units and the 100 single-family fee lots). Consequently, Maui Oceanview LP proposes to develop a total of 280 Residential Workforce Housing Rental units and 520 market rental housing units, along with 100 single-family lots.

5. Maui Oceanview's primarily rental project will offer 280 units, or 31% of the total units, as Residential Workforce Rental Housing consistent with HUD requirements for (1) very low and low, (2) below moderate and (3) moderate income residents, the Residential Workforce Housing Policy, Chapter 2.96, Maui County Code and the Housing Agreement entered with the Maui County Department of Housing and Human Concerns. The Residential Workforce Rental Units will be distributed evenly within the (1) "very low income" and "low-income" (2) "below-moderate" and (3) "moderate income" Income Groups.

6. Maui Oceanview LP's primarily rental project will offer preferences for the 280 workforce rental housing units consistent with the Residential Workforce Housing Policy, Chapter 2.96, Maui County Code and the Housing Agreement entered with the Maui County Department of Housing and Human Concerns.

7. As discussed with Maui County officials, Maui Oceanview will integrate rental workforce housing units within the rental apartment houses developed throughout the Project area.

8. PHASES: Maui Oceanview LP contemplates development of Pulelehua in approximately five phases, anticipated to be completed over an eleven-year period, as follows:

PULELEHUA PROPOSED PHASING				
PHASE	**ESTATE LOTS**	**WORKFORCE RENTAL HOUSING UNITS**	**MARKET RENTAL HOUSING UNITS**	**TOTAL**
PHASE 1		90	150	240
PHASE 2		120	230	350
PHASE 3		70	140	210
PHASE 4				
PHASE 5	100			100
TOTALS	100	280	520	900

9. Maui Oceanview LP does not intend to construct any accessory ‘ohana units as part of the Project.

10. WATER AND WASTEWATER: Maui Oceanview LP plans to develop its own water treatment and wastewater treatment facilities.

11. Maui Oceanview LP has entered into agreements with Maui Land and Pineapple Company, Inc. for the delivery of water for Pulelehua. See Exhibits N-1, N-2; Declaration of Paul Cheng, ¶11.

12. Unlike the LWWRF, Maui Oceanview LP will develop a wastewater

treatment system that does not employ injection wells. Instead, the treated water will be used for Pulelehua's irrigation needs (and excess will be taken by MLP for its project needs).

13. RETAIL: Maui Oceanview LP proposes to develop retail space in multiple locations, with neighborhood island style retail along Akahele Street at the north end of the development and on the south side of Mahinahina Gulch adjacent to the proposed County of Maui Regional Sports Park. Some live/work units will be allowed in certain apartment buildings in close proximity to the proposed commercial areas offering local services. The Pulelehua master plan includes a commercial/retail component envisioned to have 70,000 square feet of gross leasable area spread among multiple development pads totaling 17.5 acres on the south side of Akehele Street (the airport access drive) at Honoapi'ilani Highway as well as at the north end of the development and on the south side adjacent to the Regional Sports Park. The overall Floor Area Ratio will be approximately 0.092. The intent of the commercial/retail component is to primarily service the needs of the Pulelehua community residents. Based on the average Maui per capita demand for commercial/retail space at 36.0 square feet per person and typical capture rates for "neighborhood retail", "service commercial/medical" and "support/other commercial" space types, with nominal additional demand from on-site workers, passersby and residents of nearby development, we conservatively estimate there will be in-place demand for approximately 66,000 square feet of proposed space.

SOCIO-ECONOMIC IMPACTS

14. Tom Holliday from CBRE prepared for Maui Oceanview LP a Market Study, Economic Impact Analysis and Public Fiscal Assessment of the Proposed Pulelehua 900-Unit Project Mixed-Use Project. Exhibit O-1.

15. CBRE constructed a model depicting the economic impact of the

Pulelehua project on the Maui and Statewide community during its "lifespan" from anticipated ground-breaking in 2019, through build-out and absorption in 2026, and stabilized "operations" (commercial/retail businesses, common element management and maintenance) thereafter.

16. From a direct perspective, Maui Oceanview LP's proposed 900 residential units (800 apartment and 100 single-family homes) and 70,000 square feet of commercial space will create numerous construction, equipment operator and specialty trade jobs on- and off-site, directly and indirectly, during the planning and emplacement of the infrastructure, and building of the improvements.

17. Pulelehua will bring an estimated $324.2 million in direct development capital into Maui over the build-out period for the project.

18. The development of the Pulelehua project will bring in an estimated $324.2 million of new, direct capital investment with significant unquantified indirect expenditures into the island's real estate market and generate $966.3 million in total economic activity island-wide during its build-out and stabilization over a 9-year period (forecast from circa 2018 to 2026). Pulelehua will contribute some $74.8 million in annual economic activity on a stabilized basis thereafter.

19. Infrastructure cost estimates prepared by Maui Oceanview LP and planning team members, are forecast at $30.0 million, excluding design, entitlement and indirect expenses incurred in the islands. Vertical construction costs would total $294.2 million during the modeling period (based on construction costs averaging $208,333 per unit estimated from Maui Oceanview). The development costs are not intended to be indicative of the rental rates for the respective units, as the developer may elect to allocate base costs in a far different matter.

20. Pulelehua development will infuse on average an anticipated $40.5 million annually into the Maui building industry on average over the 8-year build-out period. While a significant percentage of the materials needed to build Pulelehua's infrastructure, and residential and commercial structures must be imported to Maui, a portion of the construction costs spent in the development will directly flow to local businesses in the form of contractor profits and supplier profits.[1]

21. The total Contractor's Profit generated by Pulelehua for local building companies will average some $4.1 million per year, with a cumulative profit of $32.4 million over the construction period. The total annual Supplier's Profit would be some $1.6 million equating to $13 million in aggregate.

22. Based on indicators provided by the construction of comparable sized projects and Hawaii industry averages, CBRE estimated the demand for on- and off-site, direct and indirect, fulltime equivalent employment positions associated with laying of initial infrastructure systems, construction of the units, and the on-going commercial/retail businesses and the apartment business (and its community association efforts) in the project.

23. The construction, operating economic activities, and indirect/off-site employment opportunities created by the subject development will not all be "new" jobs requiring new Maui residents, but will be vitally needed new opportunities for in-place resident construction trade workers and existing local businesses. The jobs associated with the commercial/retail tenants and apartment business operations will represent an expansion of the employment pool. CBRE

[1] Typically, within the industry net contractor profit margins are expected to be at 8 to 20 percent of total construction costs. CBRE used a conservative ten percent figure and extrapolated supplier profits at four percent of total costs

assumed the off-site/indirect work created will be steered towards existing Maui supply, equipment providers.

24. A total of 1,516 worker-years of employment in the construction trades will be needed for developing Pulelehua. The commercial/retail businesses will have worker-years totaling 886 during the modeling period and 200 per year thereafter. The apartment business/community association and maintenance worker-years will total 97 during the modeling period and 28 per year thereafter.

25. The construction of the Pulelehua infrastructure and finished apartment units, will directly create an estimated 1,516 "worker-years" of employment (the equivalent of 52 work weeks at 40 hours per week) in the construction trades, support and supply businesses during build-out, averaging about 189 worker years annually, with an estimated $110.3 million in wages (averaging about $13.8 million per year).

26. The commercial/retail businesses, apartment rental company, and community management and landscape/maintenance of the 70,000 square feet of commercial space and 800 apartment units will create 982 worker-years of employment from 2020 through 2026 and associated wages of $33.4 million. Once stabilized these project components will create demand for 228 permanent FTE positions with annual wages of $7.8 million.

27. Associated secondary/off-site employment during the overall development and absorption time-frame will total 654 worker-years with wages of $42.0 million and a stabilized FTE job-count of 76 with total wages of $4.1 million per year.

28. Off-Site/Indirect/Secondary employment created by Pulelehua will total 654 worker-years from 2019 through 2026 and 76 FTE positions per year as stabilized.

29. Total construction wages paid during build-out will be $80.7 million. Total commercial/retail employee wages during the modeling period will be $29.5 million and stabilize at $6.7 million thereafter. Total apartment business/association and maintenance employee wages during the modeling period will be $4 million and stabilize at $1.2 million thereafter. Off-sits/indirect employee wages will total $35.4 million during build-out and be $4.1 million annually on a stabilized basis.

30. During build-out the 900 households containing 2,380 residents at Pulelehua will have aggregate incomes of $334.6 million (2020-2026) and will stabilize at $81.2 million annually thereafter. Discretionary expenditures into Maui businesses by the Pulelehua population will be some $167.3 million during build-out and average $40.9 million per year on a stabilized basis. CBRE notes the amounts will not all necessarily be new income and spending for Maui as many of the households would merely be located elsewhere on the island if Pulelehua wasn't constructed.

31. CBRE estimate that about one-half (50%) of the resident households in the project will be comprised of new/in-migrating Maui residents. Their household income and spending will be "new" to Maui and not just redirected from elsewhere on the island. These 1,190 persons will have cumulative household incomes of some $167.3 million during build-out and $40.9 million annually on a stabilized basis. Their discretionary income will total $83.7 million from 2020 through 2026, and stabilize at $20.4 million per year.

32. The on-going commercial/retail, apartment rental, and management and maintenance activity in the community will total $642.1 million during the 2020-2026 projection period and average $74.8 million per year on a stabilized basis. The base impact to the Maui from 2018 through 2026 will be $966.3 million and average $74.8 million annually

thereafter.[2]

33. PUBLIC INFRASTRUCTURE: Maui Oceanview LP does not object to the Department of Public Works request (see Exhibit H) that any amended Decision and Order include clarification that TMK 4-3-001-079 (the County-owned parcel) be released from all Land Use Commission conditions as that property is merely a drainage basin, and that Maui Oceanview LP agree to take over maintenance of the drainage basin.

34. The Hawaii State Department of Education (DOE) has decided on an area along Honoapi'ilani Highway as the location for a future elementary school. The DOE does not have funding for further planning or construction of a school on the site at this time. Maui Oceanview LP contemplates that roadway improvements along Honoapi'ilani Highway will be required when the school is constructed to accommodate impacts of the school.

35. At the request of the County of Maui Department of Parks and Recreation, Maui Oceanview LP will provide and develop a 10-acre park for the County of Maui. A trail system connecting the entire project area will also be provided by Maui Oceanview LP.

36. The proposed amended Decision and Order (Exhibit R-1) includes a discussion of conformance to conformance with the goals, objectives, and policies of the Hawai'i State Plan; relationship with applicable priority guidelines and functional plans, the Maui County General Plan, West Maui Community Plan, and the Project District Zoning adopted for

[2] CBRE notes application of the Hawaii Inter-County Input-Output Model macro multipliers depicting direct, indirect and induced economic impacts arising from development of Pulelehua result in significantly higher economic out-flow indicators for every item than those from CBRE's direct, subject-specific micro model.

Pulelehua.

CONCLUSION

Maui Oceanview LP requests an amendment of 2006 D&O findings of fact and conditions in the form attached.

DATED: Wailuku, Maui, Hawaii, MAY 24, 2019.

GILBERT S.C. KEITH-AGARAN
DAVID M. JORGENSEN

Attorneys for Petitioner MAUI OCEANVIEW LP

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAII

IN THE MATTER OF THE PETITION OF MAUI LAND & PINEAPPLE COMPANY, INC., a Hawaii corporation, TO AMEND THE AGRICULTURAL DISTRICT BOUNDARY INTO THE URBAN LAND USE DISTRICT FOR APPROXIMATELY 310.440 ACRES OF LAND AT MAHINAHINA AND KAHANA, DISTRICT OF LAHAINA, MAUI, HAWAII, TAX MAP KEY NO. 4-3-01; POR. 31 AND 79	DOCKET NO. A04-751 DECLARATION OF PAUL CHENG;

DECLARATION OF PAUL CHENG

I, PAUL CHENG, declare upon penalty of perjury, the following:

1. I am the President of MAUI OCEANVIEW GP, INC., the general partner of MAUI OCEANVIEW LP, a Delaware limited partnership registered to do business in Hawaii as a foreign limited partnership.

2. MAUI OCEANVIEW LP is the successor in interest to MAUI LAND & PINEAPPLE COMPANY, INC. MAUI OCEANVIEW LP is an affiliate of USA Infrastructure Investments, LP which completed the purchase of the project area from MAUI LAND & PINEAPPLE COMPANY, INC. in June 2016. USA Infrastructure Investments, LP is a Paul Cheng family owned development company based in Texas. Exhibits I and J are true and correct copies of the two deeds for the lands conveyed to MAUI OCEANVIEW LP by MAUI LAND & PINEAPPLE COMPANY, INC.

3. USA Infrastructure Investments LP and/or its affiliates have other real estate investments on Maui and have extensive development expertise in multi-family, retail and also affordable multi-family housing. They have won awards in several master-planned community developments in Texas as well an award for affordable senior multi-family housing in Forney, Texas in which they won $500,000 from the Federal Home Loan Bank Board for being one of two best affordable national senior multi-family developments in the nation for 2013.

4. MAUI OCEANVIEW LP is a joint venture between USA Infrastructure Investments, LP, a privately held developer, and ANICO Eagle LLC, an affiliate of a large publicly held insurance company based in Texas with assets of over $20Billion and serving customers for over 100 years. USA Infrastructure Investments, LP has ongoing real estate ventures with the insurance partner of over $100Million. Funding for Pulelehua has been approved by both partners and is ready to go subject to necessary approvals. MAUI OCEANVIEW LP anticipates that development and construction of Pulelehua will generate approximately $400Million of direct new capital investment and spending into the Maui County economy over the ten-year development period.

5. Attached as Exhibit A-2 is a further updated and revised conceptual site plan of the Pulelehua project that includes a designation of the proposed locations for live/work units.

6. Exhibit K is a true and correct copy of a letter from of Scott F. Brast, Senior Vice President of American National Insurance Company, the parent of ANICO Eagle LLC. Mr. Brast heads investments for the company. I concur with the description in Mr. Brast's letter of the manner in which Maui Oceanview LP will finance the development.

7. As Mr. Brast indicates, a separate audited statement is not prepared for ANICO Eagle LLC. Exhibit L-3 is a true and correct copy of the most recent Annual Report of the company

filed pursuant to the Securities and Exchange Act of 1934. Real estate investments are discussed on pages 50-51 of the Annual Report.

8. Through counsel, MAUI OCEANVIEW LP requested that the Maui Department of Public Work confirm the authorization of the inclusion of its parcel in the Petition Area. Attached as Exhibit H is a letter dated February 12, 2018 from David C. Goode, Director of Public Works and Authorization of Maui County Department of Public Works. Director Goode requests in the letter that the Commission clarify that conditions associated with the development do not apply to the Department of Public Works.

9. As a result of preliminary meetings with Hawaii State Land Use Commission and Office of Planning officials, MAUI OCEANVIEW LP prepared an updated Cultural Impact Assessment. Attached to the original submissions as Exhibit D is a true and correct copy of the report of Maria Orr updating her Cultural Impact Assessment to reflect the passage of time since the approval of the 2006 Decision and Order in this Docket. Attached to the original submissions as Exhibit E is a true and correct copy of the report of Aina Archaeology updating the Cultural Impact Assessment to reflect the passage of time since the approval of the 2006 Decision and Order in this Docket. The Aina Archaeology Cultural Impact Assessment noted kamaaina expressed an additional concern of maintaining access to areas mauka of the Petition Area and Kapalua-West Maui Airport. To the extent Petitioner has control of existing mauka access from its property, mauka access from Pulelehua will not be impeded.

10. Attached as Exhibit M-1 is a further updated and revised Traffic Impact Analysis Report prepared by Austin Tsutsumi & Associates.

11. Attached as Exhibit N-1 is a copy of the Agreement for Water Delivery (Pulelehua) between MAUI LAND & PINEAPPLE COMPANY, INC. and MAUI OCEANVIEW LP dated

June 3, 2016 and Exhibit N-2 is a copy of the First Amendment of Agreement for Water Delivery between MAUI LAND & PINEAPPLE COMPANY, INC. and MAUI OCEANVIEW LP dated September 1, 2017.

12. Attached as Exhibit O-1 is a true and correct copy of a supplement to the Market Study, Economic Impact Analysis, and Public Fiscal Assessment of the Proposed Pulelehua 900-Unit Multi-Use Project prepared by CBRE.

13. Exhibit P is a letter from T.H. Pritchett regarding flora and fauna and agricultural resources on the project area.

14. Attached as Exhibit Q-1 is a true and correct copy of the most recent annual report filed in this docket.

15. Attached as Exhibit R-1 is the proposed amended decision and order (in ramseyer format).

16. Attached as Exhibit S is a true and correct copy of the Agreement to provide a 50 acre offsite park between MAUI LAND & PINEAPPLE COMPANY, INC. and MAUI OCEANVIEW LP.

17. Attached as Exhibit T is a true and correct copy of the executed Residential Workforce Housing Agreement Pululehua Multi-Family Dwelling Units – Rental between Maui County Housing Department and MAUI OCEANVIEW LP.

DATED: May 20, 2019.

Paul Cheng

PAUL CHENG

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAII

IN THE MATTER OF THE PETITION OF MAUI LAND & PINEAPPLE COMPANY, INC., a Hawaii corporation, TO AMEND THE AGRICULTURAL DISTRICT BOUNDARY INTO THE URBAN LAND USE DISTRICT FOR APPROXIMATELY 310.440 ACRES OF LAND AT MAHINAHINA AND KAHANA, DISTRICT OF LAHAINA, MAUI, HAWAII, TAX MAP KEY NO. 4-3-01; POR. 031 AND 079	DOCKET NO. A04-751 CERTIFICATE OF SERVICE RE: SECOND SUPPLEMENTAL MEMORANDUM IN SUPPORT OF MOTION OF PETITIONER MAUI OCEANVIEW LP TO AMEND DECISION AND ORDER; DECLARATION OF PAUL CHENG; EXHIBITS A-1; H – Q-1; EXHIBIT R-1 [PROPOSED AMENDED DECISION AND ORDER]; EXHIBITS S-T

CERTIFICATE OF SERVICE RE:
SECOND SUPPLEMENTAL MEMORANDUM IN SUPPORT OF MOTION OF PETITIONER MAUI OCEANVIEW LP TO AMEND DECISION AND ORDER DECLARATION OF PAUL CHENG; EXHIBITS A-1; H – Q-1; EXHIBIT R-1 [PROPOSED AMENDED DECISION AND ORDER]; EXHIBITS S-T

I certify that a copy of the SECOND SUPPLEMENTAL MEMORANDUM IN SUPPORT OF MOTION OF PETITIONER MAUI OCEANVIEW LP TO AMEND DECISION AND ORDER; DECLARATION OF PAUL CHENG; EXHIBITS A-1; H – Q-1; EXHIBIT R-1 [PROPOSED AMENDED DECISION AND ORDER]; EXHIBITS S-T has been duly served on the following parties at their last known address by hand delivery, or depositing in the U.S. mail, postage prepaid on MAY 24, 2019:

Rodney Funakoshi
Office of Planning
State of Hawaii
235 S Beretania Street, 6th Floor
Honolulu, Hawaii 96813

Michelle McLean, Director
Department of Planning
County of Maui
2200 Main Street, One Main Plaza Suite 315
Wailuku, Maui, Hawaii 96793

Dawn Takeuchi-Apuna, Esq.
Deputy Attorney General
Commerce and Economic Development
Department of the Attorney General
425 Queen Street
Honolulu, Hawaii 96813

Moana Lutey, Corporation Counsel
Michael Hopper, Dep. Corp. Counsel
Office of the Corporation Counsel
County of Maui
200 S. High Street, 3rd Floor
Wailuku, Maui, Hawaii 96793

Rowena Dagdag, Director
Maui County Department of Public Works
200 S. High Street
Wailuku, Maui, Hawaii 96793

Jeff Pearson, Director
Maui County Department of Water Supply
200 S. High Street
Wailuku, Maui, Hawaii 96793

Maui Electric Company, Limited
ATTN: Corporate Secretary
PO Box 2750
Honolulu, Hawaii 96840
(DIGITAL COPY ONLY)

Maui Electric Company, Limited
c/o Susan A. Li
900 Richards Street, Room 414
Honolulu, Hawaii 96813
(DIGITAL COPY ONLY)

Hawaiian Telecom, Inc.
ATTN: Legal Department
1177 Bishop Street, Ste. 15
Honolulu, Hawaii 96813
(DIGITAL COPY ONLY)

Hawaiian Telecom, Inc.
c/o Owen Massiah
Legal Department
1177 Bishop Street, Ste. 15
Honolulu, Hawaii 96813
(DIGITAL COPY ONLY)

Hawaiian Airlines
c/o Corporation Service Company
1003 Bishop Street
Suite 1600 Pauahi Tower
Honolulu, Hawaii 96813
(DIGITAL COPY ONLY)

Hawaiian Airlines
3375 Koapaka St., Ste. G-350
Honolulu, Hawaii 96819
(DIGITAL COPY ONLY)

DATED: Wailuku, Maui, Hawaii, MAY 24, 2019.

GSC. Keith-Agaran

GILBERT S.C. KEITH-AGARAN
DAVID M. JORGENSEN
Attorneys for Petitioner MAUI OCEANVIEW LP

EXHIBIT A-2

UPDATED and REVISED
Pulelehua Conceptual Plan (with Live/Work Unit Locations)

LEGEND

LIVE / WORK UNIT

LIVE-WORK LOCATION PLAN

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawaii
March 15, 2019

Maui Oceanview LP
Kimley»Horn

DWG NAME K:\FRI_CIVIL\67790501 - PULELEHUA\CAD\EXHIBITS\PLANSHEETS\12-LIVE WORK LOCATION_1905.DWG
LAST SAVED 4/3/2019 10:19 AM

EXHIBIT H

Letter dated February 12, 2018 from David C. Goode, Director of Public Works and Authorization of Maui County Department of Public Works

ALAN M. ARAKAWA
Mayor

DAVID C. GOODE
Director

ROWENA M. DAGDAG-ANDAYA
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
200 SOUTH HIGH STREET, ROOM NO. 434
WAILUKU, MAUI, HAWAII 96793

GLEN A. UENO, P.E., P.L.S.
Development Services Administration

CARY YAMASHITA, P.E.
Engineering Division

JOHN R. SMITH, P.E.
Highways Division

February 12, 2018

Gilbert S. C. Keith-Agaran, Esq.
Takitani Agaran & Jorgensen, LLLP
24 North Church Street, Suite 409
Wailuku, Maui, Hawaii 96793

Dear Mr. Keith-Agaran:

SUBJECT: DOCKET NO. A04-751/MAUI LAND AND PINEAPPLE COMPANY, INC.; MOTION OF PETITIONER MAUI OCEANVIEW LP TO AMEND DECISION AND ORDER

As requested, enclosed is our authorization to amend the Land Use Commission's Decision and Order in the subject matter.

The Department would like to see any amended Decision and Order to include the following:

1. Release TMK 4-3-001:079 from all Land Use Commission conditions as it is merely a drainage basin; and

2. The maintenance of the drainage basin would be taken over by Maui Oceanview LP.

Sincerely,

DAVID C. GOODE
Director of Public Works

DCG:jso
Enclosure
xc: Department of Planning
s:\gilbert keith-agaran_A04-751 ml&p mtn of petitioner maui oceanview to amend D&O

TAKITANI AGARAN & JORGENSEN, LLLP
GILBERT S.C. KEITH-AGARAN
DAVID M. JORGENSEN
24 NORTH CHURCH STREET, ROOM 409
WAILUKU, MAUI, HAWAII 96793
TEL. (808) 242-4049
FAX. (808) 244-4021
EMAIL: GKeithAgaran@gmail.com

ATTORNEYS FOR PETITIONER
MAUI OCEANVIEW LP

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAII

IN THE MATTER OF THE PETITION OF MAUI LAND & PINEAPPLE COMPANY, INC., a Hawaii corporation, TO AMEND THE AGRICULTURAL DISTRICT BOUNDARY INTO THE URBAN LAND USE DISTRICT FOR APPROXIMATELY 310.440 ACRES OF LAND AT MAHINAHINA AND KAHANA, DISTRICT OF LAHAINA, MAUI, HAWAII, TAX MAP KEY NO. 4-3-01; POR. 31 AND 79	DOCKET NO. A04-751 AUTHORIZATION OF MAUI COUNTY DEPARTMENT OF PUBLIC WORKS

AUTHORIZATION OF
MAUI COUNTY DEPARTMENT OF PUBLIC WORKS

WHEREAS, the Maui County Department of Public Works is the owner of Tax Map Key No. 4-3-01:79 (consisting of approximately 6.181 acres).

WHEREAS, DPW authorized including its parcel in the Petition Area for Docket No. A04-751.

WHEREAS, Maui Oceanview LP has filed a motion seeking amendments to the 2006 Decision and Order by the Land Use Commission in this docket.

WHEREAS, DPW is willing to continue including its parcel in the Petition Area.

NOW, THEREFORE, as DPW Director, I hereby confirm that Maui Oceanview LP is authorized to file its motion seeking amendments to the 2006 Decision and Order by the Land Use Commission in this docket.

MAUI DEPARTMENT OF PUBLIC WORKS

BY DAVID GOODE,
Its Director

STATE OF HAWAII)
) §
COUNTY OF MAUI)

This 2-page AUTHORIZATION OF MAUI COUNTY DEPARTMENT OF PUBLIC WORKS dated February 12, 2018 was subscribed and sworn to before me, on February 12, 2018 by DAVID GOODE., to me personally known to be the person (or proved to me based on satisfactory evidence), who, being by me duly sworn, did say he is the DIRECTOR OF THE MAUI COUNTY DEPARTMENT OF PUBLIC WORKS, and that said instrument was signed and sealed in that capacity, and he acknowledged said instrument as his free act and deed.

JILL ANNE S. ONO
NOTARY PUBLIC
No. 98-637
STATE OF HAWAII

Name of Notary: JILL ANNE S. ONO

Notary Public, State of Hawaii,

State of Hawaii.

My commission expires: 11/30/18

Commission No.: 98-637

EXHIBIT I

Limited Warranty Deed with Reservations and Covenants from Maui Land and Pineapple Company, Inc., recorded in the Bureau of Conveyances of the State of Hawai'i on June 3, 2016 as Document No. A-59980843 (for TMK 4-3-01-82)

311

STATE OF HAWAII
BUREAU OF CONVEYANCES
RECORDED
June 03, 2016 8:01 AM
Doc No(s) A-59980843

/s/ NICKI ANN THOMPSON
REGISTRAR

1 3/9 OFC
B-32817042

Conveyance Tax: $67,500.00

LAND COURT SYSTEM | REGULAR SYSTEM

Return by Mail [✓] Pickup [ ] To:

Mr. Anthony J. Barbieri
Kessler Collins, P.C.
2100 Ross Ave., Ste. 750
Dallas, TX 75201

TG: 201611721 (3)
TGE: 16073344
Robyn M. Delapinia RS

TITLE OF DOCUMENT:

LIMITED WARRANTY DEED WITH RESERVATIONS & COVENANTS

PARTIES TO DOCUMENT:

GRANTOR: **MAUI LAND & PINEAPPLE COMPANY, INC.**, a Hawaii corporation

GRANTEE: **MAUI OCEANVIEW LP**, a Delaware limited partnership
2525 McKinney Avenue, Suite B
Dallas, Texas 75201

TAX MAP KEY(S): Maui 4-3-001-082

(This document consists of 16 pages.)

LIMITED WARRANTY DEED WITH RESERVATIONS & COVENANTS

THIS LIMTED WARRANTY DEED WITH RESERVATIONS & COVENANTS is made this 3rd day of June, 2016, by and between MAUI LAND & PINEAPPLE COMPANY, INC., a Hawaii corporation, hereinafter referred to as the "GRANTOR", and MAUI OCEANVIEW LP, a Delaware limited partnership, whose address is 2525 McKinney Avenue, Suite B, Dallas, Texas 75201, hereinafter referred to as the "GRANTEE".

W I T N E S S E T H:

That Grantor, for and in consideration of the sum of TEN AND NO/100 DOLLARS ($10.00), in lawful money of the United States of America, and for other good and valuable consideration to Grantor paid by Grantee, the receipt whereof is hereby acknowledged, does hereby grant, bargain, sell and convey unto Grantee, the property described in Exhibit "A" attached hereto and by reference made a part hereof, together with all other rights and interests described in said Exhibit "A", and the reversions, remainders, rents, issues and profits thereof, and all of the estate, right, title and interest of the Grantor, both at law and in equity, therein and thereto (the "Property").

TO HAVE AND TO HOLD the same unto Grantee, as tenant in severalty, in fee simple, forever.

AND Grantor hereby covenants and agrees with Grantee, as aforesaid, that Grantor is lawfully seised in fee simple of the Property described in said Exhibit "A", and has good right and lawful authority to sell and convey the same as aforesaid; that the Property is free and clear of all encumbrances made or suffered by Grantor, subject, however, to the reservations, restrictions, and encumbrances contained herein and shown on said Exhibit "B" (the "Permitted Exceptions"), and that Grantor will WARRANT AND DEFEND the same unto Grantee as aforesaid, against the lawful claims and demands of all persons whomsoever, except as herein set forth.

AND, in consideration of the premises, Grantee does hereby accept the Property conveyed hereby on the terms, conditions, covenants and restrictions contained herein, and Grantee does further acknowledge, covenant and agree that:

1. Property Conveyed "AS IS". Grantee acknowledges and agrees that the Property is conveyed to Grantee in its "as is" condition and, except as specifically set forth in this instrument, and as specifically set forth in the Purchase and Sale Agreement dated March 2, 2016, by and between Grantor and Grantee, as assignee of USA Land Investments, LLC, as Texas limited liability company.

2. Soil and Water Resource Covenants & Waiver. Grantee acknowledges and agrees that, due to historical use of the Property and other properties surrounding the Property, the soil and groundwater beneath the Property may contain pesticides, fertilizers, nematicides, petrochemicals, and other chemicals

and/or components, residues or byproducts thereof ("Residues"). The Grantee hereby assumes complete risk of and forever releases the Grantor, its successors and assigns from all claims for injury or damages (including, but not limited to, consequential damages, general damages, damages for emotional distress or mental anguish, statutory damages, special damages, exemplary and punitive damages) arising from Residues that currently or in the future affect the soil, groundwater or aquifer underlying or surrounding the Property, or any wells existing or developed in the future at the Property. Without limiting the generality of the foregoing, the Grantee hereby, with full knowledge of its rights, forever waives any right to require the Grantor, its successors or assigns, and releases the Grantor, its successors and assigns, from any obligation to take any action to correct, remediate, modify, alter, eliminate, abate or clean-up any Residues, whether in the soil, groundwater or in water pumped from wells developed at the Property. As used in this section, all references to the "Grantor" shall mean and include Maui Land & Pineapple Company, Inc., Maui Pineapple Company, Ltd., and all subsidiary, sister and other affiliated companies of the Grantor, and all successors and assigns of the Grantor and its parent, subsidiary, sister and affiliated companies.

3. Compliance with Land Use Conditions. The Property is subject to (a) that certain Amended & Restated Declaration of Conditions dated September 19, 2006, and recorded in the Bureau of Conveyances of the State of Hawaii as Document No. 2006-178683, and (b) that certain Unilateral Agreement and Declaration for Conditional Zoning dated October 12, 2011, and recorded in said Bureau as Document No. 2011-176094. Grantee acknowledges and agrees, for itself and for its successors and assigns, that ownership, development, use and occupancy of the Property must at all times comply with the conditions and requirements set forth in those documents, as they may be amended from time to time with the approval of the applicable governmental authorities.

4. Flowage. Grantor reserves to itself and its successors and assigns an easement for the free flow and discharge over and onto the Property of surface water and run-off from any adjacent or nearby lands owned by Grantor, but only as such flow and discharge exists as of the date hereof.

5. Hawaii Right to Farm Act. Grantee acknowledges that the Property is located in the vicinity of lands designated and zoned agricultural and that the Hawaii Right to Farm Act protects farming, ranching and other agricultural activities on such land by, among other things, limiting claims by owners and occupants of the Property arising from the impacts of such activities.

Each of the foregoing reservations, covenants, agreements, acknowledgments, waivers and releases shall constitute covenants running with the land. Each such reservation, covenant, agreement, acknowledgment, waiver and release shall be binding upon, and all references to "Grantee" shall mean and include, the Grantee and it successors and assigns, and all persons now or hereafter acquiring any right, title or interest in or to the Property (or any portion thereof) or occupying all or any portion of the Property. By accepting any right, title or interest in the Property (or any portion thereof) or by occupying all or any portion of the Property, each such person automatically shall be deemed to have made and agreed to, and shall be bound by, observe and be subject to, each of the foregoing covenants, agreements, acknowledgments, waivers and releases. The terms "Grantor" and "Grantee," wherever used herein, and any pronouns used in place thereof, shall mean and include the singular and the plural, and the use of any gender shall mean and include all genders.

The parties hereto agree that this instrument may be executed in counterparts, each of which shall be deemed an original, and said counterparts shall together constitute one and the same agreement, binding all of the parties hereto, notwithstanding all of the parties are not signatory to the original or the same counterparts. For all purposes, including, without limitation, recordation, filing and delivery of this instrument, duplicate unexecuted and unacknowledged pages of the counterparts may be discarded and the remaining pages assembled as one document.

[Remainder of page left intentionally blank; signature page follows]

IN WITNESS WHEREOF, the parties hereto have caused these presents to be duly executed on the day and year first above written.

GRANTOR:

MAUI LAND & PINEAPPLE COMPANY, INC., a Hawaii corporation

By______________________________
Tim T. Esaki
Its Chief Financial Officer

GRANTEE:

MAUI OCEANVIEW LP,
a Delaware limited partnership

By: Maui Oceanview GP Inc., a Texas corporation, its sole general partner

By______________________________
Name:
Its

STATE OF HAWAII)
) SS.
COUNTY OF MAUI)

On this 24th day of May, 2016, before me personally appeared Tim T. Esaki, to me personally known, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable in the capacity shown, having been duly authorized to execute such instrument in such capacity.

JODIE E. YASUDA
NOTARY
No. 91-62
PUBLIC
STATE OF HAWAII

(Official Stamp or Seal)

Notary Public, State of Hawaii
Printed Name: Jodie E. Yasuda
My commission expires: July 8, 2017

<u>NOTARY CERTIFICATION STATEMENT</u>

Document Identification or Description: Limited Warranty Deed with Reservations and Covenants

☐ Doc. Date: ______ or ☒ Undated at time of notarization.

No. of Pages: ____________ Jurisdiction: Second Circuit
(in which notarial act is performed)

May 24, 2016
Signature of Notary — Date of Notarization and Certification Statement

Jodie E. Yasuda
Printed Name of Notary

JODIE E. YASUDA
NOTARY
No. 91-62
PUBLIC
STATE OF HAWAII

(Official Stamp or Seal)

IN WITNESS WHEREOF, the parties hereto have caused these presents to be duly executed on the day and year first above written.

GRANTOR:

MAUI LAND & PINEAPPLE COMPANY, INC., a Hawaii corporation

By______________________________
Tim T. Esaki
Its Chief Financial Officer

GRANTEE:

MAUI OCEANVIEW LP,
a Delaware limited partnership

By: Maui Oceanview GP Inc., a Texas corporation, its sole general partner

By Paul Cheng
Name: PAUL CHENG
Its PRESIDENT

1

STATE OF TEXAS)
) SS.
COUNTY OF DALLAS)

On this 27th day of MAY, 2016, before me personally appeared PAUL CHENG, to me personally known, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable in the capacity shown, having been duly authorized to execute such instrument in such capacity.

Alis Bonda

Notary Public, State of TEXAS

Printed Name: ALIS BONDA

My commission expires: 10/10/19

NOTARY PUBLIC STATE OF TEXAS
ALIS BONDA
Notary Public, State of Texas
My Commission Expires
October 10, 2019

(Official Stamp or Seal)

EXHIBIT "A"

PROPERTY DESCRIPTION

All of that certain parcel of land (being portions of Grant 1166 to D. Baldwin, J. F. Pogue and S. E. Bishop and Royal Patent 415, Land Commission Award 75 to Charles Cockett) situate, lying and being on the easterly side of Honoapiilani Highway, Federal Aid Project Number RF-030-1(5), at Mahinahina 1, 2, 3 and 4, District of Lahaina, Island and County of Maui, State of Hawaii, being LOT 1 of "MAHINAHINA MAUKA SUBDIVISION", as shown on Subdivision map prepared by Reed M. Ariyoshi, Land Surveyor, with Warren S. Unemori-Engineering, Inc., dated September 15, 2009, last revised April 23, 2010, and approved by the Department of Public Works, County of Maui on May 12, 2010 (Subdivision File Number 4.955) and thus bounded and described as per survey dated September 19, 2011, to-wit:

Beginning at a point at the southwesterly corner of this lot, the coordinates of said point of beginning referred to Government Survey Triangulation Station "MANINI" being 9,575.26 feet North and 11,525.11 feet West and running by azimuths measured clockwise from True South:

1. Thence along the easterly side of Honoapiilani Highway, F.A.P. No. RF-030-1(5) on a curve to the left, with the point of curvature azimuth from the radial point being: 285° 29' 23", and the point of tangency azimuth from the radial point being: 283° 20', having a radius of 6,075.00 feet, the chord azimuth and distance being: 194° 24' 41.5" 228.63 feet to a point;

2.	193°	20'		703.87	feet along same to a point;
3.	187°	37'	22"	100.50	feet along same to a point;
4.	194°	13'	16"	1,597.25	feet along same to a point;
5.	195°	47'	40"	393.60	feet along same to a point;

6. Thence along same on a curve to the right, with the point of curvature azimuth from the radial point being: 109° 49' 56", and the point of tangency azimuth from the radial point being: 111° 05' 09", having a radius of 4,925.00 feet, the chord azimuth and distance being: 200° 27' 32.5" 107.76 feet to a point;

7.	289°	40'	48"	100.00	feet along Lot P-1 of Kapalua - West Maui Airport Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
8.	21°	33'		50.00	feet along Lot P-22 of Kapalua - West Maui Airport Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
9.	291°	33'		55.00	feet along same to a point;
10.	201°	33'		51.80	feet along same to a point;
11.	289°	40'	48"	151.35	feet along Lot P-1 of Kapalua - West Maui Airport Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;

12. Thence along same on a curve to the right, with the point of curvature azimuth from the radial point being:
201° 33', and the point of tangency azimuth from the radial point being:
202° 37', having a radius of 1,970.00 feet, the chord azimuth and distance being:
292° 05' 36.67 feet to a point;

13.	292°	37'	1,052.33	feet along same to a point;
14.	308°	00'	241.47	feet along Lot P-24 of Kapalua - West Maui Airport Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
15.	298°	00'	205.00	feet along same to a point;
16.	208°	00'	15.00	feet along same to a point;
17.	298°	00'	380.00	feet along Lot 1 of Kapalua West - Maui Airstrip, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
18.	28°	00'	470.00	feet along same to a point;

19.	32°	10'	300.00	feet along Lot P-4 of Kapalua - West Maui Airport Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
20.	19°	40'	150.40	feet along same to a point;
21.	28°	00'	251.98	feet along Lot 1 of Kapalua - West Maui Airstrip, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
22.	298°	00'	400.00	feet along same to a point;
23.	25°	08'	500.00	feet along Lot 3 of Mahinahina Mauka Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
24.	268°	40'	180.00	feet along same to a point;
25.	329°	52'	430.00	feet along same to a point;
26.	340°	14'	620.00	feet along Lot 3 of Mahinahina Mauka Subdivision, being also along the remainders of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop and Royal Patent 415, Land Commission Award 75 to Charles Cockett to a point;
27.	15°	13'	237.41	feet along Lot 3 of Mahinahina Mauka Subdivision, being also along the remainder of Royal Patent 415, Land Commission Award 75 to Charles Cockett to a point;
28.	105°	13'	2,369.72	feet along the Mahinahina 4 and Honokowai boundary to a point;
29.	101°	42'	638.81	feet along same to the point of beginning and containing a Gross Area of 159.388 Acres and excluding therefrom Exclusion No. 1 (6.181 Acres) as described below, for a Net Area of 153.207 Acres.

Exclusion No. 1:

Being Lot 2-B-2 of M.L.& P. - N.H.L.C. Subdivision, being also a portion of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop at Mahinahina 1, 2 & 3, Lahaina, Maui, Hawaii as described by Newcomer - Lee Land Surveyors, Inc., a Hawaii Corporation as described in Document No. 2001-200459, dated November 12, 2001 and recorded in the State of Hawaii, Bureau of Conveyances as follows:

Beginning at a 3/4-inch pipe at the northeast corner of this parcel of land, the record coordinates (Honoapiilani Highway) of said point of beginning referred to Government Survey Triangulation Station "MANINI" being 10,800.03 feet north and 10,293.01 feet west and running by azimuths measured clockwise from true South:

1.	0°	00'	00"	180.00	feet along Lot 2-B-1 of said M.L.& P. - N.H.L.C. Subdivision and along the remainder of said Grant 1166 to D. Baldwin, J. F. Pogue and E. Bishop to a 3/4-inch pipe;
2.	68°	35'	54"	417.50	feet along said same to a 3/4-inch pipe;
3.	104°	13'	16"	418.65	feet along same to a steel rebar with plastic cap;
4.	113°	30'	00"	94.16	feet along same to a 3/4-inch pipe;

Thence along same on the arc of a curve to the right, concave northeasterly with a radius of 50.00 feet, the chord azimuth and distance being:

5.	152°	10'	00"	62.48	feet to a 3/4-inch pipe;
6.	190°	50'	00"	62.06	feet along said Lot 2-B-1 of the M.L.& P. - N.H.L.C. Subdivision and along the remainder of said Grant 1166 D. Baldwin, J.F. Pogue and E. Bishop to a 3/4-inch pipe;
7.	271°	14'	20"	69.10	feet along same to a steel rebar with plastic cap;
8.	193°	20'	00"	76.70	feet along same to a steel rebar with plastic cap;
9.	91°	14'	20"	72.49	feet along same to a 3/4-inch pipe;
10.	190°	50'	00"	41.94	feet along same to a 3/4-inch pipe;

Thence along same on the arc of a curve to the right, concave southeasterly with a radius of 125.00 feet, the chord azimuth and distance being:

11.	243°	14'	30"	198.09	feet along said Lot 2-B-1 of the M.L.& P. - N.H.L.C. Subdivision and along the remainder of said Grant 1166 to D. Baldwin, J.F. Pogue and E. Bishop to a steel rebar with plastic cap;
12.	295°	39'	00"	298.78	feet along same to a 3/4-inch pipe;
13.	270°	00'	00"	430.00	feet along same to the point of beginning and containing an area of 6.181 acres, more or less.

Said above described parcel of land having been acquired by Grantor herein, as follows:

1. By Deed of Honolua Plantation Land Company, Inc., a Hawaii corporation, dated June 21, 1978, recorded in said Bureau in Liber 13012 at Page 652;

2. By Judgment and Decree dated January 29, 1985, filed in the Circuit Court of the Second Circuit, Case No. 4782 (1) on January 29, 1985, recorded in said Bureau in Liber 18434 at Page 1 on February 5, 1985;

3. By Judgment and Decree dated January 31, 1985, filed in the Circuit Court of the Second Circuit, Case No. 3673(1) on January 31, 1985, recorded in said Bureau in Liber 18447 at Page 6, as amended by instruments dated October 21, 1986, recorded in said Bureau in Liber 19979 at Page 731 (re-recorded in said Bureau in Liber 20204 at Page 551), and recorded in said Bureau in Liber 20993 at Page 48; and

4. By Judgment and Decree dated April 24, 1991, filed in the Circuit Court of the Second Circuit, Case No. 87-0499(3) on April 24, 1991, recorded in said Bureau as Document No. 91-055417 on May 1, 1991.

\B

EXHIBIT "B"

PERMITTED EXCEPTIONS

1. Mineral and water rights of any nature.

2. Lease dated October 9, 1961, recorded in said Bureau in Liber 4162 at Page 301, by and between Maui Pineapple Company, Limited, a Hawaii corporation, as Lessor and Maui Electric Company, Limited, a Hawaii corporation and Hawaiian Telephone Company, now known as Hawaiian Telcom, Inc., a Hawaii corporation, as Lessee, for a term of 35 years from October 9, 1961 and thereafter from year to year until terminated, regarding rights-of-way, each twenty-five feet in width, over, across and under all lands owned and held, by the Lessor situate in the Island and County of Maui, State of Hawaii.

Said Lease was amended by instrument dated August 30, 1985, recorded in said Bureau in Liber 19063 at Page 490, regarding removing the "Haliimaile Subdivision".

3. Notice of Airport and Aircraft Operations dated November 26, 1984, recorded in said Bureau in Liber 18291 at Page 140, made by Maui Land & Pineapple Company, Inc., a Hawaii corporation; regarding development of an airstrip, including but not limited to flight paths used by aircrafts approaching and leaving therefrom.

4. Rights in favor of the State of Hawaii, as set forth by Judgment and Decree dated January 31, 1985, recorded in said Bureau in Liber 18447 at Page 6, as amended by instruments recorded in said Bureau in Liber 19979 at Page 731, in Liber 20204 at Page 551, and in Liber 20993 at Page 48; the foregoing includes, but is not limited to, matters relating to the following:

> "15. Title to said property being quieted is subject to reservation of all mineral and metallic mines of every description whatsoever in favor of the State of Hawaii.
>
> 16. Title to said property being quieted is subject to rights of native tenants as reserved by the sovereigns and subsequently by Section 7 of the Act of August 6, 1950.
>
> 17. No right, title and interest or claims to water having its source upon or flowing over or under the lands involved in this action, or to easements to a continuous or uninterrupted flow of water through streams, ditches and auwais on the lands which are the subject of this action are to be

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adjudicated here, but are specifically excepted from this proceeding.

18. The State reserves its right to protect historic, religious or archaeological sites, or prehistoric or historic remains found upon or under this property.

19. The State reserves the right to contest any survey establishing any common boundaries between State land and the lands claimed by Defendant."

5. Terms, provisions, covenants, conditions and reservations contained in Private Water System and Elevation Agreement dated December 23, 1986, recorded in said Bureau in Liber 20250 at Page 172, by and between Maui Land & Pineapple Company, Inc., Hawaiian Airlines, Inc. and County of Maui, and its Department of Water Supply.

6. Terms, provisions, covenants, conditions and reservations contained in Deferral and Subdivision Requirements dated October 17, 1989, recorded in said Bureau in Liber 23924 at Page 329, by and between Maui Land & Pineapple Company, Inc., George Nuinui Kaae, Trustee representing the heirs of Kaae, et al, and the County of Maui and its Department of Water Supply.

7. Terms, provisions, covenants, conditions and reservations contained in Subdivision Agreement (Large Lots) dated August 24, 1990, recorded in said Bureau as Document No. 90-133064, by and between Maui Land & Pineapple Company, Inc., a Hawaii corporation, and Trustees of the Kahana Hui Land Trust, and the County of Maui.

8. Terms, provisions, covenants, conditions and reservations contained in Agreement to Defer Sewage Improvements dated August 30, 1990, recorded in said Bureau as Document No. 90-144662, by and between Maui Land & Pineapple Company, Inc. and the County of Maui, Department of Public Works.

9. Terms, provisions, covenants, conditions and reservations contained in Judgment and Decree dated February 24, 1991, recorded in said Bureau as Document No. 91-055417.

The foregoing includes, but is not limited to, matters relating to reservations of mineral, rights of native tenants, prehistoric and historic remains, water sources, free flowage of waters, water pipeline and electrical transmission lines, etc., in favor of the State of Hawaii.

10. Terms, provisions, covenants, conditions and reservations contained in Declaration of Conditions dated July 10, 2006, recorded in said Bureau as Document No. 2006-129980.

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Said Declaration amended and restated by instrument dated September 19, 2006, recorded in said Bureau as Document No. 2006-178683.

11. The following unrecorded Easements shown on subdivision map prepared by Reed M. Ariyoshi, Land Surveyor, with Warren S. Unemori - Engineering, Inc., dated September 15, 2009, last revised April 23, 2010, and approved by the Department of Public Works, County of Maui on May 12, 2010 (Subdivision File No. 4.955):

(1) Easement A (2.062 acres, more or less, affecting Lot 1 besides other Lands) for access purposes; and

(2) Easement B, (6.479 acres, more or less, affecting Lot 1 besides other lands) for access purposes.

12. Grant dated November 12, 2001, recorded in said Bureau as Document No. 2001-207054, in favor of County of Maui, a political subdivision of the State of Hawaii; granting a non-exclusive easement for pedestrian and vehicular access (but not for the purposes of providing utility services) over and across Easement "D" and Easement "A-1" more particularly described therein.

13. Designation of Easement "2" for aviation purposes, as shown on subdivision map, prepared by Kazutaka Saiki, Land Surveyor with Sam O. Hirota, Inc., dated March 2003, last revised November 24, 2004, approved by the County of Maui Department of Public Works and Waste Management on December 7, 2004 (L.U.C.A. File No. 4.859).

Above Easement in favor of the State of Hawaii, Final Order of Condemnation, Civil No. 92-0701(2), filed July 7, 1999 in the Circuit Court of the Second Circuit, recorded in said Bureau as Document No. 2000-051518.

14. Restriction of abutters rights of vehicle access into and from Honoapiilani Highway FAP No. RF-030-1(5), except where access is permitted for agricultural crossing only, which rights were acquired by the State of Hawaii by Final Order of Condemnation for Civil No. 3120 dated October 3, 1986, filed in the Circuit Court of the Second Circuit, State of Hawaii, Civil Nos. 3120, 3156 and 3419 (Consolidated) on October 7, 1986, recorded in said Bureau in Liber 20295 at Page 285 on January 21, 1987.

15. By Final Order of Condemnation for Civil No. 3120 dated October 3, 1986, filed in the Circuit Court of the Second Circuit, State of Hawaii, Civil Nos. 3120, 3156 and 3419 (Consolidated) on October 7, 1986, recorded in said Bureau in Liber 20295 at Page 285 on January 21, 1987; Easement "A", containing an area of 9,978 square feet, Easement "B", containing an area of 3,421 square feet, and Easement "C", containing an area of 6,526 square feet, each for drainage purposes, and each being more

particularly described therein, in favor of the State of Hawaii, for the construction, preservation and protection of Honoapiilani Highway FAP No. RF-030-1(5).

16. Restriction of Vehicular Access Rights along Honoapiilani Highway, as shown on subdivision map, prepared by Reed M. Ariyoshi, Land Surveyor with Warren S. Unemori - Engineering, Inc., dated September 15, 2009, last revised April 23, 2010 (L.U.C.A. File No. 4.955).

17. Terms, provisions, covenants, conditions and reservations contained in Hold-Harmless Agreement dated August 14, 2008, recorded in said Bureau as Document No. 2008-150715, by and between County of Maui, "County" and Maui Land & Pineapple Company, Inc., a Hawaii corporation, "Developer" and "Owner".

18. Terms, provisions, covenants, conditions and reservations contained in Subdivision Agreement (Large Lots) dated October 22, 2008, recorded in said Bureau as Document No. 2008-180982.

19. Terms, provisions, covenants, conditions and reservations contained in Subdivision Agreement dated March 8, 2010, recorded in said Bureau as Document No. 2010-035140, by and between Maui Land & Pineapple Company, Inc., a Hawaii corporation, "Owner" and the County of Maui, "County".

20. Terms, provisions, covenants, conditions and reservations contained in Unilateral Agreement and Declaration for Conditional Zoning dated October 12, 2011, recorded in said Bureau as Document No. 2011-176094, by Maui Land & Pineapple Company, Inc., a Hawaii corporation, (Declarant).

21. Utility Easement dated November 7, 2011, recorded in said Bureau as Document No. A-44900872, in favor of Maui Electric Company, Limited, a Hawaii corporation, for electrical utility purposes, Easement M11-48 more particularly described therein.

22. Grant of Access and Utility Easement dated June 3rd, 2016, recorded in said Bureau as Document No. Doc A-59980842, in favor of Maui Land & Pineapple Company, Inc, for access and utility purposes as more particularly described therein.

23. Claims arising out of customary and traditional rights and practices, including without limitation those exercised for subsistence, cultural, religious, access or gathering purposes, as provided for in the Hawaii Constitution or the Hawaii Revised Statutes.

EXHIBIT J

Limited Warranty Deed with Reservations and Covenants from Maui Land and Pineapple Company, Inc., recorded in the Bureau of Conveyances of the Sate of Hawai'i on June 2, 2016 as Document No. A-59980844 (for TMK 4-3-01-083)

31D

STATE OF HAWAII
BUREAU OF CONVEYANCES
RECORDED

June 03, 2016 8:01 AM

Doc No(s) A-59980844

/s/ NICKI ANN THOMPSON
REGISTRAR

1 4/9 OFC
B-32817042

Conveyance Tax: $67,500.00

LAND COURT SYSTEM	REGULAR SYSTEM

Return by Mail [✓] Pickup [ ] To:

Mr. Anthony J. Barbieri
Kessler Collins, P.C.
2100 Ross Ave., Ste. 750
Dallas, TX 75201

TG: 201611721-S RS
TGE: 16073344
Robyn M. Delapinia (4)

TITLE OF DOCUMENT:

LIMITED WARRANTY DEED WITH RESERVATIONS & COVENANTS

PARTIES TO DOCUMENT:

GRANTOR: **MAUI LAND & PINEAPPLE COMPANY, INC.**, a Hawaii corporation

GRANTEE: **MAUI OCEANVIEW LP**, a Delaware limited partnership
2525 McKinney Avenue, Suite B
Dallas, Texas 75201

TAX MAP KEY(S): Maui 4-3-001-083

(This document consists of 10 pages.)

LIMITED WARRANTY DEED WITH RESERVATIONS & COVENANTS

THIS LIMTED WARRANTY DEED WITH RESERVATIONS & COVENANTS is made this 3rd day of June, 2016, by and between MAUI LAND & PINEAPPLE COMPANY, INC., a Hawaii corporation, hereinafter referred to as the "GRANTOR", and MAUI OCEANVIEW LP, a Delaware limited partnership, whose address is 2525 McKinney Avenue, Suite B, Dallas, Texas 75201, hereinafter referred to as the "GRANTEE".

W I T N E S S E T H:

That Grantor, for and in consideration of the sum of TEN AND NO/100 DOLLARS ($10.00), in lawful money of the United States of America, and for other good and valuable consideration to Grantor paid by Grantee, the receipt whereof is hereby acknowledged, does hereby grant, bargain, sell and convey unto Grantee, the property described in Exhibit "A" attached hereto and by reference made a part hereof, together with all other rights and interests described in said Exhibit "A", and the reversions, remainders, rents, issues and profits thereof, and all of the estate, right, title and interest of the Grantor, both at law and in equity, therein and thereto (the "Property").

TO HAVE AND TO HOLD the same unto Grantee, as tenant in severalty, in fee simple, forever.

AND Grantor hereby covenants and agrees with Grantee, as aforesaid, that Grantor is lawfully seised in fee simple of the Property described in said Exhibit "A", and has good right and lawful authority to sell and convey the same as aforesaid; that the Property is free and clear of all encumbrances made or suffered by Grantor, subject, however, to the reservations, restrictions, and encumbrances contained herein and shown on said Exhibit "B" (the "Permitted Exceptions"), and that Grantor will WARRANT AND DEFEND the same unto Grantee as aforesaid, against the lawful claims and demands of all persons whomsoever, except as herein set forth.

AND, in consideration of the premises, Grantee does hereby accept the Property conveyed hereby on the terms, conditions, covenants and restrictions contained herein, and Grantee does further acknowledge, covenant and agree that:

1. Property Conveyed "AS IS". Grantee acknowledges and agrees that the Property is conveyed to Grantee in its "as is" condition and, except as specifically set forth in this instrument, and as specifically set forth in the Purchase and Sale Agreement dated March 2, 2016, by and between Grantor and Grantee, as assignee of USA Land Investments, LLC, as Texas limited liability company.

2. Soil and Water Resource Covenants & Waiver. Grantee acknowledges and agrees that, due to historical use of the Property and other properties surrounding the Property, the soil and groundwater beneath the Property may contain pesticides, fertilizers, nematicides, petrochemicals, and other chemicals

and/or components, residues or byproducts thereof ("Residues"). The Grantee hereby assumes complete risk of and forever releases the Grantor, its successors and assigns from all claims for injury or damages (including, but not limited to, consequential damages, general damages, damages for emotional distress or mental anguish, statutory damages, special damages, exemplary and punitive damages) arising from Residues that currently or in the future affect the soil, groundwater or aquifer underlying or surrounding the Property, or any wells existing or developed in the future at the Property. Without limiting the generality of the foregoing, the Grantee hereby, with full knowledge of its rights, forever waives any right to require the Grantor, its successors or assigns, and releases the Grantor, its successors and assigns, from any obligation to take any action to correct, remediate, modify, alter, eliminate, abate or clean-up any Residues, whether in the soil, groundwater or in water pumped from wells developed at the Property. As used in this section, all references to the "Grantor" shall mean and include Maui Land & Pineapple Company, Inc., Maui Pineapple Company, Ltd., and all subsidiary, sister and other affiliated companies of the Grantor, and all successors and assigns of the Grantor and its parent, subsidiary, sister and affiliated companies.

3. Compliance with Land Use Conditions. The Property is subject to (a) that certain Amended & Restated Declaration of Conditions dated September 19, 2006, and recorded in the Bureau of Conveyances of the State of Hawaii as Document No. 2006-178683, and (b) that certain Unilateral Agreement and Declaration for Conditional Zoning dated October 12, 2011, and recorded in said Bureau as Document No. 2011-176094. Grantee acknowledges and agrees, for itself and for its successors and assigns, that ownership, development, use and occupancy of the Property must at all times comply with the conditions and requirements set forth in those documents, as they may be amended from time to time with the approval of the applicable governmental authorities.

4. Flowage. Grantor reserves to itself and its successors and assigns an easement for the free flow and discharge over and onto the Property of surface water and run-off from any adjacent or nearby lands owned by Grantor, but only as such flow and discharge exists as of the date hereof.

5. Hawaii Right to Farm Act. Grantee acknowledges that the Property is located in the vicinity of lands designated and zoned agricultural and that the Hawaii Right to Farm Act protects farming, ranching and other agricultural activities on such land by, among other things, limiting claims by owners and occupants of the Property arising from the impacts of such activities.

Each of the foregoing reservations, covenants, agreements, acknowledgments, waivers and releases shall constitute covenants running with the land. Each such reservation, covenant, agreement, acknowledgment, waiver and release shall be binding upon, and all references to "Grantee" shall mean and include, the Grantee and it successors and assigns, and all persons now or hereafter acquiring any right, title or interest in or to the Property (or any portion thereof) or occupying all or any portion of the Property. By accepting any right, title or interest in the Property (or any portion thereof) or by occupying all or any portion of the Property, each such person automatically shall be deemed to have made and agreed to, and shall be bound by, observe and be subject to, each of the foregoing covenants, agreements, acknowledgments, waivers and releases. The terms "Grantor" and "Grantee," wherever used herein, and any pronouns used in place thereof, shall mean and include the singular and the plural, and the use of any gender shall mean and include all genders.

The parties hereto agree that this instrument may be executed in counterparts, each of which shall be deemed an original, and said counterparts shall together constitute one and the same agreement, binding all of the parties hereto, notwithstanding all of the parties are not signatory to the original or the same counterparts. For all purposes, including, without limitation, recordation, filing and delivery of this instrument, duplicate unexecuted and unacknowledged pages of the counterparts may be discarded and the remaining pages assembled as one document.

[Remainder of page left intentionally blank; signature page follows]

IN WITNESS WHEREOF, the parties hereto have caused these presents to be duly executed on the day and year first above written.

GRANTOR:

MAUI LAND & PINEAPPLE COMPANY, INC., a Hawaii corporation

By______________________________
Tim T. Esaki
Its Chief Financial Officer

GRANTEE:

MAUI OCEANVIEW LP,
a Delaware limited partnership

By: Maui Oceanview GP Inc., a Texas corporation, its sole general partner

By______________________________
Name:
Its

ImanageDB:3467366.1

IN WITNESS WHEREOF, the parties hereto have caused these presents to be duly executed on the day and year first above written.

GRANTOR:

MAUI LAND & PINEAPPLE COMPANY, INC., a Hawaii corporation

By________________________________
Tim T. Esaki
Its Chief Financial Officer

GRANTEE:

MAUI OCEANVIEW LP,
a Delaware limited partnership

By: Maui Oceanview GP Inc., a Texas corporation, its sole general partner

By________________________________
Name: PAUL CHENG
Its PRESIDENT

ImanageDB:3467366.1

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STATE OF HAWAII)
) SS.
COUNTY OF MAUI)

On this 24th day of May, 2016, before me personally appeared Tim T. Esaki, to me personally known, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable in the capacity shown, having been duly authorized to execute such instrument in such capacity.

JODIE E. YASUDA NOTARY No. 91-62 PUBLIC STATE OF HAWAII

(Official Stamp or Seal)

Jodie E. Yasuda
Notary Public, State of Hawaii
Printed Name: Jodie E. Yasuda
My commission expires: July 8, 2017

NOTARY CERTIFICATION STATEMENT	
Document Identification or Description: Limited Warranty Deed with Reservations and Covenants	
☐ Doc. Date: ______ or ☒ Undated at time of notarization.	
No. of Pages: ____________ Jurisdiction: Second Circuit (in which notarial act is performed)	JODIE E. YASUDA NOTARY No. 91-62 PUBLIC STATE OF HAWAII
Jodie E Yasuda Signature of Notary	May 24, 2016 Date of Notarization and Certification Statement
Jodie E. Yasuda Printed Name of Notary	(Official Stamp or Seal)

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STATE OF TEXAS)
) SS.
COUNTY OF DALLAS)

On this 27th day of MAY, 2016, before me personally appeared PAUL CHENG, to me personally known, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable in the capacity shown, having been duly authorized to execute such instrument in such capacity.

ALIS BONDA
Notary Public, State of Texas
My Commission Expires
October 10, 2019

(Official Stamp or Seal)

Alis Bonda
Notary Public, State of TEXAS
Printed Name: ALIS BONDA
My commission expires: 10/10/19

ImanageDB:3467366.1

EXHIBIT "A"

PROPERTY DESCRIPTION

All of that certain parcel of land (being portion of the land(s) described in and covered by Royal Patent Grant Number 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop) situate, lying and being on the easterly side of Honoapiilani Highway, Federal Aid Project Number RF-030-1(5), at Mahinahina 1, 2 & 3, Kahana, District of Lahaina, Island and County of Maui, State of Hawaii, being LOT 2 of "MAHINAHINA MAUKA SUBDIVISION", as shown on subdivision map prepared by Reed M. Ariyoshi, Land Surveyor, with Warren S. Unemori-Engineering, Inc., dated September 15, 2009, last revised April 23, 2010, and approved by the Department of Public Works, County of Maui on May 12, 2010 (Subdivision File Number 4.955) and thus bounded and described as per survey dated September 19, 2011, to-wit:

Beginning at a point at the southwesterly corner of this lot, the coordinates of said point of beginning referred to Government Survey Triangulation Station "MANINI" being 12,692.88 feet north and 10,722.23 feet west and running by azimuth measured clockwise from true South:

1. Thence along the easterly side of Honoapiilani Highway, F.A.P. No. RF-030-1(5) on a curve to the right, with the point of curvature azimuth from the radial point being: 112° 07' 58", and the point of tangency azimuth from the radial point being: 121° 09', having a radius of 4,925.00 feet, the chord azimuth and distance being: 206° 38' 29" 774.30 feet to a point;

2. 208° 36' 112.43 feet along same to a point;

3. 211° 09' 300.00 feet along same to a point;

4. 208° 53' 126.46 feet along same to a point;

5. Thence along same on a curve to the left, with the point of curvature azimuth from the radial point being: 301° 09', and the point of tangency azimuth from the radial point being: 297° 52' 31", having a radius of 5,065.00 feet, the chord azimuth and distance being: 209° 30' 45.5" 289.45 feet to a point;

6. Thence along same on a curve to the left, with the point of curvature azimuth from the radial point being:

297° 52' 31", and the point of tangency azimuth from the radial point being: 297° 25' 22", having a radius of 5,065.00 feet, the chord azimuth and distance being: 207° 38' 56.6" 40.00 feet to a point;

7.	293°	16'		1,464.20	feet along Lots 15, 14, 13, 10 and 9 of Kahana Hui Subdivision (File Plan 1708) to a point;
8.	208°	13'	40"	904.79	feet along Lots 9, 8, and 7 of Kahana Hui Subdivision (File Plan 1708) to a point;
9.	122°	44'	30"	484.71	feet along Lots 7 and 6 of Kahana Hui Subdivision (File Plan 1708) to a point;
10.	200°	00'	20"	2,077.79	feet along Lots 42 to 36, inclusive, 200 and 35 to 12, inclusive, of Kahana Ridge Subdivision (File Plan 2209) to a point;
11.	294°	36'		420.00	feet along Lot 3 of Mahinahina Mauka Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;

Thence along Lot 3 of Mahinahina Mauka Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop, and along the centerline of gulch for the next four (4) courses, the direct azimuth and distance between points along said centerline being:

12.	331°	22'		545.00	feet;
13.	341°	56'		810.00	feet;
14.	318°	50'		330.00	feet;
15.	296°	04'		198.00	feet;
16.	31°	20'		758.43	feet along Lot 3 of Mahinahina Mauka Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
17.	118°	00'		400.00	feet along Lot 1 of Kapalua - West Maui Airstrip, being also along the remainder of

				Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
18.	28°	00'	300.00	feet along same to a point;
19.	47°	20'	105.72	feet along Lot P-7 of Kapalua - West Maui Airport Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
20.	28°	00'	1,700.06	feet along Lots P-7, P-13 and P-6 of Kapalua - West Maui Airport Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
21.	86°	20'	152.74	feet along Lot P-6 of Kapalua - West Maui Airport Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
22.	118°	00'	420.00	feet along Lot 1 of Kapalua - West Maui Airport Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
23.	28°	00'	112.44	feet along Lot 1 of Kapalua - West Maui Airstrip, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
24.	52°	50'	71.43	feet along Lot P-23 of Kapalua - West Maui Airport Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;
25.	28°	00'	515.00	feet along same to a point;
26.	96°	30'	182.73	feet along same to a point;
27.	112°	37'	1,095.94	feet along Lot P-1 of Kapalua - West Maui Airport Subdivision, being also along the remainder of Grant 1166 to D. Baldwin, J.F. Pogue and S.E. Bishop to a point;

28. Thence along same on a curve to the left, with the point of curvature azimuth from the radial point being: 202° 37', and the point of tangency azimuth from the radial point being: 201° 33', having a radius of 2,030.00 feet, the chord azimuth and distance being: 112° 05' 37.79 feet to a point;

29. 115° 17' 12" 306.78 feet along same to the point of beginning and containing an area of 151.048 acres, more or less.

Said above described parcel of land having been acquired by Grantor herein, as follows:

1. By Deed of Honolua Plantation Land Company, Inc., a Hawaii corporation, dated June 21, 1978, recorded in said Bureau in Liber 13012 at Page 652;

2. By Judgment and Decree dated January 29, 1985, filed in the Circuit Court of the Second Circuit, Case No. 4782 (1) on January 29, 1985, recorded in said Bureau in Liber 18434 at Page 1 on February 5, 1985;

3. By Judgment and Decree dated January 31, 1985, filed in the Circuit Court of the Second Circuit, Case No. 3673(1) on January 31, 1985, recorded in said Bureau in Liber 18447 at Page 6, as amended by instruments dated October 21, 1986, recorded in said Bureau in Liber 19979 at Page 731 (re-recorded in said Bureau in Liber 20204 at Page 551), and recorded in said Bureau in Liber 20993 at Page 48; and

4. By Judgment and Decree dated April 24, 1991, filed in the Circuit Court of the Second Circuit, Case No. 87-0499(3) on April 24, 1991, recorded in said Bureau as Document No. 91-055417 on May 1, 1991.

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EXHIBIT "B"

PERMITTED EXCEPTIONS

1. Mineral and water rights of any nature.

2. Lease dated October 9, 1961, recorded in said Bureau in Liber 4162 at Page 301, by and between Maui Pineapple Company, Limited, a Hawaii corporation, as Lessor and Maui Electric Company, Limited, a Hawaii corporation and Hawaiian Telephone Company, now known as Hawaiian Telcom, Inc., a Hawaii corporation, as Lessee, for a term of 35 years from October 9, 1961 and thereafter from year to year until terminated, regarding rights-of-way, each twenty-five feet in width, over, across and under all lands owned and held, by the Lessor situate in the Island and County of Maui, State of Hawaii.

Said Lease was amended by instrument dated August 30, 1985, recorded in said Bureau in Liber 19063 at Page 490, regarding removing the "Haliimaile Subdivision".

3. Notice of Airport and Aircraft Operations dated November 26, 1984, recorded in said Bureau in Liber 18291 at Page 140, made by Maui Land & Pineapple Company, Inc., a Hawaii corporation; regarding development of an airstrip, including but not limited to flight paths used by aircrafts approaching and leaving therefrom.

4. Rights in favor of the State of Hawaii, as set forth by Judgment and Decree dated January 31, 1985, recorded in said Bureau in Liber 18447 at Page 6, as amended by instruments recorded in said Bureau in Liber 19979 at Page 731, in Liber 20204 at Page 551, and in Liber 20993 at Page 48; the foregoing includes, but is not limited to, matters relating to the following:

> "15. Title to said property being quieted is subject to reservation of all mineral and metallic mines of every description whatsoever in favor of the State of Hawaii.
>
> 16. Title to said property being quieted is subject to rights of native tenants as reserved by the sovereigns and subsequently by Section 7 of the Act of August 6, 1950.
>
> 17. No right, title and interest or claims to water having its source upon or flowing over or under the lands involved in this action, or to easements to a continuous or uninterrupted flow of water through streams, ditches and auwais on the lands which are the subject of this action are to be

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> adjudicated here, but are specifically excepted from this proceeding.
>
> 18. The State reserves its right to protect historic, religious or archaeological sites, or prehistoric or historic remains found upon or under this property.
>
> 19. The State reserves the right to contest any survey establishing any common boundaries between State land and the lands claimed by Defendant."

5. Terms, provisions, covenants, conditions and reservations contained in Private Water System and Elevation Agreement dated December 23, 1986, recorded in said Bureau in Liber 20250 at Page 172, by and between Maui Land & Pineapple Company, Inc., Hawaiian Airlines, Inc. and County of Maui, and its Department of Water Supply.

6. Terms, provisions, covenants, conditions and reservations contained in Deferral and Subdivision Requirements dated October 17, 1989, recorded in said Bureau in Liber 23924 at Page 329, by and between Maui Land & Pineapple Company, Inc., George Nuinui Kaae, Trustee representing the heirs of Kaae, et al, and the County of Maui and its Department of Water Supply.

7. Terms, provisions, covenants, conditions and reservations contained in Subdivision Agreement (Large Lots) dated August 24, 1990, recorded in said Bureau as Document No. 90-133064, by and between Maui Land & Pineapple Company, Inc., a Hawaii corporation, and Trustees of the Kahana Hui Land Trust, and the County of Maui.

8. Terms, provisions, covenants, conditions and reservations contained in Agreement to Defer Sewage Improvements dated August 30, 1990, recorded in said Bureau as Document No. 90-144662, by and between Maui Land & Pineapple Company, Inc. and the County of Maui, Department of Public Works.

9. Terms, provisions, covenants, conditions and reservations contained in Judgment and Decree dated February 24, 1991, recorded in said Bureau as Document No. 91-055417.

The foregoing includes, but is not limited to , matters relating to reservations of mineral, rights of native tenants, prehistoric and historic remains, water sources, free flowage of waters, water pipeline and electrical transmission lines, etc., in favor of the State of Hawaii.

10. Terms, provisions, covenants, conditions and reservations contained in Declaration of Conditions dated July 10, 2006, recorded in said Bureau as Document No. 2006-129980.

Said Declaration amended and restated by instrument dated September 19, 2006, recorded in said Bureau as Document No. 2006-178683.

11. Designation of Easement "3", for aviation purposes, as shown on subdivision map, prepared by Kazutaka Saiki, Land Surveyor, with Sam O. Hirota, Inc., dated March 2003, revised November 24, 2004, approved by the Department of Public Works and Waste Management, County of Maui, on December 7, 2004 (L.U.C.A. File No. 4.859).

Above Easement in favor of the State of Hawaii, Final Order Of Condemnation, Civil No. 92-0701(2), filed July 7, 1999 in the Circuit Court of the Second Circuit, recorded in said Bureau as Document No. 2000-051518.

12. Grant dated June 23, 1980, recorded in said Bureau in Liber 15034 at Page 499, in favor of the County of Maui; granting an easement to accommodate period flooding over Easement "6", being more particularly described therein.

13. Restriction of abutters rights of vehicle access into and from Honoapiilani Highway FAP No. RF-030-1(5), except where access is permitted for agricultural crossing only, which rights were acquired by the State of Hawaii by Final Order of Condemnation for Civil No. 3120 dated October 3, 1986, filed in the Circuit Court of the Second Circuit, State of Hawaii, Civil Nos. 3120, 3156 and 3419 (Consolidated) on October 7, 1986, recorded in said Bureau in Liber 20295 at Page 285 on January 21, 1987.

14. By Final Order of Condemnation for Civil No. 3120 dated October 3, 1986, filed in the Circuit Court of the Second Circuit, State of Hawaii, Civil Nos. 3120, 3156 and 3419 (Consolidated) on October 7, 1986, recorded in said Bureau in Liber 20295 at Page 285 on January 21, 1987; Easement "A", containing an area of 9,978 square feet, Easement "B", containing an area of 3,421 square feet, and Easement "C", containing an area of 6,526 square feet, each for drainage purposes, and each being more particularly described therein, in favor of the State of Hawaii, for the construction, preservation and protection of Honoapiilani Highway FAP No. RF-030-1(5).

15. Restriction of Vehicular Access Rights along Honoapiilani Highway, as shown on subdivision map, prepared by Reed M. Ariyoshi, Land Surveyor with Warren S. Unemori - Engineering, Inc., dated September 15, 2009, last revised April 23, 2010 (L.U.C.A. File No. 4.955).

16. Terms, provisions, covenants, conditions and reservations contained in Hold-Harmless Agreement dated August 14, 2008, recorded in said Bureau as Document No. 2008-150715, by and between County of Maui, "County" and Maui Land & Pineapple Company, Inc., a Hawaii corporation, "Developer" and "Owner".

15

17. Terms, provisions, covenants, conditions and reservations contained in Subdivision Agreement (Large Lots) dated October 22, 2008, recorded in said Bureau as Document No. 2008-180982.

18. Terms, provisions, covenants, conditions and reservations contained in Subdivision Agreement dated March 8, 2010, recorded in said Bureau as Document No. 2010-035140, by and between Maui Land & Pineapple Company, Inc., a Hawaii corporation, "Owner" and the County of Maui, "County".

19. Terms, provisions, covenants, conditions and reservations contained in Unilateral Agreement and Declaration for Conditional Zoning dated October 12, 2011, recorded in said Bureau as Document No. 2011-176094, by Maui Land & Pineapple Company, Inc., a Hawaii corporation, (Declarant).

20. Grant of Access and Utility Easement dated June 3rd, 2016, recorded in said Bureau as Document No. Doc A-59980842, in favor of Maui Land & Pineapple Company, Inc, for access and utility purposes as more particularly described therein.

21. Claims arising out of customary and traditional rights and practices, including without limitation those exercised for subsistence, cultural, religious, access or gathering purposes, as provided for in the Hawaii Constitution or the Hawaii Revised Statutes.

EXHIBIT K

Letter from Scott F. Brast/Senior Vice President of American National Insurance Company

AMERICAN NATIONAL INSURANCE COMPANY

SCOTT F. BRAST, SENIOR VICE PRESIDENT, MORTGAGE & REAL ESTATE INVESTMENTS
ONE MOODY PLAZA, GALVESTON, TEXAS 77550-7999

Please reply to:
2525 South Shore Boulevard, Suite 207
League City, Texas 77573

Ph: (281) 538-4800 Fax: (281) 334-8106
Email: Scott.Brast@anico.com

January 11, 2018

Dan E. Orodenker
Executive Officer
Land Use Commission
235 South Beretania St., Ste. 406
Honolulu, Hawaii 96813

Re: Pulelehua Project Financing

Gentlemen:

Pulelehua will primarily be an apartment community of 900 to 1,200 units and ultimately between 75,000 to 95,000 SF of neighborhood retail. The traditional method of financing such types of commercial development would be to finance 50% to 70% of the costs of each phase with a construction loan and the balance in a form of equity provided by the ownership. At completion and lease-up, we will replace the construction loan with permanent financing which are readily available from multiple sources including FNMA, HUD, CMBS and insurance companies.

ANICO Eagle is a subsidiary of the American National Insurance Company. We are based in Galveston, Texas and is a publicly held NASDAQ listed insurance company with over $26 Billion in assets. With our ANICO-EAGLE subsidiary, we have been active in real estate development financing and equity financing for projects of our choosing for many decades. Pulelehua is owned by Maui Oceanview LP - a partnership between ANICO-EAGLE and USA Infrastructure Investments, LP of Texas and we intend to finance the project's funding needs from internal or appropriate external resources as it arises. ANICO-EAGLE typically finances such construction needs with either construction financing and or equity financing. A separate audited statement is not prepared for ANICO Eagle.

Sincerely,

Scott F. Brast
Senior Vice President

SFB:crg

EXHIBIT L-3

American Nation Insurance Company Annual Statement

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

☒ **Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934**

For the fiscal year ended December 31, 2018

or

☐ **Transition Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934**

Commission File No. 001- 34280

American National Insurance Company
(Exact name of registrant as specified in its charter)

Texas	74-0484030
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

One Moody Plaza
Galveston, Texas 77550-7999
(Address of principal executive offices) (Zip Code)

(409) 763-4661
(Registrant's telephone number, including area code)

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. ☒ Yes ☐ No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§229.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). ☒ Yes ☐ No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See definitions of "large accelerated filer", "accelerated filer", "smaller reporting company", and "emerging growth company" in Rule 12b-2 of the Exchange Act:

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
Emerging growth company	☐		

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

The aggregate market value on June 30, 2018 (the last business day of the registrant's most recently completed second fiscal quarter) of the voting stock held by non-affiliates of the registrant was approximately $877.1 million. For purposes of the determination of the above-stated amount, only directors, executive officers and 10% shareholders are presumed to be affiliates, but neither the registrant nor any such person concedes that they are affiliates of registrant.

As of February 19, 2019, there were 26,885,449 shares of the registrant's voting common stock, $1.00 par value per share, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Information called for in Part III of this Form 10-K is incorporated by reference to the registrant's Definitive Proxy Statement to be filed within 120 days of the close of the registrant's fiscal year in conjunction with the registrant's annual meeting of shareholders.

AMERICAN NATIONAL INSURANCE COMPANY

PART I

ITEM 1. BUSINESS

Company Overview

American National Insurance Company was founded in 1905 and has always maintained its corporate headquarters in Galveston, Texas. Our core businesses are life insurance, annuities and property and casualty insurance. We also offer limited health insurance. We provide personalized service to approximately six million policyholders throughout the United States, the District of Columbia, and Puerto Rico. In addition, as of December 31, 2018, we have over $110 billion of life insurance in force.

In this document, we refer to American National Insurance Company and its subsidiaries as the “Company,” “we,” “our,” and “us.”

Our vision is to be a leading provider of financial products and services for current and future generations. For more than a century, we have maintained a conservative business approach and corporate culture. We have an unwavering commitment to serve our policyholders, agents, and shareholders by providing excellent service and competitively priced and diversified products. We are committed to profitable growth, which enables us to remain financially strong. Acquisitions that are strategic and offer synergies may be considered, but they are not our primary source of growth. We invest regularly in our distribution channels and markets to fuel our capacity for profitable growth.

We are committed to excellence and maintaining high ethical standards in all our business dealings. Disciplined adherence to our values has allowed us to deliver consistently high levels of service through talented people, who are at the heart of our business. We define our values with the acronym FIRST which stands for Financial strength, Integrity, Respect, Service and Teamwork.

Business Segments

Our family of companies includes five life insurance companies, eight property and casualty insurance companies, and numerous non-insurance subsidiaries. We run and organize our businesses in the following business segments: life segment, annuity segment, health segment, property and casualty segment and our corporate and other segment. The following discussion provides an overview of the products we offer within these segments.

Life Segment

Whole Life. Whole life products provide a guaranteed benefit upon the death of the insured in return for the periodic payment of a fixed premium over a predetermined period. Premium payments may be required for the entire life of the contract, to a specified age or a fixed number of years, and may be level or change in accordance with a predetermined schedule. Whole life insurance includes some policies that provide a participation feature in the form of dividends. Policyholders may receive dividends in cash or apply them to increase death benefits or cash values available upon surrender, or reduce the premiums required to maintain the contract in-force.

Term Life. Term life products provide a guaranteed benefit upon the death of the insured for a specified time period in return for the periodic payment of premiums. Coverage periods typically range from one to thirty years, but in no event longer than the period over which premiums are paid.

Universal Life. Universal life insurance products provide coverage through a contract that gives the policyholder flexibility in premium payments and coverage amounts. Universal life products may allow the policyholder, within certain limits, to increase or decrease the amount of death benefit coverage over the term of the contract and to adjust the frequency and amount of premium payments. Universal life products are interest rate sensitive, and we determine the interest crediting rates during the contract period, subject to policy specific minimums.

An equity-indexed universal life product is credited with interest using a return that is based, in part, on changes in an index, such as the S&P 500 Composite Stock Price Index, subject to a specified minimum.

Variable Universal Life. Variable universal life products provide insurance coverage on a similar basis as universal life, except that the policyholder bears the investment risk because the value of the policyholder's account balance varies with the investment experience of the securities held in the separate account investment options selected by the policyholder.

Credit Life Insurance. Credit life insurance products are sold in connection with a loan or other credit account. Credit life insurance products are designed to pay to the lender the borrower's remaining debt on a loan or credit account if the borrower dies during the coverage period.

Annuity Segment

Deferred Annuity. A deferred annuity is an asset accumulation product. Deposits are received as a single premium deferred annuity or in a series of payments for a flexible premium deferred annuity. Deposits are credited with interest at our determined rates subject to policy minimums. For certain limited periods of time, usually from one to ten years, interest rates are guaranteed not to change. Deferred annuities usually have surrender charges that begin at issue and reduce over time and may have market value adjustments that can increase or decrease any surrender value.

An equity-indexed deferred annuity is credited with interest using a return that is based, in part, on changes in an index, such as the S&P 500 Composite Stock Price Index, subject to a specified minimum.

Single Premium Immediate Annuity ("SPIA"). A SPIA is purchased with one premium payment, providing periodic (usually monthly or annual) payments to the annuitant for a specified period, such as for the remainder of the annuitant's life. Return of the original deposit may or may not be guaranteed, depending on the terms of the annuity contract.

Variable Annuity. With a variable annuity the policyholder bears the investment risk because the value of the policyholder's account balance varies with the investment experience of the separate account investment options selected by the policyholder. Our variable annuity products have no guaranteed minimum withdrawal benefits.

Health Segment

Medicare Supplement. Medicare Supplement insurance is a type of private health insurance designed to supplement or pay the costs of certain medical services not covered by Medicare.

Supplemental Insurance. Supplemental insurance is designed to provide supplemental coverage for specific events or illnesses such as cancer and accidental injury or death, or for short periods of time.

Stop-Loss. Stop-loss coverage is used by employers to limit their exposure under self-insured medical plans. Two coverages, which are usually offered concurrently, are available. Specific Stop-Loss provides coverage when claims for an individual reach a threshold; after the threshold is reached, the policy reimburses claims paid by the employer up to a coverage limit for each individual. Aggregate Stop-Loss reimburses the employer once the group's total paid claims reach a threshold.

Credit Disability. Credit disability (also called credit accident and health) insurance pays a limited number of monthly payments on a loan or credit account if the borrower becomes disabled during the coverage period.

Medical Expense. Medical expense insurance covers most health expenses including hospitalization, surgery and outpatient services (excluding dental and vision costs). We no longer market these products and existing contracts are in run-off.

Property and Casualty Segment

Personal Lines. Personal lines include insurance policies sold to individuals for auto, homeowners and other exposures. Auto insurance covers specific risks involved in owning and operating an automobile. Homeowner insurance provides coverage that protects the insured owner's or renter's property against loss from perils. Other personal insurance provides coverage for property such as boats, motorcycles and recreational vehicles.

Commercial Lines. The majority of our commercial lines is Agricultural business insurance. This includes property and casualty coverage tailored for a farm, ranch or other agricultural or agricultural-related business within rural and suburban markets. Commercial auto insurance is typically issued in conjunction with the sale of our Agricultural business insurance and covers specific risks involved in owning and operating vehicles. Other commercial insurance is also offered and encompasses businessowners, property, liability, mortgage security insurance, and workers' compensation coverages.

Credit-Related Property Insurance Products. We primarily offer the following credit insurance products:

> *Collateral* or *Creditor Protection Insurance* ("CPI"). CPI provides insurance against loss, expense to recover, or damage to personal property pledged as collateral (typically automobiles and homes) resulting from fire, burglary, collision, or other loss occurrence that would either impair a creditor's interest or adversely affect the value of the collateral. The coverage is purchased from us by the lender according to the terms of the credit obligation and charged to the borrower by the lender when the borrower fails to provide the required insurance.
>
> *Guaranteed Auto Protection* or *Guaranteed Asset Protection* ("GAP"). GAP insures the excess outstanding indebtedness over the primary property insurance benefits that may occur when there is a total loss to or an unrecovered theft of the collateral. GAP can be written on a variety of assets that are used as collateral to secure credit; however, it is most commonly written on automobiles.

Corporate and Other Segment—Our Corporate and Other segment is primarily our invested assets not matched with our insurance activities. It also includes our non-insurance subsidiaries.

Marketing Channels

Product distribution is managed to satisfy the needs of the markets we serve and compete in and to minimize channel conflict across our marketing channels described below. When possible, products are cross-sold to maximize product offerings and return on investment in products and distribution.

Career Sales and Service Division's ("CSSD")—can be traced to the Company's founding in 1905, and offers life insurance, annuities, and limited benefit health insurance products through exclusive employee agents primarily to the lower and middle-income market. CSSD's business model is structured to enable agents located throughout the United States to efficiently distribute new products as well as provide personalized service to the customer. CSSD has evolved its operations to offer a wider variety of products and electronic processing to meet the ever changing needs of the customer and the agents that serve them.

Independent Marketing Group ("IMG")—distributes life insurance and annuities through independent agents serving middle and affluent markets, as well as niche markets such as the small pension plan sponsor. IMG provides products and services to clients in need of wealth protection, accumulation, distribution, and transfer. Products are marketed through financial institutions, large marketing organizations, employee benefit firms, broker-dealers, and independent insurance agents and brokers.

IMG also markets to individuals who favor purchasing insurance directly from an insurance company. It offers life insurance to middle-income customers through channels including internet and call centers.

Multiple Line Agencies—offers life insurance, annuities, and property and casualty insurance and a limited amount of health insurance primarily through dedicated agents. This distribution channel serves individuals, families, agricultural clients, and small business owners across the country. Policyholders can generally do all their insurance business with a single agent, which has been identified as an important driver to client satisfaction.

Health Insurance Division—through independent agents and managing general underwriters ("MGU"), serves the needs of a variety of markets including middle-income seniors, self-insured employers, and the special needs of individuals through supplemental products. The Health Division offers an array of life and health insurance products for these growing segments of the population, including group life products, Supplemental health insurance products, and health reinsurance. It remains committed to traditional Medicare Supplement products. The Health Division also administers the health insurance products sold by other marketing channels.

Specialty Markets Group—which was previously referred to as the Credit Insurance Division, offers credit related products that provide protection to borrowers and the creditors that extend credit to them. Products offer coverage against unpaid indebtedness as a result of death, disability, involuntary unemployment or untimely loss to the collateral securing a personal or mortgage loan. Credit product distribution includes general agents who market to financial institutions, automobile dealers, and furniture dealers. The Group also writes renters, aviation, and private flood insurance through managing general agents.

Policyholder Liabilities

We record the amounts for policyholder liabilities in accordance with U.S. generally accepted accounting principles ("GAAP") and the standards of practice of the American Academy of Actuaries. We carry liabilities for future policy benefits associated with base policies and riders, unearned mortality charges and future disability benefits, for other policyholder liabilities associated with unearned premiums and claims payable, and for unearned revenue and the unamortized portion of front-end fees. We also establish liabilities for unpaid claims and claim adjustment expenses, including those that have been incurred but not yet reported. In addition, we carry liabilities for secondary guarantees relating to certain life policies, and fair value reserves associated with embedded derivatives on equity indexed products.

Pursuant to state insurance laws, we establish statutory reserves, which are reported as liabilities, and which generally differ from future policy benefits determined using GAAP on our respective policies. These statutory reserves are established in amounts sufficient to meet policy and contract obligations, when taken together with expected future premiums and interest at assumed rates.

Additional information regarding our policyholder liabilities may be found in Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations- Critical Accounting Estimates - *Reserves* section.

Risk Management

A conservative operating philosophy was a founding principle for our Company and continues to be a guiding principle for us. We manage risks throughout the Company by employing controls throughout our business operations. These controls are designed to both place limits on activities and provide internal reporting information that helps shape adjustments to existing controls. The Company's Board of Directors oversees a formal enterprise risk management program to coordinate risk management efforts and to provide reasonable assurance that risk taking activities are aligned with strategic objectives. The Board Audit Committee assists the Board in its risk management oversight. The risk management program includes a corporate risk officer who chairs a Management Risk Committee intended to ensure consistent application of the enterprise risk management process across all business segments. The Management Risk Committee is supported by two sub-committees, one focusing on life and corporate business risks and the other focusing on property and casualty business risks. In addition, several other senior management committees support the discussion and enforcement of risk controls in the management of the Company.

Our insurance products are designed to balance features desired by the marketplace with provisions that mitigate our risk exposures across our insurance portfolio. We employ underwriting standards to help ensure proper rates are charged to different classes of risks. In our life insurance and annuity products, we mitigate the risk of disintermediation through the use of surrender charges and market value adjustment features.

The process of linking the timing and the amount of paying obligations related to our insurance and annuity contracts and the cash flows and valuations of the invested assets supporting those obligations is commonly referred to as asset-liability management ("ALM"). Our ALM Committee regularly monitors the level of risk in the interaction of assets and liabilities and helps shape actions intended to attain our desired risk-return profile. Investment allocations and duration targets are also intended to manage the risk exposure in our annuity products by setting the credited rate within a range supported by these investments. Tools which help shape investment decisions include deterministic and stochastic interest rate scenario analyses using a licensed, third party economic scenario generator and detailed insurance ALM models. These models also use experience related to surrenders and death claims.

We also manage risk by purchasing reinsurance to limit exposure in our Life, Health, and Property and Casualty segments. In our Life segment, we currently retain 100% of newly developed permanent and term products up to our retention limit and cede the excess. Consistent with our corporate risk management strategy, we periodically adjust our Life reinsurance program and retention limits as market conditions warrant. In our Health segment, we use reinsurance on an excess of loss basis for our medical expense business. In our Property and Casualty segment, our reinsurance program provides coverage for some individual risks with exposures above certain amounts as well as exposure to catastrophes including hurricanes, tornadoes, wind and hail events, earthquakes, fires following earthquakes, winter storms, and wildfires. In all segments, we purchase reinsurance from many providers and regularly review the financial strength ratings of our reinsurers. Reinsurance does not remove our liability to pay our policyholders, and we remain liable to our policyholders for the risks we insure.

In our Property and Casualty segment, the use of catastrophic event models is an important element of risk management. These models assist us in the measurement and management of exposure concentrations and the amount and structure of reinsurance purchases. In addition to reinsurance, we manage exposure to catastrophic risk by limiting property exposure in coastal areas and certain other sensitive areas, implementing hurricane, wind and hail deductible requirements where appropriate, and not renewing coverage in regions where exposure to risky events exceeds our risk appetite.

Pricing

We establish premium rates for life and health insurance products using assumptions as to future mortality, morbidity, persistency, and expenses, all of which are estimates generally based on our experience, industry data, projected investment earnings, competition, regulation and legislation. Premium rates for property and casualty insurance are influenced by many factors, including the estimated frequency and severity of claims, expenses, state regulation and legislation, and general business and economic conditions, including market interest rates and inflation. Profitability is affected to the extent actual experience deviates from our pricing assumptions.

Payments we receive for certain annuity and life products are not recognized as revenues, but are deposits added to policyholder account balances. Revenues from these products are charges to the account balances for the cost of insurance risk and administrative fees and, in some cases surrender fees. Profits are earned to the extent these revenues exceed actual costs. Profits are also earned from investment income on assets invested from the deposits in excess of the amounts credited to policyholders.

Premiums for accident and health policies with medical expense components must take into account the rising utilization and cost of medical care. The annual rate of medical cost inflation has historically been higher than the general rate of inflation, requiring frequent rate increases, most of which are subject to approval by state regulatory agencies.

Credit Life and Health rates are set by each state. These rates are the maximum amounts that may be charged. We may charge a lower rate to reflect a variety of factors including better than expected experience, compensation adjustments, and competitive forces. In the event that an account experiences poor experience, we may request a rate increase from the applicable state.

Competition

We compete principally on the breadth of our product offerings, reputation, marketing expertise and support, the scope of our distribution systems, financial strength and ratings, product features and prices, customer service, claims handling, and in the case of producers, service as well as compensation. The market for insurance, retirement and investment products continues to be highly fragmented and competitive. We compete with a large number of domestic and foreign insurance companies, many of which offer one or more similar products. In addition, for products that include an asset accumulation component, our competition includes domestic and foreign securities firms, investment advisors, mutual funds, banks and other financial institutions.

Several competing insurance carriers are larger than we are, and have brands that are more commonly known and spend significantly more on advertising than we do. We remain competitive with these commonly known brands by managing costs, providing attractive coverage and service, maintaining positive relationships with our agents and our policyholders, and by maintaining our financial strength.

Ratings

Rating agencies provide independent opinions or ratings regarding the capacity of an insurance company to meet the contractual obligations of its insurance policies and contracts. These ratings are based on each rating agency’s quantitative and qualitative evaluation of a company. The rating agencies do not provide ratings as a recommendation to purchase insurance or annuities, nor as a guarantee of an insurer’s current or future ability to meet contractual obligations. Each agency’s rating should be evaluated independently of any other rating. Ratings may be changed, suspended, or withdrawn at any time.

Our current insurer financial strength rating from two of the most widely referenced rating organizations as of the date of this filing are as follows:

- A.M. Best Company: A [(1)]
- Standard & Poor’s (“S&P”): A [(2)]

(1) A.M. Best’s active company rating scale consists of thirteen ratings ranging from A++ (Superior) to D (poor).

(2) S&P’s active company ratings scale ‘AAA’ to ‘R’ may be modified by the addition of a plus (+) or minus (-) sign to show relative standing within the major rating categories.

Regulations Applicable to Our Business

Our insurance operations are subject to extensive regulation, primarily at the state level. Such regulation varies by state but generally has its source in statutes that establish requirements for the business of insurance and that grant broad regulatory authority to a state agency. Insurance regulation has a substantial effect on us and governs a wide variety of matters, such as insurance company licensing, agent and adjuster licensing, policy benefits, price setting, accounting practices, product suitability, the payment of dividends, the nature and amount of investments, underwriting practices, reserve requirements, sales and advertising practices, privacy, information systems security, policy forms, reinsurance reserve requirements, risk and solvency assessments, mergers and acquisitions, capital adequacy, transactions with affiliates, participation in shared markets and guaranty associations, claims practices, the remittance of unclaimed property, and enterprise risk management requirements. The models for state laws and regulations often emanate from the National Association of Insurance Commissioners ("NAIC").

State insurance departments monitor compliance with regulations through periodic reporting procedures and examinations. At any given time, financial, market conduct or other examinations of our insurance companies may be occurring.

The Dodd-Frank Wall Street Reform and Consumer Protection Act ("Dodd-Frank") expanded the U.S. federal government presence in insurance oversight. Dodd-Frank's requirements include streamlining the state-based regulation of reinsurance and non-admitted insurance. Dodd-Frank also established the Federal Insurance Office ("FIO") within the U.S. Department of Treasury, which is authorized to, among other things, gather data and information to monitor aspects of the insurance industry, identify certain issues in the regulation of insurers, and preempt state insurance measures under certain circumstances. There may be further federal involvement in the business of insurance in the future, which may add significant legal complexity and associated costs to our business.

Regulatory matters having the most significant effects on our insurance operations and financial reporting are described further below. In addition, Item 1A, Risk Factors, Litigation and Regulation Risk Factors, below discusses significant risks presented to our business by extensive regulation and describes certain other laws and regulations that are or may become applicable to us.

Limitations on Dividends by Insurance Subsidiaries. Dividends received from our insurance subsidiaries represent one source of cash for us. Our insurance subsidiaries' ability to pay dividends is restricted by state law and impacted by federal income tax considerations.

Holding Company Regulation. We are an insurance holding company system under the insurance laws of the states where we do business. Our insurance companies are organized under the laws of Texas, Missouri, New York, Louisiana, and California. Insurance holding company system laws and regulations in such states generally require periodic reporting to state insurance regulators of various business, enterprise risk management and financial matters and advance notice to, and in some cases approval by, such regulators prior to certain transactions between insurers and their affiliates. These laws also generally require regulatory approval prior to the acquisition of a controlling interest in an insurance company. These requirements may deter or delay certain transactions considered desirable by management or our stockholders.

Rate Regulation. Nearly all states have laws that require life, health, credit, and property and casualty insurers to file rate schedules and require most insurers to file policy or coverage forms and other information with the state's regulatory authority. In many cases these must be approved prior to use. The objectives of rate laws vary, but generally a price cannot be excessive, inadequate or unfairly discriminatory. Prohibitions on discriminatory pricing apply in the context of certain products as well.

Our ability to adjust prices is often dependent on the applicable pricing law and our ability to demonstrate to the particular regulator that current or proposed pricing complies with such law. In states that significantly restrict underwriting selectivity, we can manage our risk of loss by charging a price that reflects the cost and expense of providing insurance products. In states that significantly restrict price-setting ability, we can manage our risk of loss by being more selective in underwriting. When a state has significant underwriting and pricing restrictions, it becomes more difficult to manage our risk of loss, which can adversely impact our ability to market products profitably in such states.

Guaranty Associations and Involuntary Markets. State laws allow insurers to be assessed, subject to prescribed limits, insurance guaranty fund fees to pay certain obligations of insolvent insurance companies. In addition, to maintain our licenses to write property and casualty insurance in various states, we are required to participate in assigned risk plans, reinsurance facilities, and joint underwriting associations that provide various insurance coverages to purchasers that otherwise are unable to obtain coverage from private insurers. Underwriting results related to these arrangements, which tend to be adverse, have not been material to our results of operations.

Investment Regulation. Insurance company investment regulations require investment portfolio diversification and limit the amount of investment in certain asset categories. Failure to comply with these regulations leads to the treatment of non-conforming investments as non-admitted assets for measuring statutory surplus. In some instances, these rules require sale of non-conforming investments.

Exiting Geographic Markets, Canceling and Non-Renewing Policies. Most states regulate an insurer's ability to exit a market by limiting the ability to cancel and non-renew policies. Some states prohibit an insurer from withdrawing one or more types of insurance business from the state, except pursuant to an approved plan. These regulations could restrict our ability to exit unprofitable markets.

Statutory Accounting. Financial reports to state insurance regulators utilize statutory accounting practices as defined in the Accounting Practices and Procedures Manual of the NAIC, which are different from GAAP. Statutory accounting practices, in keeping with the intent to assure the protection of policyholders, are generally based on a solvency concept, while GAAP is based on a going-concern concept. While not a substitute for GAAP performance measures, statutory information is used by industry analysts and reporting sources to compare the performance of insurance companies. Maintaining both GAAP and Statutory financial records increases our business costs.

Insurance Reserves. State insurance laws require life and property and casualty insurers to annually analyze the adequacy of statutory reserves. Our appointed actuaries must submit opinions annually for our insurance companies that policyholder and claim reserves are adequate.

Risk-Based Capital and Solvency Requirements. The NAIC has a formula for analyzing capital levels of insurance companies called risk-based capital ("RBC"). The RBC formula has minimum capital thresholds that vary with the size and mix of a company's business and assets. It is designed to identify companies with capital levels that may require regulatory attention. At its June 2018 meeting, the NAIC's Capital Adequacy Task Force adopted a change to the formulas used to calculate risk-based capital to reflect the lower federal corporate income tax rate applicable under the Tax Cuts and Jobs Act of 2017. The NAIC's risk-based capital formulas now employ a tax factor of 21%, instead of 35%. Despite this change, at December 31, 2018, American National Insurance Company and each of its insurance subsidiaries remained more than adequately capitalized and exceeded the minimum RBC requirements.

Securities Regulation. The sale and administration of variable life insurance and variable annuities are subject to extensive regulation at the federal and state level, including by the Securities and Exchange Commission ("SEC") and the Financial Industry Regulatory Authority ("FINRA"). Our variable annuity contracts and variable life insurance policies are issued through separate accounts that are registered with the SEC as investment companies under the Investment Company Act of 1940. Each registered separate account is generally divided into sub-accounts, each of which invests in an underlying mutual fund that is itself a registered investment company under such act. In addition, the variable annuity contracts and variable life insurance policies issued by the separate accounts generally are registered with the SEC under the Securities Act of 1933. The U.S. federal and state regulatory authorities and FINRA from time to time make inquiries and conduct examinations regarding our compliance with securities and other laws and regulations.

In addition, our periodic reports and proxy statements to stockholders are subject to the requirements of the Securities Exchange Act of 1934 and corresponding rules of the SEC, and our corporate governance processes are subject to regulation by the SEC and the NASDAQ Stock Market. Our registered wholesale broker-dealer and registered investment adviser subsidiaries are subject to regulation and supervision by the SEC, FINRA and, in some cases, state securities administrators.

Suitability. FINRA rules require broker-dealers selling variable insurance products to determine that transactions in such products are "suitable" to the circumstances of the particular customer. In addition, most states have enacted the NAIC's Suitability in Annuity Transactions Model Regulation that, in adopting states, places suitability responsibilities on insurance companies in the sale of fixed and indexed annuities, including responsibilities for training agents. The NAIC is considering revisions to this model regulation that would further elevate the standard of care for annuity sales. New York already has taken further action, through the adoption by the New York Department of Financial Services of a regulation that requires in part that life insurance policies and annuity contracts delivered or issued for delivery in New York be in the best interest of the consumer, effective August 1, 2019 for annuities and February 1, 2020 for life insurance.

Protection of Consumer Information. U.S. federal laws, such as the Gramm-Leach-Bliley Act, and the laws of some states regulate disclosures of certain customer information and require us to protect the security and confidentiality of such information. Such laws also require us to notify customers about our policies and practices relating to the collection, protection and disclosure of confidential customer information. State and federal laws, such as the federal Health Insurance Portability and Accountability Act regulate our use, protection and disclosure of certain personal health information. In addition, most states have laws or regulations that require us to notify regulators and affected customers in the event of a data breach.

On June 28, 2018, California enacted a sweeping new privacy law known as the California Consumer Privacy Act of 2018 ("CCPA"), with an original effective date of January 1, 2020. The CCPA requires enhanced customer disclosure about how a business collects and uses personal data, how such data is used in business processes, and with and to whom customer data is shared or sold. In addition, the CCPA also affords a consumer a "right to be forgotten" in certain circumstances. On August 31, 2018, the California State Legislature passed SB-1121, a bill that delays enforcement of the CCPA until July 1, 2020 and makes other amendments and clarifications to the law. Such clarifications include exempting from certain requirements of the CCPA information that is collected, processed, sold or disclosed pursuant to the California Information Privacy Act, the federal Gramm-Leach-Bliley Act or the federal Driver's Protection Act. The revisions, however, do not exempt such information from the CCPA's private right of action provision in all instances. Additionally, the definition of "personal information" in the CCPA is broad and may encompass other information that we maintain in our California business beyond that excluded under the Gramm-Leach-Bliley Act, Driver's Protection Act or the California Information Privacy Act exemption.

In addition, the Fair Credit Reporting Act (the "FCRA") is a federal law that governs the use and sharing of consumer credit information provided by a consumer reporting agency. Requirements under the FCRA apply to an insurer if such insurer obtains and uses consumer credit information to underwrite insurance. Such requirements may include obtaining the consumer's consent and providing various notices to the consumer. While the use of consumer credit information in the underwriting process is expressly authorized by the FCRA, various states have issued regulations that limit or prohibit the use of consumer credit information by insurers, and some consumer groups continue to criticize the use of credit-based insurance scoring in underwriting and rating processes. As a result of a 2017 data breach of a major credit reporting agency, there may be additional efforts at the federal or state level to regulate the use of credit-based information by insurers. Any such regulation could force changes in our underwriting practices and impact our profitability.

Cybersecurity. In recent years, millions of consumers and businesses have been impacted by data breaches of companies in various industries, increasing the regulatory focus on cybersecurity. With the August 28, 2017 effectiveness of new regulations applicable to certain financial institutions, New York became the first state to adopt minimum cybersecurity standards. It is expected that other states will follow suit. The new regulation of the New York Department of Financial Services ("NYDFS") requires financial institutions authorized to do business under New York banking, insurance or other financial services laws, including certain of our subsidiaries, to develop a cybersecurity program and policy based on an assessment of the institution's cybersecurity risks, designate a Chief Information Security Officer, maintain written policies and procedures with respect to third party service providers, limit who has access to data or systems, use qualified cybersecurity personnel to manage cybersecurity risks, notify the NYDFS of a cybersecurity event within seventy-two hours, maintain a written incident response plan and provide the NYDFS with an annual certification of compliance.

In addition, the NAIC has adopted the Cybersecurity Bill of Rights, a set of directives aimed at protecting consumer data, and the Insurance Data Security Model Law. The data security model law establishes standards for data security in the insurance industry, including standards for investigating a data breach and requiring certain notifications to regulators, producers and consumers. South Carolina became the first state to adopt the data security model law in May 2018, and its compliance requirements will be fully enacted by July 1, 2020. Several other states are considering adopting this model law. While it is not mandatory for insurers to comply with an NAIC model law, nor for states to adopt a model law, state and federal legislators and regulators are likely to look to the model law, as well as the NYDFS regulation, for guidance in proposing new legislation and regulation. The NAIC model law could also become a standard to which insurance companies are held in decisions on whether to bring enforcement actions. The NAIC has also strengthened and enhanced the cybersecurity guidance included in its handbook for state insurance examiners. We expect a continuing focus at the state and federal levels on the privacy and security of personal information.

Anti-Money Laundering. Federal law and regulation requires us to take certain steps to help prevent and detect money laundering activities. The USA PATRIOT Act of 2001 contains anti-money laundering and financial transparency requirements applicable to certain financial services companies, including insurance companies. The Bank Secrecy Act requires insurers to implement a risk-based compliance program to detect, deter and (in some cases) report financial or other illicit crimes including, but not limited to, money laundering and terrorist financing. The Office of Foreign Assets Control ("OFAC"), a division of the U.S. Treasury Department, administers and enforces economic and trade sanctions. For certain transactions, an insurer may be required to search policyholder, agent, vendor and employee databases for specially designated nationals or suspected terrorists, in order to comply with OFAC obligations.

Healthcare Regulation. We are subject to various conditions and requirements of the Patient Protection and Affordable Care Act of 2010 (the "Healthcare Act"). The Healthcare Act affects the small blocks of business we have offered or acquired over the years that are, or are deemed to be, health insurance. The Healthcare Act also influences the design of products sold by our Health segment, which may influence consumer acceptance of such products and the cost of monitoring compliance with the Healthcare Act. Moreover, the Healthcare Act affects the benefit plans we sponsor for employees, retirees and their dependents, our expense to provide such benefits, our tax liabilities in connection with the provision of such benefits, and our ability to attract or retain employees. Any repeal, replacement or amendment of the Healthcare Act could have similar effects on us. Although President Trump and many Congressional Republicans have indicated a desire to repeal or revise the Healthcare Act, the fate of these proposals is unclear. Further, a December 2018 decision by the federal district court for the Northern District of Texas ruled the Healthcare Act to be unconstitutional. The Healthcare Act will remain in effect during the likely appeals process; however, such litigation creates further uncertainty regarding the future of the Healthcare Act. We are unable to predict how these events will ultimately be resolved and what the potential impact may be on the Healthcare Act and our business.

Environmental Considerations. As an owner and operator of real property, we are subject to extensive federal, state and local environmental laws and regulations. Inherent in such ownership and operation is the risk that there may be potential environmental liabilities and costs in connection with any required remediation of such properties. We routinely have environmental assessments performed with respect to real estate being acquired for investment or through foreclosure, but we cannot provide assurance that unexpected environmental liabilities will not arise. In addition, we hold equity interests in companies that could potentially be subject to environmental liabilities. Based on information currently available to us, management believes that any costs associated with compliance with environmental laws and regulations or any required remediation will not have a material adverse effect on our business, results of operations or financial condition.

Other types of regulations that affect us include insurable interest laws, employee benefit plan laws, antitrust laws, employment and labor laws, and federal and state tax laws. Failure to comply with federal and state laws and regulations may result in censure; the issuance of cease-and-desist orders; suspension, termination or limitation of the activities of our operations and/or our employees and agents; or the obligation to pay fines, penalties, assessments, interest, or additional taxes and wages. In some cases, severe penalties may be imposed for breach of these laws. We cannot predict the impact of these actions on our business, results of operations or financial condition.

Employees

As of December 31, 2018, we had approximately 4,640 employees. We consider our employee relations to be good.

Available Information

We file periodic and current reports, proxy statements and other information with the SEC. The SEC maintains a website (www.sec.gov) that contains reports, proxy statements, and other information regarding issuers that file electronically with the SEC, including us.

Our press releases, financial information and reports filed with the SEC (for example, Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and any amendments to those forms) are also available online at www.americannational.com. The reference to our website does not constitute the incorporation by reference of information contained at such website into this, or any other, report. Copies of any documents on our website are available without charge, and reports filed with or furnished to the SEC will be available as soon as reasonably practicable after they are filed with or furnished to the SEC.

ITEM 1A. RISK FACTORS

Our performance is dependent on our ability to manage complex operational, financial, legal, and regulatory risks and uncertainties throughout our operations. The most significant of these risks and uncertainties are described below. Any of these, individually or in the aggregate, could materially adversely impair our business, financial condition or results of operations, particularly if our actual experience differs from our estimates and assumptions. While our enterprise risk management framework contains various strategies, processes, policies and procedures to address these risks and uncertainties, we cannot be certain that these measures will be implemented successfully in all circumstances. In addition, we could experience risks that we failed to identify, or risks of a magnitude greater than expected.

Economic and Investment Market Risk Factors

Our results of operations are materially affected by economic and political conditions in the U.S. and elsewhere. The strength and sustainability of economic activity is inherently uncertain. Factors such as unemployment, declining workforce participation, consumer prices, geopolitical and international trade issues, energy prices, stagnant or declining family incomes, consumer confidence and spending, and increased student and consumer debt can adversely affect the economy and demand for our products. Unfavorable economic developments could adversely affect us if our customers have less need for insurance coverage, cancel existing insurance policies, modify coverage, or choose not to renew with us. Challenging economic conditions may impair the ability of our customers to pay premiums as they come due.

Interest rates have a significant impact on our business and on consumer demand for our products. When interest rates rise, the value of our investment portfolio may decline due to decreases in the fair value of our fixed maturity securities. In addition, increasing rates on other insurance or investment products offered by competitors can lead to higher surrenders by our customers at a time when fixed maturity investment asset values are lower. We may react to market conditions by increasing crediting rates, which narrows our "spread," or the difference between the amounts we earn on investment and the amount we must pay under our contracts. Decreasing interest rates also can adversely affect our spreads, particularly with interest-sensitive life insurance and fixed annuities. An environment of persistently low (or lower) interest rates, as in recent years, compounds this spread compression. Further, when market interest rates decrease or remain at relatively low levels, prepayments and redemptions affecting our investment securities and mortgage loan investments may increase as issuers and borrowers seek to refinance at a lower rate. Proceeds from maturing, prepaid or sold bonds or mortgage loan investments may be reinvested at lower yields, reducing our spread. Our ability to decrease product crediting rates in response may be limited by market and competitive conditions and by regulatory or contractual minimum rate guarantees. While we use ALM processes to mitigate the effect on our spreads of changes in interest rates, they may not be fully effective. See the Risk Management discussion in Item 1 above and the General Trends discussion in Part II, Item 7 below for further details about interest rates and our ALM processes.

Fluctuations in the markets for fixed maturity securities, equity securities, and commercial real estate could adversely affect our business. Investment returns are an important part of our profitability. Substantially all investments, including our fixed maturity, equity, real estate and mortgage loan investment portfolios, are subject to market and credit risks, including market volatility and deterioration in the credit or prospects of companies or governmental entities in which we invest. We could incur significant losses from such risks, particularly during extreme market events. The concentration of our investments in any particular industry, group of related industries or government issuers, or geographic area can compound these risks. Moreover, the Board of Governors of the Federal Reserve System has moved towards normalizing monetary policy from the programs of recent years that have fostered a historically low interest rate environment. In addition to resulting in higher interest rates, this move has generated volatility in debt and equity markets, which could continue or worsen.

In addition to negatively affecting investment returns, equity market downturns and volatility can have other adverse effects on us. First, equity market downturns and volatility may discourage new purchases of our products that have returns linked to the performance of the equity market and may cause some existing customers to withdraw cash values or reduce investments in such products, in turn reducing our fee revenues. Second, the guarantees provided under certain products may cost more than expected in volatile or declining equity market conditions, which could negatively affect our earnings. Third, our estimates of liabilities and expenses for pension and other postretirement benefits incorporate assumptions regarding the rate used to discount estimated future liabilities and the long-term rate of return on plan assets. Declines in the discount rate or the rate of return on plan assets, both of which are influenced by potential investment returns, could increase our required cash contributions or pension-related expenses in future periods.

Some of our investments are relatively illiquid. Investments in privately placed securities, mortgage loans, and real estate, including real estate joint ventures and other equity interests, are relatively illiquid. If we suddenly require significant amounts of cash in excess of ordinary cash requirements, it may be difficult or not possible to sell these investments in an orderly manner for a favorable price.

Operational Risk Factors

Our actual experience could differ from our estimates and assumptions. Our product pricing includes long-term assumptions such as investment returns, mortality, morbidity (the rate of incidence of illness), persistency (the rate at which policies remain in-force), and operating expenses. Our profitability substantially depends on actual experience being consistent with or better than these assumptions. If we fail to appropriately price our insured risks, or if claims experience is more severe than we assumed, our earnings and financial condition may be negatively affected. Conversely, significantly overpriced risks may negatively impact new business sales and retention of existing business.

Our loss reserves are estimates of amounts needed to pay and administer incurred claims and, as such, are inherently uncertain; they do not and cannot represent exact measures of liability. Inflationary events, especially events outside of historical norms, or regulatory changes that affect the assumptions underlying our estimates can cause variability. For example, increases in costs for auto parts and repair services, construction costs, and commodities (whether as a result of market forces, tariffs or other conditions or events) result in higher losses for property damage claims. Accordingly, our loss reserves could prove to be inadequate to cover our actual losses and related expenses. See Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations—Critical Accounting Estimates—*Reserves* for additional information.

With respect to our investments, the determination of estimates for allowances and impairments varies by investment type and is based upon our periodic evaluation of known and inherent risks associated with the respective asset class. Historical trends and assumed changes may not be indicative of future impairments or allowances. See Note 2, Summary of Significant Accounting Policies and Practices, of the Notes to the Consolidated Financial Statements for further description of our evaluation of impairments.

Assumptions regarding the future realization of deferred tax assets are dependent upon estimating the generation of sufficient future taxable income, including capital gains. If future events differ from our current forecasts and it is determined that deferred tax assets cannot be realized, a deferred tax valuation allowance must be established, with a charge to expenses.

Interest rate fluctuations and other events may require us to accelerate the amortization of deferred policy acquisition costs ("DAC"). When interest rates rise, life and annuity surrenders and withdrawals may increase as policyholders seek to buy products with higher or perceived higher returns, impacting estimates of future profits. Significantly lower future profits may cause us to accelerate DAC amortization, and such acceleration could adversely affect our results of operations to the extent such amortization exceeds any surrender or other charges earned as income upon surrender and withdrawal. See also Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations — Critical Accounting Estimates, and Part II, Item 8, Financial Statements and Supplementary Data - Note 2, Summary of Significant Accounting Policies and Practices, and Note 10, Deferred Policy Acquisition Costs, of the Notes to the Consolidated Financial Statements for additional information.

We may be unable to maintain the availability and performance of our systems and to safeguard our data and our customers' confidential information and privacy. We rely on the availability, reliability, and security of internet technologies, our internal networks, information-processing infrastructure, system platforms, business applications and third-party providers to receive, store, process, retrieve, calculate and evaluate customer and company information, including to provide insurance quotes, process premium payments, administer our products, provide customer support, file and pay claims and make changes to existing policies, among many other functions. We also use systems for investment management, financial reporting and data analysis to support our policyholder reserves and other actuarial estimates. We have developed or evolved strategies and processes to secure, maintain and enhance our existing internal networks, technology and processing infrastructure and our information systems and to update or replace certain information systems to keep pace with advancing technology, changing customer preferences and expectations, and increasingly stringent industry and regulatory standards. However, system failures, extended unavailability or other outages, or damage or destruction to internal or external networks or systems, whether caused by intentional or unintentional acts or events, as well as difficulties arising from the implementation of security-threat system patches, third-party system upgrades, and new systems and technologies, could compromise our ability to perform critical functions on a timely basis. For instance, if these systems were inaccessible or inoperable, or if they fail to function effectively or as designed, the resulting disruptions may impede or interrupt our business operations, cause misstated or unreliable financial data, or impact the effectiveness of our internal controls over financial reporting.

In certain lines of our business, our information technology and telecommunication systems interface with and rely upon third-party services, over which we have no direct control, including providers of computing infrastructure platforms commonly known as the “cloud.” We are highly dependent on our ability to access these external services for necessary business functions, such as acquiring new business, managing existing business, paying claims, and ensuring timely and accurate financial reporting. If we do not effectively develop, implement and monitor these relationships, if third-party providers do not perform as anticipated, if technological or other problems are incurred with a transition, or if outsourcing relationships relevant to our business process functions are terminated, we may not realize expected productivity improvements or cost-efficiencies, and we may experience operational difficulties, increased costs and a loss of business.

We receive and transmit legally protected information with and among customers, agents, financial institutions and selected third party vendors and service providers, including personally identifiable policyholder information. We have invested significant time and resources towards preventing and mitigating risks through security vulnerability assessments and several layers of data intrusion and detection protection technologies, designs and authentication capabilities. Our efforts may not be effective against all security threats and breach attempts in light of increasingly complex and persistent threat techniques and the evolving sophistication of individual and state-sponsored cyber-attacks. A breach, whether from external or internal sources, or from the theft or loss of equipment, can result in access, viewing, misappropriation, altering or deleting information in ours or a third party’s systems on which we rely, including customers’, agents’ and employees’ sensitive personal and financial information and our proprietary business information. Like other companies, we have experienced threats to our data and systems, including malware and ransomware, seeking to gain unauthorized access to systems and data or to cause disruptions in service. In addition, a limited number of spoofing attacks have been carried out by individuals impersonating customers, which have resulted in unauthorized withdrawals from certain customer accounts. Such withdrawals have been refunded by us, and we believe we have implemented appropriate business process changes to help mitigate future attacks. To date, these various threats and attacks have not been material to our operations. However, any significant attacks, unauthorized access or disclosures, disruptions or other security breaches, whether affecting us or third parties, could result in substantial business disruption and consequences, including without limitation, costs of repairing or replacing systems, increased security costs, costs of customer notifications and credit monitoring services, lost revenues, litigation, regulatory action, fines and penalties, and harm to customer and producer confidence and our reputation. While we have purchased cybersecurity risk insurance and intend to assess the adequacy of this insurance annually, this insurance may not be sufficient in scope or amount to cover all of our losses from breaches of our data.

Cybersecurity risks may also cause an index’s performance to be incorrectly calculated, which could affect the calculation of values under certain of our insurance and annuity contracts. We are not responsible for the calculation of any index. Breaches in cybersecurity may also negatively affect the value of the securities or other investments that comprise or define an index.

Employee and agent error and misconduct may be difficult to detect and prevent and may result in significant losses. The actions or inaction of our employees, agents, producers, managing general agents, managing general underwriters and third party administrators could result in losses arising from, among other things, fraud, errors, failure to properly document transactions, failure to obtain proper internal authorization, failure to maintain effective internal controls, or failure to comply with underwriting guidelines or regulatory requirements. It is not always possible to deter or prevent misconduct, and the precautions we take to prevent and detect this activity may not be effective in all cases.

Our business operations depend on our ability to appropriately distribute, execute and administer our policies and claims. Our primary business is writing and servicing life, annuity, property and casualty, and health insurance for individuals, families and businesses. Any problems or discrepancies that arise in our pricing, underwriting, billing, processing, claims handling or other practices, whether as a result of employee error, vendor error, or technological problems, could have a negative effect on operations and reputation, particularly if such problems or discrepancies are replicated through multiple policies.

If we fail to maintain an effective system of internal controls, we may not be able to accurately report our financial results, which may adversely impact our Company.

It is necessary for us to maintain effective internal controls over financial reporting to prevent fraud and errors and to maintain effective disclosure controls and procedures to provide timely and reliable financial and other information. In our Annual Report on Form 10-K for the fiscal year ended December 31, 2016, we disclosed certain material weaknesses in our internal controls over financial reporting. After enhancements to our internal controls, we concluded as of the end of fiscal year 2017 that our internal controls over financial reporting and our disclosure controls and procedures were effective. We have also concluded as of and for the year ended December 31, 2018 that our internal controls over financial reporting and our disclosure controls and procedures are effective. However, we cannot be certain that we will be able to prevent future material weaknesses or that there are no existing, but as yet undiscovered, weaknesses that we need to address. A failure to maintain adequate internal controls may adversely affect our ability to provide information that accurately reflects our financial condition on a timely basis. This could cause an adverse effect on our business, results of operations and the market price of our stock if investors, customers, rating agencies, regulators or others lose confidence in our reported financial and other information, if we become subject to SEC or other regulatory review and sanctions, or if we become subject to litigation that results in substantial fines, penalties or liabilities.

Catastrophic Event Risk Factors

We may incur significant losses resulting from catastrophic events. Our property and casualty operations are exposed to catastrophes caused by natural events, such as hurricanes, tornadoes, wildfires, droughts, earthquakes, snow, hail and windstorms, and manmade events, such as terrorism, riots, explosions, hazardous material releases, and utility outages. Our life and health insurance operations are exposed to the risk of catastrophic mortality or illness, such as a pandemic, an outbreak of an easily communicable disease, or another event that causes a large number of deaths or high morbidity. Our investment operations are exposed to catastrophes as a result of direct investments and mortgages related to real estate. Our operating results may vary significantly from one period to the next since the likelihood, timing, severity, number or type of catastrophe events cannot be accurately predicted. Our losses in connection with catastrophic events are primarily a function of the severity of the event and the amount of our exposure in the affected area.

Many scientists, legislators and regulators believe climate change has added to the unpredictability, severity and frequency of extreme weather and loss events. To the extent climate change increases the frequency and severity of such events, we may face increased claims, and we may experience investment losses as a result of such events. Predicting the frequency and severity of extreme weather and loss events is inherently uncertain. Moreover, we cannot predict how legal, regulatory and social responses to concerns about global climate change will impact our business or the value of our investments.

The occurrence of events that are unanticipated in our business continuity and disaster recovery planning could impair our ability to conduct business effectively. Our corporate headquarters is located in Galveston, Texas, on the coast of the Gulf of Mexico and in the past has been impacted by hurricanes. Our League City, Texas offices are designed to support our operations and service our policyholders in the event of a hurricane or other natural disaster affecting Galveston. The primary offices of our property and casualty insurance companies are in Springfield, Missouri and Glenmont, New York, which helps to insulate these facilities and their operations from coastal catastrophes. However, the severity, timing, duration or extent of an event may be unanticipated by our business continuity planning, which could result in an adverse impact on our ability to conduct business. In the event a significant number of our employees or agents were unavailable or unable to work following such a disaster, or if our computer-based data processing, transmission, storage and retrieval systems were affected, our ability to effectively conduct our business could be compromised.

Marketplace Risk Factors

Our future results are dependent in part on successfully operating in insurance and annuity industries that are highly competitive with regard to customers and producers. Strong competition for customers has led to increased marketing and advertising by our competitors, many of whom have well-established national reputations and greater financial and marketing resources, as well as the introduction of new insurance products and aggressive pricing. These competitive pressures could result in increased pricing pressures on a number of our products and services, particularly as competitors seek to win market share, and may limit our ability to maintain or increase our profitability. Because of its relatively low cost of entry, the Internet has emerged as a significant place of new competition, both from existing competitors and new competitors. In addition, product development and life-cycles have shortened in many product segments, leading to intense competition with respect to product features.

We compete for customers' funds with a variety of investment products offered by financial services companies other than insurance companies, such as banks, investment advisors, mutual fund companies and other financial institutions. Moreover, customer expectations are evolving as technology advances and consumers become accustomed to enjoying tailored, easy to-use-services and products from various industries. This is reshaping and raising consumer expectations when dealing with insurance. We are addressing these changing consumer expectations by investing in technology with a particular focus on consumer-facing sales and service platforms, by internally promoting a strategically-focused innovative culture initiative, and by creating internal forums to drive next generation solutions based on consumer insights. However, if we cannot effectively respond to increased competition and such increased consumer expectations, we may not be able to grow our business or we may lose market share.

We compete with other insurers for producers primarily on the basis of our financial position, reputation, stable ownership, support services, compensation, product features and pricing. We may be unable to compete with insurers that adopt more aggressive pricing or compensation, that offer a broader array of products or packages of products, or that have extensive promotional and advertising campaigns.

Our supplemental health business could be negatively affected by alternative healthcare providers or changes in federal healthcare policy. Our Medicare Supplement business is impacted by market trends in the senior-aged healthcare industry that provide alternatives to traditional Medicare, such as health maintenance organizations and other managed care or private plans. The success of these alternative healthcare solutions for seniors could negatively affect the sales and premium growth of traditional Medicare Supplement insurance and could impact our ability to offer such products. In addition, Congress or the U.S. Department of Health and Human Services ("HHS") could make changes in federal healthcare policy, including Medicare that could adversely impact our supplemental health business.

Litigation and Regulation Risk Factors

Litigation may result in significant financial losses and harm our reputation. Plaintiffs may bring lawsuits, including class actions, against us relating to, among other things, sales or underwriting practices, agent misconduct, product design, product disclosure, product administration, fees charged, denial or delay of benefits, product suitability, claims-handling practices (including the permitted use of aftermarket, non-original equipment manufacturer auto parts), loss valuation methodology, refund practices, employment matters, and breaches of duties to customers. Plaintiffs may seek very large or indeterminate amounts, including punitive and treble damages. The damages claimed and the amount of any probable and estimable liability, if any, may remain unknown for substantial periods of time. Even when successful in the defense of such actions, we could incur significant attorneys' fees, direct litigation costs and substantial amounts of management time that otherwise would be devoted to our business, and our reputation could be harmed.

We are subject to extensive regulation, and potential further regulation may increase our operating costs and limit our growth. We are subject to extensive insurance laws and regulations that affect nearly every aspect of our business. We are also subject to additional laws and regulations administered and enforced by a number of different governmental authorities, such as state securities and workforce regulators, the SEC, the Internal Revenue Service (“IRS”), FINRA, the U.S. Department of Justice, the U.S. Department of Labor (“DOL”), the U.S. Department of Housing and Urban Development (“HUD”), HHS, the Federal Trade Commission and state attorneys general, each of which exercises a degree of interpretive latitude. We face the risk that any particular regulator’s or enforcement authority’s interpretation of a legal issue may conflict with that of another regulator or enforcement authority or may change over time to our detriment. Regulatory investigations, which can be broad and unpredictable, may raise issues not identified previously and could result in new legal actions against us and industry-wide regulations that could adversely affect us. Further, we are experiencing increasing information requests from regulators without corresponding direct regulation being applicable to us, on issues such as climate change and our investments in certain companies or industries. Responding to such requests adds to our compliance burden.

The laws and regulations applicable to us are complex and subject to change, and compliance is time consuming and personnel-intensive. Changes in these laws and regulations, or interpretations by courts or regulators, may materially increase our costs of doing business and may result in changes to our practices that may limit our ability to grow and improve our profitability. Regulatory developments or actions against us could have material adverse financial effects and could harm our reputation. Among other things, we could be fined, prohibited from engaging in some or all of our business activities, or made subject to limitations or conditions on our business activities.

As insurance industry practices and legal, judicial, social, and other conditions outside of our control change, unexpected issues related to claims and coverage may emerge. These changes may include modifications to long established business practices or policy interpretations, which may adversely affect us by extending coverage beyond our underwriting intent or by increasing the type, number, or size of claims. For example, many states have adopted legislation that is similar to the Model Unclaimed Life Insurance Benefits Act. Such legislation imposes requirements on insurers to periodically compare their life insurance and annuity contracts and retained asset accounts against the U.S. Social Security Administration’s Death Master File, investigate any potential matches, determine whether benefits are payable, and attempt to locate beneficiaries. Some states are attempting to apply these laws retroactively to existing policies. A number of states have aggressively audited life insurance companies, including us and some of our subsidiaries, for compliance with such laws, and more states could do so. Such audits have sought to identify unreported insured deaths and to determine whether any unpaid benefits, proceeds or other payments under life insurance or annuity contracts should be treated as unclaimed property to be escheated to the state. We have modified our claims process to stay current with emerging trends. It is possible that such audits may result in regulatory actions, litigation, administrative fines and penalties, interest, and additional changes to our procedures.

Federal regulatory changes and initiatives have a growing impact on us. For example, Dodd-Frank provides for enhanced federal oversight of the financial services industry through multiple initiatives. Provisions of Dodd-Frank are or may become applicable to us, our competitors, or certain entities with which we do business. For example, it is possible that regulations issued by the Consumer Financial Protection Bureau (“CFPB”) may extend, or be interpreted to extend, to the sale of certain insurance products by covered financial institutions, which could adversely affect sales of such products. The Federal Insurance Office, as a result of various studies it conducts, may also recommend changes in laws or regulations that affect our business. Although President Trump has indicated a desire to revise or reverse some provisions of Dodd-Frank, the fate of such proposals is unclear, and we cannot predict with certainty how Dodd-Frank will continue to affect the financial markets generally or impact our business and results of operations.

Certain federal regulation may impact our property and casualty operations. In 2013, HUD finalized a regulation applicable to home lenders, landlords and other housing providers that prohibits lending and housing practices having a disparate impact against protected classes, even if there is no intent to discriminate. Various legal challenges to this regulation were pursued, culminating in a decision of the U.S. Supreme Court in 2015 generally viewed as favorable to the regulation. More recently, the Trump Administration has sought delay and reconsideration of the regulation and HUD has indicated its intent to propose changes to the rule, however the text of such changes has not yet been published. There is concern among property and casualty insurers that this regulation could be applied in a manner that adversely impacts price differentiation for homeowners’ policies using traditional risk selection analysis. Whether or not the regulation is modified, it is uncertain to what extent it may impact property and casualty industry underwriting practices. Such regulation could increase litigation costs, force changes in underwriting practices, and impair our ability to write homeowners business profitably. In addition, Congress or states may enact legislation affecting insurers’ ability to use credit-based insurance scores as part of the property and casualty underwriting or rating process, which could force changes in underwriting practices and impair our property and casualty operations’ ability to write homeowners business profitably.

There have been federal efforts to change the standards of care applicable to broker-dealers and investment advisers. We have previously reported that in April 2016, the U.S. Department of Labor ("DOL") issued a regulation that significantly expanded the range of activities considered to be fiduciary investment advice under the Employee Retirement and Income Security Act of 1974 and the Internal Revenue Code of 1986 (the "fiduciary rule"). The fiduciary rule impacted individuals and entities that offer investment advice to purchasers of qualified retirement products, such as IRA's and qualified retirement plans. It applied ERISA's fiduciary standard to many insurance agents, broker-dealers, advisers and others not previously subject to the standard when they sell annuities to IRA's and qualified retirement plans. On June 21, 2018, the U.S. Court of Appeals for the Fifth Circuit issued an order vacating the fiduciary rule, ending the rule's effectiveness, after finding that the DOL had exceeded its authority in implementing the rule. As a result, the DOL rules regarding ERISA fiduciary status that existed prior to the adoption of the fiduciary rule are again applicable.

We have previously reported that in April 2018, the SEC proposed a regulation addressing the standards of care applicable to broker-dealers and investment advisers. "Regulation Best Interest" would require a broker-dealer to act in the best interest of a retail customer when making a recommendation of any securities transaction or investment strategy involving securities. As part of the proposed rule, the SEC would require broker-dealers and investment advisers to provide retail customers a Client Relationship Summary ("Form CRS") to disclose certain information about the nature of the customer's relationship with their investment professional, including fees and costs associated with services and conflicts of interest the firm may have. In November 2018, the SEC published a report on investor testing conducted by the Rand Corporation, in which feedback was gathered on sample Form CRS. The SEC made the results of that testing available for public comment and is considering such comments before finalizing the Regulation Best Interest and Form CRS rule proposals.

There have also been state efforts to change the standards of care applicable to broker-dealers, investment advisers and insurance producers, including the "Suitability and Best Interests in Life Insurance and Annuity Transactions" regulation adopted by the NYDFS. Such regulation addresses the duties and obligations of insurers and their producers and provides that any transactions with respect to life insurance policies and annuity contracts delivered or issued for delivery in New York must be in the best interest of the consumer and appropriately address the insurance needs and financial objectives of the consumer at the time of the transaction. It further requires that any recommendation must be based on an evaluation of the suitability information of the consumer and reflect the care, skill, prudence and diligence that a prudent person acting in a like capacity and familiar with such matters would use under the prevailing circumstances. Further, a producer's compensation and other incentives must not influence his or her recommendations. The New York regulation will become effective for annuity products on August 1, 2019 and for life insurance products on February 1, 2020.

All or any of the above-described federal and state efforts to address the standards of care applicable to broker-dealers, investment advisers and insurance producers could materially affect how our life insurance and annuity products are designed, marketed and serviced. We may find it necessary to change our producer compensation practices, limit the assistance producers can provide to contract owners, replace or engage additional producers, or otherwise change how we design and support sales of our annuities. Any of these regulatory or legislative measures, or judicial rulings regarding the same, or consumer and producer reaction to such measures, could have a material adverse impact on our ability to sell annuities and certain other products and to retain in-force business.

Lastly, international standards continue to emerge in response to the globalization of the insurance industry and evolving standards of regulation, privacy, solvency measurement and risk management. Any international conventions or mandates that directly or indirectly impact or influence the nature of U.S. regulation or industry operations could negatively affect us.

For further discussions of the kinds of regulation applicable to us, see Item 1, Business, Regulations Applicable to Our Business section.

Changes in tax laws could adversely affect our business. Under current U.S. federal and state income tax laws, certain products we offer, primarily life insurance and annuities, receive tax treatment designed to encourage consumers to purchase these products. This treatment may encourage some consumers to select our products over non-insurance products. The U.S. Congress from time to time may consider legislation that would change the taxation of insurance products and/or reduce the taxation of competing products. Such legislation, if adopted, could materially change consumer behavior, which may harm our ability to sell such products and result in the surrender of some existing contracts and policies. In addition, changes in the U.S. federal and state estate tax laws could negatively affect the demand for the types of life insurance used in estate planning. Uncertainty regarding the tax structure in the future may also cause some current or future purchasers to delay or indefinitely postpone the purchase of products we offer.

On December 22, 2017, the federal government enacted the Tax Cuts and Jobs Act ("Tax Reform"). Tax Reform made broad and complex changes to federal corporate tax law and resulted in changes to our overall tax obligations. Most notably, Tax Reform reduced the corporate income tax rate from 35% to 21%. In addition, there were several changes that are specific to insurance companies, namely changes to the proration formula used to determine the amount of dividends eligible for the dividends-received deduction and changes to the calculation of tax reserves associated with policyholder liabilities. Amendments or clarifications of Tax Reform from additional regulatory and administrative guidance, may occur. Any changes in federal income tax laws, including changes to Tax Reform could adversely affect the federal income taxation of our ongoing operations and have a material adverse impact on our business and results of operations.

New accounting rules or changes to existing accounting rules could negatively impact our business. We are required to comply with GAAP. A number of organizations are instrumental in the development and interpretation of GAAP, such as the SEC, the Financial Accounting Standards Board ("FASB"), and the American Institute of Certified Public Accountants. GAAP is subject to review by these organizations and others and is, therefore, subject to change in ways that could change the current accounting treatments we apply.

We also must comply with statutory accounting principles ("SAP") in our insurance operations. SAP and various components of SAP (such as actuarial reserving methodology) are subject to review by the NAIC and its taskforces and committees, as well as state insurance departments.

Future changes to GAAP or SAP could impact our product profitability, reserve and capital requirements, financial condition or results of operations. See Note 3, Recently Issued Accounting Pronouncements, of the Notes to the Consolidated Financial Statements for a detailed discussion regarding the impact of the recently issued accounting pronouncements and the future adoption of new accounting standards on the Company.

Reinsurance and Counterparty Risk Factors

Reinsurance may not be available, affordable, adequate or collectible to protect us against losses. As part of our risk management strategy, we purchase reinsurance for certain risks that we underwrite. Market conditions and geo-political events beyond our control, including the continued threat of terrorism, influence the availability and cost of reinsurance for new business. In certain circumstances, the price of existing reinsurance contracts may also increase. Reinsurance does not relieve us of our direct liability to our policyholders, even when the reinsurer is liable to us. Our reinsurers may not pay the reinsurance recoverables owed to us or they may not pay these balances on a timely basis.

The counterparties to derivative instruments we use to hedge our business risks could default or fail to perform. We enter into derivative contracts, such as options, with a number of counterparties to hedge various business risks. If our counterparties fail or refuse to honor their obligations, our economic hedges of the related risks will be ineffective. Such counterparty failures could have a material adverse effect on us. See Note 7, Derivative Instruments, of the Notes to the Consolidated Financial Statements for additional details.

Other Risk Factors

Our financial strength ratings could be downgraded. Various Nationally Recognized Statistical Rating Organizations ("NRSROs") publish financial strength ratings as their opinion of an insurance company's creditworthiness and ability to meet policyholder and contractholder obligations. As with other rated companies, our ratings could be downgraded at any time and without any notice by any NRSRO. A downgrade or an announced potential downgrade of our financial strength ratings could have multiple adverse effects on us including:

- reducing new sales of insurance and annuity products or increasing the number or amount of surrenders and withdrawals;
- affecting our relationships with our sales force, independent sales intermediaries and credit counterparties;
- requiring us to offer higher crediting rates or greater policyholder guarantees on our insurance products in order to remain competitive; and
- affecting our ability to obtain reinsurance at reasonable prices.

It is likely that the NRSROs will continue to apply a high level of scrutiny to financial institutions, including us and our competitors, and may adjust the capital, risk management and other requirements employed in the NRSRO models for maintenance of certain ratings levels.

We are controlled by a small number of stockholders. As of December 31, 2018, the Moody Foundation, a charitable trust, beneficially owned approximately 22.75% of our common stock. In addition, Moody National Bank, in its capacity as trustee or agent of various accounts, had the power to vote approximately 49.07% of our common stock as of such date. As a result, subject to applicable legal and regulatory requirements, these institutions have the ability to exercise a controlling influence over matters submitted for stockholder approval, including the composition of our Board of Directors, and through the Board of Directors any determination with respect to our business direction and policies. This concentration of voting power could deter a change of control or other business combination that might be beneficial or preferable to other stockholders. It may also adversely affect the trading price of our common stock if controlling stockholders sell a significant number of shares or if investors perceive disadvantages in owning stock in a company controlled by a small number of stockholders.

See also Part II, Item 7A, Quantitative and Qualitative Disclosures About Market Risk, for additional details regarding certain risks that we face.

Advances in medical technology may adversely affect our business. Genetic testing and diagnostic imaging technology is advancing rapidly. Increases in the prevalence, availability (particularly in the case of direct to consumer genetic testing) and accuracy of such testing may increase our adverse selection risk, as people who learn that they are predisposed to certain medical conditions associated with reduced life expectancy may be more likely to purchase and maintain life insurance policies. Conversely, people who learn that they lack genetic predisposition to conditions associated with reduced life expectancy may forego the purchase of life insurance, or permit existing policies to lapse, and may be more likely to purchase certain annuity products. Our access to and ability to use medical information, including the results of genetic and diagnostic testing, that is known to our prospective policyholders is important to our underwriting of life insurance and annuities. Some states restrict insurers' access and use of genetic information, and similar additional regulations and legislation may be adopted. Such regulation and legislation likely would exacerbate adverse risk selection related to genetic and diagnostic testing.

In addition to earlier diagnosis and knowledge of disease risk, medical advances may increase overall health and longevity. If this were to occur, the duration of payments made under certain of our annuity products would be extended beyond our actuarial assumptions, reducing the profitability of such business. This may require us to modify our assumptions, models or reserves.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None

ITEM 2. PROPERTIES

We own and occupy our corporate headquarters in Galveston, Texas. We also own and occupy the following properties that are materially important to our operations:

- Three buildings in League City, Texas which are used by our Life, Health, and Corporate and Other segments.
- Five buildings, four in Springfield, Missouri and the other in Glenmont, New York, which are used by our Property and Casualty segment.

We believe our properties are adequate and suitable for our business as currently conducted and are adequately maintained. The above does not include properties we own only for investment purposes.

ITEM 3. LEGAL PROCEEDINGS

Information required for Item 3 is incorporated by reference to the discussion under the heading "Litigation" in Note 19, Commitments and Contingencies, of the Notes to the Consolidated Financial Statements.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Stockholder Information

Our common stock is traded on the NASDAQ Global Select Market under the symbol "ANAT."

On December 31, 2018, our year-end closing stock price was $127.24 per share, and there were 644 holders of record of our issued and outstanding shares of common stock.

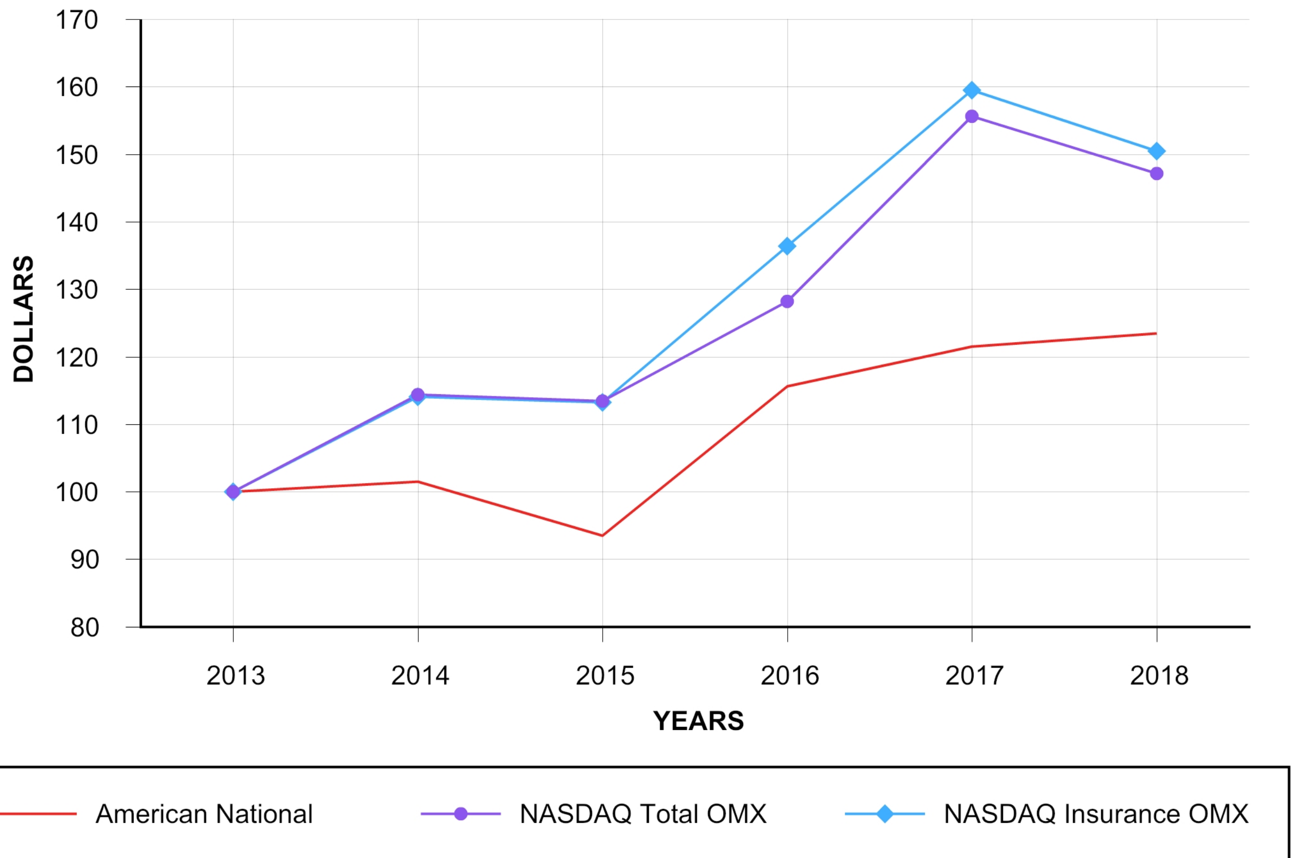
Securities Authorized for Issuance under Equity Compensation Plans

The following table provides information regarding our common stock that is authorized for issuance under American National's 1999 Stock and Incentive Plan as of December 31, 2018:

	Equity Compensation Plan Information		
	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted-average exercise price outstanding options, warrants and rights	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a))
	(a)	(b)	(c)
Plan category			
Equity compensation plans			
Approved by security holders	—	$ 80.05	$ 2,391,739
Not approved by security holders	—	—	—
Total	—	$ 80.05	$ 2,391,739

Performance Graph

The following graph compares the cumulative stockholder return for our common stock for the last five years with the performance of the NASDAQ Stock Market and a NASDAQ Insurance Stock index using NASDAQ OMX Global Indexes. It shows the cumulative changes in value of an initial $100 investment on December 31, 2013, with all dividends reinvested.



Value at each year-end of a $100 initial investment made on December 31, 2013:

	December 31,											
	2013		2014		2015		2016		2017		2018	
American National	$	100.00	$	101.53	$	93.51	$	115.64	$	121.55	$	123.48
NASDAQ Total OMX		100.00		114.43		113.46		128.22		155.63		147.16
NASDAQ Insurance OMX		100.00		114.10		113.26		136.41		159.53		150.51

This performance graph shall not be deemed to be incorporated by reference into our SEC filings or to constitute soliciting material or otherwise be considered filed under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended.

ITEM 6. SELECTED FINANCIAL DATA

American National Insurance Company
(and its subsidiaries)

(dollar amounts in millions, except per share amounts)	Years ended December 31, 2018	2017	2016	2015	2014
Total premiums and other revenues	$ 3,326	$ 3,411	$ 3,228	$ 3,017	$ 3,051
Income from continuing operations, net of tax*	160	496	183	242	247
Net income*	160	496	183	242	247
Net income attributable to American National*	159	494	181	243	245
Per common share					
Income from continuing operations, net of tax*					
Basic	5.97	18.43	6.79	9.02	9.21
Diluted	5.96	18.38	6.77	8.99	9.17
Net income attributable to American National*					
Basic	5.91	18.35	6.73	9.04	9.15
Diluted	5.91	18.31	6.71	9.02	9.11
Cash dividends per share	3.28	3.28	3.26	3.14	3.08

	December 31, 2018	2017	2016	2015	2014
Total assets	$ 26,912	$ 26,387	$ 24,533	$ 23,766	$ 23,566
Total American National stockholders' equity	5,257	5,247	4,652	4,452	4,428
Total equity	5,272	5,256	4,661	4,462	4,440

* Results for the year ended December 31, 2017 include the impact of the U. S. Tax Cut and Jobs Act ("Tax Reform") of $206.4 million, primarily due to the remeasurement of our deferred tax balances to the new 21% corporate income tax rate. Excluding the impact of Tax Reform, the Company's net income for the year ended December 31, 2017 would have been $287.3 million and net earnings per basic and diluted share of $10.68 and $10.65, respectively.

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

Forward-Looking Statements

Certain statements made in this report include forward-looking statements within the meaning of the "safe harbor" provisions of the Private Securities Litigation Reform Act of 1995. Forward-looking statements generally are indicated by words such as "expects," "intends," "anticipates," "plans," "believes," "estimates," "will" or words of similar meaning, and include, without limitation, statements regarding the outlook of our business and expected financial performance. These forward-looking statements are subject to changes and uncertainties which are, in many instances, beyond our control and have been made based upon our assumptions, expectations and beliefs concerning future developments and their potential effect upon us. There can be no assurance that future developments will be in accordance with our expectations, or that the effect of future developments on us will be as anticipated. It is not a matter of corporate policy for us to make specific projections relating to future earnings, and we do not endorse any projections regarding future performance made by others. Additionally, we do not publicly update or revise forward-looking statements based on the outcome of various foreseeable or unforeseeable events. Forward-looking statements are not guarantees of future performance and involve various risks and uncertainties. There are certain important factors that could cause actual results to differ, possibly materially, from expectations or estimates reflected in such forward-looking statements, including without limitation risks, uncertainties and other factors discussed in Item 1A, Risk Factors and elsewhere in this report. Management's discussion and analysis ("MD&A") of our financial condition and results of operations should be read in conjunction with our consolidated financial statements and related notes included in Item 8, Financial Statements and Supplementary Data.

Overview

Chartered in 1905, we are a diversified insurance and financial services company offering a broad spectrum of insurance products in all 50 states, the District of Columbia and Puerto Rico. Our headquarters are in Galveston, Texas.

Our business has been and will continue to be influenced by a number of industry-wide, segment or product-specific trends and conditions. In our discussion below, we first outline the broad macro-economic or industry trends (General Trends) that we expect to impact our overall business. Second, we discuss certain segment-specific trends we believe may impact individual segments or specific products within these segments.

Segments

The insurance segments do not directly own assets. Rather, assets are allocated to support the liabilities and capital allocated to each segment. The mix of assets allocated to each of the insurance segments is intended to support the characteristics of the insurance liabilities within each segment including expected cash flows and pricing assumptions, and is intended to be sufficient to support each segment's business activities. We have utilized this methodology consistently over all periods presented.

The Corporate and Other segment acts as the owner of all of the invested assets of the Company. The investment income from the invested assets is allocated to the insurance segments in accordance with the assets allocated to each insurance segment. Earnings of the Corporate and Other segment are derived from income related to invested assets not allocated to the insurance segments and from our non-insurance businesses. All realized investment gains and losses, which includes other-than-temporary impairments ("OTTI"), are recorded in this segment.

General Trends

Our business, financial condition and results of operations are materially affected by economic and financial market conditions. The U.S. and global economies, as well as the capital markets, continue to show mixed signals, and uncertainties continue to be significant factors in the markets in which we operate. Factors such as consumer spending, business investment, the volatility of the capital markets, the level of interest rates, unemployment, the level of participation in the workforce and the risk of inflation or deflation will affect the business and economic environment and, in turn, impact the demand for the type of financial and insurance products we offer. Adverse changes in the economy could have a material adverse effect on us. However, we believe those risks are somewhat mitigated by our financial strength, active enterprise risk management and disciplined underwriting for our products. Our diverse product mix and distribution channels across insurance segments is a strength that we expect will help us adapt to the volatile economic environment and give us the ability to serve the changing needs of our customers. Additionally, through our long-term business approach, we believe we are financially strong, and we are committed to providing a steady and reliable source of financial protection for policyholders.

Interest Rates: The low-interest rate environment is a challenge for life insurers as the spreads on deposit-type contracts remain narrow, especially as interest rates have approached minimum crediting rates. Low market interest rates reduce the spreads between the amounts we credit to fixed annuity and individual life policyholders and the amounts we earn on the investments that support these obligations. Our ALM Committee actively manages the profitability of our in-force blocks. In previous years, we reduced the guaranteed minimum crediting rates on new fixed annuity contracts, which has afforded us the flexibility to respond to the unusually low-interest rate environment. In previous years, we also reduced crediting rates on in-force contracts, where permitted to do so. These actions help mitigate the adverse impact of low interest rates on the profitability of these products, although sales volume may be negatively impacted as a result. We also maintain assets with various maturities to support product liabilities and ensure liquidity. A gradual increase in longer-term interest rates relative to short-term rates generally will have a favorable effect on the profitability of our products. Rapidly rising interest rates could result in reduced persistency of our spread-based products, if contract holders shift assets into higher yielding investments. We believe our ability to react quickly to the changing marketplace will help us manage this risk.

The interest rate environment affects estimated future profit projections, which could impact the amortization of our DAC assets and the estimates of policyholder liabilities. Significantly lower future estimated profits may cause us to accelerate the amortization of DAC or require us to establish additional policyholder liabilities, thereby reducing earnings. We periodically review assumptions with respect to future earnings to make sure that they remain appropriate considering the current interest rate environment.

Low interest rates are also challenging for property and casualty insurers. Investment income is an important element in earning an acceptable return on capital. Lower interest rates resulting in lower investment income require us to achieve better underwriting results. We have adjusted policy prices to help mitigate the adverse impact of low interest rates on our property and casualty business.

Changing Regulatory Environment: The insurance industry is primarily regulated at the state level, although some life and annuity products and services are also subject to U.S. federal regulation. We are regularly subjected to additional or changing regulation that requires us to update systems, change product structure, increase the amount of reporting or adopt changes to distribution. These changes may increase the capital requirements for us and the industry, increase operating costs, change our operating practices and change our ability to provide products with pricing attractive to the marketplace.

Importance of Operating Efficiencies: The volatile economic environment and costs associated with greater regulation create a further need for operating efficiencies. We manage our cost base while maintaining our commitment to provide superior customer service to policyholders and agents. Investments in technology are coordinated through a disciplined project management process. We anticipate continually improving our use of technology to enhance our policyholders' and agents' experience and increase efficiency of our employees.

Increased Role of Advanced Technology: The use of mobile technology has changed the way consumers want to conduct their business, including real-time access to information. Many customers expect to complete transactions in a digital format instead of traditional methods that require a phone call or submission of paper forms. Social media and other customer-facing technologies also reshape the way companies communicate and collaborate with key stakeholders, and new tools exist to better collect and analyze information for potential business opportunities and better manage risks. For example, American National has mobile-enabled all of its Internet-based access and leverages social media channels to reach out to potential customers to promote awareness of the company, including the products and services offered. We expect that technology will continue to evolve, offering new and more effective ways to reach and service our customers and shareholders. We evaluate available and evolving technologies and incorporate those that we believe offer appropriate benefits to the company and its customers.

Increased Challenges of Talent Attraction and Retention: Attracting qualified individuals and retaining existing employees is a challenge for all employers. Businesses have become extremely competitive in the talent marketplace, and with such low unemployment today, it has become a candidate's job market. Combined with the increasing impact of social media it is easier than ever for companies to find individuals with needed job skills and lure them away from their current positions. As a result, the ability to distinguish American National as the employer of choice grows increasingly challenging.

Our expanded use of technology, particularly our new recruiting-marketing platform combined with greater use of social media, is intended to enhance our employer brand and educate candidates on why they should work for us. Our ongoing efforts to develop a diverse and inclusive workforce not only strengthens the engagement of our current employee population but helps make us an attractive employer where differing insights and opinions are valued. Valuing different perspectives and the impact of broader employee influence on how decisions are made, are two areas for the company to focus on for successful retention. Providing for robust career development opportunities and effective succession planning is expected to be another important part of our retention efforts.

Life and Annuity

Life insurance and annuity are mainstay segments, as they have been during our long history. We believe that the combination of predictable and decreasing mortality rates, positive cash flow generation for many years after policy issue and favorable persistency characteristics suggest a viable and profitable future for these lines of business.

Effective management of invested assets and associated liabilities using crediting rates and, where applicable, financial hedging instruments (which we use as economic hedges of equity-indexed life and annuity products), is important to the success of our life and annuity segments. Asset "disintermediation", the risk of large outflows of cash at times when it is disadvantageous to us to dispose of invested assets, is a risk associated with these segments.

Demographics: We believe a key driver shaping the actions of the life insurance industry is the rising income protection, wealth accumulation and insurance needs of retiring Baby Boomers (those born between 1946 and 1964). As a result of increasing longevity and uncertainty regarding the Social Security System and an ongoing transition from defined benefit pension plans to 401(k) type retirement plans, retirees will need to accumulate sufficient savings to support retirement income requirements.

We believe we are well positioned to address the Baby Boomers' increasing need for savings tools and income protection. We believe that our overall financial strength and broad distribution channels position us to respond with a variety of products for individuals approaching retirement age, who seek information to plan for and manage their retirement needs. We believe our products that offer guaranteed income flows for life, including single premium immediate annuities, are well positioned to serve this market.

Competitive Pressures: In recent years, the competitive landscape of the U.S. life insurance industry has shifted. Established insurers are competing against each other and also against new market entrants that are developing products to attract the interest of the growing number of retirees. Competition exists in terms of retaining and acquiring consumers' business and also in terms of access to producers and distributors. Consolidation among distributors coupled with the aging sales force remains a challenge among insurers. In addition, the increased technological sophistication of consumers necessitates that insurers and distributors invest significant resources in technology to adapt to consumer expectations. We believe we possess sufficient scale, financial strength, resources and flexibility to compete effectively.

The annuity market is also highly competitive. In addition to aggressive interest crediting rates and new product features on annuities, there is competition from other financial service firms. Insurers continue to evaluate their distribution channels and the way they deliver products to consumers.

We believe we will continue to be competitive in the life and annuity markets through our broad line of products, diverse distribution channels, and consistent high level of customer service. We modify our products to meet customer needs and to expand our reach where we believe we can obtain profitable growth.

Health

Most of the major provisions of the Patient Protection and Affordable Care Act, and a reconciliation measure, the Health Care and Education Reconciliation Act of 2010 (collectively, "the Healthcare Acts"), phased in effective January 1, 2014. The Healthcare Acts mandated broad changes in the delivery of health care benefits that have impacted our business model including our relationships with current and future customers, producers, and health care providers, as well as our products, services and processes. As a result, the Healthcare Acts generated new opportunities in the limited benefit and supplemental product markets. In recent years, we built a portfolio of such products to be sold in the worksite market as well as to individuals. We feel that recent changes to the Healthcare Acts that removed the tax consequences for not having health coverage and the removal of limitations on Short Term Medical products could significantly increase our production. We also continue to expand our presence in the worksite market to generate new opportunities in the broker market, as well as developing and implementing a captive sales force.

We expect our Managing General Underwriter ("MGU") business to remain stable during 2019. We generally retain only 10% of the MGU premium and risk. The majority of the revenue generated from this business is fee income included in "Other income" of the Health segment's operating results.

Property and Casualty

We offer our personal and commercial property and casualty lines of business primarily through exclusive agents. We favor a balanced, focused and collaborative approach to both growth and profitability through the development of successful agencies.

To acquire and retain profitable business, we use sophisticated pricing models and risk segmentation, along with a focused distribution force. We believe this approach allows us to make product enhancements and offer programs that are tailored to our target markets while charging an appropriate premium for the risk.

Demand for property and casualty credit-related insurance products continues to increase. We continue to update credit-related insurance product offerings and pricing to meet changing market needs, as well as adding new agents to expand market share in the credit-related insurance market. We are reviewing and implementing procedures to enhance customer service while, at the same time, looking for efficiencies to reduce administrative costs.

Competition: The property and casualty insurance industry remains highly competitive. Despite the competitive environment, we expect to identify profitable opportunities through our strong distribution channels, expanding geographic coverage, marketing efforts, new product development and pricing sophistication.

Critical Accounting Estimates

The preparation of financial statements in accordance with GAAP requires estimates and assumptions that often involve a significant degree of judgment. These estimates and judgments include expectations of current and future mortality, morbidity, persistency, claims and claim adjustment expenses, recoverability of receivables, investment returns and interest rates which extend well into the future. In developing these estimates, there is inherent uncertainty, and material changes to facts and circumstances may develop. Although variability is inherent in these estimates, we believe the amounts as reported are appropriate, based upon the facts available upon compilation of the consolidated financial statements.

On an ongoing basis, management reviews the estimates and assumptions used in preparing the financial statements. If current facts and circumstances warrant modifications in estimates and assumptions, our financial position and results of operations as reported in the consolidated financial statements could change significantly.

A description of these critical accounting estimates is presented below. Also, see the Notes to the Consolidated Financial Statements for additional information.

Reserves

Life and Annuity Reserves

Life Reserving–Principal assumptions used in the determination of the reserves for future policy benefits are mortality, policy lapse rates, investment return, inflation, expenses and other contingent events as appropriate to the respective product type. Reserves for incurred but not reported ("IBNR") claims on life policies are calculated using historical claims information. Reserves for interest-sensitive and variable universal life insurance policies are equal to the current account value calculated for the policyholder. Some of our universal life policies contain secondary guarantees, for which additional reserves are recorded based on the term of the policy.

Annuity Reserving–Reserves for payout annuities with more than insignificant amounts of mortality risk are calculated in accordance with the applicable accounting guidance for limited pay insurance contracts. Benefit and maintenance expense reserves are calculated by using assumptions reflecting our expectations of future costs, including an appropriate margin for adverse deviation. These assumptions are locked-in at issue and generally reflect pricing assumptions from that period. If the resulting reserve would otherwise cause profits to be recognized at the issue date, additional reserves are recorded. The resulting recognition of profits would be gradual over the expected life of the contract.

Reserves for fixed deferred annuities are established equivalent to the account value held on behalf of the policyholder. Reserves for indexed annuities are calculated in accordance with derivative accounting guidance which defines a host liability for return of principal and guaranteed interest, and an embedded derivative liability for funded benefits in excess of the host guarantee. Additional reserves for benefits that can exceed contract fund value, such as lifetime income riders, are determined as needed in accordance with the applicable accounting guidance. The profit recognition on deferred annuity contracts is gradual over the expected life of the contract. No immediate profit is recognized on the sale of the contract.

Key Assumptions–The following assumptions reflect our best estimates and may impact our life and annuity reserves:

- Future lapse rates will remain reasonably consistent with our current expectations;
- Mortality rates will remain reasonably consistent within standard industry mortality table ranges; and
- Future interest spreads will remain reasonably consistent with our current expectations.

Recoverability–At least annually, we test the adequacy of the net benefit reserves (policy benefit reserves less DAC) recorded for life insurance and annuity products. To perform the tests, we use our current best-estimate assumptions as to policyholder mortality, persistency, maintenance expenses and invested asset returns.

For interest-sensitive business, best-estimate assumptions are updated to reflect observed changes based on experience studies and current economic conditions. We reflect the effect of such assumption changes in DAC and reserve balances accordingly. Due to the long-term nature of many of the liabilities, small changes in certain assumptions may cause large changes in profitability. In particular, changes in estimates of the future invested asset return have a large effect on the degree of reserve adequacy and DAC recoverability.

For traditional business, a "lock-in" principle applies, whereby the assumptions used to calculate the benefit reserves and DAC are set when a policy is issued and do not change with changes in actual experience. These include margins for adverse deviation in the event that actual experience differs from the original assumptions.

Health Reserves

Health reserves are established using the following methods:

Completion Factor Approach–This method assumes that the historical claim patterns will be an accurate representation of unpaid claim liabilities. An estimate of the unpaid claims is calculated by subtracting period-to-date paid claims from an estimate of the ultimate "complete" payment for all incurred claims in the period. Completion factors are calculated which "complete" the current period-to-date payment totals for each incurred month to estimate the ultimate expected payout.

Tabular Claims Reserves–This method is used to calculate the reserves for disability income blocks of business. These reserves rely on published valuation continuance tables created using industry experience regarding assumptions of continued morbidity and subsequent recovery. Reserves are calculated by applying these continuance tables, along with appropriate company experience adjustments, to the stream of contractual benefit payments. These expected benefit payments are discounted at the required interest rate.

Future Policy Benefits–Reserves are equal to the aggregate of the present value of expected future benefit payments, less the present value of expected future premiums. Morbidity and termination assumptions are based on our experience or published valuation tables when available and appropriate.

Premium Deficiency Reserves–Deficiency reserves are established when the expected future claim payments and expenses for a classification of policies are in excess of the expected premiums for these policies. The determination of a deficiency reserve takes into consideration the likelihood of premium rate increases, the timing of these increases, and the expected benefit utilization patterns. We have established premium deficiency reserves for portions of the major medical business and the long-term care business that are in run-off. The assumptions and methods used to determine the deficiency reserves are reviewed periodically for reasonableness, and the reserve amount is monitored against emerging losses.

Property and Casualty Reserves

Reserves for Claims and Claim Adjustment Expense ("CAE")–Property and casualty reserves are established to provide for the estimated cost of settling and paying both reported ("case") as well as incurred but not reported ("IBNR") claims. The two major categories of CAE are defense and cost containment expense, and adjusting and other expense. The details of property and casualty reserves are shown below (in thousands):

	December 31, 2018			December 31, 2017		
	Gross	Ceded	Net	Gross	Ceded	Net
Case	$ 858,800	$ 58,381	$ 800,419	$ 544,256	$ 62,629	$ 481,627
IBNR	131,988	11,107	120,881	409,137	26,657	382,480
Total	**$ 990,788**	**$ 69,488**	**$ 921,300**	**$ 953,393**	**$ 89,286**	**$ 864,107**

Case Reserves–Reserves for reported losses are determined on either a judgment or a formula basis, depending on the timing and type of the loss. The formula reserve is a fixed amount for each claim of a given type based on historical paid loss data for similar claims with a provision for claim inflation. Judgment reserve amounts replace initial formula reserves and are set for each loss based on facts and circumstances of each case and the expectation of damages. We regularly monitor the adequacy of reserves on a case-by-case basis and change the amount of such reserves as necessary.

IBNR–IBNR reserves are estimated based on many variables including: historical statistical information, inflation, legal environment, economic conditions, trends in claim severity and frequency as well as other factors affecting the adequacy of claim reserves. Loss and premium data is aggregated by exposure class and by accident year. IBNR reserves are estimated by projecting ultimate losses on each class of business and subtracting paid losses and case reserves. Our overall reserve practice provides for ongoing claims evaluation and adjustment based on the development of related data and other relevant information pertaining to claims. Adjustments in aggregate reserves, if any, are included in the results of operations of the period during which such adjustments are made.

We believe we conservatively reflect the potential uncertainty generated by volatility in our loss development profiles when selecting loss development factor patterns for each line of business. See Note 12, Liability for Unpaid Claims and Claim Adjustment Expenses, of the Notes to the Consolidated Financial Statements for additional information.

The evaluation process to determine reserves involves the collaboration of underwriting, claims and actuarial departments. The process also includes consultation with independent actuarial firms as part of our process of gaining reassurance that claims and CAE reserves estimate sufficiently, all obligations arising from all losses incurred as of year-end. The independent actuarial firm completes the Statements of Actuarial Opinion required by individual state insurance regulations at each year-end, opining that the recorded statutory claims and CAE reserves are reasonable.

Premium Deficiency Reserve—Deficiency reserves are recorded when the expected claims payments and policy maintenance costs for a product line exceed the expected premiums for that product line. The estimation of a deficiency reserve considers the current profitability of a product line using anticipated claims, CAE, and policy maintenance costs. The assumptions and methods used to determine the need for deficiency reserves are reviewed periodically for reasonableness. There were no reserves of this type at December 31, 2018 and December 31, 2017, respectively.

Property and Casualty Reserving Methodology–The following methods are utilized:

- Initial Expected Loss Ratio–This method calculates an estimate of ultimate losses by applying an estimated loss ratio to actual earned premium for each calendar/accident year. This method is appropriate for classes of business where the actual paid or reported loss experience is not yet mature enough to influence initial expectations of the ultimate loss ratios.
- Bornhuetter-Ferguson–This method uses as a starting point an assumed initial expected loss ratio method and blends in the loss ratio implied by the claims experience to date by using loss development patterns based on our historical experience. This method is generally appropriate where there are few reported claims and an unstable pattern of reported losses.
- Loss or Expense Development (Chain Ladder)–This method uses actual loss or defense and cost containment expense data and the historical development profiles on older accident periods to project more recent, less developed periods to their ultimate total. This method is appropriate when there is a relatively stable pattern of loss and expense emergence and a relatively large number of reported claims.
- Ratio of Paid Defense and Cost Containment Expense to Paid Loss Development–This method uses the ratio of paid defense and cost containment expense to paid loss data and the historical development profiles on older accident periods to project more recent, less developed periods to their ultimate total. In this method, an ultimate ratio of paid defense and cost containment expense to paid loss is selected for each accident period. The selected paid defense and cost containment expense to paid loss ratio is then applied to the selected ultimate loss for each accident period to estimate the ultimate defense and cost containment expense. Paid defense and cost containment expense is then subtracted from the ultimate defense and cost containment expense to calculate the unpaid defense and cost containment expense for that accident period.
- Calendar Year Paid Adjusting and Other Expense to Paid Loss–This method uses a selected prior calendar years' paid expense to paid loss ratio to project ultimate loss adjustment expenses for adjusting and other expense. A percentage of the selected ratio is applied to the case reserves (depending on the line of insurance) and 100% to the indicated IBNR reserves. These ratios assume that a percentage of the expense is incurred when a claim is opened and the remaining percentage is paid throughout the claim's life.

The basis of our selected single point best estimate on a particular line of business is often a blended result from two or more methods (e.g. weighted averages). Our estimate is highly dependent on actuarial and management judgment as to which method(s) is most appropriate for a particular accident year and class of business. Our methodology changes over time, as new information emerges regarding underlying loss activity and other factors.

Key Assumptions—The following assumptions may impact our property and casualty reserves:

- Stability of future inflation rates and consistency with historical inflation norms;
- The expected loss development patterns;
- Consistent claims handling, reserving and payment processes;
- No unusual growth patterns or unexpected changes in the mix of business; and
- No significant prospective changes in laws that would significantly affect future payouts.

The loss ratio selections and development profiles are developed primarily using our historical claims and loss experience. These development patterns reflect prior inflation rates, and could be impacted by future changes in inflation rates, particularly those relating to medical care costs, automobile repair parts and building or home material costs. These assumptions have not been modified from the preceding periods and are consistent with historical loss reserve development patterns.

For non-credit lines of business, future inflation rates could vary from our assumption of relatively stable rates. Unexpected changes in future inflation rates could impact our financial position and liquidity, and we measure the sensitivity of our reserve levels to unexpected changes in inflation. The impacts of future inflation for a 1.0% decrease and 3.0% increase over the implied inflation rate in the December 31, 2018 gross loss reserve balance are as follows (amounts in thousands):

Cumulative Increase (Decrease) in Reserves	1.0% Decrease	3.0% Increase
Personal		
Automobile	$ (6,038)	$ 18,582
Homeowner	(1,578)	4,894
Commercial		
Agricultural Business	(6,544)	22,323
Automobile	(2,799)	7,965

The analysis of our credit insurance lines of business quantifies the estimated impact on gross loss reserves of a reasonably likely scenario of varying the ratio applied to the earned premium to determine the IBNR reserves at December 31, 2018. IBNR reserving methodology for this line of business focuses primarily on the use of a ratio applied to the unearned premium for each credit insurance product. The selected ratios are based on historical loss and claim data. In our analysis, we varied this ratio by +/- 5% across all credit insurance products combined. The results of our analysis show an increase or decrease in gross reserves across all accident years combined of approximately $10.1 million.

It is not appropriate to aggregate the impacts shown in our sensitivity analysis, as our lines of business are not directly correlated. The variations are not meant to be a “best-case” or “worst-case” scenario, and it is possible that future variations will be more or less than the amounts in the sensitivity analysis. While these are possible scenarios based on the information available to us at this time, we do not believe the reader should consider our sensitivity analysis an actual reserve range.

Management believes our reserves at December 31, 2018 are adequate. New information, regulation, events or circumstances unknown at the original valuation date, however, may result in future development resulting in ultimate losses being significantly greater or less than the recorded reserves at December 31, 2018.

Deferred Policy Acquisition Costs

We had a DAC asset of approximately $1.50 billion and $1.37 billion at December 31, 2018 and 2017, respectively. See Note 10, Deferred Policy Acquisition Costs, of the Notes to the Consolidated Financial Statements for additional details.

We believe the estimates used in our DAC calculations provide an example of how variations in assumptions and estimates would affect our business. The following table displays the sensitivity of reasonably likely changes in assumptions in the DAC amortization for our long-tail business at December 31, 2018 (in thousands):

	Increase (Decrease) in DAC
Increase in future investment margins of 25 basis points	$ 36,192
Decrease in future investment margins of 25 basis points	(39,335)
Decrease in future life mortality by 1%	1,509
Increase in future life mortality by 1%	(1,520)

Reinsurance

We manage our insurance underwriting risk exposures by purchasing reinsurance. We manage counterparty risk by entering into agreements with reinsurers we consider creditworthy, generally measured by the individual entity or entities' financial strength rating. However, we do not require a specified minimum rating. We monitor the concentrations of the reinsurers and reduce the participation percentage of lower-rated and unrated companies when appropriate in our judgment. While we believe we currently have no significant credit risk related to reinsurance counterparties, we continue to monitor their financial condition.

Some of our reinsurance contracts contain clauses that allow us to terminate the participation with reinsurers whose ratings are downgraded. Information used in our risk assessment is comprised of industry ratings, recent news and reports, and a limited review of financial statements. We also may require reinsurers not licensed in our state of domicile or with whom we have limited experience, to provide letters of credit, trust agreements, or cash advances to fund their share of reserves.

Other-Than-Temporary Impairment

A decline in the fair value of fixed maturity investment securities below their cost basis is evaluated on an ongoing basis to determine if the decline is other-than-temporary. A number of assumptions and estimates inherent in evaluating impairments are used to determine if they are other-than-temporary, which include 1) our ability and intent to hold the investment securities for a period of time sufficient to allow for an anticipated recovery in value; 2) the expected recoverability of principal and interest; 3) the length of time and extent to which the fair value has been less than cost basis; 4) the financial condition, near-term and long-term prospects of the issue or issuer, including relevant industry conditions and trends and implications of rating agency actions and offering prices; and 5) the specific reasons that a security is in a significant unrealized loss position, including market conditions, which could affect liquidity.

Valuation of Financial Instruments

The fair value of available-for-sale fixed maturity and equity securities is determined by management using one of the three primary sources of information: the quoted prices in active markets; third-party pricing services; or independent broker quotations. Estimated fair value of securities based on quoted prices in active markets is readily and regularly available; therefore, valuation of these securities generally does not involve management judgment. For securities without quoted prices, fair value measurement is determined using third-party pricing services' proprietary pricing applications. Typical inputs used by the models are relevant market information, benchmark curves, benchmark pricing of like securities, sector groupings and matrix pricing. Any securities remaining unpriced after utilizing the first two pricing methods are submitted to independent brokers for prices. We have analyzed the third-party pricing services and independent brokers' valuation methodologies and related inputs, and have evaluated the various types of securities in our investment portfolio to determine an appropriate fair value hierarchy level based upon trading activity and the observability of market inputs. Management completes certain tests throughout the year and at year-end to determine that prices provided by our pricing services are reasonable.

We utilize over-the-counter equity options to hedge our exposure to equity-indexed universal life and equity-indexed deferred annuity benefits, and the fair values for these options are sourced from broker quotations. Accounting guidance requires a fair value calculation as part of equity-indexed policy reserves. This is called the value of embedded derivative (or VED) and the other part of the indexed policy reserve is called the host reserve. The embedded derivative represents future benefit cash flows in excess of minimum guarantee cash flows. The host covers the minimum guarantee cash flows. Both the VED and the host reserve are calculated by a vendor-sourced reserve valuation system. The VED calculation model incorporates assumptions related to current option pricing (such as implied volatility and LIBOR/swap curve), future policyholder behavior (such as surrenders and withdrawals), and factors affecting the value of future indexed interest periods (such as option budgets).

Pension and Postretirement Benefit Plans

The Company has frozen each of its defined benefit pension plans. Our pension and postretirement benefit obligations and related costs covering our employees are estimated using actuarial concepts in accordance with the relevant accounting guidance. The discount rate and the expected return on plan assets are important elements of expense and/or liability measurements. Each year, these key assumptions are reevaluated to determine whether they reflect the best estimates for the current period. Changes in the methodology used to determine the best estimates are made when facts or circumstances change. Other assumptions involve demographic factors such as retirement age, mortality and turnover. The expected long-term rate of return on plan assets is determined using the building-block method which is described further in Item 8, Financial Statements and Supplementary Data, Notes to the Consolidated Financial Statements, Note 2, Summary of Significant Accounting Policies and Practices, Pension and Postretirement Benefit Plans. In 2017, the Company commenced a one-time window offering to terminated, vested participants of our qualified defined benefit pension plans. The offer allowed participants to take a lump sum or annuity payout which was funded from pension plan assets. See Item 8, Financial Statements and Supplementary Data, Notes to the Consolidated Financial Statements, Note 18, Pension and Postretirement Benefits for additional details.

Litigation Contingencies

Based on information currently available, we believe that amounts ultimately paid, if any, arising from existing and currently potential litigation would not have a material effect on our results of operations and financial condition. However, it should be noted that the frequency of large damage awards, which bear little or no relation to the economic damages incurred by plaintiffs, continues to create the potential for an unpredictable judgment in any given lawsuit. It is possible that, if the defenses in these lawsuits are not successful, and the judgments are greater than we anticipate, the resulting liability could have a material impact on the consolidated financial statements.

Federal Income Taxes

Our effective tax rate is based on income at statutory tax rates, adjusted for non-taxable and non-deductible items, and tax credits. Management's best estimate of future events and their impact is included in our effective tax rate. Certain changes or future events, such as changes in tax legislation, and completion of tax audits could have an impact on our estimates and effective tax rate. Audit periods remain open for review until the statute of limitations has passed.

GAAP requires us to evaluate the recoverability of our deferred tax assets and establish a valuation allowance, if necessary, to reduce our deferred tax assets to an amount that is more-likely-than-not to be realized. Considerable judgment is required in determining whether a valuation allowance is necessary, and if so, the amount of such valuation allowance. There were no material valuation allowances recorded during the years ended December 31, 2018 and 2017. Although realization is not assured, management believes it is more-likely-than-not that our remaining deferred tax assets will be realized and that no additional valuation allowance is necessary as of December 31, 2018.

On December 22, 2017, the federal government enacted the Tax Cuts and Jobs Act ("Tax Reform"). Tax Reform made broad and complex changes to federal corporate tax law and resulted in changes to our overall tax obligations. Most notably, Tax Reform reduced the corporate income tax rate from 35% to 21%. Other provisions affecting corporations include, but are not limited to, changes to the deductibility of interest expense, limitations on certain deductions for executive compensation and the repeal of the corporate Alternative Minimum Tax. In addition, there were several changes that are specific to insurance companies, namely changes to the proration formula used to determine the amount of dividends eligible for the dividends-received deduction, and changes to the calculation of tax reserves associated with policyholder liabilities.

Subsequent to enactment, the Securities Exchange Commission introduced Staff Accounting Bulletin No. 118 ("SAB 118"). SAB 118 provides guidance on accounting for the effects of the Tax Reform where our determinations were incomplete but we were able to determine a reasonable estimate. A final determination is required to be made within a measurement period not to extend beyond one year from the enactment of Tax Reform. In 2017, we recorded a provisional tax benefit of $206.4 million in accordance with the guidance in SAB 118. As a result of Tax Reform, we remeasured our existing deferred tax balances to the new 21% corporate income tax rate. Additionally, we made a reasonable estimate to evaluate the impact of Tax Reform on our 2017 financial statements. There were no adjustments in 2018 to the provisional tax benefit we recorded in 2017.

Consolidated Results of Operations

The following sets forth the consolidated results of operations (in thousands):

	Years ended December 31,			Change over prior year	
	2018	2017	2016	2018	2017
PREMIUMS AND OTHER REVENUES					
Premiums	$ 2,228,193	$ 2,067,202	$ 1,996,648	$ 160,991	$ 70,554
Other policy revenues	285,549	248,526	306,880	37,023	(58,354)
Net investment income	858,367	966,077	860,235	(107,710)	105,842
Realized investments gains (losses), net	16,931	91,209	28,940	(74,278)	62,269
Net losses on equity securities	(107,188)	—	—	(107,188)	—
Other income	44,530	37,986	35,248	6,544	2,738
Total premiums and other revenues	**3,326,382**	**3,411,000**	**3,227,951**	**(84,618)**	**183,049**
BENEFITS, LOSSES AND EXPENSES					
Policyholder benefits	708,313	681,122	726,399	27,191	(45,277)
Claims incurred	1,171,659	1,037,081	1,015,609	134,578	21,472
Interest credited to policyholders' account balances	315,684	415,190	331,770	(99,506)	83,420
Commissions for acquiring and servicing policies	564,054	545,405	465,965	18,649	79,440
Other operating expenses	497,011	485,340	476,462	11,671	8,878
Change in deferred policy acquisition costs (1)	(71,497)	(81,484)	1,152	9,987	(82,636)
Total benefits, losses and expenses	**3,185,224**	**3,082,654**	**3,017,357**	**102,570**	**65,297**
Income before federal income taxes and other items	**$ 141,158**	**$ 328,346**	**$ 210,594**	**$ (187,188)**	**$ 117,752**

(1) A negative amount of net change indicates more expense was deferred than amortized and represents a decrease to expenses in the period indicated. A positive amount of net change indicates less expense was deferred than amortized and represents an increase to expenses in the period indicated.

Income before federal income taxes and other items ("Earnings")

Earnings decreased during the year ended December 31, 2018 compared to 2017 primarily due to the inclusion of net unrealized losses on equity securities in income as required by new accounting guidance. The earnings for the year ended December 31, 2018 were also impacted by a reduced interest margin resulting from a decrease in the S&P 500 index on equity-indexed products in our Annuity segment as well as losses impacting our homeowners, commercial auto and GAP lines of business in our Property and Casualty segment. Earnings increased during 2017 compared to 2016 primarily due to an increase in net investment income and realized investment gains. The increase in net investment income was attributable to increased income on mortgage loans. The increase in realized investment gains was attributable to an increase in the sale of bonds, equity securities, and certain real estate holdings.

Life

Life segment financial results for the periods indicated were as follows (in thousands):

	Years ended December 31,			Change over prior year	
	2018	2017	2016	2018	2017
PREMIUMS AND OTHER REVENUES					
Premiums	$ 350,012	$ 328,570	$ 318,953	$ 21,442	$ 9,617
Other policy revenues	270,839	234,979	295,289	35,860	(60,310)
Net investment income	233,181	245,835	227,923	(12,654)	17,912
Other income	2,266	2,256	2,067	10	189
Total premiums and other revenues	**856,298**	**811,640**	**844,232**	**44,658**	**(32,592)**
BENEFITS, LOSSES AND EXPENSES					
Policyholder benefits	417,702	410,152	429,813	7,550	(19,661)
Interest credited to policyholders' account balances	54,249	73,965	63,565	(19,716)	10,400
Commissions for acquiring and servicing policies	158,657	147,176	132,428	11,481	14,748
Other operating expenses	190,835	190,482	186,879	353	3,603
Change in deferred policy acquisition costs (1)	(33,893)	(49,786)	3,887	15,893	(53,673)
Total benefits, losses and expenses	**787,550**	**771,989**	**816,572**	**15,561**	**(44,583)**
Income before federal income taxes and other items	**$ 68,748**	**$ 39,651**	**$ 27,660**	**$ 29,097**	**$ 11,991**

(1) A negative amount of net change indicates more expense was deferred than amortized and represents a decrease to expenses in the period indicated. A positive amount of net change indicates less expense was deferred than amortized and represents an increase to expenses in the period indicated.

Items affecting the comparability of life results

The Company converted the valuation of its universal life business from an internally developed valuation system to a vendor based system in 2016 and further upgraded the system in 2017. Both events resulted in impacts to other policy revenues, policyholder benefits, and change in deferred policy acquisition costs. Neither event had significant impacts on operating income.

The unlocking of best estimate assumptions on the interest sensitive block impacted other policy revenues, policyholder benefits, and change in deferred policy acquisition costs. The Company unlocked assumptions in 2017 and 2018 with favorable operating income impacts of $5 million and $6 million, respectively.

Earnings

Earnings increased during the year ended December 31, 2018 compared to 2017 due to higher premiums and other policy revenues. Earnings increased during 2017 compared to 2016 primarily due to a decrease in policyholder benefits.

Premiums and other revenues

Premiums increased during the year ended December 31, 2018 compared to 2017 and 2017 compared to 2016 primarily due to continued growth in renewal premium on traditional life products.

Other policy revenues, which include cost of insurance charges, earned policy service fees and surrender charges, have also increased during the year ended December 31, 2018 as the size of our interest sensitive block continues to grow, through increased sales and aging of the in-force. The decrease in other policy revenue during 2017 compared to 2016 is due to the change in estimates discussed in "Items affecting the comparability of life results" section.

Life insurance sales

The following table presents life insurance sales as measured by annualized premium, a non-GAAP measure used by the insurance industry, which allows a comparison of new policies sold by an insurance company during the period (in thousands):

	Years ended December 31,			Change over prior year	
	2018	2017	2016	2018	2017
Traditional Life	$ 57,714	$ 58,666	$ 52,596	$ (952)	$ 6,070
Universal Life	25,270	23,833	19,543	1,437	4,290
Indexed UL	33,543	29,110	24,606	4,433	4,504
Total Recurring	**$ 116,527**	**$ 111,609**	**$ 96,745**	**$ 4,918**	**$ 14,864**
Single and excess[1]	$ 3,336	$ 3,026	$ 1,932	$ 310	$ 1,094
Credit life[1]	8,076	8,689	9,035	(613)	(346)

(1) These are weighted amounts representing 10% of single and excess premiums and 31% of credit life premiums. In 2018, credit life weighting changed from 15% to 31% due to an increase in monthly outstanding balance; 2017 amounts have been updated for comparison purposes.

Life insurance sales measure activity associated with gaining new insurance business in the current period, and includes deposits received related to interest sensitive life and universal life-type products. In contrast, GAAP premium revenues are associated with policies sold in current and prior periods, and deposits received related to interest sensitive life and universal life-type products are recorded in a policyholder account which is reflected as a liability. Therefore, a reconciliation of premium revenues and insurance sales is not meaningful.

Life insurance sales increased during 2018 compared to 2017 primarily due to increased Indexed Universal Life sales. Life insurance sales increased in all major product lines during 2017 compared to 2016.

Benefits, losses and expenses

Policyholder benefits increased during the year ended December 31, 2018 compared to 2017 attributable to an increase in the severity of claims. Policyholder benefits decreased during 2017 compared to 2016 primarily due to the change in estimates.

Commissions increased during the year ended December 31, 2018 compared to 2017 which was commensurate with the increase in indexed universal life and universal life sales. Commissions increased during 2017 compared to 2016 which was commensurate with the increase in life sales.

The following table presents the components of the change in DAC (in thousands):

	Years ended December 31,			Change over prior year	
	2018	2017	2016	2018	2017
Acquisition cost capitalized	$ 131,156	$ 123,854	$ 108,825	$ 7,302	$ 15,029
Amortization of DAC	(97,263)	(74,068)	(112,712)	(23,195)	38,644
Change in DAC	**$ 33,893**	**$ 49,786**	**$ (3,887)**	**$ (15,893)**	**$ 53,673**

The amortization of DAC increased during the year ended December 31, 2018 due to release of reserves due to an increase in the severity of claims. The increase in DAC during 2017 compared to 2016 was primarily due to the change in estimates.

Policy in-force information

The following table summarizes changes in the Life segment's in-force amounts (in thousands):

	December 31,			Change over prior year	
	2018	2017	2016	2018	2017
Life insurance in-force					
Traditional life	$ 78,872,533	$ 73,452,519	$ 67,649,433	$ 5,420,014	$ 5,803,086
Interest-sensitive life	31,483,582	29,648,405	27,971,646	1,835,177	1,676,759
Total life insurance in-force	**$ 110,356,115**	**$ 103,100,924**	**$ 95,621,079**	**$ 7,255,191**	**$ 7,479,845**

The following table summarizes changes in the Life segment's number of policies in-force:

	December 31,			Change over prior year	
	2018	2017	2016	2018	2017
Number of policies in-force					
Traditional life	1,701,980	1,800,425	1,841,359	(98,445)	(40,934)
Interest-sensitive life	243,447	232,251	222,845	11,196	9,406
Total number of policies in-force	**1,945,427**	**2,032,676**	**2,064,204**	**(87,249)**	**(31,528)**

Total life insurance in-force increased during the year ended December 31, 2018 compared to 2017 and 2017 compared to 2016, due to increased sales, despite a reduction in the number of policies in-force. The reduction in policies in-force reflects continued decrease in lower face amount policies.

Reinsurance

The table below summarizes reinsurance reserves and premium amounts assumed and ceded (in thousands):

	Reserves			Premiums		
	Years ended December 31,			Years ended December 31,		
	2018	2017	2016	2018	2017	2016
Reinsurance assumed	$ 1,922	$ 2,337	$ 1,716	$ 389	$ 1,290	$ 2,188
Reinsurance ceded	(248,688)	(249,988)	(219,375)	(103,749)	(104,599)	(104,128)
Total	**$ (246,766)**	**$ (247,651)**	**$ (217,659)**	**$ (103,360)**	**$ (103,309)**	**$ (101,940)**

We use reinsurance to mitigate certain risks to the life segment. During 2018, our retention limits were $1.5 million for issue ages 65 and under, and $700,000 for issue ages 66 and older for traditional and universal life. In our life segment, we currently retain 100% of newly developed permanent and term products up to our retention limit and cede the excess. We also engage in facultative reinsurance through several reinsurers. Accidental death and premium waiver benefits are mostly retained on new business. Increases in reserves and premium amounts ceded primarily reflect increased use of reinsurance in conjunction with treaties related to universal life products.

For 2018, the companies to whom we have ceded reinsurance for the Life segment are shown below (in thousands, except percentages)

Reinsurer	A.M. Best Rating(1)	Ceded Premium	Percentage of Gross Premium
Swiss Re Life & Health of America Inc.	A+	$ 27,892	4.1 %
SCOR Global Life Reinsurance Company of Delaware	A +	23,988	3.5
Munich American Reassurance Company	A+	16,251	2.4
Canada Life Reinsurance	A+	9,954	1.5
Reinsurance Group of America	A-	5,861	0.9
Other Reinsurers with no single company greater than 5% of the total ceded premium		19,803	2.9
Total life reinsurance ceded		**$ 103,749**	**15.3%**

(1) A.M. Best rating as of the most current information available February 15, 2019.

In addition, reinsurance is used in the credit life business primarily to provide producers of credit-related insurance products the opportunity to participate in the underwriting risk through producer-owned captive reinsurance companies often domiciled outside of the United States. A majority of the treaties entered into by our Specialty Markets Group are written on a 100% coinsurance basis with benefit limits of $100,000 on credit life.

Annuity

Annuity segment financial results for the periods indicated were as follows (in thousands):

	Years ended December 31, 2018	2017	2016	Change over prior year 2018	2017
PREMIUMS AND OTHER REVENUES					
Premiums	$ 231,027	$ 222,207	$ 248,714	$ 8,820	$ (26,507)
Other policy revenues	14,710	13,547	11,591	1,163	1,956
Net investment income	467,788	573,789	500,726	(106,001)	73,063
Other income	2,611	2,832	3,161	(221)	(329)
Total premiums and other revenues	**716,136**	**812,375**	**764,192**	**(96,239)**	**48,183**
BENEFITS, LOSSES AND EXPENSES					
Policyholder benefits	290,611	270,970	296,586	19,641	(25,616)
Interest credited to policyholders' account balances	261,435	341,225	268,205	(79,790)	73,020
Commissions for acquiring and servicing policies	94,879	105,389	78,177	(10,510)	27,212
Other operating expenses	46,859	44,486	51,283	2,373	(6,797)
Change in deferred policy acquisition costs (1)	(35,135)	(30,022)	(5,780)	(5,113)	(24,242)
Total benefits, losses and expenses	**658,649**	**732,048**	**688,471**	**(73,399)**	**43,577**
Income before federal income taxes and other items	**$ 57,487**	**$ 80,327**	**$ 75,721**	**$ (22,840)**	**$ 4,606**

(1) A negative amount of net change indicates more expense was deferred than amortized and represents a decrease to expenses in the period indicated. A positive amount of net change indicates less expense was deferred than amortized and represents an increase to expenses in the period indicated.

Items affecting the comparability of annuity results

The Company converted the valuation of its single premium immediate annuity business from a mainframe valuation system to a more robust vendor based system in 2017 resulting in a $9.6 million decrease in estimates affecting policyholder benefits.

Earnings

Earnings decreased during the year ended December 31, 2018 compared to 2017 primarily due to a reduced interest margin on equity-indexed products, driven by mark-to-market option volatility resulting from a decrease in the S&P 500 index. Earnings increased during 2017 compared to 2016 primarily due to a decrease in operating expenses as well as the conversion of SPIA reserve valuation discussed in "Items affecting the comparability of annuity results" section immediately above.

Premiums and other revenues

Annuity premium and deposit amounts received are shown below (in thousands):

	Years ended December 31,			Change over prior year	
	2018	2017	2016	2018	2017
Fixed deferred annuity	$ 399,102	$ 741,184	$ 508,894	$ (342,082)	$ 232,290
Single premium immediate annuity	271,513	261,809	281,521	9,704	(19,712)
Equity-indexed deferred annuity	858,283	893,032	572,473	(34,749)	320,559
Variable deferred annuity	64,907	76,470	76,012	(11,563)	458
Total premium and deposits	**1,593,805**	**1,972,495**	**1,438,900**	**(378,690)**	**533,595**
Less: Policy deposits	1,362,778	1,750,288	1,190,186	(387,510)	560,102
Total earned premiums	**$ 231,027**	**$ 222,207**	**$ 248,714**	**$ 8,820**	**$ (26,507)**

Sales declined during the year ended December 31, 2018 driven by a decrease in fixed deferred products. Deferred products are deposit type contracts and do not contribute to earned premiums. Sales strengthened during 2017 compared to 2016 led by the equity-indexed and fixed deferred products. Earned premiums consist of single premium immediate annuity sales which increased during the year ended December 31, 2018 compared to 2017. These variances are reflective of our management of our annuity block in a very competitive environment for annuities.

We monitor account values and changes in those values as a key indicator of performance in our Annuity segment. Shown below are the changes in account values (in thousands):

	Years ended December 31,		
	2018	2017	2016
Fixed deferred and equity-indexed annuity			
Account value, beginning of period	$ 10,042,683	$ 9,122,568	$ 8,882,184
Net inflows	929,455	1,337,864	769,377
Surrenders	(775,597)	(745,118)	(784,666)
Fees	(7,090)	(6,608)	(5,821)
Interest credited	252,795	333,977	261,494
Account value, end of period	**10,442,246**	**10,042,683**	**9,122,568**
Single premium immediate annuity			
Reserve, beginning of period	1,691,502	1,566,440	1,398,481
Net inflows	74,426	78,637	117,840
Interest and mortality	60,209	46,425	50,119
Reserve, end of period	**1,826,137**	**1,691,502**	**1,566,440**
Variable deferred annuity			
Account value, beginning of period	381,902	392,345	417,821
Net inflows	62,103	73,891	71,982
Surrenders	(88,979)	(140,686)	(114,543)
Fees	(4,283)	(4,481)	(4,745)
Change in market value and other	(17,845)	60,833	21,830
Account value, end of period	**332,898**	**381,902**	**392,345**
Total account value, end of period	**$ 12,601,281**	**$ 12,116,087**	**$ 11,081,353**

Benefits, losses and expenses

Policyholder benefits consist of annuity payments and reserve increases for SPIA contracts. Reserve increases are highly correlated to the sales volume of SPIA contracts, which explains the change in benefits over the past three years.

Commissions decreased during the year ended December 31, 2018 compared to 2017 driven by a decrease in sales of fixed deferred and equity-indexed products partially offset by an increase in single premium immediate products. Commissions increased during 2017 compared to 2016 driven by an increase in sales of deferred annuity and equity-indexed products.

Other operating expenses remained relatively flat during the year ended December 31, 2018 compared to 2017. Other operating expenses decreased during 2017 compared to 2016 primarily due to a non-recurring premium tax payment in 2016.

The change in DAC represents acquisition costs capitalized less the amortization of existing DAC, which is calculated in proportion to expected gross profits. The following shows the components of the change in DAC (in thousands):

	Years ended December 31,			Change over prior year	
	2018	2017	2016	2018	2017
Acquisition cost capitalized	$ 92,602	$ 104,772	$ 77,161	$ (12,170)	$ 27,611
Amortization of DAC	(57,467)	(74,750)	(71,381)	17,283	(3,369)
Change in DAC	**$ 35,135**	**$ 30,022**	**$ 5,780**	**$ 5,113**	**$ 24,242**

The amortization of DAC as a percentage of gross profits is an important ratio for the Annuity segment. Changes in this ratio reflect the impact of emerging experience. The ratios for the years ended December 31, 2018, 2017 and 2016 were 35.0%, 36.8% and 35.5%, respectively. A higher ratio is less favorable due to a higher proportion of the margin used to amortize DAC.

In 2018, DAC assumptions were unlocked, resulting in a favorable reduction in amortization.

Interest Margin

Overall, the margin earned on annuity reserves decreased during the year ended December 31, 2018 compared to 2017, due to continued spread compression and unfavorable market conditions reflected in the mark-to-market option values related to equity-indexed products.The following table summarizes the interest margin due to the impact of the investment performance, interest credited to policyholder’s account balances, and the end of period assets measured by account balance (in thousands):

	Years ended December 31,			Change over prior year	
	2018	2017	2016	2018	2017
Fixed deferred annuities					
Fixed investment income	$ 309,797	$ 336,136	$ 347,194	$ (26,339)	$ (11,058)
Interest credited	(196,610)	(200,383)	(209,730)	3,773	9,347
Interest margin	**113,187**	**135,753**	**137,464**	**(22,566)**	**(1,711)**
Account balance, end of period	**6,773,601**	**7,108,252**	**7,068,119**	**(334,651)**	**40,133**
Equity-indexed annuities					
Fixed investment income	135,595	91,010	66,347	44,585	24,663
Option return	(48,613)	80,399	26,099	(129,012)	54,300
Interest and mortality	(55,729)	(133,177)	(52,947)	77,448	(80,230)
Interest and mortality margin	**31,253**	**38,232**	**39,499**	**(6,979)**	**(1,267)**
Reserve, end of period	**3,668,645**	**2,934,430**	**2,054,449**	**734,215**	**879,981**
Single premium immediate annuities					
Fixed investment income	71,009	66,244	61,083	4,765	5,161
Interest and mortality	(60,296)	(47,768)	(50,609)	(12,528)	2,841
Interest and mortality margin	**10,713**	**18,476**	**10,474**	**(7,763)**	**8,002**
Reserve, end of period	**1,826,137**	**1,691,502**	**1,566,440**	**134,635**	**125,062**
Total interest and mortality margin	**$ 155,153**	**$ 192,461**	**$ 187,437**	**$ (37,308)**	**$ 5,024**
Total account balance and reserve, end of period	**$ 12,268,383**	**$ 11,734,184**	**$ 10,689,008**	**$ 534,199**	**$ 1,045,176**

Health

Health segment financial results for the periods indicated were as follows (in thousands):

	Years ended December 31,			Change over prior year	
	2018	2017	2016	2018	2017
PREMIUMS AND OTHER REVENUES					
Premiums	$ 180,414	$ 156,436	$ 175,589	$ 23,978	$ (19,153)
Net investment income	9,376	9,538	9,942	(162)	(404)
Other income	24,185	19,284	17,488	4,901	1,796
Total premiums and other revenues	**213,975**	**185,258**	**203,019**	**28,717**	**(17,761)**
BENEFITS, LOSSES AND EXPENSES					
Claims incurred	122,547	103,037	132,390	19,510	(29,353)
Commissions for acquiring and servicing policies	32,516	27,400	22,846	5,116	4,554
Other operating expenses	41,819	38,475	42,655	3,344	(4,180)
Change in deferred policy acquisition costs (1)	2,846	3,814	3,770	(968)	44
Total benefits, losses and expenses	**199,728**	**172,726**	**201,661**	**27,002**	**(28,935)**
Income before federal income taxes and other items	**$ 14,247**	**$ 12,532**	**$ 1,358**	**$ 1,715**	**$ 11,174**

(1) A negative amount of net change indicates more expense was deferred than amortized and represents a decrease to expenses in the period indicated. A positive amount of net change indicates less expense was deferred than amortized and represents an increase to expenses in the period indicated.

Items affecting the comparability of health results

During 2017, earnings increased due to the absence of a group health plan that was not renewed, slightly offset by a decrease in earned premiums.

Earnings

Earnings increased for the year ended December 31, 2018 compared to 2017, primarily due to an increase in other income driven by Managing General Underwriting (MGU) fee income resulting from growth of MGU business, partially offset by an increase in operating expenses. Earnings increased during 2017 compared to 2016, primarily due to a change in estimate which decreased the amount of ceded MGU claim reserves during 2016. Earnings also increased due to the absence of a group health plan that was not renewed and an improvement in results for the closed medical expense block.

Premiums and other revenues

Health earned premiums for the periods indicated were as follows (in thousands, except percentages):

	Years ended December 31,					
	2018		2017		2016	
Medicare Supplement	$ 71,357	39.6 %	$ 66,550	42.4 %	$ 68,376	38.9 %
Credit health	17,948	9.9	18,217	11.6	15,124	8.6
MGU	46,133	25.5	26,574	17.0	17,611	10.0
Supplemental insurance	24,119	13.4	25,321	16.2	23,876	13.6
Medical expense	11,127	6.2	12,891	8.2	14,021	8.0
Group health	3,063	1.7	2,239	1.4	30,974	17.6
All other	6,667	3.7	4,644	3.2	5,607	3.3
Total	**$ 180,414**	**100.0%**	**$ 156,436**	**100.0%**	**$ 175,589**	**100.0%**

Earned premiums increased during the year ended December 31, 2018 compared to 2017 primarily due to an increase in MGU retention and Medicare Supplement sales. Earned premiums decreased during 2017 compared to 2016 primarily due to the non-renewal of a group health plan, partially offset by an increase in MGU and credit health premiums.

Our in-force certificates or policies as of the dates indicated are as follows:

	Years ended December 31,					
	2018		2017		2016	
Medicare Supplement	36,679	5.9 %	35,481	6.8 %	33,815	6.3 %
Credit health	166,176	26.6	179,158	34.4	194,194	36.1
MGU	334,653	53.6	210,293	40.5	195,936	36.4
Supplemental insurance	53,415	8.5	55,559	10.7	60,261	11.2
Medical expense	1,452	0.2	1,878	0.4	2,228	0.4
Group health	8,852	1.4	10,577	2.0	17,485	3.3
All other	23,552	3.8	26,788	5.2	33,820	6.3
Total	**624,779**	**100.0%**	**519,734**	**100.0%**	**537,739**	**100.0%**

Total in-force policies increased during the year ended December 31, 2018 compared to 2017 primarily due to an increase in MGU business. Total in-force policies decreased during 2017 compared to 2016 in all blocks of business except for Medicare Supplement and MGU. Although credit health premiums increased from 2016 to 2017, policy counts decreased due to a decrease in the traditional single premium business. Although supplemental insurance sales increased during 2017 compared to 2016, the termination of two large groups produced a net decrease in supplemental insurance policy counts.

Benefits, losses and expenses

Claims incurred increased during the year end December 31, 2018 compared to 2017 consistent with growth in the MGU line of business. Claims incurred decreased during 2017 compared to 2016 due to the non-renewal of a group health plan.

Commissions increased during 2018 primarily due to the increase in premiums from the MGU and Medicare Supplement lines of business. Commissions increased during 2017 compared to 2016 due to the correlated sales in the credit health and MGU lines of business.

Other operating expenses increased during 2018 correlated to an increase in the Medicare Supplement line of business. Other operating expenses decreased during 2017 in correlation to the absence of a non-renewed group health plan.

Change in Deferred Policy Acquisition Costs

The following table presents the components of the change in DAC (in thousands):

	Years ended December 31,			Change over prior year	
	2018	2017	2016	2018	2017
Acquisition cost capitalized	$ 12,590	$ 11,413	$ 11,203	$ 1,177	$ 210
Amortization of DAC	(15,436)	(15,227)	(14,973)	(209)	(254)
Change in DAC	**$ (2,846)**	**$ (3,814)**	**$ (3,770)**	**$ 968**	**$ (44)**

Reinsurance

We cede or retrocede the majority of the premium and risk associated with our stop loss and other MGU programs. We maintain reinsurance on a quota share basis for our long-term care and disability income business.

For 2018, the companies to which we have ceded reinsurance for the health segment are shown below (in thousands, except percentages):

Reinsurer	A.M. Best Rating[(1)]	Ceded Premium	Percentage of Gross Premium
Axis Insurance Company	A+	$ 59,090	12.2
Munich Reinsurance America	A+	39,460	8.2
Navigator Insurance Company	A	23,894	4.9
PartnerRe America Insurance Company	A	15,816	3.3
American Healthcare Indemnity Company	A-	12,802	2.6
Other reinsurers with no single company greater than 5.0% of the total ceded premium		152,561	31.5
Total health reinsurance ceded		**$ 303,623**	**62.7**

(1) A.M. Best rating as of the most current information available February 15, 2019.

Reinsurance is also used in the credit health business. In certain cases, we may also reinsure the policy written through non-U.S. producer-owned captive reinsurers to allow the dealer to participate in the performance of these credit health contracts. A majority of the treaties entered into by our Specialty Markets Group are written on a 100% coinsurance basis with benefit limits of $1,000 per month.

Property and Casualty

Property and Casualty segment financial results for the periods indicated were as follows (in thousands, except percentages):

	Years ended December 31,			Change over prior years	
	2018	2017	2016	2018	2017
PREMIUMS AND OTHER REVENUES					
Net premiums written	$ 1,514,563	$ 1,414,024	$ 1,282,876	$ 100,539	$ 131,148
Net premiums earned	$ 1,466,740	$ 1,359,989	$ 1,253,392	$ 106,751	$ 106,597
Net investment income	62,320	61,688	57,091	632	4,597
Other income	10,628	8,372	4,588	2,256	3,784
Total premiums and other revenues	**1,539,688**	**1,430,049**	**1,315,071**	**109,639**	**114,978**
BENEFITS, LOSSES AND EXPENSES					
Claims incurred	1,049,112	934,044	883,219	115,068	50,825
Commissions for acquiring and servicing policies	278,002	265,440	232,514	12,562	32,926
Other operating expenses	186,019	177,345	165,278	8,674	12,067
Change in deferred policy acquisition costs [1]	(5,315)	(5,490)	(725)	175	(4,765)
Total benefits, losses and expenses	**1,507,818**	**1,371,339**	**1,280,286**	**136,479**	**91,053**
Income before federal income taxes and other items	**$ 31,870**	**$ 58,710**	**$ 34,785**	**$ (26,840)**	**$ 23,925**
Loss ratio	71.5 %	68.7 %	70.5 %	2.8 %	(1.8)%
Underwriting expense ratio	31.3	32.1	31.7	(0.8)	0.4
Combined ratio	**102.8%**	**100.8%**	**102.2%**	**2.0%**	**(1.4)%**
Impact of catastrophe events on combined ratio	7.1	7.8	6.8	(0.7)	1.0
Combined ratio without impact of catastrophe events	**95.7%**	**93.0%**	**95.4%**	**2.7%**	**(2.4)%**
Gross catastrophe losses	$ 103,890	$ 111,455	$ 85,252	$ (7,565)	$ 26,203
Net catastrophe losses	$ 105,670	$ 105,880	$ 84,989	$ (210)	$ 20,891

(1) A negative amount of net change indicates more expense was deferred than amortized and represents a decrease to expenses in the period indicated. A positive amount of net change indicates less expense was deferred than amortized and represents an increase to expenses in the period indicated.

Earnings

Property and Casualty earnings decreased during the year ended December 31, 2018 compared to 2017 due primarily to an increase in claim severity in the commercial auto line of business and increased losses impacting our homeowners and personal auto lines of business. Earnings increased during 2017 compared to 2016, primarily due to increased net premiums earned coupled with an improvement in the loss ratio.

Premiums and other revenues

Net premiums written and earned increased for all major lines of business during the year ended December 31, 2018 compared to 2017 and the year ended December 31, 2017 compared to 2016. The largest increases were in the personal auto, homeowners, and other commercial lines of business.

Benefits, losses and expenses

Claims increased during the year ended December 31, 2018 compared to 2017 due to increases in non-catastrophe losses in the personal, commercial automobile and homeowners lines. Claims incurred increased during 2017 compared to 2016, as a result of increases in catastrophe losses and premium growth.

Commissions increased during the year ended December 31, 2018 compared to 2017 and the year ended December 31, 2017 compared to 2016, primarily as a result of the premium growth as well as the mix of products.

Operating expenses increased during the year ended December 31, 2018 compared to 2017, but at a rate less than the increase in premiums. Operating expenses increased during 2017 compared to 2016, as a result of costs related to growth initiatives.

Products

Our Property and Casualty segment consists of: (i) Personal products, marketed primarily to individuals, representing 58.9% of net premiums written; (ii) Commercial products, focused primarily on agricultural and other business related markets, representing 31.3% of net premiums written; and (iii) Credit-related property insurance products, marketed to and through financial institutions and retailers, representing 9.8% of net premiums written.

Personal Products

Personal Products results for the periods indicated were as follows (in thousands, except percentages):

	Years ended December 31,			Change over prior year	
	2018	**2017**	**2016**	**2018**	**2017**
Net premiums written					
Automobile	$ 564,833	$ 506,110	$ 445,860	$ 58,723	$ 60,250
Homeowner	275,986	259,319	238,967	16,667	20,352
Other Personal	50,651	46,026	42,484	4,625	3,542
Total net premiums written	**$ 891,470**	**$ 811,455**	**$ 727,311**	**$ 80,015**	**$ 84,144**
Net premiums earned					
Automobile	$ 543,163	$ 482,851	$ 431,580	$ 60,312	$ 51,271
Homeowner	264,603	247,575	230,565	17,028	17,010
Other Personal	48,105	44,306	42,122	3,799	2,184
Total net premiums earned	**$ 855,871**	**$ 774,732**	**$ 704,267**	**$ 81,139**	**$ 70,465**
Loss ratio					
Automobile	81.4 %	80.3 %	85.7 %	1.1 %	(5.4)%
Homeowner	76.6	74.7	71.8	1.9	2.9
Other Personal	62.0	68.3	55.3	(6.3)	13.0
Personal line loss ratio	**78.8%**	**77.9%**	**79.3%**	**0.9%**	**(1.4)%**
Combined Ratio					
Automobile	104.3 %	103.5 %	110.9 %	0.8 %	(7.4)%
Homeowner	111.0	108.4	100.0	2.6	8.4
Other Personal	97.8	99.4	79.1	(1.6)	20.3
Personal line combined ratio	**106.0%**	**104.8%**	**105.5%**	**1.2%**	**(0.7)%**

Automobile: Net premiums written and earned increased in our personal automobile line during the year ended December 31, 2018 compared to 2017 and the year ended December 31, 2017 compared to 2016 due to rate increases and an increase in policies in force. The loss and combined ratios increased during the year ended December 31, 2018 compared to 2017 primarily due to increased claim activity outpacing premium. The loss and combined ratios decreased during 2017 compared to 2016 primarily due to an improvement in rate adequacy somewhat offset by an increase in catastrophe losses.

Homeowners: Net premiums written and earned increased during the year ended December 31, 2018 compared to 2017 primarily due to increased sales to renters, as well as rate increases. The loss and combined ratios increased during the year ended December 31, 2018 compared to 2017 due to an increase in weather-related catastrophe and non-catastrophe losses. Net premiums written and earned increased during 2017 compared to 2016 primarily due to increased sales to renters. The loss and combined ratios increased during 2017 compared to 2016 due to an increase in catastrophe losses.

Other Personal: These products include coverages for individuals seeking to protect their personal property and liability not covered within their home and auto policies such as coverages for watercraft, personal umbrella, and rental owners. The loss ratio decreased during the year ended December 31, 2018 compared to 2017 primarily due to decrease in non-catastrophe related claims. The combined ratio decreased during the year ended December 31, 2018 compared to 2017 primarily due to increased premium outpacing expenses. The loss and combined ratios increased during 2017 compared to 2016 due to increased claims for rental owners along with several large umbrella claims.

Commercial Products

Commercial Products results for the periods indicated were as follows (in thousands, except percentages):

	Years ended December 31,			Change over prior year	
	2018	**2017**	**2016**	**2018**	**2017**
Net premiums written					
Other Commercial	$ 217,196	$ 197,772	$ 172,667	$ 19,424	$ 25,105
Agricultural Business	146,461	142,241	137,182	4,220	5,059
Automobile	110,259	103,048	96,939	7,211	6,109
Total net premiums written	**$ 473,916**	**$ 443,061**	**$ 406,788**	**$ 30,855**	**$ 36,273**
Net premiums earned					
Other Commercial	$ 212,145	$ 188,077	$ 165,828	$ 24,068	$ 22,249
Agricultural Business	142,996	139,573	133,436	3,423	6,137
Automobile	106,718	100,196	94,423	6,522	5,773
Total net premiums earned	**$ 461,859**	**$ 427,846**	**$ 393,687**	**$ 34,013**	**$ 34,159**
Loss ratio					
Other Commercial	47.2 %	50.5 %	63.1 %	(3.3)%	(12.6)%
Agricultural Business	62.7	57.2	58.1	5.5	(0.9)
Automobile	89.0	62.2	70.8	26.8	(8.6)
Commercial line loss ratio	**61.7%**	**55.4%**	**63.2%**	**6.3 %**	**(7.8)%**
Combined ratio					
Other Commercial	80.1 %	83.5 %	94.7 %	(3.4)%	(11.2)%
Agricultural Business	101.2	95.4	95.4	5.8	—
Automobile	113.4	86.1	95.6	27.3	(9.5)
Commercial line combined ratio	**94.3%**	**88.0%**	**95.1%**	**6.3 %**	**(7.1)%**

Other Commercial: Net premiums written and earned increased during the year ended December 31, 2018 compared to 2017 primarily due to increased sales of business owners as well as the addition of the Investor Property Protection line of business. The decrease in the loss and combined ratios for the year ended December 31, 2018 compared to 2017 is primarily due to the favorable workers' compensation experience. Net premiums written and earned increased during 2017 compared to 2016 primarily due to increased sales of mortgage security insurance and workers' compensation. The decrease in the loss and combined ratios for 2017 compared to 2016 is primarily due to decreased claim activity on business owners' lines of business and lower than anticipated prior year claim emergence on workers' compensation.

Agricultural Business: Our agricultural business product allows policyholders to customize and cover their agriculture exposure using a package policy, which includes coverage for residences and household contents, farm buildings and building contents, personal and commercial liability and personal property. Net premiums written and earned increased during the year ended December 31, 2018 compared to 2017 primarily due to increased sales. The loss and combined ratios increased during the year ended December 31, 2018 compared to 2017 primarily due to an increase in catastrophe losses. Net premiums written and earned increased during 2017 compared to 2016 primarily as a result of an increase in policies in force. The loss and combined ratios were relatively constant during 2017 compared to 2016.

Commercial Automobile: Net premiums written and earned increased during the year ended December 31, 2018 compared to 2017, due to an increase in policies in force and rate increases. The loss and combined ratios increased during the year ended December 31, 2018 compared to 2017 primarily due to an increase in the average severity of losses from prior accident years. Net premiums written and earned increased during 2017 compared to 2016, primarily due to increased sales as well as improved rate adequacy. The loss and combined ratios decreased during 2017 compared to 2016 primarily due to a decrease in the average severity of losses.

Credit Products

Credit-related property product results for the periods indicated were as follows (in thousands, except percentages):

	Years ended December 31,			Change over prior year	
	2018	2017	2016	2018	2017
Net premiums written	$ 149,177	$ 159,508	$ 148,777	$ (10,331)	$ 10,731
Net premiums earned	149,010	157,411	155,437	(8,401)	1,974
Loss ratio	60.1%	59.6%	48.7%	0.5 %	10.9%
Combined ratio	110.8%	116.2%	107.2%	(5.4)%	9.0%

Credit-related property products are offered on automobiles, furniture and appliances in connection with the financing of those items. These policies pay an amount if the insured property is lost or damaged and the amount paid is not directly related to an event affecting the consumer's ability to pay the debt.

Net written and earned premiums decreased during the year ended December 31, 2018 compared to 2017 primarily due to a decrease in Collateral Protection Insurance ("CPI") business. The loss ratio for the year ended December 31, 2018 is comparable to the year ended December 31, 2017. The combined ratio for 2018 decreased compared to 2017 due to lower commission expense in the CPI business. Net written and earned premiums increased during 2017 compared to 2016 primarily due to an increase in debt cancellation business. The loss and combined ratios increased during 2017 compared to 2016 primarily due to an increase in claims in the Guaranteed Auto Protection ("GAP") business, partially resulting from catastrophes that caused flooding to automobiles.

Reinsurance

We reinsure a portion of the risks that we underwrite to manage our loss exposure. In return for ceded premiums, reinsurers assume a portion of the claims incurred. In addition to our reinsurance coverage, we are partially protected by the Terrorism Risk Insurance Program Reauthorization Act of 2015 and its predecessors. We participate in the National Flood Insurance Program administered by the Federal Emergency Management Agency.

We retain the first $500,000 for workers' compensation risks and the first $1.5 million of loss per risk for non-workers' compensation risks. Workers' compensation reinsurance coverage for losses between $500,000 and $1 million follows satisfaction of a $2 million annual aggregate deductible. Our catastrophe reinsurance retention covering property and casualty companies in total is $17.5 million for non-earthquake losses and $10 million for earthquake losses.

The following table summarizes the Company's catastrophe reinsurance coverage effective during 2018:

Layer of Loss	Catastrophe Reinsurance Coverage In Force
Less than $10.0 million	100% of loss retained except for certain losses covered by the *Catastrophe Aggregate* and *Stretch & Aggregate* coverage described below
$10.0 million - $17.5 million	100% of earthquake losses countrywide
$17.5 million - $500 million	100% of multiple peril losses covered by *Corporate Program*(1) (all perils)

(1) The Corporate Program covers all non-credit property and casualty business, subject to certain limits, and is not specific to the Company or any of its subsidiaries, or any state or region. The program does cover the "MSI" and "GAP" business written by the Specialty Markets Group.

Each per-event coverage above includes one automatic reinstatement except for a 12.4% portion of the Corporate Program (12.4% of $35 million to $500 million). The automatic reinstatement requires us to pay additional reinsurance premium for any losses into each reinsurance layer. The reinstatement premium is prorated by the percentage of actual loss to the coverage, with the exception of losses from $35 million to $100 million, which reflect a 50% reduction on the prorated amount, and the losses from $17.5 million to $35 million, in which a 39% portion is free for the first limit through reinstatement premium protection coverage purchased. The 12.4% placement of non-reinstateable coverage reduces the amount of reinstatement premium we are obligated to pay.

We purchase a Catastrophe Aggregate reinsurance coverage that provides for $30 million of limit excess of $90 million of aggregated catastrophe losses. Qualifying losses include amounts of retained losses below $10 million on Property Claims Services ("PCS") declared catastrophe events and internally declared catastrophe events exceeding $5 million. The Catastrophe Aggregate reinsurance coverage has been placed at 100.0% for 2019 and does not include a reinstatement.

A Stretch & Aggregate cover is purchased which consists of a $35 million annual limit available either wholly or in part across two layers. The first layer is 8.75% of $400 million excess of $100 million on an occurrence basis. The second layer provides aggregate protection where subject loss is $35 million excess of $5 million of each catastrophe. Recoveries follow satisfaction of a $40 million annual aggregate deductible. This cover was placed at 90% on July 1, 2018, and remains in place until June 30, 2019. American National expects to place the cover again on July 1, 2019.

We use multiple reinsurers with each reinsurer absorbing part of the overall risk ceded. The primary reinsurers in the 2018 programs and the coverage each provides are shown in the following table:

		Percent of Risk Covered	
Reinsurer	**A.M. Best Rating(1)**	**Non–Catastrophe**	**Catastrophe**
Lloyd's Syndicates	A	38.6%	40.3%
Swiss Re	A+	12.1	6.3
Safety National Casualty Corporation	A+	18.2	—
Hannover Ruckversicherung-Aktiengesellschaft, Germany	A+	9.9	—
Tokio Millennium Re Ltd.	A+	—	8.9
Other Reinsurers with no single company with greater than a 8% share		21.2	44.5
Total Reinsurance Coverage		**100.0%**	**100.0%**

(1) A.M. Best rating as of the most current information available February 20, 2019.

Reinsurance is used in the credit property and casualty business primarily to provide producers of credit-related insurance products the opportunity to participate in the underwriting risk through various entities, such as producer-owned captive reinsurance companies or other Insurance Companies. A majority of the treaties entered into by our Specialty Markets Group are written on a 100% coinsurance basis without benefit limits on credit P&C. We also place a corporate catastrophe reinsurance program which covers P&C business written by the Specialty Markets Group as well as personal and commercial business written by our Multiple Line agents.

Reserve Development

While we believe that our claims reserves at December 31, 2018 are adequate, new information, events or circumstances, unknown at the original valuation date, may lead to future developments in ultimate losses in amounts significantly greater or less than the reserves currently recorded. The actual final cost of settling both claims outstanding at December 31, 2018 and claims expected to arise from unexpired periods of risk is uncertain. There are many other possible changes that would cause losses to increase or decrease, which include but are not limited to: claim severity; the expected level of reported claims; judicial action changing the scope or liability of coverage; the regulatory, social and economic environment; and unexpected changes in loss inflation. For additional information regarding prior year development of our claims and CAE reserves, refer to Note 12, Liability for Unpaid Claims and Claim Adjustment Expenses, of the Notes to the Consolidated Financial Statements.

Corporate and Other

Corporate and Other segment financial results for the periods indicated were as follows (in thousands):

	Years ended December 31,			Change over prior year	
	2018	2017	2016	2018	2017
OTHER REVENUES					
Net investment income	$ 85,702	$ 75,227	$ 64,553	$ 10,475	$ 10,674
Realized investment gains, net	16,931	91,209	28,940	(74,278)	62,269
Net losses on equity securities*	(107,188)	—	—	(107,188)	—
Other income	4,840	5,242	7,944	(402)	(2,702)
Total other revenues	**285**	**171,678**	**101,437**	**(171,393)**	**70,241**
BENEFITS, LOSSES AND EXPENSES					
Other operating expenses	31,479	34,552	30,367	(3,073)	4,185
Total benefits, losses and expenses	**31,479**	**34,552**	**30,367**	**(3,073)**	**4,185**
Income before federal income taxes and other items	**$ (31,194)**	**$ 137,126**	**$ 71,070**	**$ (168,320)**	**$ 66,056**

*Effective January 1, 2018, the Company adopted ASU No. 2016-01. As a result, equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income; rather, all changes in the fair value of equity securities are now recognized in earnings. Since changes in fair value are recognized in earnings each reporting period, OTTI is no longer recognized on equity securities in a loss position. Prior periods have not been restated to conform to the current presentation. See note 3, Recently Issued Accounting Pronouncements.

Earnings

Earnings decreased during the year ended December 31, 2018 compared to 2017 primarily due to net losses on equity securities due to unfavorable market conditions reflected in the S&P 500 index and a reduction in realized investment gains in 2018 compared to 2017. Earnings for the year ended December 31, 2018 included net losses on equity securities as a result of our adoption of new accounting guidance which was effective January 1, 2018. Earnings increased during 2017 compared to 2016 primarily due to an increase in realized investment gains. The increase in realized investment gains is primarily attributable to an increase in the sale of equity securities and certain real estate holdings. These increases were partially offset during 2017 by an increase in other operating expenses which included a pension cost of $12.5 million relating to the completion of the one-time pension payment window that occurred in 2017.

Investments

We manage our investment portfolio to optimize the rate of return commensurate with sound and prudent asset selection and to maintain a well-diversified portfolio. Our investment operations are regulated primarily by the state insurance departments where our insurance companies are domiciled. Investment activities, including setting investment policies and defining acceptable risk levels, are subject to oversight by our Board of Directors, which is assisted by our Finance Committee and Management Risk Committee.

Our insurance and annuity products are generally supported by investment-grade bonds and commercial mortgage loans. We also invest in equity options as a hedge for our indexed products. We purchase fixed maturity securities and designate them as either held-to-maturity or available-for-sale considering our estimated future cash flow needs. We also monitor the composition of our fixed maturity securities classified as held-to-maturity and available-for-sale and adjust the mix within the portfolio as investments mature or new investments are purchased.

We invest in commercial mortgage loans when the yield and credit risk compare favorably with fixed maturity securities. Individual residential mortgage loans including sub-prime or Alt-A mortgage loans have not been and are not expected to be part of our investment portfolio. We purchase real estate and equity investments based on a risk and reward analysis where we believe there are opportunities for enhanced returns.

The following summarizes the carrying values of our invested assets (other than investments in unconsolidated affiliates) by asset class (in thousands, except percentages):

	December 31, 2018		December 31, 2017	
Fixed maturity, bonds held-to-maturity, at amortized cost	$ 8,211,449	36.8%	$ 7,552,959	34.5%
Fixed maturity, bonds available-for-sale, at fair value	6,215,563	27.9	6,145,308	28.1
Equity securities, at fair value	1,530,228	6.9	1,784,226	8.2
Mortgage loans on real estate, net of allowance	5,124,707	23.0	4,749,999	21.7
Policy loans	376,254	1.7	377,103	1.7
Investment real estate, net of accumulated depreciation	587,516	2.6	532,346	2.4
Short-term investments	206,760	0.9	658,765	3.0
Other invested assets	50,087	0.2	80,165	0.4
Total investments	**$ 22,302,564**	**100.0%**	**$ 21,880,871**	**100.0%**

The increase in our total investments at December 31, 2018 compared to 2017 was primarily a result of an increase in bonds held-to-maturity and mortgage loans, somewhat offset by a reduction in short-term investments and a decline in the fair value of equity securities.

Bonds—We allocate most of our fixed maturity securities to support our insurance business. At December 31, 2018, our fixed maturity securities had an estimated fair value of $14.3 billion, which was $0.1 billion, or 0.9%, below amortized cost. At December 31, 2017, our fixed maturity securities had an estimated fair value of $13.9 billion, which was $0.4 billion, or 3.0%, above amortized cost. The estimated fair value for securities due in one year or less was $0.5 billion as of December 31, 2018 and December 31, 2017. For additional information regarding total bonds by credit quality rating refer to Note 4, Investments in Securities, of the Notes to the Consolidated Financial Statements.

Equity Securities—We invest in companies publicly traded on national U.S. stock exchanges. See Note 4, Investments in Securities, of the Notes to the Consolidated Financial Statements for the cost, gross unrealized gains and losses, and fair value of the equity securities.

Mortgage Loans— We invest in commercial mortgage loans that are diversified by property-type and geography. Generally, mortgage loans are secured by first liens on income-producing real estate with a loan-to-value ratio of up to 75%. Mortgage loans are generally carried at outstanding principal balances, adjusted for any unamortized premium or discount, deferred fees or expenses, and net of allowances. The weighted average coupon yield on the principal funded for mortgage loans was 4.9% and 4.7% at December 31, 2018 and 2017, respectively. For additional information regarding mortgage loans refer to Note 5, Mortgage Loans, of the Notes to the Consolidated Financial Statements

Policy Loans—For certain life insurance products, policyholders may borrow funds using the policy's cash value as collateral. The maximum amount of the policy loan depends upon the policy's surrender value. As of December 31, 2018, we had $376.3 million in policy loans with a loan to surrender value of approximately 60%, and at December 31, 2017, we had $377.1 million in policy loans with a loan to surrender value of approximately 63%. Interest rates on policy loans primarily range from 3.0% to 12.0% per annum. Policy loans may be repaid at any time by the policyholder and have priority to any claims on the policy. If the policyholder fails to repay the policy loan, funds are withdrawn from the policy's benefits.

Investment Real Estate—We invest in commercial real estate where positive cash flows and/or appreciation in value is expected. Real estate may be owned directly by our insurance companies or non-insurance affiliates or indirectly in joint ventures with real estate developers or investors we determine share our perspective regarding risk and return relationships. The carrying value of real estate is stated at cost, less accumulated depreciation and impairments, if any. Depreciation is provided over the estimated useful lives of the properties.

Short-Term Investments—Short-term investments are primarily commercial paper rated A2 or P2 or better by Standard & Poor's and Moody's, respectively. The amount fluctuates depending on our view of the desirability of investing in the available long-term investment opportunities and our liquidity needs, including mortgage investment-funding commitments.

Net Investment Income and Net Realized Gains (Losses)

Net investment income decreased $107.7 million during 2018 compared to 2017 primarily due to a loss on options due to a downturn in the S&P 500 Index.

Interest income on mortgage loans is accrued on the principal amount of the loan at the contractual interest rate. Accretion of discounts is recorded using the effective yield method. Interest income, accretion of discounts and prepayment fees are reported in net investment income. Interest is not accrued on loans generally more than 90 days past due or when the collection of interest is not considered probable. Loans in foreclosure are placed on non-accrual status. Interest received on non-accrual status mortgage loans is included in net investment income in the period received.

Net realized gains decreased $86.4 million during the year ended December 31, 2018 compared to 2017. The decrease in net realized gains in 2018 was primarily attributable to new accounting guidance affecting how income from the sale of equity securities is recognized. Other-than-temporary impairment on investment securities decreased $12.1 million during 2018 compared to 2017.

Net Unrealized Gains and Losses

The unrealized gains and losses of our fixed maturity and equity securities investment portfolio are shown below (in thousands):

	December 31,		
	2018	2017	Change
Held-to-Maturity			
Gains	$ 72,403	$ 240,713	$ (168,310)
Losses	(153,768)	(19,319)	(134,449)
Net gains (losses)	**(81,365)**	**221,394**	**(302,759)**
Available-for-Sale			
Gains	61,286	204,803	(143,517)
Losses	(107,344)	(17,396)	(89,948)
Net gains (losses)	**(46,058)**	**187,407**	**(233,465)**
Total	**$ (127,423)**	**$ 408,801**	**$ (536,224)**

The net change in the unrealized gains on fixed maturity securities between December 31, 2018 and December 31, 2017 is primarily attributable to the increase in benchmark ten-year interest rates which were 2.7% and 2.4% respectively. The Company does not currently intend to sell nor does it expect to be required to sell any of the securities in an unrealized loss position.

Liquidity

Our liquidity requirements have been and are expected to continue to be met by funds from operations, comprised of premiums received from our customers, collateral for derivative transactions, and investment income and maturities. The primary use of cash has been and is expected to continue to be payment of policyholder benefits and claims incurred. Current and expected patterns of claim frequency and severity may change from period to period but continue to be within historical norms. Management considers our current liquidity position to be sufficient to meet anticipated demands over the next twelve months. Our contractual obligations are not expected to have a significant negative impact to cash flows from operations.

Increasing interest rates may lead to an increase in the volume of annuity contracts sold, which may be partially offset by increases in surrenders. Our defined benefit plans are frozen and currently adequately funded; however, low interest rates, increased longevity of participants, and rising Pension Benefit Guaranty Corporation ("PBGC") premiums may cause us to increase our funding of the plans. An increase in funding provided an opportunity to realize tax savings on contributions made before September 15, 2018. Consequently, a $60 million contribution was made before the aforementioned deadline. This contribution did not significantly impact cash flow and resulted in an overfunded status on our qualified pension plan. No unusually large capital expenditures are expected in the next 12-24 months. We have paid dividends to stockholders for over 110 consecutive years and expect to continue this trend. There are no other known trends or uncertainties regarding product pricing, changes in product lines or rising costs that are expected to have a significant impact to cash flows from operations.

Funds received as premium payments and deposits, that are not used for liquidity requirements are generally invested in bonds and commercial mortgages. Funds are invested with the intent that income from the investments and proceeds from the maturities will meet our ongoing cash flow needs. We historically have not had to liquidate invested assets in order to cover cash flow needs. We believe our portfolio of highly liquid available-for-sale investment securities, including equity securities, is sufficient to meet future liquidity needs as necessary. Deposits of certain securities under the Company's membership with the Federal Home Loan Bank of Dallas ("FHLB") provided approximately $113 million of borrowing capacity as of December 31, 2018 should we require additional liquidity resources.

The Company holds collateral to offset exposure from its derivative counterparties. Cash flows associated with collateral received from counterparties change as the market value of the underlying derivative contract changes. As the value of a derivative asset declines or increases, the collateral requirements would also decline or increase respectively.

Our cash and cash equivalents and short-term investment position decreased from $1.0 billion at December 31, 2017 to $474.9 million at December 31, 2018. The decrease primarily relates to a decrease in commercial paper to fund additional investments.

A downgrade or a potential downgrade in our financial strength ratings could result in a loss of business and could adversely affect our cash flows from operations.

Further information regarding additional sources or uses of cash is described in Note 19, Commitments and Contingencies, of the Notes to the Consolidated Financial Statements.

Capital Resources

Our capital resources are summarized below (in thousands):

	December 31,		
	2018	**2017**	**2016**
American National stockholders' equity, excluding accumulated other comprehensive income, net of tax ("AOCI")	$ 5,356,986	$ 4,604,543	$ 4,196,279
Accumulated other comprehensive income (loss)	(99,738)	642,216	455,899
Total American National stockholders' equity	**$ 5,257,248**	**$ 5,246,759**	**$ 4,652,178**

We have notes payable relating to borrowings by real estate joint ventures that we consolidate into our financial statements that are not part of our capital resources. The lenders for the notes payable have no recourse against us in the event of default by the joint ventures. Therefore, the liability we have for these notes payable is limited to our investment in the respective ventures, which totaled $26.6 million and $28.4 million at December 31, 2018 and 2017, respectively.

The changes in our capital resources are summarized below (in thousands):

	Years ended					
	2018			2017		
	Capital and Retained Earnings	Accumulated Other Comprehensive Income (loss)	Total	Capital and Retained Earnings	Accumulated Other Comprehensive Income	Total
Net income attributable to American National	$ 158,995	$ —	$ 158,995	$ 493,651	$ —	$ 493,651
Dividends to shareholders	(88,228)	—	(88,228)	(88,335)	—	(88,335)
Change in net unrealized gains on debt securities	—	(136,261)	(136,261)	—	169,740	169,740
Foreign currency transaction and translation adjustment	—	(900)	(900)	—	746	746
Defined benefit pension plan adjustment	—	22,326	22,326	—	15,831	15,831
Cumulative effect of accounting changes	687,051	(627,119)	59,932	—	—	—
Other	(5,375)	—	(5,375)	2,948	—	2,948
Total	**$ 752,443**	**$ (741,954)**	**$ 10,489**	**$ 408,264**	**$ 186,317**	**$ 594,581**

Statutory Capital and Surplus and Risk-based Capital

Statutory capital and surplus is the capital of our insurance companies reported in accordance with accounting practices prescribed or permitted by the applicable state insurance departments. RBC is calculated using formulas applied to certain financial balances and activities that consider, among other things, investment risks related to the type and quality of investments, insurance risks associated with products and liabilities, interest rate risks and general business risks. Insurance companies that do not maintain capital and surplus at a level of at least 200% of the authorized control level RBC are required to take certain actions. At December 31, 2018 and December 31, 2017, American National Insurance Company's statutory capital and surplus was $3,162,808,000 and $3,293,474,000, respectively. American National Insurance Company and each of its insurance subsidiaries had statutory capital and surplus at December 31, 2018 and December 31, 2017, substantially above 200% of the authorized control level.

The achievement of long-term growth will require growth in American National Insurance Company's and our insurance subsidiaries' statutory capital and surplus. Our subsidiaries may obtain additional statutory capital through various sources, such as retained statutory earnings or equity contributions from us.

Contractual Obligations

The following summarizes our contractual obligations as of December 31, 2018 (in thousands):

	Payments Due by Period				
	Total	Less than 1 year	1-3 years	3-5 years	More than 5 years
Life insurance obligations[1]	$ 5,164,156	$ (14,430)	$ (12,922)	$ 97,139	$ 5,094,369
Annuity obligations[1]	15,652,997	1,291,792	2,568,730	2,187,036	9,605,439
Property and casualty insurance obligations[2]	959,140	424,109	342,658	109,475	82,898
Health insurance obligations[3]	279,082	174,428	28,657	14,521	61,476
Purchase obligations					
Commitments to purchase and fund investments	349,258	162,937	156,329	28,565	1,427
Mortgage loan commitments	505,592	371,226	134,366	—	—
Operating leases	13,781	4,104	6,604	2,513	560
Defined benefit pension plans[4]	82,059	15,386	16,961	14,980	34,732
Notes payable[5]	137,963	—	10,835	42,399	84,729
Total	**$ 23,144,028**	**$ 2,429,552**	**$ 3,252,218**	**$ 2,496,628**	**$ 14,965,630**

(1) Life and annuity obligations include undiscounted estimated claim, benefit, surrender and commission obligations offset by expected future premiums and deposits on in-force insurance policies and annuity contracts. All amounts are gross of any reinsurance recoverable. Estimated claim, benefit and surrender obligations are based on mortality and lapse assumptions comparable with historical experience. Estimated payments on interest-sensitive life and annuity obligations include interest credited to those products. The interest crediting rates are derived by deducting current product spreads from a constant investment yield. As a result, the estimated obligations for insurance liabilities included in the table exceed the liabilities recorded in the liability for future policy benefits and policy and contract claims. Due to the significance of the assumptions used, the amounts presented could materially differ from actual payments. Separate account obligations have not been included in the table since those obligations are not part of the general account obligations and will be funded by cash flows from separate account assets. The general account obligations for insurance liabilities will be funded by cash flows from general account assets and future premiums and deposits. Participating policyholder dividends payable consists of liabilities related to dividends payable in the following calendar year and are presented in the less than one-year category. All estimated cash payments are net of estimated future premiums on policies currently in-force net of future policyholder dividends payable. The participating policyholders' share obligation included in other policyholder funds and the timing and amount of the ultimate participating policyholder obligation is subject to significant uncertainty and the amount of the participating policyholder obligation is based upon a long-term projection of the performance of the participating policy block.
(2) Includes undiscounted case reserves for reported claims and reserves for IBNR with the timing of future payments based on our historical payment patterns. The timing of these payments may vary significantly from the pattern shown in the preceding table. The ultimate losses may vary materially from the recorded amounts, which are our best estimates.
(3) Reflects estimated future claim payments for claims incurred based on mortality and morbidity assumptions that are consistent with historical claims experience. These are not discounted with interest and will exceed the liabilities recorded in reserves for future claim payment, which are discounted with interest. Due to the significance of the assumptions used, the amounts presented could materially differ from actual payments.
(4) Estimated payments through continuing operations for benefit obligations of the non-qualified defined benefit pension plan. A liability has been established for the full amount of benefits accrued.
(5) The estimated payments due by period for notes payable reflect the contractual maturities of principal for amounts borrowed by real estate joint ventures and collateralized by real-estate owned by the respective entity. American National's liability is limited to its investment in the respective joint venture. See Note 6, Real Estate and Other Investments, of the Notes to the Consolidated Financial Statements for additional details.

Off-Balance Sheet Arrangements

We have off-balance sheet arrangements relating to third-party marketing operation bank loans as discussed in Note 19, Commitments and Contingencies, of the Notes to the Consolidated Financial Statements. We could be exposed to a liability for these loans, which are supported by the cash value of the underlying insurance contracts. The cash value of the life insurance policies is designed to always equal or exceed the balance of the loans. Accordingly, management does not foresee any material loss related to these arrangements.

Related-Party Transactions

We have various agency, consulting and service arrangements with individuals and entities considered to be related parties. Each of these arrangements has been reviewed and approved by our Audit Committee, which retains final decision-making authority for these transactions. The amounts involved, both individually and in the aggregate, with these arrangements are not material to any segment or to our overall operations. For additional details see Note 20, Related Party Transactions, of the Notes to the Consolidated Financial Statements.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Our investments and some of our products are subject to various market risks associated with changes in interest rates, credit spreads, issuer defaults, equity prices and market indices. Adverse changes due to these market risks may occur as a result of various factors, including changes in market liquidity, risk tolerances and market perceptions of credit worthiness.

We emphasize prudent risk management throughout all our operations. Our enterprise risk management procedures help us to identify, prioritize and manage various risks including market risk. Under the leadership of our Board of Directors and Corporate Risk Officer, we have instituted a framework based on the principles of enterprise risk management to provide reasonable assurance regarding the achievement of our strategic objectives. Related activities include:

- Identifying evolving and potential risks and events that may affect us;
- managing risks within our risk profile;
- appropriate escalation of risks and disclosure of any risk limit breaches within the enterprise, along with the correction method if appropriate;
- tracking actual risk levels against predetermined thresholds; and
- monitoring our capital adequacy.

We expect ongoing enterprise risk management efforts will expand the management tools used to support an efficient allocation of capital and enhance the measurement of possible diversification benefits across business segments and risk classes.

A key component of our risk management program is our ALM Committee. The ALM Committee monitors the level of our risk exposure in managing our assets and liabilities to attain the desired risk-return profile for our diverse mix of assets and liabilities and their resultant cash flows. This process includes maintaining adequate reserves, monitoring claims and surrender experience, managing interest rate spreads, evaluation of alternate investment strategies and protecting against disintermediation risk for life insurance and annuity products.

As a part of the ALM process, we have asset portfolios for each major line of business, which represent the investment strategies used to fund liabilities within acceptable levels of risk. We monitor these strategies through regular review of portfolio metrics, such as effective duration, yield curve sensitivity and liquidity. In executing these ALM strategies, we regularly reevaluate the estimates used in determining the approximate amounts and timing of payments to or on behalf of policyholders for insurance liabilities. Many of these estimates are inherently subjective and could impact our ability to achieve our ALM goals and objectives. Our Finance Committee and ALM Committee also review the risks associated with evaluation of alternate investment strategies and the specific investments made to support our business and for consistency with our overall investment strategy.

Interest Rate Risk

Interest rate risk is the risk that the value of our interest sensitive assets or liabilities will change with changes in market interest rates. The fair market value of fixed maturity securities is inversely related to changes in market interest rates. As interest rates fall, the cash flow from the interest coupon and dividend streams of existing fixed rate investments become more valuable and thus, market values of fixed maturity securities rise. As interest rates rise, the reverse occurs and the market value of fixed maturity securities falls.

These calculations hold all other variables influencing the values of fixed maturity securities constant and would not fully reflect any prepayment to the portfolio, changes in corporate spreads or non-parallel changes in interest rates for different maturities or credit quality. Actual results may differ materially from these amounts due to the assumptions and estimates used in calculating the scenarios.

The carrying values of our investment in fixed maturity securities, which comprise 64.7% of our portfolio, are summarized below (in thousands):

	December 31,			
	2018		2017	
	Amount	Percent	Amount	Percent
Bonds held-to-maturity	$ 8,211,449	56.9%	$ 7,552,959	55.1%
Bonds available-for-sale	6,215,563	43.1	6,145,308	44.9
Net unrealized gains (losses) on available-for-sale bonds	(46,058)	(0.7)	187,407	3.1

The unrealized losses on available-for-sale bonds were primarily the result of an increase in unrealized losses on corporate debt securities. Information regarding our unrealized gains or losses is disclosed in Note 4, Investments in Securities, of the Notes to the Consolidated Financial Statements. Our exposure to cash flow changes is discussed further in the Liquidity and Capital Resources section of the MD&A.

Our mortgage loans also have interest rate risk. As of December 31, 2018, these mortgage loans have fixed rates ranging from 4.0% to 10.0%. Most of the mortgage loan contracts require periodic payments of both principal and interest, and have amortization periods of three to 30 years. Many of our mortgage loans contain prepayment restrictions or fees or both that reduce the risk of payment before maturity or compensate us for all or a portion of the investment income lost through early payment of the loan principal.

Rising interest rates can cause increases in policy loans associated with life insurance policies and surrenders relating to life insurance or annuities. Policyholders may move their assets into new products offering higher rates if there were sudden or significant changes in interest rates. We may have to sell assets earlier than anticipated to pay for these withdrawals. Our life insurance and annuity product designs reduce the financial impact of early surrenders through the use of restrictions on withdrawal, surrender charges and market value adjustment features. ALM guidelines, including duration targets and asset allocation tolerances, help ensure this risk is managed within the constraints of established criteria. Consistent monitoring of and periodic changes to our product pricing help us to better match the duration of assets and liabilities.

Falling interest rates can have an adverse impact on our general account and immediate annuities. We aim to manage interest margin, which is the difference between yields on investments supporting our liabilities and amounts credited to policyholder account balances and reserves. As portfolio yields decline, we can reduce crediting rates on some deferred annuities, to a limit defined by contractual minimum guarantees, but we cannot adjust immediate annuity benefits and reserves. Assuming a 10 basis point decline in current portfolio yield, our annual interest margin would decline $9.0 million.

Interest Rate sensitivity analysis: The table below shows the estimated change in pre-tax market values of our investments in fixed maturity securities caused by instantaneous, one time parallel shifts in the corresponding year-end U.S. Treasury yield curves of +/- 100bps and +/- 50bps (in thousands):

	Increase (Decrease) in Market Value Given an Interest Rate Increase (Decrease) of X Basis Points			
	(100)	(50)	50	100
December 31, 2018	$ 628,238	$ 311,485	$ (307,352)	$ (609,109)
December 31, 2017	$ 647,685	$ 320,670	$ (317,212)	$ (637,882)

These calculations hold all other variables influencing the values of fixed maturity securities constant and would not fully reflect any prepayment to the portfolio, changes in corporate spreads or non-parallel changes in interest rates for different maturities or credit quality. Actual results may differ materially from these amounts due to the assumptions and estimates used in calculating the scenarios.

Credit Risk

We are exposed to credit risk, which is the uncertainty of whether a counterparty will honor its obligation under the terms of a security, loan or contract. To help manage credit risk, we have an Investment Plan approved by our Board of Directors. This plan provides issuer and geographic concentration limits, investment size limits, mortgage loan-to-value guidelines and other applicable parameters. Investment activity, including the setting of investment policies and defining acceptable risk levels, is subject to review by our Finance Committee and Management Risk Committee.

We are also exposed to risks created by changes in market prices and cash flows associated with fluctuations in the credit spread or the market's perception of the relative risk and reward to hold fixed maturity securities of borrowers with different credit characteristics or credit ratings. Credit spread widening will reduce the fair value of our existing investment portfolio and will increase investment income on new purchases. Credit spread tightening would have the opposite effect. Information regarding the credit quality of our fixed maturity securities can be found in the Investments section of the MD&A.

We are subject to credit risk associated with our reinsurance agreements. While we believe our reinsurers are reputable and have the financial strength to meet their obligations to us, reinsurance does not eliminate our liability to pay our policyholders, and we remain primarily liable to our policyholders for the risks we insure. We regularly monitor the financial strength of our reinsurers and the levels of concentration to individual reinsurers to verify they meet established thresholds.

The Company's use of derivative instruments exposes it to credit risk in the event of non-performance by counterparties. The Company has adopted a policy of only dealing with counterparties we believe are creditworthy and obtaining sufficient collateral where appropriate, as a means of mitigating the financial loss from defaults. The non-performance risk is the net counterparty exposure based on the fair value of the open contracts, less collateral held. For additional information regarding counterparties used and collateral received, see Note 7, Derivative Instruments, of the Notes to the Consolidated Financial Statements.

Equity Risk

Equity risk is the risk that we will incur realized or unrealized losses due to changes in the overall equity investment markets or specific investments within our portfolio. As a result of FASB issued guidance, the change in fair value of equity securities is recognized in earnings, which could increase the level of volatility in our statement of operations. At December 31, 2018, we held approximately $1.5 billion of equity investments, which are subject to equity risk. Our exposure to the equity markets is managed by sector and individual security and is intended to track the Standard & Poor's 500 Index ("S&P 500") with minor variations. We mitigate our equity risk by diversification of the investment portfolio.

We also have equity risk associated with the equity-indexed life and annuity products we issue. We have entered into derivative transactions, primarily over-the-counter equity call options, to hedge our exposure to equity-index changes.

Changes in Accounting Principles

Refer to Note 3, Recently Issued Accounting Pronouncements, of the Notes to the Consolidated Financial Statements for a discussion of recently issued accounting pronouncements not yet adopted.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Index to Annual Consolidated Financial Statements

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
American National Insurance Company:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of American National Insurance Company and subsidiaries (the Company) as of December 31, 2018 and 2017, the related consolidated statements of operations, comprehensive income, changes in equity, and cash flows for each of the years in the three-year period ended December 31, 2018, the related notes and financial statement schedules I to V (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2018, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated February 28, 2019 expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

Change in Accounting Principle

As discussed in Note 3 to the consolidated financial statements, the Company has changed its method of accounting for equity investments in 2018 due to the adoption of ASU 2016-01, *Financial Instruments - Overall* (Subtopic 825-10)*: Recognition and Measurement of Financial Assets and Financial Liabilities*.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these (consolidated) financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ KPMG LLP

We have served as the Company's auditor since 2000.

Houston, Texas
February 28, 2019

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
American National Insurance Company:

Opinion on Internal Control Over Financial Reporting

We have audited American National Insurance Company and subsidiaries' (the Company) internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2018 and 2017, the related consolidated statements of operations, comprehensive income, changes in equity, and cash flows for each of the years in the three-year period ended December 31, 2018, the related notes and financial statement schedules I to V (collectively, the consolidated financial statements), and our report dated February 28, 2019 expressed an unqualified opinion on those consolidated financial statements.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Annual Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ KPMG LLP

Houston, Texas
February 28, 2019

AMERICAN NATIONAL INSURANCE COMPANY
CONSOLIDATED STATEMENTS OF FINANCIAL POSITION
(In thousands, except share data)

	December 31, 2018	December 31, 2017
ASSETS		
Fixed maturity, bonds held-to-maturity, at amortized cost (Fair value $8,130,084 and $7,774,353)	$ 8,211,449	$ 7,552,959
Fixed maturity, bonds available-for-sale, at fair value (Amortized cost $6,261,621 and $5,957,901)	6,215,563	6,145,308
Equity securities, at fair value (Cost $714,504 and $757,583)	1,530,228	1,784,226
Mortgage loans on real estate, net of allowance	5,124,707	4,749,999
Policy loans	376,254	377,103
Investment real estate, net of accumulated depreciation of $267,920 and $260,904	587,516	532,346
Short-term investments	206,760	658,765
Other invested assets	50,087	80,165
Total investments	22,302,564	21,880,871
Cash and cash equivalents	268,164	375,837
Investments in unconsolidated affiliates	571,897	484,207
Accrued investment income	188,630	187,670
Reinsurance recoverables	427,475	418,589
Prepaid reinsurance premiums	53,622	63,625
Premiums due and other receivables	345,705	314,345
Deferred policy acquisition costs	1,497,261	1,373,844
Property and equipment, net of accumulated depreciation of $236,922 and $217,076	109,472	115,818
Current tax receivable	8,855	44,170
Prepaid pension	57,117	—
Other assets	163,222	158,024
Separate account assets	918,369	969,764
Total assets	**$ 26,912,353**	**$ 26,386,764**
LIABILITIES		
Future policy benefits		
Life	$ 3,047,421	$ 2,997,353
Annuity	1,524,006	1,400,150
Health	51,347	57,104
Policyholders' account balances	12,461,833	12,060,045
Policy and contract claims	1,481,294	1,390,561
Unearned premium reserve	908,856	875,294
Other policyholder funds	318,948	334,501
Liability for retirement benefits	73,631	114,538
Notes payable	137,963	137,458
Deferred tax liabilities, net	264,185	316,370
Other liabilities	452,985	477,855
Separate account liabilities	918,369	969,764
Total liabilities	**$ 21,640,838**	**$ 21,130,993**
EQUITY		
American National stockholders' equity:		
Common stock, $1.00 par value, - Authorized 50,000,000, Issued 30,832,449 and 30,832,449 Outstanding 26,885,449 and 26,931,884 shares	30,832	30,832
Additional paid-in capital	20,694	19,193
Accumulated other comprehensive income (loss)	(99,738)	642,216
Retained earnings	5,413,952	4,656,134
Treasury stock, at cost	(108,492)	(101,616)
Total American National stockholders' equity	5,257,248	5,246,759
Noncontrolling interest	14,267	9,012
Total equity	**5,271,515**	**5,255,771**
Total liabilities and equity	**$ 26,912,353**	**$ 26,386,764**

See accompanying notes to the consolidated financial statements.

AMERICAN NATIONAL INSURANCE COMPANY
CONSOLIDATED STATEMENTS OF OPERATIONS
(In thousands, except share and per share data)

	Years ended December 31, 2018	2017	2016
PREMIUMS AND OTHER REVENUES			
Premiums			
Life	$ 350,012	$ 328,570	$ 318,953
Annuity	231,027	222,207	248,714
Health	180,414	156,436	175,589
Property and casualty	1,466,740	1,359,989	1,253,392
Other policy revenues	285,549	248,526	306,880
Net investment income	858,367	966,077	860,235
Net realized investment gains	18,174	104,595	46,607
Other-than-temporary impairments	(1,243)	(13,386)	(17,667)
Net losses on equity securities	(107,188)	—	—
Other income	44,530	37,986	35,248
Total premiums and other revenues	3,326,382	3,411,000	3,227,951
BENEFITS, LOSSES AND EXPENSES			
Policyholder benefits			
Life	417,702	410,152	429,813
Annuity	290,611	270,970	296,586
Claims incurred			
Health	122,547	103,037	132,390
Property and casualty	1,049,112	934,044	883,219
Interest credited to policyholders' account balances	315,684	415,190	331,770
Commissions for acquiring and servicing policies	564,054	545,405	465,965
Other operating expenses	497,011	485,340	476,462
Change in deferred policy acquisition costs	(71,497)	(81,484)	1,152
Total benefits, losses and expenses	3,185,224	3,082,654	3,017,357
Income before federal income tax and other items	141,158	328,346	210,594
Less: Provision (benefit) for federal income taxes			
Current	24,044	49,101	(15,376)
Deferred	(22,599)	(142,096)	93,082
Total provision (benefit) for federal income taxes	1,445	(92,995)	77,706
Income after federal income tax	139,713	421,341	132,888
Equity in earnings of unconsolidated affiliates	21,281	86,674	57,200
Other components of net periodic pension costs, net of tax	(572)	(12,408)	(7,421)
Net income	160,422	495,607	182,667
Less**:** Net income attributable to noncontrolling interest, net of tax	1,427	1,956	1,664
Net income attributable to American National	**$ 158,995**	**$ 493,651**	**$ 181,003**
Amounts available to American National common stockholders			
Earnings per share			
Basic	$ 5.91	$ 18.35	$ 6.73
Diluted	5.91	18.31	6.71
Cash dividends to common stockholders	3.28	3.28	3.26
Weighted average common shares outstanding	26,886,357	26,896,926	26,908,570
Weighted average common shares outstanding and dilutive potential common shares	26,916,643	26,960,695	26,967,072

See accompanying notes to the consolidated financial statements.

AMERICAN NATIONAL INSURANCE COMPANY
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(In thousands)

	Years ended December 31, 2018	2017	2016
Net income	$ 160,422	$ 495,607	$ 182,667
Other comprehensive income (loss), net of tax			
Change in net unrealized gains (losses) on securities	(136,261)	169,740	93,704
Foreign currency transaction and translation adjustments	(900)	746	289
Defined benefit pension plan adjustment	22,326	15,831	9,286
Other comprehensive income (loss), net of tax	(114,835)	186,317	103,279
Total comprehensive income	**45,587**	**681,924**	**285,946**
Less: Comprehensive income attributable to noncontrolling interest	1,427	1,956	1,664
Total comprehensive income attributable to American National	**$ 44,160**	**$ 679,968**	**$ 284,282**

See accompanying notes to the consolidated financial statements.

AMERICAN NATIONAL INSURANCE COMPANY
CONSOLIDATED STATEMENTS OF CHANGES IN EQUITY
(In thousands)

	Years ended December 31, 2018	2017	2016
Common Stock			
Balance at beginning and end of the period	$ 30,832	$ 30,832	$ 30,832
Additional Paid-In Capital			
Balance as of January 1,	19,193	16,406	13,689
Reissuance of treasury shares	1,173	1,964	1,825
Income tax effect from restricted stock arrangement	—	—	49
Amortization of restricted stock	328	823	843
Balance at end of the period	20,694	19,193	16,406
Accumulated Other Comprehensive Income			
Balance as of January 1,	642,216	455,899	352,620
Cumulative effect of accounting change	(627,119)	—	—
Other comprehensive income (loss)	(114,835)	186,317	103,279
Balance at end of the period	(99,738)	642,216	455,899
Retained Earnings			
Balance as of January 1,	4,656,134	4,250,818	4,157,184
Cumulative effect of accounting changes	687,051	—	372
Net income attributable to American National	158,995	493,651	181,003
Cash dividends to common stockholders	(88,228)	(88,335)	(87,741)
Balance at end of the period	5,413,952	4,656,134	4,250,818
Treasury Stock			
Balance as of January 1,	(101,616)	(101,777)	(102,043)
Reissuance (purchase) of treasury shares	(6,876)	161	266
Balance at end of the period	(108,492)	(101,616)	(101,777)
Noncontrolling Interest			
Balance as of January 1,	9,012	9,317	10,189
Contributions	6,182	26	—
Distributions	(2,354)	(2,287)	(2,536)
Net income attributable to noncontrolling interest	1,427	1,956	1,664
Balance at end of the period	14,267	9,012	9,317
Total Equity	**$ 5,271,515**	**$ 5,255,771**	**$ 4,661,495**

See accompanying notes to the consolidated financial statements.

AMERICAN NATIONAL INSURANCE COMPANY
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	Years ended December 31, 2018	2017	2016
OPERATING ACTIVITIES			
Net income	$ 160,422	$ 495,607	$ 182,667
Adjustments to reconcile net income to net cash provided by operating activities			
Net realized investment gains	(18,174)	(104,595)	(46,607)
Other-than-temporary impairments	1,243	13,386	17,667
Accretion of premiums, discounts and loan origination fees	(6,163)	(2,008)	(2,926)
Net capitalized interest on policy loans and mortgage loans	(39,262)	(32,551)	(32,813)
Depreciation	52,049	53,937	45,278
Interest credited to policyholders’ account balances	315,684	415,190	331,770
Charges to policyholders’ account balances	(285,549)	(248,526)	(306,880)
Deferred federal income tax expense (benefit)	(22,599)	(142,096)	93,082
Equity in earnings of unconsolidated affiliates	(21,281)	(86,674)	(57,200)
Distributions from equity method investments	21,453	21,541	1,096
Changes in			
Policyholder liabilities	288,065	320,743	282,159
Deferred policy acquisition costs	(71,497)	(81,484)	1,152
Reinsurance recoverables	(8,886)	(16,880)	12,172
Premiums due and other receivables	(31,360)	(19,445)	(11,691)
Prepaid reinsurance premiums	10,003	(599)	14,881
Accrued investment income	(960)	(7,347)	(2,849)
Current tax receivable/payable	35,315	17,252	(57,332)
Liability for retirement benefits	(69,762)	(14,127)	(53,979)
Fair value of option securities	54,951	(90,357)	(28,401)
Fair value of equity securities	107,188	—	—
Other, net	24,630	4,958	20,331
Net cash provided by operating activities	**495,510**	**495,925**	**401,577**
INVESTING ACTIVITIES			
Proceeds from sale/maturity/prepayment of			
Held-to-maturity securities	629,359	893,977	491,478
Available-for-sale securities	451,292	489,902	348,317
Equity securities	214,737	137,780	111,194
Investment real estate	11,577	67,227	12,833
Mortgage loans	812,239	811,049	587,355
Policy loans	52,606	42,580	59,920
Other invested assets	118,846	80,901	30,743
Disposals of property and equipment	—	554	16,240
Distributions from unconsolidated affiliates	58,287	102,000	55,311
Payment for the purchase/origination of			
Held-to-maturity securities	(1,349,008)	(1,215,311)	(156,453)
Available-for-sale securities	(680,477)	(737,651)	(656,974)
Equity securities	(79,514)	(108,054)	(26,154)
Investment real estate	(71,732)	(33,844)	(45,631)
Mortgage loans	(1,173,189)	(1,194,672)	(1,428,471)
Policy loans	(26,147)	(23,325)	(25,480)
Other invested assets	(75,233)	(47,134)	(67,571)
Additions to property and equipment	(17,670)	(24,395)	(47,301)
Contributions to unconsolidated affiliates	(151,261)	(27,869)	(135,208)
Change in short-term investments	452,005	(466,539)	268,386
Change in collateral held for derivatives	(68,565)	89,981	24,349
Other, net	7,087	18,030	27,869
Net cash used in investing activities	**(884,761)**	**(1,144,813)**	**(555,248)**
FINANCING ACTIVITIES			
Policyholders’ account deposits	1,717,153	2,095,734	1,528,107
Policyholders’ account withdrawals	(1,345,498)	(1,271,128)	(1,313,394)
Change in notes payable	505	1,377	7,643
Dividends to stockholders	(88,228)	(88,335)	(87,741)
Payments to noncontrolling interest	(2,354)	(2,261)	(2,536)
Net cash provided by financing activities	**281,578**	**735,387**	**132,079**
NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS	(107,673)	86,499	(21,592)
Beginning of the period	375,837	289,338	310,930
End of the period	**$ 268,164**	**$ 375,837**	**$ 289,338**

See accompanying notes to the consolidated financial statements.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS

Note 1 – Nature of Operations

American National Insurance Company and its consolidated subsidiaries (collectively "American National" or "the Company") offer a broad spectrum of insurance products, including individual and group life insurance, annuities, health insurance, and property and casualty insurance. Business is conducted in all 50 states, the District of Columbia and Puerto Rico.

Note 2 – Summary of Significant Accounting Policies and Practices

The consolidated financial statements and notes thereto have been prepared in conformity with U.S. generally accepted accounting principles ("GAAP") and are reported in U.S. currency. American National consolidates entities that are wholly-owned and those in which American National owns less than 100% but controls, as well as variable interest entities in which American National is the primary beneficiary. Intercompany balances and transactions with consolidated entities have been eliminated. Investments in unconsolidated affiliates are accounted for using the equity method of accounting. Certain amounts in prior years have been reclassified to conform to current year presentation.

The preparation of the consolidated financial statements in conformity with GAAP requires the use of estimates and assumptions that affect the reported consolidated financial statement balances. Actual results could differ from those estimates.

Investments

Investment securities – Bonds classified as held-to-maturity are carried at amortized cost. Bonds classified as available-for-sale are carried at fair value. As a result of FASB issued guidance, equity investments, other than those accounted for under the equity method or those that result in consolidation of the investor, are measured at fair value with changes in fair value recognized in earnings.

Mortgage loans on real estate are stated at unpaid principal balance, adjusted for any unamortized discount, deferred expenses, and allowances. Accretion of discounts is recorded using the effective yield method. Interest income, prepayment fees and accretion of discounts and origination fees are reported in "Net investment income" in the consolidated statements of operations. Interest income earned on impaired and non-impaired loans is accrued on the principal amount of the loan based on contractual interest rate. However, interest ceases to accrue for loans on which interest is more than 90 days past due, when the collection of interest is not probable or when a loan is in foreclosure. Income on past due loans is reported on a cash basis. When a loan becomes current, it is placed back into accrual status. Cash receipts on impaired loans are recorded as a reduction of principal, interest income, expense reimbursement or other manner in accordance with the loan agreement. Gains and losses from the sale of loans and changes in allowances are reported in "Net realized investment gains" in the consolidated statements of operations.

Each mortgage loan is evaluated quarterly and placed in a watchlist if events occur or circumstances exist that could indicate that American National will be unable to collect all amounts due according to the contractual terms. Additionally, loans with estimated collateral value less than their balance and loans with characteristics indicative of higher than normal credit risks are reviewed quarterly. All loans in the watchlist are analyzed individually for impairment. If a loan is concluded to be fully collectible, no loss allowance is recorded. Loans are considered impaired when, based upon current information and events, it is probable that all amounts due under the contractual terms of the loan will be uncollectible. A specific allowance for loan losses is established for the excess carrying value of the loan over either: (i) the present value of expected future cash flows discounted at the loan's original effective interest rate, or (ii) the estimated fair value of the underlying collateral if the loan is in the process of foreclosure or otherwise collateral dependent. Allowances are also established on groups of loans with similar characteristics, such as property types, if based on experience, it is probable that a loss has occurred and the amount of the loss can be reasonably estimated. The allowance is reviewed quarterly to determine if it is adequate, or if a recovery of the asset is assured and the allowance can be reduced.

Management believes the recorded allowance is adequate and is the best estimate of probable loan losses, including losses incurred at the reporting date but not identified by a specific loan. The allowance is based on historical loan loss experience, known and inherent risks in the portfolio, adverse situations affecting the borrower's ability to repay, the estimated value of the underlying collateral, composition of the loan portfolio, current economic conditions and other relevant factors. Loans are charged off as uncollectible only when the loan is forgiven by a legal agreement. Prior to charging off a loan, an allowance is recorded based on the estimated recoverable amount. Upon forgiveness, both the allowance and the loan balance are reduced which results in no further gain or loss.

Policy loans are carried at cost, which approximates fair value.

Investment real estate including related improvements are stated at cost less accumulated depreciation. Depreciation is provided on a straight-line basis over the estimated useful life of the asset (typically 15 to 50 years). Rental income is recognized on a straight-line basis over the term of the respective lease. American National classifies a property as held-for-sale if it commits to a plan to sell a property within one year and actively markets the property in its current condition for a price that is reasonable in comparison to its estimated fair value. Real estate held-for-sale is stated at the lower of depreciated cost or estimated fair value less expected disposition costs, and is not depreciated while it is classified as held-for-sale. American National periodically reviews its investment real estate for impairment and tests properties for recoverability whenever events or changes in circumstances indicate the carrying amount of the asset may not be recoverable and the carrying value of the property exceeds its estimated fair value. Properties whose carrying values are greater than their undiscounted cash flows are written down to their estimated fair value, with the impairment loss included as an adjustment to "Net realized investment gains" in the consolidated statements of operations. Impairment losses are based upon the estimated fair value of real estate, which is generally computed using the present value of expected future cash flows from the real estate discounted at a rate commensurate with the underlying risks as well as other appraisal methods. Real estate acquired upon foreclosure is recorded at the lower of its cost or its estimated fair value at the date of foreclosure.

Real estate joint ventures and other limited partnership interests in which the Company has more than a minor interest or influence over the investee's operations, but it does not have a controlling interest and is not the primary beneficiary, are accounted for using the equity method. These investments are reported as "Investments in unconsolidated affiliates" in the consolidated statements of financial position. For certain joint ventures, American National records its share of earnings using a lag methodology of one to three months when timely financial information is not available and the contractual right does not exist to receive such financial information. In addition to the investees' impairment analysis of its underlying investments, American National routinely evaluates its investments in those investees for impairments. American National considers financial and other information provided by the investee, other known information and inherent risks in the underlying investments, as well as future capital commitments, in determining whether impairment has occurred. When an impairment is deemed to have occurred at the joint venture level, American National recognizes its share as an adjustment to "Equity in earnings of unconsolidated affiliates" to record the investment at its fair value. When an impairment results from American National's separate analysis, an adjustment is made through "Net realized investment gains" to record the investment at its fair value.

Short-term investments comprised of commercial paper are carried at amortized cost, which approximates fair value. Short-term investments have a maturity of less than one year.

Other invested assets comprised primarily of equity-indexed options are carried at fair value and may be collateralized by counterparties; such collateral is restricted to the Company's use. Other invested assets also include tax credit partnerships, Certified Capital Companies ("CAPCO") investments, mineral rights and limited liability company interests, are carried at cost, less allowance for depletion, where applicable. Separately managed accounts are also included in other invested assets. Separately managed accounts are carried at cost or market value if available from the account manager.

Impairments are evaluated quarterly and where management believes that the carrying value will not be realized, an other-than-temporary impairment ("OTTI") loss is recorded.

All fixed maturity securities with unrealized losses are assessed to determine if the creditworthiness of any of those securities has deteriorated to a point where its carrying value will not be realized at maturity. For fixed maturity securities at December 31, 2018, the unrealized losses on fixed maturity securities that were not other-than-temporarily impaired were the result of credit spread widening. There were no delinquent coupon payments attributed to these securities for the year ended December 31, 2018.

For all fixed maturity securities in unrealized loss positions which American National does not intend to sell and for which it is not more-likely-than-not that it will be required to sell before its anticipated recovery, American National assesses whether the amortized cost basis of securities will be recovered by comparing the net present value of the expected cash flows from those securities with its amortized cost basis. Management estimates the expected cash flows using historical experience information as well as market observable data, such as industry analyst reports and forecasts, sector credit ratings and other data relevant to the collectability of a security. The net present value of the expected cash flows from fixed maturity securities is calculated by discounting management's best estimate of expected cash flows at the effective interest rate implicit in the fixed maturity security when acquired. If the net present value of the expected cash flows is less than the amortized cost, an OTTI has occurred in the form of a credit loss. The credit loss is recognized in earnings in the amount of excess amortized cost over the net present value of the expected cash flows. If the fair value is less than the net present value of its expected cash flows at the impairment measurement date, a non-credit loss exists which is recorded in other comprehensive income (loss) for the difference between the fair value and the net present value of the expected cash flows.

After the recognition of an OTTI, fixed maturity securities are accounted for as if they had been purchased on the OTTI measurement date, with a cost basis equal to their previous amortized cost less the related OTTI losses recognized in earnings. The new cost basis of an other-than-temporarily impaired security is not adjusted for subsequent increases in estimated fair value. Should there be a significant increase in the estimate of cash flows expected to be collected from previously impaired securities, the increase would be accounted for prospectively by accreting it as interest income over its remaining life.

Derivative instruments are purchased to hedge against future interest rate increases in liabilities indexed to market rates, and are recorded in the consolidated statements of financial position at fair value net of collateral provided by counterparties. The change in fair value of derivative assets and liabilities is reported in the consolidated statements of operations as "Net investment income" and "Interest credited to policyholders' account balances," respectively. American National does not apply hedge accounting treatment to its derivative instruments. The Company uses derivative instruments to hedge its business risk and holds collateral to offset exposure from its counterparties. Collateral that supports credit risk is reported in the consolidated statements of financial position as an offset to "Other invested assets" with an associated payable to "Other liabilities" for excess collateral.

Cash and cash equivalents include cash on-hand and in banks, as well as amounts invested in money market funds, and are reported as "Cash and cash equivalents" in the consolidated statements of financial position.

Property and equipment consist of buildings occupied by American National, data processing equipment, software, furniture and equipment, and automobiles which are carried at cost, less accumulated depreciation. Depreciation is calculated using the straight-line method over the estimated useful life of the asset (typically 3 to 50 years).

Insurance specific assets and liabilities

Deferred policy acquisition costs (“DAC”) are capitalized costs related directly to the successful acquisition of new or renewal insurance contracts. Significant costs are incurred to acquire insurance and annuity contracts, including commissions and certain underwriting, policy issuance and processing expenses.

DAC on traditional life and health products is amortized with interest over the anticipated premium-paying period of the related policies, in proportion to the ratio of annual premium revenue expected to be received over the life of the policies. Expected premium revenue is estimated by using the same mortality, morbidity and withdrawal assumptions used in computing liabilities for future policy benefits. DAC is reduced by a provision for possible inflation of maintenance and settlement expenses determined by means of grading interest rates.

DAC on universal life, limited-pay and investment-type contracts is amortized as a level percentage of the present value of anticipated gross profits from investment yields, mortality, and surrender charges. The effect of the realization of unrealized gains (losses) on DAC is recognized within AOCI in the consolidated statements of financial position as of the reporting date. A change in interest rates could have a significant impact on DAC calculated for these contracts.

DAC associated with property and casualty business is amortized over the coverage period of the related policies, in relation to premium earned.

For short-duration and long-duration contracts, DAC is grouped consistent with the manner in which insurance contracts are acquired, serviced and measured for profitability and is reviewed for recoverability based on the profitability of the underlying insurance contracts. Investment income is not anticipated in assessing the recoverability of DAC for short-duration contracts.

Liabilities for future policy benefits for traditional products have been provided on a net level premium method based on estimated investment yields, withdrawals, mortality, and other assumptions that were appropriate at the time policies were issued. Estimates are based on historical experience, adjusted for possible adverse deviation. These estimates are periodically reviewed and compared with actual experience. When it is determined that future expected experience differs significantly from existing assumptions, the estimates are revised for current and future issues.

Policyholders’ account balances represent the contract value that has accrued to the benefit of the policyholders related to universal-life and investments-type contracts. For fixed products, these are generally equal to the accumulated deposits, plus interest credited, reduced by withdrawals, payouts, and accumulated policyholder assessments. Indexed product account balances are equal to the sum of host and embedded derivative reserves computed per derivative accounting guidance.

Reserves for claims and claim adjustment expenses (“CAE”) are established to provide for the estimated costs of paying claims. These reserves include estimates for both case reserves and incurred but not reported (“IBNR”) claim reserves. Case reserves include the liability for reported but unpaid claims. IBNR reserves include a provision for potential development on case reserves, losses on claims currently closed which may reopen in the future, as well as incurred but not reported claims. These reserves also include an estimate of the expense associated with settling claims, including legal and other fees and the general expenses of administering the claims adjustment process.

Reinsurance—Reinsurance recoverables are estimated amounts due to American National from reinsurers related to paid and unpaid ceded claims and CAE and are presented net of a reserve for collectability. Recoveries of gross ultimate losses are estimated by a review of individual large claims and the ceded portion of IBNR using assumed distribution of loss by percentage retained. The most significant assumption is the average size of the individual losses for those claims that have occurred but have not yet been reported. The ultimate amount of the reinsurance ceded recoverable is unknown until all losses settle.

Separate account assets and liabilities

Separate account assets and liabilities are funds that are held separate from the general assets and liabilities of American National and that represent the investments of variable insurance product contract holders, who bear the investment risk of such funds. Investment income and investment gains and losses from these separate funds accrue to the benefit of the contract holders. Separate accounts are established in conformity with insurance laws and are not chargeable with liabilities that arise from any other business of American National. American National reports separately, as assets and liabilities, investments held in separate accounts and liabilities of the separate accounts if (i) such separate accounts are legally recognized; (ii) assets supporting the contract liabilities are legally insulated from American National's general account liabilities; (iii) investments are directed by the contractholder; and (iv) all investment performance, net of contract fees and assessments, is passed through to the contract holder. American National's qualified and non-qualified pension plan assets are included in separate accounts. The assets of these accounts are carried at fair value. Deposits, net investment income and realized investment gains and losses for these accounts are excluded from revenues, and related liability increases are excluded from benefits and expenses in the consolidated financial statements.

Premiums, benefits, claims incurred and expenses

Traditional ordinary life and health premiums are recognized as revenue when due. Benefits and expenses are associated with earned premiums to result in recognition of profits over the term of the insurance contracts.

Annuity premiums received on limited-pay and supplemental annuity contracts involving a significant life contingency are recognized as revenue when due. Deferred annuity premiums are recorded as deposits rather than recognized as revenue. Revenues from deferred annuity contracts are principally surrender charges and, in the case of variable annuities, administrative fees assessed to contractholders.

Universal life and single premium whole life revenues represent amounts assessed to policyholders including mortality charges, surrender charges actually paid and earned policy service fees. Amounts included in expenses are benefits in excess of account balances returned to policyholders.

Property and casualty premiums are recognized as revenue proportionately over the contract period, net of reinsurance ceded. Claims incurred consist of claims and CAE paid and the change in reserves, net of reinsurance received and recoverable.

Participating insurance policies

Participating business comprised approximately 4.9% of the life insurance in-force at December 31, 2018 and 16.6% of life premiums in 2018.

For the majority of this participating business, profits earned are reserved for the payment of dividends to policyholders, except for the stockholders' share of profits on participating policies, which is limited to the greater of 10% of the profit on participating business, or 50 cents per thousand dollars of the face amount of participating life insurance in-force. Participating policyholders' interest includes the accumulated net income from participating policies reserved for payment to such policyholders in the form of dividends (less net income allocated to stockholders as indicated above) as well as a pro rata portion of unrealized investment gains (losses), net of tax not included in net income.

For all other participating business, the allocation of dividends to participating policyowners is based upon a comparison of experienced rates of mortality, interest and expenses, as determined periodically for representative plans of insurance, issue ages and policy durations, with the corresponding rates assumed in the calculation of premiums.

Federal income taxes

American National files a consolidated life and non-life federal income tax return. Certain subsidiaries that are consolidated for financial reporting are not eligible to be included in the consolidated federal income tax return; accordingly, they file separate returns.

Deferred income tax assets and liabilities are recognized to reflect the future tax consequences attributable to differences between the financial statement amounts of assets and liabilities and their respective tax bases. Deferred taxes are measured using enacted tax rates expected to apply in the years in which those temporary differences are expected to be recovered or settled.

The effects of tax legislation are recognized in the period of enactment. On December 22, 2017, the U.S. Tax Cut and Jobs Act ("Tax Reform") was enacted. The effects of Tax Reform were reflected in the 2017 financial statements as reasonably estimated provisional amounts based on available information subject to interpretation in accordance with the SEC's Staff Accounting Bulletin No. 118 ("SAB 118"). SAB 118 provides guidance on accounting for the effects of Tax Reform where our determinations were incomplete but we were able to determine a reasonable estimate. In 2017, we recorded a provisional tax benefit of $206.4 million in accordance with the guidance in SAB 118. There were no adjustments in 2018 to the provisional tax benefit we recorded in 2017. Interest and penalties assessed, if applicable, are classified as current federal income taxes in the consolidated statements of operations. See Item 8. Financial Statements and Supplementary Data, Notes to the Consolidated Financial Statements, Note 14, Income Taxes for further discussion.

American National recognizes tax benefits on uncertain tax positions if it is "more-likely-than-not" the position based on its technical merits will be sustained by taxing authorities. American National recognizes the largest benefit that is greater than 50% likely of being ultimately realized upon settlement. Tax benefits not meeting the "more-likely-than-not" threshold, if applicable, are included with "Other liabilities" in the consolidated statements of financial position.

Pension and postretirement benefit plans

Pension and postretirement benefit obligations and costs for our frozen benefit plans are estimated using assumptions including demographic factors such as retirement age and mortality.

American National uses a discount rate to determine the present value of future benefits on the measurement date. The guideline for setting this rate is a high-quality long-term corporate bond rate. For this purpose, a hypothetical bond portfolio to match the expected monthly benefit payments under the pension plan was constructed with the resulting yield of the portfolio used as a discount rate. To determine the expected long-term rate of return on plan assets, a building-block method is used. The expected rate of return on each asset is broken down into inflation, the real risk-free rate of return (i.e., the long-term estimate of future returns on default-free U.S. government securities), and the risk premium for each asset class (i.e., the expected return in excess of the risk-free rate). Using this approach, the calculated return will fluctuate from year to year; however, it is American National's policy to hold this long-term assumption relatively constant.

Note 2 – Summary of Significant Accounting Policies and Practices — (Continued)

Stock-based compensation

Stock Appreciation Rights (“SARs”) liability and compensation cost is based on the fair value of the grants and is remeasured each reporting period through the settlement date. The fair value of the SAR’s is calculated using the Black-Scholes-Merton option-pricing model. The key assumptions used in the model include: the grant date and remeasurement date stock prices, expected life of the SARs and the risk-free rate of return. The compensation liability related to the SAR award is included in “Other liabilities” in the consolidated statements of financial position.

Restricted Stock (“RS”) equity and compensation cost is based on the fair value of the underlying stock at grant date. The compensation cost accrued is included in “Additional paid-in capital” in the consolidated statements of financial position.

Restricted Stock Units (“RSU”) provides the recipients of the awards the option to settle vested RSUs in cash, American National common stock, or a combination of both. The settlement provision within the outstanding restricted stock units results in classifying RSUs as a liability award. The liability is remeasured each reporting period through the vesting date and is adjusted for changes in fair value. The compensation liability related to the RSUs is included in “Other Liabilities” in the consolidated statements of financial position.

Litigation contingencies

Existing and potential litigation is reviewed quarterly to determine if any adjustments to liabilities for possible losses are necessary. Reserves for losses are established whenever they are probable and estimable. If no one estimate within the range of possible losses is more probable than any other, a reserve is recorded based on the lowest amount of the range.

Note 3 – Recently Issued Accounting Pronouncements

Adoption of New Accounting Standards

In May 2014, the FASB issued guidance that superseded most existing revenue recognition requirements in GAAP. Insurance contracts generally are excluded from the scope of the guidance. For those contracts which are impacted, the transaction price is attributed to the underlying performance obligations in the contract and revenue is recognized as the entity satisfies the performance obligations and transfers control of a good or service to the customer. The Company’s revenues include premium, other policy revenue, net investment income, realized investment gains, and other income. Other income includes fee income which is recognized when obligations under the terms specified within a contract with a customer are either (1) satisfied at a point in time or (2) the progress of completion is measured over a period of time as the obligation is performed using the input method. The Company adopted the standard on its required effective date of January 1, 2018 using the modified retrospective approach. The majority of our revenue sources are insurance related and not in the scope of the guidance. The adoption of the standard did not have a material impact on the Company’s consolidated financial position, results of operations, equity or cash flows as of the adoption date or for the year ended December 31, 2018.

In January 2016, the FASB issued Accounting Standard Update ("ASU") 2016-01, Financial Instruments guidance that changed certain aspects of recognition, measurement, presentation, and disclosure of financial instruments. The new guidance requires that equity investments, other than those accounted for under the equity method or those that result in consolidation of the investee, be measured at fair value and the changes in fair value are recognized through earnings. When the fair value option has been elected for financial liabilities, changes in fair value due to instrument-specific credit risk will be recognized separately in other comprehensive income. The guidance also simplifies the impairment assessment of equity investments and eliminates the disclosure requirements for methods and significant assumptions used to estimate fair value of financial instruments that are measured at amortized cost on the statement of financial position. The Company adopted the standard on its required effective date of January 1, 2018 using a modified retrospective approach. Upon adoption, cumulative unrealized gains and losses on equity securities of $667.7 million, partially offset by $30.4 million participating policyholders’ interest, net of tax, related to unrealized gains and losses on equity securities, were reclassified from accumulated other comprehensive income to retained earnings. In April 2018, an additional $10.2 million deferred policy acquisition cost adjustment, net of tax, related to net unrealized gains and losses on equity securities, was reclassified from accumulated other comprehensive income to retained earnings. Earnings decreased $84.7 million, net of tax, for December 31, 2018, from the change in net unrealized gains and losses on equity securities.

In October of 2016, the FASB issued guidance requiring an entity to recognize the income tax consequences of an intra-entity transfer of an asset other than inventory when the transfer occurs, whereas, prior guidance prohibited the recognition of current and deferred income taxes for an intra-entity asset transfer until the asset was sold to an outside party. The Company adopted the standard on its required effective date of January 1, 2018 using a modified retrospective approach. Upon adoption, a liability was released and retained earnings increased by $59.9 million.

In March 2017, the FASB issued guidance on the presentation of net periodic pension and postretirement benefit costs. The guidance requires the service cost component to be reported in the same line item as other compensation costs. All other components of net periodic pension cost are required to be presented in the income statement separately from the service cost component and outside of income from operations. The Company adopted the standard on its required effective date of January 1, 2018 using a retrospective approach. Upon adoption, other components of net periodic pension costs of $12.4 million, net of tax, for December 31, 2017, were reclassified from other operating expenses. The guidance changed presentation only and did not have an impact on the Company's consolidated financial position, results of operations, equity or cash flows. Since the Company's defined benefit pension plans have been frozen, the components of net periodic benefit costs have not materially changed from year-end 2017.

Future Adoption of New Accounting Standards— The FASB issued the following accounting guidance relevant to American National:

In February 2016, the FASB issued guidance that will require significant changes to the statement of financial position of lessees. The new standard requires lessees to apply a dual approach, classifying leases as either finance or operating leases based on the principle of whether or not the lease is effectively a financed purchase by the lessee. This classification will determine whether lease expense is recognized based on an effective interest method or on a straight line basis over the term of the lease, respectively. A lessee is also required to record a right-of-use asset and a lease liability for all leases with a term of greater than 12 months regardless of their classification. Leases with a term of 12 months or less will be accounted for similarly to existing guidance for operating leases today. Lessor accounting is less affected by the standard, but has been updated to align with certain changes in the lessee model and the new revenue recognition standard. The standard is effective for annual periods and interim periods within those annual periods beginning after December 15, 2018 and will be implemented using the effective date method, which requires a cumulative-effect adjustment to the opening balance of retained earnings on the effective date. We have elected certain practical expedients permitted under the transition guidance. We have identified and analyzed the lease contracts and determined the adoption of the standard will not be material to the Company's results of operations or financial position.

In June 2016, the FASB issued guidance that will significantly change how entities measure credit losses for most financial assets, reinsurance recoverables and certain other instruments that are not measured at fair value through net income. The guidance will replace the current "incurred loss" approach with an "expected loss" model for instruments measured at amortized cost. For available-for-sale debt securities, entities will be required to record allowances rather than reduce the carrying amount, as they do under the current other-than-temporary impairment model. The standard is effective for annual periods and interim periods within those annual periods beginning after December 15, 2019. The Company must develop appropriate models to measure expected credit losses to begin determining the impact of adopting the standard on our results of operations and financial position.

In February 2018, the FASB issued guidance that allows for a reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from the Tax Cuts and Jobs Act. The standard is effective for annual periods and interim periods within those annual periods beginning after December 15, 2018. The Company plans to adopt the standard effective January 1, 2019. The guidance changes equity presentation only and will not have a material impact on the Company's results of operations or financial position.

In August 2018, the FASB issued guidance that seeks to improve financial reporting for insurance companies that issue long duration contracts. The guidance improves the timeliness of recognizing changes in the liability for future policy benefits and modifies the rate used to discount future cash flows. The guidance will also simplify and improve accounting for certain market-based options or guarantees associated with deposit type contracts, simplify the amortization of deferred acquisition costs and provide users of the financial statements with enhanced disclosures. The standard is effective for annual periods and interim periods within those annual periods beginning after December 15, 2020. This standard could potentially have a material impact on our results of operations and financial position.

Note 4 – Investment in Securities

The cost or amortized cost and fair value of investments in securities are shown below (in thousands):

	December 31, 2018			
	Cost or Amortized Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Fair Value
Fixed maturity securities, bonds held-to-maturity				
U.S. states and political subdivisions	$ 245,360	$ 5,840	$ (301)	$ 250,899
Foreign governments	3,961	469	—	4,430
Corporate debt securities	7,640,891	58,772	(150,834)	7,548,829
Residential mortgage-backed securities	315,306	7,237	(2,633)	319,910
Collateralized debt securities	5,214	71	—	5,285
Other debt securities	717	14	—	731
Total bonds held-to-maturity	**8,211,449**	**72,403**	**(153,768)**	**8,130,084**
Fixed maturity securities, bonds available-for-sale				
U.S. treasury and government	28,304	338	(243)	28,399
U.S. states and political subdivisions	848,228	16,827	(3,025)	862,030
Foreign governments	5,000	1,210	—	6,210
Corporate debt securities	5,345,579	41,812	(103,573)	5,283,818
Residential mortgage-backed securities	31,735	424	(497)	31,662
Collateralized debt securities	2,775	675	(6)	3,444
Total bonds available-for-sale	**6,261,621**	**61,286**	**(107,344)**	**6,215,563**
Total investments in securities	**$ 14,473,070**	**$ 133,689**	**$ (261,112)**	**$ 14,345,647**

	December 31, 2017			
	Cost or Amortized Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Fair Value
Fixed maturity securities, bonds held-to-maturity				
U.S. states and political subdivisions	$ 266,966	$ 12,466	$ (37)	$ 279,395
Foreign governments	4,011	582	—	4,593
Corporate debt securities	7,032,464	217,883	(18,020)	7,232,327
Residential mortgage-backed securities	246,803	9,702	(1,262)	255,243
Collateralized debt securities	923	31	—	954
Other debt securities	1,792	49	—	1,841
Total bonds held-to-maturity	**7,552,959**	**240,713**	**(19,319)**	**7,774,353**
Fixed maturity securities, bonds available-for-sale				
U.S. treasury and government	27,569	475	(146)	27,898
U.S. states and political subdivisions	866,250	31,621	(824)	897,047
Foreign governments	5,000	1,460	—	6,460
Corporate debt securities	5,038,908	170,112	(16,093)	5,192,927
Residential mortgage-backed securities	15,009	37	(329)	14,717
Collateralized debt securities	3,171	651	(4)	3,818
Other debt securities	1,994	447	—	2,441
Total bonds available-for-sale	**5,957,901**	**204,803**	**(17,396)**	**6,145,308**
Equity securities*				
Common stock	738,453	1,029,340	(7,166)	1,760,627
Preferred stock	19,130	4,469	—	23,599
Total equity securities	**757,583**	**1,033,809**	**(7,166)**	**1,784,226**
Total investments in securities	**$ 14,268,443**	**$ 1,479,325**	**$ (43,881)**	**$ 15,703,887**

*Effective January 1, 2018, the Company adopted ASU No. 2016-01. As a result, equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income; rather, all changes in the fair value of equity securities are now recognized in earnings. Since changes in fair value are recognized in earnings each reporting period, OTTI is no longer recognized on equity securities in a loss position. Prior periods have not been restated to conform to the current presentation. See note 3, Recently Issued Accounting Pronouncements.

Note 4 – Investment in Securities—(Continued)

The amortized cost and fair value, by contractual maturity, of fixed maturity securities are shown below (in thousands):

	December 31, 2018			
	Bonds Held-to-Maturity		Bonds Available-for-Sale	
	Amortized Cost	Fair Value	Amortized Cost	Fair Value
Due in one year or less	$ 383,192	$ 386,893	$ 76,516	$ 77,149
Due after one year through five years	4,214,944	4,228,048	2,841,372	2,852,085
Due after five years through ten years	2,968,600	2,888,783	2,846,375	2,791,623
Due after ten years	644,713	626,360	497,358	494,706
Total	**$ 8,211,449**	**$ 8,130,084**	**$ 6,261,621**	**$ 6,215,563**

Actual maturities differ from contractual maturities because borrowers may have the right to call or prepay obligations with or without call or prepayment penalties. Residential and commercial mortgage-backed securities, which are not due at a single maturity, have been allocated to their respective categories based on the year of final contractual maturity.

Proceeds from sales of available-for-sale securities, with the related gross realized gains and losses, are shown below (in thousands):

	Years ended December 31,		
	2018	2017	2016
Proceeds from sales of fixed maturity available-for-sale securities	$ 85,590	$ 161,223	$ 138,665
Gross realized gains	376	63,075	34,135
Gross realized losses	(2,298)	(6,406)	(7,775)

Gains and losses are determined using specific identification of the securities sold. During 2018 and 2017, bonds with a carrying value of $34,690,000 and $25,266,000, respectively were transferred from held-to-maturity to available-for-sale after a deterioration in the issuers' credit worthiness. Further, during 2018, a bond with a carrying value of $38,381,000 was transferred from held-to-maturity to available-for-sale due to an isolated event that could not have been reasonably anticipated by the Company. No realized loss was recorded in 2018 and a realized loss of $6,000,000 was recorded in 2017 on a bond that was transferred due to an other-than-temporary impairment.

In accordance with various regulations, American National has bonds on deposit with regulating authorities with a carrying value of $48,068,000 and $47,556,000 at December 31, 2018 and 2017, respectively. In addition, American National has pledged bonds in connection with agreements and transactions, such as financing and reinsurance agreements. The carrying value of bonds pledged was $168,118,000 and $63,386,000 at December 31, 2018 and 2017, respectively

The components of the change in net unrealized gains (losses) on debt securities are shown below (in thousands):

	Years ended December 31,		
	2018	2017	2016
Bonds available-for-sale	$ (233,465)	$ 53,115	$ 78,207
Adjustments for			
Deferred policy acquisition costs	51,920	(2,083)	(29,074)
Participating policyholders' interest	11,157	(7,086)	(10,282)
Deferred federal income tax benefit (expense)	34,127	(15,516)	(13,456)
Change in net unrealized gains (losses) on debt securities, net of tax	**$ (136,261)**	**$ 28,430**	**$ 25,395**

The components of the change in net losses on equity securities are shown below (in thousands):

	Year ended December 31, 2018
Unrealized losses on equity securities	$ (108,693)
Less: Net gain on equity securities sold	1,505
Net losses on equity securities	**$ (107,188)**

Note 4 – Investment in Securities—(Continued)

The gross unrealized losses and fair value of the investment securities, aggregated by investment category and length of time that individual securities have been in a continuous unrealized loss position, are shown below (in thousands):

	December 31, 2018					
	Less than 12 months		12 Months or more		Total	
	Unrealized (Losses)	Fair Value	Unrealized (Losses)	Fair Value	Unrealized (Losses)	Fair Value
Fixed maturity securities, bonds held-to-maturity						
U.S. states and political subdivisions	$ (301)	$ 22,605	$ —	$ —	$ (301)	$ 22,605
Corporate debt securities	(90,931)	2,969,461	(59,903)	1,063,679	(150,834)	4,033,140
Residential mortgage-backed securities	(703)	58,119	(1,930)	57,661	(2,633)	115,780
Total bonds held-to-maturity	**(91,935)**	**3,050,185**	**(61,833)**	**1,121,340**	**(153,768)**	**4,171,525**
Fixed maturity securities, bonds available-for-sale						
U.S. treasury and government	(29)	9,741	(214)	13,478	(243)	23,219
U.S. states and political subdivisions	(1,274)	119,987	(1,751)	61,992	(3,025)	181,979
Corporate debt securities	(65,492)	2,383,548	(38,081)	572,600	(103,573)	2,956,148
Residential mortgage-backed securities	(54)	6,034	(443)	13,515	(497)	19,549
Collateralized debt securities	(2)	158	(4)	100	(6)	258
Total bonds available-for-sale	**(66,851)**	**2,519,468**	**(40,493)**	**661,685**	**(107,344)**	**3,181,153**
Total	**$ (158,786)**	**$ 5,569,653**	**$ (102,326)**	**$ 1,783,025**	**$ (261,112)**	**$ 7,352,678**

	December 31, 2017					
	Less than 12 months		12 Months or more		Total	
	Unrealized (Losses)	Fair Value	Unrealized (Losses)	Fair Value	Unrealized (Losses)	Fair Value
Fixed maturity securities, bonds held-to-maturity						
U.S. states and political subdivisions	$ (37)	$ 1,937	$ —	$ —	$ (37)	$ 1,937
Corporate debt securities	(8,444)	951,425	(9,576)	192,737	(18,020)	1,144,162
Residential mortgage-backed securities	(325)	49,283	(937)	18,888	(1,262)	68,171
Total bonds held-to-maturity	**(8,806)**	**1,002,645**	**(10,513)**	**211,625**	**(19,319)**	**1,214,270**
Fixed maturity securities, bonds available-for-sale						
U.S. treasury and government	(141)	20,352	(5)	3,875	(146)	24,227
U.S. states and political subdivisions	(160)	27,669	(664)	28,010	(824)	55,679
Corporate debt securities	(6,657)	559,710	(9,436)	159,532	(16,093)	719,242
Residential mortgage-backed securities	(193)	12,419	(136)	1,428	(329)	13,847
Collateralized debt securities	—	—	(4)	123	(4)	123
Total bonds available-for-sale	**(7,151)**	**620,150**	**(10,245)**	**192,968**	**(17,396)**	**813,118**
Equity securities*						
Common stock	(7,166)	60,391	—	—	(7,166)	60,391
Total equity securities	**(7,166)**	**60,391**	**—**	**—**	**(7,166)**	**60,391**
Total	**$ (23,123)**	**$ 1,683,186**	**$ (20,758)**	**$ 404,593**	**$ (43,881)**	**$ 2,087,779**

*Effective January 1, 2018, the Company adopted ASU No. 2016-01. As a result, equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income; rather, all changes in the fair value of equity securities are now recognized in earnings. Since changes in fair value are recognized in earnings each reporting period, OTTI is no longer recognized on equity securities in a loss position. Prior periods have not been restated to conform to the current presentation. See note 3, Recently Issued Accounting Pronouncements.

As of December 31, 2018, the securities with unrealized losses including those exceeding one year were not deemed to be other-than-temporarily impaired. American National has the ability and intent to hold those securities until a market price recovery or maturity. It is not more-likely-than-not that American National will be required to sell them prior to recovery, and recovery is expected in a reasonable period of time. It is possible an issuer’s financial circumstances may be different in the future, which may lead to a different impairment conclusion in future periods.

Note 4 – Investment in Securities—(Continued)

The following table identifies the total bonds distributed by credit quality rating (in thousands, except percentages):

	December 31, 2018			December 31, 2017		
	Amortized Cost	Estimated Fair Value	% of Fair Value	Amortized Cost	Estimated Fair Value	% of Fair Value
AAA	$ 690,009	$ 702,531	4.9 %	$ 638,039	$ 664,396	4.8 %
AA	1,326,947	1,336,380	9.3	1,220,544	1,264,282	9.0
A	5,350,316	5,314,589	37.0	4,856,802	4,997,574	35.9
BBB	6,584,478	6,507,212	45.4	6,273,220	6,480,719	46.6
BB and below	521,320	484,935	3.4	522,255	512,690	3.7
Total	**$ 14,473,070**	**$ 14,345,647**	**100.0%**	**$ 13,510,860**	**$ 13,919,661**	**100.0%**

Equity securities by market sector distribution are shown below:

	December 31,	
	2018	2017
Consumer goods	21.1 %	20.2 %
Energy and utilities	8.2	8.6
Finance	18.1	21.9
Healthcare	13.5	11.8
Industrials	9.0	9.5
Information technology	22.6	20.0
Other	7.5	8.0
Total	**100.0%**	**100.0%**

Note 5 – Mortgage Loans

Generally, commercial mortgage loans are secured by first liens on income-producing real estate. American National attempts to maintain a diversified portfolio by considering the location of the underlying collateral. The distribution based on carrying amount of mortgage loans by location is as follows:

	December 31,	
	2018	2017
East North Central	13.9 %	15.4 %
East South Central	2.8	3.1
Mountain	20.0	14.0
Pacific	16.2	16.5
South Atlantic	12.1	14.1
West South Central	27.2	29.8
Other	7.8	7.1
Total	**100.0%**	**100.0%**

During 2018, American National foreclosed on four loans with a total recorded investment of $22,608,000, and one loan with a recorded investment of $7,363,000 was in the process of foreclosure. For the year ended December 31, 2017, American National foreclosed on one loan with a recorded investment of $2,285,000, and four loans with a total recorded investment of $17,263,000 were in the process of foreclosure. American National did not sell any loans during 2018 or 2017.

Note 5 – Mortgage Loans – (Continued)

The age analysis of past due loans is shown below (in thousands):

December 31, 2018	30-59 Days Past Due	60-89 Days Past Due	More Than 90 Days	Total	Current	Total Amount	Total Percent
Industrial	$ —	$ —	$ —	$ —	$ 761,294	$ 761,294	14.8%
Office	—	—	—	—	1,747,926	1,747,926	34.0
Retail	—	—	—	—	896,429	896,429	17.4
Other	—	4,000	18,888	22,888	1,717,503	1,740,391	33.8
Total	**$ —**	**$ 4,000**	**$ 18,888**	**$ 22,888**	**$ 5,123,152**	**$ 5,146,040**	**100.0%**
Allowance for loan losses						(21,333)	
Total, net of allowance						**$ 5,124,707**	
December 31, 2017							
Industrial	$ 4,985	$ —	$ —	$ 4,985	$ 781,385	$ 786,370	16.5%
Office	—	10,713	8,881	19,594	1,764,151	1,783,745	37.4
Retail	—	—	—	—	750,979	750,979	15.7
Other	—	—	—	—	1,447,771	1,447,771	30.4
Total	**$ 4,985**	**$ 10,713**	**$ 8,881**	**$ 24,579**	**$ 4,744,286**	**$ 4,768,865**	**100.0%**
Allowance for loan losses						(18,866)	
Total, net of allowance						**$ 4,749,999**	

There were no unamortized purchase discounts as of December 31, 2018 or 2017. Total mortgage loans are also net of unamortized origination fees of $31,586,000 and $32,766,000 at December 31, 2018 and 2017, respectively. No unearned income is included in these amounts.

Allowance for Credit Losses

A loan is considered impaired when it is probable that all amounts due will not be collected according to the contractual terms of the loan agreement. Mortgage loans with temporary difficulties are not considered impaired when the borrower has the financial capacity to fund revenue shortfalls from the properties for the foreseeable future. Individual valuation allowances are established for impaired loans to reduce the carrying value to the fair value of the collateral. Loans not evaluated individually for collectability are segregated by property-type and location, and allowance factors are applied. These factors are developed based on historical loss experience adjusted for the expected trend in the rate of foreclosure losses. Allowance factors are higher for loans of certain property types and in certain regions based on loss experience or a blended historical loss factor.

The change in allowance for credit losses in mortgage loans is shown below (in thousands, except number of loans):

	Collectively Evaluated for Impairment			Individually Impaired			Total		
	Number of Loans	Recorded Investment	Valuation Allowance	Number of Loans	Recorded Investment	Valuation Allowance	Number of Loans	Recorded Investment	Valuation Allowance
Balance at December 31, 2016	**430**	**$ 4,358,596**	**$ 11,488**	**2**	**$ 1,940**	**$ 1,002**	**432**	**$ 4,360,536**	**$ 12,490**
Change in allowance	—	—	4,553	—	—	1,823	—	—	6,376
Net change in recorded	21	403,719	—	1	4,610	—	22	408,329	—
Balance at December 31, 2017	**451**	**4,762,315**	**16,041**	**3**	**6,550**	**2,825**	**454**	**4,768,865**	**18,866**
Change in allowance	—	—	2,566	—	—	(99)	—	—	2,467
Net change in recorded	(2)	366,102	—	(1)	11,073	—	(3)	377,175	—
Balance at December 31, 2018	**449**	**$ 5,128,417**	**$ 18,607**	**2**	**$ 17,623**	**$ 2,726**	**451**	**$ 5,146,040**	**$ 21,333**

Note 5 – Mortgage Loans – (Continued)

Troubled Debt Restructurings

American National has granted concessions which are classified as troubled debt restructurings to certain mortgage loan borrowers. Concessions are generally one of, or a combination of, a delay in payment of principal or interest, a reduction of the contractual interest rate or an extension of the maturity date. American National considers the amount, timing and extent of concessions in determining any impairment or changes in the specific allowance for loan losses recorded in connection with a troubled debt restructuring. The carrying value after specific allowance, before and after modification in a troubled debt restructuring, may not change significantly, or may increase if the expected recovery is higher than the pre-modification recovery assessment.

Troubled debt restructuring mortgage loan information is as follows (in thousands, except number of loans):

	Years ended December 31,					
	2018			2017		
	Number of loans	Recorded investment pre-modification	Recorded investment post modification	Number of loans	Recorded investment pre-modification	Recorded investment post modification
Office	1	$ 5,164	$ 5,164	2	$ 34,207	$ 34,207
Retail	1	42,448	42,448	—	—	—
Other (hotel/motel)	1	8,203	8,203	5	24,801	24,801
Total	**3**	**$ 55,815**	**$ 55,815**	**7**	**$ 59,008**	**$ 59,008**

There were three loans determined to be a troubled debt restructuring for the year ended December 31, 2018. There are no commitments to lend additional funds to debtors whose loans have been modified in a troubled debt restructuring during the periods presented.

Note 6 – Real Estate and Other Investments

Investment real estate by property-type and geographic distribution are as follows:

	December 31,	
	2018	2017
Industrial	13.1 %	6.0 %
Office	37.3	39.0
Retail	37.0	39.3
Other	12.6	15.7
Total	**100.0%**	**100.0%**

	December 31,	
	2018	2017
East North Central	5.6 %	6.1 %
East South Central	5.4	3.6
Mountain	11.9	13.2
Pacific	7.3	8.5
South Atlantic	13.8	14.0
West South Central	53.8	52.4
Other	2.2	2.2
Total	**100.0%**	**100.0%**

Note 6 – Real Estate and Other Investments – (Continued)

American National regularly invests in real estate partnerships and joint ventures. American National frequently participates in the design of these entities with the sponsor, but in most cases, its involvement is limited to financing. Through analysis performed by American National, some of these partnerships and joint ventures have been determined to be variable interest entities ("VIEs"). In certain instances, in addition to an economic interest in the entity, American National holds the power to direct the most significant activities of the entity and is deemed the primary beneficiary or consolidator of the entity. The assets of the consolidated VIEs are restricted and must first be used to settle their liabilities. Creditors or beneficial interest holders of these VIEs have no recourse to the general credit of American National, as American National's obligation is limited to the amount of its committed investment. American National has not provided financial or other support to the VIEs in the form of liquidity arrangements, guarantees, or other commitments to third parties that may affect the fair value or risk of its variable interest in the VIEs in 2018 or 2017.

The assets and liabilities relating to the VIEs included in the consolidated financial statements are as follows (in thousands):

	December 31,	
	2018	2017
Investment real estate	$ 141,843	$ 148,456
Short-term investments	500	501
Cash and cash equivalents	10,392	6,320
Other receivables	3,939	4,461
Other assets	13,231	15,920
Total assets of consolidated VIEs	**$ 169,905**	**$ 175,658**
Notes payable	$ 137,963	$ 137,458
Other liabilities	7,145	5,616
Total liabilities of consolidated VIEs	**$ 145,108**	**$ 143,074**

The notes payable in the consolidated statements of financial position pertain to the borrowings of the consolidated VIEs. The liability of American National relating to notes payable of the consolidated VIEs is limited to the amount of its direct or indirect investment in the respective ventures, which totaled $26,635,000 and $28,377,000 at December 31, 2018 and 2017, respectively.

The total long-term notes payable of the consolidated VIE's consists of the following (in thousands):

		December 31,	
Interest rate	**Maturity**	**2018**	**2017**
LIBOR	2020	$ 10,834	$ 9,702
90 day LIBOR + 2.5%	2021	42,399	40,124
4% fixed	2022	84,730	87,632
Total		**$ 137,963**	**$ 137,458**

Note 6 – Real Estate and Other Investments – (Continued)

For other VIEs in which American National is a partner, it is not the primary beneficiary, and these entities are not consolidated, as the major decisions that most significantly impact the economic activities of the VIE require consent of all partners. The carrying amount and maximum exposure to loss relating to unconsolidated VIEs follows (in thousands):

	December 31,			
	2018		2017	
	Carrying Amount	Maximum Exposure to Loss	Carrying Amount	Maximum Exposure to Loss
Investment in unconsolidated affiliates	$ 330,730	$ 330,730	$ 314,808	$ 314,808
Mortgage loans	633,533	633,533	493,014	493,014
Accrued investment income	2,191	2,191	1,817	1,817

As of December 31, 2018, no real estate investments were classified as held-for-sale.

The Company's equity in earnings of unconsolidated affiliates is the Company's share of operating earnings and realized gains from investments in real estate joint ventures and other limited partnership interests ("joint ventures") using the equity method of accounting. In 2018 and 2017 certain joint ventures took advantage of market opportunities to generate realized gains on the sale of real estate held or developed by the ventures.

The Company's income from and investment in each joint venture did not exceed 20% and therefore no separate financial disclosure is required. The Company's income from, assets held, and investment in each joint venture did not exceed 10% of operating income before tax. Additionally, the Company's investment in joint ventures continues to be 2% or less of the Company's total assets, and investments in individual joint ventures is not considered to be material to the Company in relation to its financial position or ongoing results of operations. Therefore, summarized financial information of equity method investees has not been included.

The Company's total investment in and equity in earnings of unconsolidated affiliates, of which substantially all are LLC's or limited partnerships, were comprised of the following (in thousands):

	December 31,	
	2018	2017
Real estate	$ 386,981	$ 359,130
Equity and fixed income	156,121	95,819
Other	28,795	29,258
Total investments in unconsolidated affiliates	**$ 571,897**	**$ 484,207**

	Years ended December 31,		
	2018	2017	2016
Income from operations	$ 7,595	$ 16,663	$ 19,005
Net gain on sales	13,686	70,011	38,195
Equity in earnings of unconsolidated affiliates	**$ 21,281**	**$ 86,674**	**$ 57,200**

Note 7 – Derivative Instruments

American National purchases over-the-counter equity-indexed options as economic hedges against fluctuations in the equity markets to which equity-indexed products are exposed. These options are not designated as hedging instruments for accounting purposes under U.S. GAAP. Equity-indexed contracts include a fixed host universal-life insurance or annuity contract and an equity-indexed embedded derivative. The detail of derivative instruments is shown below (in thousands, except number of instruments):

		December 31,					
		2018			2017		
Derivatives Not Designated as Hedging Instruments	**Location in the Consolidated Statements of Financial Position**	**Number of Instruments**	**Notional Amounts**	**Estimated Fair Value**	**Number of Instruments**	**Notional Amounts**	**Estimated Fair Value**
Equity-indexed options	Other invested assets	493	$ 2,391,000	$ 148,006	468	$ 1,885,600	$ 220,190
Equity-indexed embedded derivative	Policyholders' account balances	90,440	2,327,769	596,075	76,621	1,819,523	512,526

		Gains (Losses) Recognized in Income on Derivatives		
		Years ended December 31,		
Derivatives Not Designated as Hedging Instruments	**Location in the Consolidated Statements of Operations**	**2018**	**2017**	**2016**
Equity-indexed options	Net investment income	$ (54,951)	$ 91,055	$ 28,869
Equity-indexed embedded derivative	Interest credited to policyholders' account balances	17,862	(98,351)	(25,239)

Note 7 – Derivative Instruments – (Continued)

The Company's use of derivative instruments exposes it to credit risk in the event of non-performance by the counterparties. The Company has a policy of only dealing with counterparties it believes are creditworthy and obtaining sufficient collateral where appropriate, as a means of mitigating the financial loss from defaults. The Company holds collateral in cash and notes secured by U.S. government backed assets. The non-performance risk is the net counterparty exposure based on the fair value of the open contracts, less the fair value of collateral held. The Company maintains master netting agreements with its current active trading partners. As such, a right of offset has been applied to collateral that supports credit risk and has been recorded in the consolidated statements of financial position as an offset to "Other invested assets" with an associated payable to "Other liabilities" for excess collateral.

Information regarding the Company's exposure to credit loss on the options it holds is presented below (in thousands):

		December 31, 2018						
Counterparty	Moody/ S&P Rating	Options Fair Value	Collateral Held in Cash	Collateral Held in Invested Assets	Total Collateral Held	Collateral Amounts used to Offset Exposure	Excess Collateral	Exposure Net of Collateral
Barclays	Baa3/ BBB	$ 38,905	$ 11,063	$ 28,041	$ 39,104	$ 38,905	$ 199	$ —
Goldman-Sachs	A3/BBB+	615	670	—	670	615	55	—
ING	Baa1/A-	24,183	7,960	16,023	23,983	23,983	—	200
Morgan Stanley	A3/BBB+	11,649	2,046	9,013	11,059	11,059	—	590
NATIXIS*	A1/A+	26,786	27,610	—	27,610	26,786	824	—
SunTrust	Baa1/ BBB+	23,488	6,520	17,025	23,545	23,464	81	24
Wells Fargo	A2/A-	22,380	7,030	15,022	22,052	22,052	—	328
Total		**$ 148,006**	**$ 62,899**	**$ 85,124**	**$ 148,023**	**$ 146,864**	**$ 1,159**	**$ 1,142**

		December 31, 2017				
Counterparty	Moody/S&P Rating	Options Fair Value	Collateral Held	Collateral Amounts used to Offset Exposure	Excess Collateral	Exposure Net of Collateral
Barclays	Baa2/BBB	$ 55,215	$ 56,883	$ 55,215	$ 1,668	$ —
Goldman-Sachs	A3/BBB+	956	780	780	—	176
ING	Baa1/A-	26,650	27,330	26,650	680	—
JP Morgan	A3/A-	189	—	—	—	189
Morgan Stanley	A3/BBB+	17,490	18,776	17,490	1,286	—
NATIXIS*	A2/A	37,550	33,860	33,860	—	3,690
SunTrust	Baa1/BBB+	37,266	36,560	36,560	—	706
Wells Fargo	A2/A	44,874	47,230	44,874	2,356	—
Total		**$ 220,190**	**$ 221,419**	**$ 215,429**	**$ 5,990**	**$ 4,761**

* *Includes collateral restrictions*

Note 8 – Net Investment Income and Net Realized Investment Gains (Losses)

Net investment income is shown below (in thousands):

	Years ended December 31,		
	2018	2017	2016
Bonds	$ 566,513	$ 541,772	$ 551,849
Dividends on equity securities	39,193	38,730	38,680
Mortgage loans	258,102	245,116	211,972
Real estate	13,533	12,672	6,743
Options	(54,951)	91,055	28,869
Other invested assets	35,977	36,732	22,122
Total	**$ 858,367**	**$ 966,077**	**$ 860,235**

Net realized investment gains (losses) are shown below (in thousands):

	Years ended December 31,		
	2018	2017	2016
Bonds	$ 10,903	$ 27,061	$ 16,705
Equity securities*	—	56,528	33,348
Mortgage loans	(4,798)	(7,700)	405
Real estate	12,076	28,853	2,188
Other invested assets	(7)	(147)	(6,039)
Total	**$ 18,174**	**$ 104,595**	**$ 46,607**

Other-than-temporary impairment losses are shown below (in thousands):

	Years ended December 31,		
	2018	2017	2016
Bonds	$ (1,243)	$ (6,416)	$ (94)
Equity securities*	—	(6,970)	(17,573)
Total	**$ (1,243)**	**$ (13,386)**	**$ (17,667)**

*Effective January 1, 2018, the Company adopted ASU No. 2016-01. As a result, equity securities are no longer classified as available-for-sale with unrealized gains and losses recognized in other comprehensive income; rather, all changes in the fair value of equity securities are now recognized in earnings. Since changes in fair value are recognized in earnings each reporting period, OTTI is no longer recognized on equity securities in a loss position. Prior periods have not been restated to conform to the current presentation. See note 3, Recently Issued Accounting Pronouncements.

Note 9 – Fair Value of Financial Instruments

The carrying amount and fair value of financial instruments are shown below (in thousands):

	December 31,			
	2018		2017	
	Carrying Amount	Fair Value	Carrying Amount	Fair Value
Financial assets				
Fixed maturity securities, bonds held-to-maturity	$ 8,211,449	$ 8,130,084	$ 7,552,959	$ 7,774,353
Fixed maturity securities, bonds available-for-sale	6,215,563	6,215,563	6,145,308	6,145,308
Equity securities	1,530,228	1,530,228	1,784,226	1,784,226
Equity-indexed options	148,006	148,006	220,190	220,190
Mortgage loans on real estate, net of allowance	5,124,707	5,049,468	4,749,999	4,811,006
Policy loans	376,254	376,254	377,103	377,103
Short-term investments	206,760	206,760	658,765	658,765
Separate account assets ($905,824 and $965,575 included in fair value hierarchy)	918,369	918,369	969,764	969,764
Separately managed accounts	16,532	16,532	851	851
Total financial assets	**$ 22,747,868**	**$ 22,591,264**	**$ 22,459,165**	**$ 22,741,566**
Financial liabilities				
Investment contracts	$ 10,003,990	$ 10,003,990	$ 8,990,771	$ 8,990,771
Embedded derivative liability for equity-indexed contracts	596,075	596,075	512,526	512,526
Notes payable	137,963	137,963	137,458	137,458
Separate account liabilities ($905,824 and $965,575 included in fair value hierarchy)	918,369	918,369	969,764	969,764
Total financial liabilities	**$ 11,656,397**	**$ 11,656,397**	**$ 10,610,519**	**$ 10,610,519**

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability. A fair value hierarchy is used to determine fair value based on a hypothetical transaction at the measurement date from the perspective of a market participant. American National has evaluated the types of securities in its investment portfolio to determine an appropriate hierarchy level based upon trading activity and the observability of market inputs. The classification of assets or liabilities within the fair value hierarchy is based on the lowest level of significant input to its valuation. The input levels are defined as follows:

Level 1 Unadjusted quoted prices in active markets for identical assets or liabilities.

Level 2 Quoted prices in markets that are not active or inputs that are observable directly or indirectly. Level 2 inputs include quoted prices for similar assets or liabilities other than quoted prices in Level 1; quoted prices in markets that are not active; or other inputs that are observable or can be derived principally from or corroborated by observable market data for substantially the full term of the assets or liabilities.

Level 3 Unobservable inputs that are supported by little or no market activity and are significant to the fair value of the assets or liabilities. Unobservable inputs reflect American National's own assumptions about the assumptions that market participants would use in pricing the asset or liability. Level 3 assets and liabilities include financial instruments whose values are determined using pricing models and third-party evaluation, as well as instruments for which the determination of fair value requires significant management judgment or estimation.

Fixed Maturity Securities and Equity Options—American National utilizes a pricing service to estimate fair value measurements. The estimates of fair value for most fixed maturity securities, including municipal bonds, provided by the pricing service are disclosed as Level 2 measurements as the estimates are based on observable market information rather than market quotes.

The pricing service utilizes market quotations for fixed maturity securities that have quoted prices in active markets. Since fixed maturity securities generally do not trade on a daily basis, the pricing service prepares estimates of fair value measurements for these securities using its proprietary pricing applications, which include available relevant market information, benchmark curves, benchmarking of like securities, sector groupings and matrix pricing. Additionally, an option adjusted spread model is used to develop prepayment and interest rate scenarios.

The pricing service evaluates each asset class based on relevant market information, credit information, perceived market movements and sector news. The market inputs utilized in the pricing evaluation, listed in the approximate order of priority, include: benchmark yields, reported trades, broker/dealer quotes, issuer spreads, two-sided markets, benchmark securities, bids, offers, reference data, and economic events. The extent of the use of each market input depends on the asset class and the market conditions. Depending on the security, the priority of the use of inputs may change or some market inputs may not be relevant. For some securities, additional inputs may be necessary.

American National has reviewed the inputs and methodology used and the techniques applied by the pricing service to produce quotes that represent the fair value of a specific security. The review confirms that the pricing service is utilizing information from observable transactions or a technique that represents a market participant's assumptions. American National does not adjust quotes received from the pricing service. The pricing service utilized by American National has indicated that they will only produce an estimate of fair value if there is objectively verifiable information available.

American National holds a small amount of private placement debt and fixed maturity securities that have characteristics that make them unsuitable for matrix pricing. For these securities, a quote from an independent broker (typically a market maker) is obtained. Due to the disclaimers on the quotes that indicate that the price is indicative only, American National includes these fair value estimates in Level 3.

For securities priced using a quote from an independent broker, such as the equity-indexed options (which are priced monthly by the broker and quarterly by pricing service, SS&C Technologies Holdings, Inc.) and certain fixed maturity securities, American National uses a market-based fair value analysis to validate the reasonableness of prices received. Price variances above a certain threshold are analyzed further to determine if any pricing issue exists. This analysis is performed quarterly.

Equity Securities—For publicly-traded equity securities, prices are received from a nationally recognized pricing service that are based on observable market transactions, and these securities are classified as Level 1 measurements. For certain preferred stock, current market quotes in active markets are unavailable. In these instances, an estimate of fair value is received from the pricing service. The service utilizes similar methodologies to price preferred stocks as it does for fixed maturity securities. If applicable, these estimates would be disclosed as Level 2 measurements. American National tests the accuracy of the information provided by reference to other services annually.

Mortgage Loans—The fair value of mortgage loans is estimated using discounted cash flow analyses on a loan by loan basis by applying a discount rate to expected cash flows from future installment and balloon payments. The discount rate takes into account general market trends and specific credit risk trends for the individual loan. Factors used to arrive at the discount rate include inputs from spreads based on U.S. Treasury notes and the loan's credit quality, region, property type, lien priority, payment type and current status. These estimates would be disclosed as Level 2 measurements.

Short-term investments— Short-term investments are primarily commercial paper rated A2 or P2 or better by Standard & Poor's and Moody's, respectively. Commercial paper is carried at amortized cost which approximates fair value. These investments are classified as Level 2 measurements.

Separate account assets and liabilities— Separate account assets and liabilities are funds that are held separate from the general assets and liabilities of American National and that represent the investments of variable insurance product contract holders, who bear the investment risk of such funds. Investment income and investment gains and losses from these separate funds accrue to the benefit of the contract holders. Separate accounts are established in conformity with insurance laws and are not chargeable with liabilities that arise from any other business of American National. American National reports separately, as assets and liabilities, investments held in separate accounts and liabilities of the separate accounts if (i) such separate accounts are legally recognized; (ii) assets supporting the contract liabilities are legally insulated from American National's general account liabilities; (iii) investments are directed by the contract holder; and (iv) all investment performance, net of contract fees and assessments, is passed through to the contract holder. The assets of these accounts are carried at fair value. Deposits, net investment income and realized investment gains and losses for these accounts are excluded from revenues, and related liability increases are excluded from benefits and expenses in the consolidated financial statements.

The separate account assets included on the quantitative disclosures fair value hierarchy table is made up of short-term investments, equity securities, and fixed maturity securities of available-for-sale bonds. Equity securities are classified as Level 1 measurements. Short-term investments and fixed maturity securities are classified as Level 2 measurements. These classifications for separate account assets reflect the same fair value level methodologies as listed above as they are derived from the same vendors and follow the same process.

Note 9 – Fair Value of Financial Instruments—(Continued)

The separate account assets account also includes cash and cash equivalents, investments in unconsolidated affiliates, accrued investment income, and receivables for securities. These are not financial instruments and are not included in the quantitative disclosures of fair value hierarchy table.

Embedded Derivative—The amounts reported within policyholder contract deposits include equity linked interest crediting rates based on the S&P 500 index within indexed annuities and indexed life. The following unobservable inputs are used for measuring the fair value of the embedded derivatives associated with the policyholder contract liabilities:

- Lapse rate assumptions are determined by company experience. Lapse rates are generally assumed to be lower during a contract's surrender charge period and then higher once the surrender charge period has ended. Decreases to the assumed lapse rates generally increase the fair value of the liability as more policyholders persist to collect the crediting interest pertaining to the indexed product. Increases to the lapse rate assumption will have the inverse effect of decreasing the fair value.
- Mortality rate assumptions vary by age and by gender based on company and industry experience. Decreases to the assumed mortality rates increase the fair value of the liabilities as more policyholders earn crediting interest. Increases to the assumed mortality rates decrease the fair value as higher decrements reduce the potential for future interest credits.
- Equity volatility assumptions begin with current market volatilities and grow to long-term values. Increases to the assumed volatility will increase the fair value of liabilities, as future projections will produce higher increases in the linked index. At December 31, 2018 and 2017, the one-year implied volatility used to estimate embedded derivative value was 23.2% and 13.7%, respectively

Fair values of indexed life and annuity liabilities are calculated using the discounted cash flow technique. Shown below are the significant unobservable inputs used to calculate the Level 3 fair value of the embedded derivatives within policyholder contract deposits (in millions, except range percentages):

	Fair Value December 31,			Range December 31,	
	2018	2017	Unobservable Input	2018	2017
Indexed Annuities	$ 592.8	$ 498.3	Lapse Rate	1-70%	1-66%
			Mortality Multiplier	90-100%	90-100%
			Equity Volatility	19-26%	7-30%
Indexed Life	3.3	14.2	Equity Volatility	19-26%	7-30%

Other Financial Instruments—Other financial instruments classified as Level 3 measurements, as there is little or no market activity, are as follows:

Policy loans—The carrying value of policy loans is the outstanding balance plus any accrued interest. Due to the collateralized nature of policy loans such that they cannot be separated from the policy contracts, the unpredictable timing of repayments and the fact that settlement is at outstanding value, American National believes the carrying value of policy loans approximates fair value.

Separately managed accounts—The amounts reported in separately managed accounts consist primarily of notes and private equity. These investments are private placements and do not have a readily determinable fair value. The carrying value of the separately managed accounts is cost or market value if available from the separately managed account manager. Market value is provided by the separately managed account manager in subsequent quarters. American National believes that cost approximates fair value at initial recognition during the quarter of investment.

Investment contracts—The carrying value of investment contracts is equivalent to the accrued account balance. The accrued account balance consists of deposits, net of withdrawals, plus or minus interest credited, fees and charges assessed and other adjustments. American National believes that the carrying value of investment contracts approximates fair value because the majority of these contracts' interest rates reset at anniversary.

Notes payable—Notes payable are carried at outstanding principal balance. The carrying value of the notes payable approximates fair value because the underlying interest rates approximate market rates at the balance sheet date.

Note 9 – Fair Value of Financial Instruments—(Continued)

Quantitative Disclosures

The fair value hierarchy measurements of the financial instruments are shown below (in thousands):

	Fair Value Measurement as of December 31, 2018			
	Total Fair Value	Level 1	Level 2	Level 3
Financial assets				
Fixed maturity securities, bonds held-to-maturity				
U.S. states and political subdivisions	$ 250,899	$ —	$ 250,899	$ —
Foreign governments	4,430	—	4,430	—
Corporate debt securities	7,548,829	—	7,548,829	—
Residential mortgage-backed securities	319,910	—	319,910	—
Collateralized debt securities	5,285	—	5,285	—
Other debt securities	731	—	731	—
Total bonds held-to-maturity	**8,130,084**	**—**	**8,130,084**	**—**
Fixed maturity securities, bonds available-for-sale				
U.S. treasury and government	28,399	—	28,399	—
U.S. states and political subdivisions	862,030	—	862,030	—
Foreign governments	6,210	—	6,210	—
Corporate debt securities	5,283,818	—	5,279,585	4,233
Residential mortgage-backed securities	31,662	—	31,662	—
Collateralized debt securities	3,444	—	3,444	—
Total bonds available-for-sale	**6,215,563**	**—**	**6,211,330**	**4,233**
Equity securities				
Common stock	1,509,186	1,509,073	—	113
Preferred stock	21,042	21,042	—	—
Total equity securities	**1,530,228**	**1,530,115**	**—**	**113**
Options	148,006	—	—	148,006
Mortgage loans on real estate	5,049,468	—	5,049,468	—
Policy loans	376,254	—	—	376,254
Short-term investments	206,760	—	206,760	—
Separate account assets	905,824	227,448	678,376	—
Separately managed accounts	16,532	—	—	16,532
Total financial assets	**$ 22,578,719**	**$ 1,757,563**	**$ 20,276,018**	**$ 545,138**
Financial liabilities				
Investment contracts	$ 10,003,990	$ —	$ —	$ 10,003,990
Embedded derivative liability for equity-indexed contracts	596,075	—	—	596,075
Notes payable	137,963	—	—	137,963
Separate account liabilities	905,824	227,448	678,376	—
Total financial liabilities	**$ 11,643,852**	**$ 227,448**	**$ 678,376**	**$ 10,738,028**

Note 9 – Fair Value of Financial Instruments—(Continued)

	Fair Value Measurement as of December 31, 2017			
	Total Fair Value	Level 1	Level 2	Level 3
Financial assets				
Fixed maturity securities, bonds held-to-maturity				
U.S. states and political subdivisions	$ 279,395	$ —	$ 276,450	$ 2,945
Foreign governments	4,593	—	4,593	—
Corporate debt securities	7,232,327	—	7,232,327	—
Residential mortgage-backed securities	255,243	—	255,243	—
Collateralized debt securities	954	—	954	—
Other debt securities	1,841	—	1,841	—
Total bonds held-to-maturity	**7,774,353**	**—**	**7,771,408**	**2,945**
Fixed maturity securities, bonds available-for-sale				
U.S. treasury and government	27,898	—	27,898	—
U.S. states and political subdivisions	897,047	—	897,047	—
Foreign governments	6,460	—	6,460	—
Corporate debt securities	5,192,927	—	5,192,927	—
Residential mortgage-backed securities	14,717	—	14,717	—
Collateralized debt securities	3,818	—	3,818	—
Other debt securities	2,441	—	2,441	—
Total bonds available-for-sale	**6,145,308**	**—**	**6,145,308**	**—**
Equity securities				
Common stock	1,760,627	1,760,499	—	128
Preferred stock	23,599	23,599	—	—
Total equity securities	**1,784,226**	**1,784,098**	**—**	**128**
Options	220,190	—	—	220,190
Mortgage loans on real estate	4,811,006	—	4,811,006	—
Policy loans	377,103	—	—	377,103
Short-term investments	658,765	—	658,765	—
Separate account assets	965,575	257,209	708,366	—
Separately managed accounts	851	—	—	851
Total financial assets	**$ 22,737,377**	**$ 2,041,307**	**$ 20,094,853**	**$ 601,217**
Financial liabilities				
Investment contracts	$ 8,990,771	$ —	$ —	$ 8,990,771
Embedded derivative liability for equity-indexed contracts	512,526	—	—	512,526
Notes payable	137,458	—	—	137,458
Separate account liabilities	965,575	257,209	708,366	—
Total financial liabilities	**$ 10,606,330**	**$ 257,209**	**$ 708,366**	**$ 9,640,755**

Note 9 – Fair Value of Financial Instruments—(Continued)

For financial instruments measured at fair value on a recurring basis using Level 3 inputs during the period, a reconciliation of the beginning and ending balances is shown below (in thousands):

	Level 3		
	Assets		Liability
	Investment Securities	Equity-Indexed Options	Embedded Derivative
Balance at December 31, 2015	**$ 20,130**	**$ 123,007**	**$ 242,412**
Total realized and unrealized investment gains included in other comprehensive income	481	—	—
Net fair value change included in realized gains (losses)	—	—	—
Net gain for derivatives included in net investment income	—	28,400	—
Net change included in interest credited	—	—	25,239
Purchases, sales and settlements or maturities			
Purchases	—	27,961	—
Sales	—	—	—
Settlements or maturities	(425)	(22,889)	—
Premiums less benefits	—	—	46,679
Gross transfers into Level 3	908	—	—
Gross transfers out of Level 3	(6,830)	—	—
Balance at December 31, 2016	**$ 14,264**	**$ 156,479**	**$ 314,330**
Total realized and unrealized investment gains included in other comprehensive income	(4,465)	—	—
Net fair value change included in realized gains (losses)	—	—	—
Net gain for derivatives included in net investment income	—	90,433	—
Net change included in interest credited	—	—	98,351
Purchases, sales and settlements or maturities			
Purchases	—	47,134	—
Sales	(12,436)	(12,837)	—
Settlements or maturities	(7,020)	(61,019)	—
Premiums less benefits	—	—	99,845
Carry value transfers in	15,000	—	—
Gross transfers into Level 3	382	—	—
Gross transfers out of Level 3	(5,725)	—	—
Balance at December 31, 2017	**$ —**	**$ 220,190**	**$ 512,526**
Net loss for derivatives included in net investment income	—	(55,093)	—
Net change included in interest credited	—	—	(17,862)
Purchases, sales and settlements or maturities			
Purchases	4,346	72,033	—
Sales	—	(18)	—
Settlements or maturities	—	(89,106)	—
Premiums less benefits	—	—	101,411
Balance at December 31, 2018	**$ 4,346**	**$ 148,006**	**$ 596,075**

Within the net gain (loss) for derivatives included in net investment income were unrealized losses of $94,883,000, and unrealized gains of $50,805,000, and $44,615,000 relating to assets still held at December 31, 2018, 2017, and 2016, respectively.

There were no transfers between Level 1 and Level 2 fair value hierarchies during the periods presented. The transfers into Level 3 during the years ended December 31, 2017, and 2016 were the result of existing securities no longer being priced by the third-party pricing service at the end of the period. Unless information is obtained from the brokers that indicate observable inputs were used in their pricing, there are not enough observable inputs to enable American National to classify the securities priced by the brokers as other than Level 3. American National's valuation of these securities involves judgment regarding assumptions market participants would use including quotes from independent brokers. The inputs used by the brokers include recent transactions in the security, similar bonds with same name, ratings, maturity and structure, external dealer quotes in the security, Bloomberg evaluated pricing and prior months pricing. None of them are observable to American National as of December 31, 2018. The transfers out of Level 3 during the years end December 31, 2017, and 2016, were securities being priced by the third-party service at the end of the period, using inputs that are observable or derived from market data, which resulted in classification of these assets as Level 2.

Note 10 – Deferred Policy Acquisition Costs

Deferred policy acquisition costs are shown below (in thousands):

	Life	Annuity	Health	Property & Casualty	Total
Balance at December 31, 2015	**$ 756,023**	**$ 411,206**	**$ 44,390**	**$ 113,050**	**$ 1,324,669**
Additions	108,825	77,161	11,203	263,024	460,213
Amortization	(112,712)	(71,381)	(14,973)	(262,299)	(461,365)
Effect of change in unrealized gains on available-for-sale debt securities	(6,296)	(22,778)	—	—	(29,074)
Net change	(10,183)	(16,998)	(3,770)	725	(30,226)
Balance at December 31, 2016	**745,840**	**394,208**	**40,620**	**113,775**	**1,294,443**
Additions	123,854	104,772	11,413	285,796	525,835
Amortization	(74,068)	(74,750)	(15,227)	(280,306)	(444,351)
Effect of change in unrealized gains on available-for-sale debt securities	(4,350)	2,267	—	—	(2,083)
Net change	45,436	32,289	(3,814)	5,490	79,401
Balance at December 31, 2017	**791,276**	**426,497**	**36,806**	**119,265**	**1,373,844**
Additions	131,156	92,603	12,590	315,305	551,654
Amortization	(97,263)	(57,468)	(15,436)	(309,990)	(480,157)
Effect of change in unrealized gains on available-for-sale debt securities	13,964	37,956	—	—	51,920
Net change	47,857	73,091	(2,846)	5,315	123,417
Balance at December 31, 2018	**$ 839,133**	**$ 499,588**	**$ 33,960**	**$ 124,580**	**$ 1,497,261**

Commissions comprise the majority of the additions to deferred policy acquisition costs.

Note 11 – Liability for Future Policy Benefits and Policyholder Account Balances

American National estimates liabilities for amounts payable under insurance and annuity policies. Generally, amounts are payable over an extended period of time and related liabilities are calculated as the present value of expected benefit payments reduced by the present value of expected premiums. Such liabilities are established on a block of business based on methods and underlying assumptions in accordance with GAAP and applicable actuarial standards. Principal assumptions used in the establishment of liabilities for future policy benefits are mortality, morbidity, policy lapse, renewal, retirement, disability incidence, disability termination, investment return, inflation, expenses, and other contingent events as appropriate to the respective product type.

Future policy benefits for non-participating traditional life insurance are equal to the aggregate of the present value of expected benefit payments and related expenses less the present value of expected net premiums. Assumptions as to mortality and persistency are based upon American National's experience when the basis of the liability is established. Interest rates for the aggregate future policy benefit liabilities range from 3.0% to 8.0%.

Future policy benefit liabilities for participating traditional life insurance are equal to the aggregate of (i) net level premium reserves for death and endowment policy benefits (calculated based upon the non-forfeiture interest rate, ranging from 2.5% to 5.5%) and mortality rates guaranteed in calculating the cash surrender values described in such contracts; and (ii) the liability for terminal dividends.

Future policy benefit liabilities for individual fixed deferred annuities after annuitization and single premium immediate annuities are equal to the present value of expected future payments. The interest rate used in establishing such liabilities range from 3.0% to 6.0% for all policies in-force.

Future policy benefit liabilities for non-medical health insurance are calculated using the net level premium method and assumptions as to future morbidity, withdrawals and interest, which provide a margin for adverse deviation. The interest rate used in establishing such liabilities range from 3.5% to 8.0%.

Future policy benefit liabilities for disabled lives are estimated using the present value of benefits method and experience assumptions as to claim terminations, expenses and interest. The interest rate used in establishing such liabilities range from 3.0% to 6.0%.

Liabilities for universal life secondary guarantees and paid-up guarantees are determined by estimating the expected value of death benefits payable when the account balance is projected to be zero and recognizing those benefits ratably over the accumulation period based on total expected assessments. American National regularly evaluates estimates used and adjusts the additional liability balances with a related charge or credit to benefit expense, if actual experience or other evidence suggests that earlier assumptions should be revised. The assumptions used in estimating the secondary and paid-up guarantee liabilities are consistent with those used for amortizing DAC, and are thus subject to the same variability and risk. The assumptions of investment performance and volatility for variable products are consistent with historical Standard & Poor's experience. The benefits used in calculating the liabilities are based on the average benefits payable over a range of scenarios.

American National periodically reviews its estimates of actuarial liabilities for future policy benefits and compares them with its actual experience. Differences between actual experience and the assumptions used in pricing these policies, guarantees and riders and in the establishment of the related liabilities result in variances in profit and could result in losses. The effects of changes in such estimated liabilities are included in the results of operations in the period in which the changes occur.

Policyholder account balances relate to investment-type contracts and universal life-type policies. Investment-type contracts principally include traditional individual fixed annuities in the accumulation phase and non-variable group annuity contracts. Policyholder account balances are equal to (i) policy account values, which consist of an accumulation of gross premium payments; (ii) credited interest, ranging from 1.0% to 8.0% (some annuities have enhanced first year crediting rates ranging from 1.0% to 7.0%), less expenses, mortality charges, and withdrawals; and (iii) fair value adjustment.

Note 12 – Liability for Unpaid Claims and Claim Adjustment Expenses

The liability for unpaid claims and claim adjustment expenses ("claims") for health and property and casualty insurance is included in "Policy and contract claims" in the consolidated statements of financial position and is the amount estimated for incurred but not reported ("IBNR") claims and claims that have been reported but not settled. Liability for unpaid claims are estimated based upon American National's historical experience and actuarial assumptions that consider the effects of current developments, anticipated trends and risk management programs, less anticipated salvage and subrogation. The effects of the changes are included in the consolidated results of operations in the period in which the changes occur. The time value of money is not taken into account for the purposes of calculating the liability for unpaid claims. There have been no significant changes in methodologies or assumptions used to calculate the liability for unpaid claims and claim adjustment expenses.

Information regarding the liability for unpaid claims is shown below (in thousands):

	Years ended December 31,		
	2018	**2017**	**2016**
Unpaid claims balance, beginning	$ 1,199,233	$ 1,140,723	$ 1,104,302
Less reinsurance recoverables	237,439	216,903	217,337
Net beginning balance	**961,794**	**923,820**	**886,965**
Incurred related to			
Current	1,193,216	1,097,730	1,055,796
Prior years	(19,852)	(77,296)	(36,788)
Total incurred claims	**1,173,364**	**1,020,434**	**1,019,008**
Paid claims related to			
Current	688,493	661,662	654,175
Prior years	411,463	320,798	327,978
Total paid claims	**1,099,956**	**982,460**	**982,153**
Net balance	1,035,373	961,794	923,820
Plus reinsurance recoverables	254,466	237,439	216,903
Unpaid claims balance, ending	**$ 1,289,839**	**$ 1,199,233**	**$ 1,140,723**

The net and gross reserve calculations have shown favorable development as a result of favorable loss emergence compared to what was implied by the loss development patterns used in the original estimation of losses in prior years. Estimates for ultimate incurred claims attributable to insured events of prior years decreased by approximately $19,852,000, $77,296,000, $36,788,000 in 2018, 2017, and 2016, respectively. This was a reflection of lower-than-anticipated losses in 2018 related to accident years prior to 2018 in the workers compensation, other commercial, business owner and commercial package policy lines of business. The decrease during 2017 reflects lower-than-anticipated losses in the workers compensation, auto and business owner and commercial package policy lines of business. Lower-than-anticipated losses in the auto and multi-peril lines of business resulted in favorable development in 2016.

For short-duration health insurance claims, the total of IBNR plus expected development on reported claims included in the liability for unpaid claims and claim adjustment expenses at December 31, 2018 was $39,337,000.

Note 12 – Liability for Unpaid Claims and Claim Adjustment Expenses—(Continued)

The reconciliation of the net incurred and paid claims development tables to the liability for claims and claim adjustment expenses in the consolidated statement of financial position is as follows (in thousands):

	December 31, 2018
Net outstanding liabilities	
Auto Liability	$ 448,736
Non-Auto Liability	256,558
Commercial Multi-Peril	92,695
Homeowners	72,895
Short Tail Property	33,801
Credit	16,615
Health	40,361
Other	2,091
Liabilities for unpaid claims and claim adjustment expenses, net of reinsurance	963,752
Reinsurance recoverable on unpaid claims	
Auto Liability	11,731
Non-Auto Liability	37,234
Commercial Multi-Peril	3,381
Homeowners	2,993
Short Tail Property	3,124
Credit	11,025
Health	173,329
Other	7,600
Total reinsurance recoverable on unpaid claims	250,417
Insurance lines other than short-duration	215,966
Unallocated claims adjustment expenses	51,159
	267,125
Total gross liability for unpaid claims and claim adjustment expense	$ 1,481,294

Property and Casualty Reserving Methodology—The following methods are utilized:

- Initial Expected Loss Ratio—This method calculates an estimate of ultimate losses by applying an estimated loss ratio to actual earned premium for each calendar/accident year.

- Bornhuetter-Ferguson—This method uses as a starting point an assumed initial expected loss ratio method and blends in the loss ratio implied by the claims experience to date by using loss development patterns based on our historical experience.

- Loss or Expense Development (Chain Ladder)—This method uses actual loss or defense and cost containment expense data and the historical development profiles on older accident periods to project more recent, less developed periods to their ultimate total.

- Ratio of Paid Defense and Cost Containment Expense to Paid Loss Development—This method uses the ratio of paid defense and cost containment expense to paid loss data and the historical development profiles on older accident periods to project more recent, less developed periods to their ultimate total. In this method, an ultimate ratio of paid defense and cost containment expense to paid loss is selected for each accident period. The selected paid defense and cost containment expense to paid loss ratio is then applied to the selected ultimate loss for each accident period to estimate the ultimate defense and cost containment expense. Paid defense and cost containment expense is then subtracted from the ultimate defense and cost containment expense to calculate the unpaid defense and cost containment expense for that accident period.

- Calendar Year Paid Adjusting and Other Expense to Paid Loss—This method uses a selected prior calendar years' paid expense to paid loss ratio to project ultimate loss adjustment expenses for adjusting and other expense. A percentage of the selected ratio is applied to the case reserves (depending on the line of insurance) and 100% to the indicated IBNR reserves. These ratios assume that a percentage of the expense is incurred when a claim is opened and the remaining percentage is paid throughout the claim's life.

- Pegged Frequency and Severity—Uses actual claims count data and emergence patterns of older accident periods to project the ultimate number of reported claims for a given accident year. A similar process projects the ultimate average severity per claim so that the product of the 2 projections results in a projection of ultimate loss for a given accident year.

For most credit property and casualty products, IBNR liability is calculated as a percentage of pro rata unearned premium, with the specific percentage for a given product line determined by a completion factor method. For a large subset of GAP waiver and collateral protection insurance business, IBNR liability is the average monthly paid loss over the preceding 12 months.

The expected development on reported claims is the sum of a pay-to-current reserve and a future reserve. The pay-to-current reserve is calculated for each open claim having a monthly indemnity and contains the monies required to pay the open claim from the last payment date to the current valuation date. The future reserve is calculated by assigning to each open claim a fixed reserve amount based on the historical average severity. For debt cancellation products and involuntary unemployment insurance this reserve is calculated using published valuation tables.

Cumulative claim frequency information is calculated on a per claim basis. Claims that do not result in a liability are not considered in the determination of unpaid liabilities.

For any given line of business, none of these methods are relied on exclusively. With minor exception, we will typically run all of these methods for most lines. While we may not ultimately utilize a given method for a given line, we will review as a check for reasonableness of our selected result.

The following contains information about incurred and paid claims development as of December 31, 2018, net of reinsurance, as well as cumulative claim frequency and the total of incurred-but-not-reported liabilities plus expected development on reported claims included within the net incurred claims amounts. The information about incurred and paid claims development for the years ended December 31, 2009 to 2017 is presented as supplementary information.

Auto Liability—Consists of personal and commercial auto. Claims and claim adjustment expenses are shown below (in thousands):

	Incurred Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance										As of December 31, 2018	
	For the Years Ended December 31,										IBNR Plus Expected Development	Cumulative Number of Reported Claims
Accident Year	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016*	2017*	2018		
2009	$299,753	$273,551	$263,269	$258,749	$260,029	$258,200	$257,678	$256,586	$256,407	$ 256,634	$ 23	47,070
2010		288,166	270,935	266,223	265,949	264,104	263,040	261,930	261,092	261,207	111	47,099
2011			263,411	250,659	248,865	244,519	244,436	242,619	241,711	240,997	225	47,067
2012				251,593	242,255	231,312	228,013	229,426	228,559	228,864	489	44,713
2013					242,364	236,432	233,068	231,301	228,285	226,608	1,207	38,720
2014						232,146	223,386	217,819	215,419	214,870	2,355	35,966
2015							237,578	240,697	239,421	245,775	6,698	36,033
2016								259,177	256,080	261,400	17,057	36,904
2017									269,803	280,012	39,501	38,087
2018										314,467	94,962	34,697
									Total	**$ 2,530,834**		

	Cumulative Paid Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance									
	For the Years Ended December 31,									
Accident Year	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016*	2017*	2018
2009	$ 95,847	$ 166,441	$ 203,869	$ 228,650	$ 242,768	$ 250,681	$ 253,417	$ 254,988	$ 255,308	$ 256,241
2010		92,589	164,298	208,531	237,540	250,647	257,021	259,173	259,966	260,404
2011			93,245	161,387	197,326	217,640	230,585	236,187	238,510	239,409
2012				82,531	150,323	183,448	204,980	214,467	219,170	222,117
2013					79,358	143,709	181,535	204,480	215,280	219,303
2014						72,838	134,376	166,947	187,375	204,057
2015							78,861	149,366	186,281	211,908
2016								86,492	153,911	198,326
2017									88,357	175,175
2018										95,777
									Total	**$ 2,082,717**
									All outstanding liabilities before 2009, net of reinsurance*	619
									Liabilities for claims and claim adjustment expenses, net of reinsurance	**$ 448,736**

* Unaudited supplemental information

Note 12 – Liability for Unpaid Claims and Claim Adjustment Expenses—(Continued)

Non-Auto Liability—Consists of workers' compensation and other liability occurrence. Claims and claim adjustment expenses are shown below (in thousands):

	Incurred Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance										As of December 31, 2018	
	For the Years Ended December 31,											
Accident Year	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016*	2017*	2018	IBNR Plus Expected Development	Cumulative Number of Reported Claims
2009	$ 83,773	$ 75,857	$ 70,905	$ 72,267	$ 72,490	$ 72,077	$ 71,003	$ 71,517	$ 69,099	$ 69,696	$ 1,632	13,275
2010		91,191	85,498	83,724	82,287	82,145	82,087	80,920	78,279	77,985	2,255	7,820
2011			86,409	76,038	75,390	74,372	73,647	71,423	68,248	67,979	2,480	5,656
2012				83,146	80,470	78,644	75,226	68,017	63,630	64,118	3,490	4,785
2013					74,183	75,815	70,772	67,841	65,096	64,564	4,085	4,435
2014						83,084	75,550	72,624	67,339	67,865	5,575	5,914
2015							83,897	78,968	76,724	67,548	10,626	5,344
2016								86,935	83,179	73,764	19,334	4,065
2017									102,616	88,902	27,488	7,400
2018										88,986	52,227	10,347
									Total	**$ 731,407**		

	Cumulative Paid Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance									
	For the Years Ended December 31,									
Accident Year	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016*	2017*	2018
2009	$ 15,389	$ 28,725	$ 41,424	$ 49,895	$ 55,391	$ 61,277	$ 63,039	$ 64,755	$ 65,441	$ 66,047
2010		16,473	31,819	46,746	57,354	65,557	69,091	70,369	71,509	72,261
2011			13,848	31,943	41,814	52,003	56,791	60,706	62,414	63,121
2012				13,862	27,574	38,826	49,585	55,194	57,863	59,528
2013					12,794	22,743	32,474	42,504	47,987	51,672
2014						11,201	26,587	36,220	45,206	51,853
2015							11,979	23,488	37,059	46,285
2016								12,733	24,633	35,502
2017									14,865	37,139
2018										13,156
Total										**$ 496,564**
All outstanding liabilities before 2009, net of reinsurance*										21,715
Liabilities for claims and claim adjustment expenses, net of reinsurance										**$ 256,558**

* Unaudited supplemental information

Note 12 – Liability for Unpaid Claims and Claim Adjustment Expenses—(Continued)

Commercial Multi-Peril—Consists of business owners insurance and mortgage fire business. Claims and claim adjustment expenses are shown below (in thousands):

	Incurred Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance										As of December 31, 2018	
	For the Years Ended December 31,											
Accident Year	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016*	2017*	2018	IBNR Plus Expected Development	Cumulative Number of Reported Claims
2009	$ 41,027	$ 38,666	$ 36,610	$ 35,354	$ 34,884	$ 34,381	$ 34,529	$ 34,079	$ 33,515	$ 33,423	$ 17	3,516
2010		41,116	37,736	40,243	37,520	35,914	37,839	37,215	36,367	35,923	191	3,589
2011			42,185	40,825	39,037	38,160	38,456	36,945	37,014	36,638	485	3,559
2012				35,169	28,548	26,805	23,258	23,385	23,090	22,481	606	2,715
2013					33,979	27,592	27,867	26,970	25,948	26,028	1,122	2,220
2014						36,852	31,220	34,911	33,962	36,132	1,370	2,303
2015							33,997	31,488	29,023	32,282	2,238	2,203
2016								38,115	33,475	33,080	7,460	4,575
2017									42,411	37,079	9,740	6,403
2018										50,784	23,785	7,422
									Total	**$ 343,850**		

	Cumulative Paid Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance									
	For the Years Ended December 31,									
Accident Year	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016*	2017*	2018
2009	$ 11,101	$ 17,248	$ 21,660	$ 25,779	$ 30,272	$ 32,150	$ 32,623	$ 32,842	$ 32,977	$ 33,349
2010		12,511	17,490	22,135	27,152	31,378	33,384	34,888	34,764	34,903
2011			13,092	18,390	22,616	28,291	30,458	32,692	34,177	34,782
2012				11,525	14,454	16,263	18,670	20,716	21,026	21,352
2013					9,374	12,723	15,426	18,406	20,816	21,718
2014						12,001	16,484	20,199	24,602	27,339
2015							9,820	12,956	16,402	21,680
2016								11,327	17,193	19,085
2017									12,458	20,828
2018										18,027
									Total	**$ 253,063**
									All outstanding liabilities before 2009, net of reinsurance*	1,908
									Liabilities for claims and claim adjustment expenses, net of reinsurance	**$ 92,695**

* Unaudited supplemental information

Homeowners—Consists of homeowners and renters business. Claims and claim adjustment expenses are shown below (in thousands):

	Incurred Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance										As of December 31, 2018	
	For the Years Ended December 31,											
Accident Year	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016*	2017*	2018	IBNR Plus Expected Development	Cumulative Number of Reported Claims
2009	$183,437	$178,420	$179,249	$177,534	$177,798	$177,989	$178,372	$178,073	$178,008	$ 177,916	$ 2	31,489
2010		206,606	200,318	198,111	198,029	197,443	197,675	197,465	197,067	196,639	72	37,069
2011			203,301	200,356	198,757	197,581	197,381	197,451	197,239	197,070	89	38,758
2012				181,284	177,664	175,523	175,509	175,178	175,032	174,611	168	30,990
2013					152,208	149,080	149,272	148,231	147,927	147,444	171	20,035
2014						132,651	131,634	130,287	131,546	130,895	195	18,153
2015							125,430	124,199	123,619	123,824	262	17,721
2016								147,264	145,373	144,376	607	21,460
2017									164,284	172,274	1,578	23,405
2018										174,495	15,491	21,355
									Total	**$ 1,639,544**		

	Cumulative Paid Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance									
	For the Years Ended December 31,									
Accident Year	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016*	2017*	2018
2009	$ 142,781	$ 170,372	$ 173,985	$ 175,220	$ 176,588	$ 176,985	$ 177,428	$ 177,615	$ 177,670	$ 177,689
2010		149,755	189,046	193,006	195,365	195,714	196,281	196,419	196,504	196,480
2011			160,625	190,946	194,237	195,327	196,575	196,628	196,717	196,757
2012				143,797	169,415	171,842	173,170	173,676	174,139	174,247
2013					115,605	140,309	145,152	146,650	146,920	147,145
2014						96,300	122,601	126,245	129,467	130,059
2015							86,617	114,696	119,331	122,585
2016								105,415	136,796	140,972
2017									116,075	159,107
2018										121,631
									Total	**$ 1,566,672**
									All outstanding liabilities before 2009, net of reinsurance*	23
									Liabilities for claims and claim adjustment expenses, net of reinsurance	**$ 72,895**

* Unaudited supplemental information

Note 12 – Liability for Unpaid Claims and Claim Adjustment Expenses—(Continued)

Short Tail Property—Consists of auto physical damage, fire, rental owners, standard fire policy, country estates, inland marine and watercraft. This line of business has substantially all claims settled and paid in less than two years. Claims and claim adjustment expenses are shown below (in thousands):

	Incurred Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance		As of December 31, 2018	
	For the Years Ended December 31,			
Accident Year	**2017***	**2018**	**IBNR Plus Expected Development**	**Cumulative Number of Reported Claims**
2017	$ 229,284	$ 227,106	$ 91	82,343
2018	—	248,182	(1,840)	63,360
Total		**$ 475,288**		

	Cumulative Paid Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance	
	For the Years Ended December 31,	
Accident Year	**2017***	**2018**
2017	$ 205,245	225,141
2018	—	218,095
Total		**$ 443,236**
All outstanding liabilities before 2017, net of reinsurance*		1,749
Liabilities for claims and claim adjustment expenses, net of reinsurance		**$ 33,801**

* Unaudited supplemental information

Credit—Consists of credit property insurance, vendor's or lender's single interest insurance, GAP insurance, GAP waiver, debt cancellation products, involuntary unemployment insurance and collateral protection insurance. This line of business has substantially all claims settled and paid in less than two years. Claims and claim adjustment expenses are shown below (in thousands):

	Incurred Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance		As of December 31, 2018	
	For the Years Ended December 31,			
Accident Year	2017*	2018	IBNR Plus Expected Development	Cumulative Number of Reported Claims
2017	$ 93,571	$ 93,572	$ —	57,364
2018	—	89,308	7,947	47,075
Total		$ 182,880		

	Cumulative Paid Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance	
	For the Years Ended December 31,	
Accident Year	2017*	2018
2017	$ 73,838	$ 93,572
2018	—	72,693
Total		$ 166,265
All outstanding liabilities before 2017, net of reinsurance*		—
Liabilities for claims and claim adjustment expenses, net of reinsurance		$ 16,615

* Unaudited supplemental information

Health Reserving Methodology—The following methods are utilized:

Completion Factor Approach-This method assumes that the historical claim patterns will be an accurate representation of unpaid claim liabilities. An estimate of the unpaid claims is calculated by subtracting period-to-date paid claims from an estimate of the ultimate "complete" payment for all incurred claims in the period. Completion factors are calculated which "complete" the current period-to-date payment totals for each incurred month to estimate the ultimate expected payout.

Tabular Claims Reserves-This method is used to calculate the reserves for disability income blocks of business. These reserves rely on published valuation continuance tables created using industry experience regarding assumptions of continued morbidity and subsequent recovery. Reserves are calculated by applying these continuance tables, along with appropriate company experience adjustments, to the stream of contractual benefit payments. These expected benefit payments are discounted at the required interest rate.

Future Policy Benefits-Reserves are equal to the aggregate of the present value of expected future benefit payments, less the present value of expected future premiums. Morbidity and termination assumptions are based on our experience or published valuation tables when available and appropriate.

Premium Deficiency Reserves-Deficiency reserves are established when the expected future claim payments and expenses for a classification of policies are in excess of the expected premiums for these policies. The determination of a deficiency reserve takes into consideration the likelihood of premium rate increases, the timing of these increases, and the expected benefit utilization patterns. We have established premium deficiency reserves for portions of the major medical business and the long-term care business that are in run-off. The assumptions and methods used to determine the deficiency reserves are reviewed periodically for reasonableness, and the reserve amount is monitored against emerging losses.

There is no expected development on reported claims in the health blocks. Claim frequency is determined by totaling the number of unique claim numbers during the period as each unique claim number represents a claim event for an individual claimant.

Note 12 – Liability for Unpaid Claims and Claim Adjustment Expenses—(Continued)

Health—Consists of stop loss, other supplemental health products and credit disability insurance. This line of business has substantially all claims settled and paid in less than four years. Claims and claim adjustment expenses are shown below (in thousands):

	Incurred Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance					As of December 31, 2018	
	For the Years Ended December 31,					IBNR Plus Expected Development	Cumulative Number of Reported Claims
Accident Year	**2014***	**2015***	**2016***	**2017***	**2018**		
2014	$ 38,102	$ 67,545	$ 62,802	$ 62,906	$ 62,919	$ 1	35,346
2015		34,069	45,167	41,513	41,514	1	32,527
2016			36,198	41,236	37,164	7	28,706
2017				41,544	39,930	4,531	31,323
2018					64,686	28,967	28,503
				Total	**$ 246,213**		

	Cumulative Paid Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance				
	For the Years Ended December 31,				
Accident Year	**2014***	**2015***	**2016***	**2017***	**2018**
2014	$ 25,436	$ 62,632	$ 62,678	$ 62,819	$ 62,819
2015		23,574	41,491	41,436	41,462
2016			24,357	37,040	37,115
2017				25,358	35,392
2018					34,894
				Total	**$ 211,682**
	All outstanding liabilities before 2014, net of reinsurance*				5,830
	Liabilities for claims and claim adjustment expenses, net of reinsurance				**$ 40,361**

* Unaudited supplemental information

The following table is supplementary information. 10 year average annual percentage payout of incurred claims is shown below:

Average Annual Percentage Payout of Incurred Claims by Age, Net of Reinsurance

Years	1	2	3	4	5	6	7	8	9	10
Auto Liability	34.4%	28.4%	15.6%	9.8%	5.4%	2.3%	1.0%	0.4%	0.1%	2.6%
Non-Auto Liability	18.8%	20.3%	16.7%	14.3%	8.7%	5.7%	2.3%	1.7%	1.0%	10.5%
Homeowners	75.2%	19.1%	2.5%	1.3%	0.4%	0.2%	0.1%	0.1%	—%	1.1%
Commercial Multi-Peril	35.8%	15.0%	10.3%	13.2%	9.5%	4.4%	2.8%	0.7%	0.4%	7.9%
Short Tail Property	89.1%	10.9%	—%	—%	—%	—%	—%	—%	—%	—%
Credit	80.2%	19.8%	—%	—%	—%	—%	—%	—%	—%	—%

Note 13 – Reinsurance

American National reinsures portions of certain life insurance policies to provide a greater diversification of risk and manage exposure on larger risks. For the issue ages zero to 65, the maximum amount that would be retained by one life insurance company (American National) would be $1.5 million individual life, $250,000 individual accidental death, $100,000 group life, and $125,000 credit life. If individual, group and credit insurance were all in force at the same time, the maximum risk on any one life aged zero to 65 could be $1.975 million. For the issue ages 66 and over, the maximum amount that would be retained by one life insurance company (American National) would be $700,000 individual life, $250,000 individual accidental death, $100,000 group life, and $125,000 credit life. If individual, group and credit insurance were all in force at the same time, the maximum risk on any one life aged over 65 could be $1.175 million.

For the Property and Casualty segment, American National retains the first $500,000 of loss per workers' compensation risk and $1.5 million of loss per non-workers' compensation risk. Workers' compensation reinsurance coverage for losses between $500,000 and $1 million follows satisfaction of a $2 million annual aggregate deductible. Reinsurance covers up to $6 million of property and liability losses per risk. Additional excess property per risk coverage is purchased to cover risks up to $20 million, and excess casualty clash coverage is purchased to cover losses up to $60 million. Excess casualty clash covers losses incurred as a result of one casualty event involving multiple policies, excess policy limits, and extra contractual obligations. Facultative reinsurance is purchased for individual risks attaching at $20 million, as needed. Corporate catastrophe coverage is in place for losses up to $500 million. American National retains the first $17.5 million of each catastrophe. Catastrophe aggregate reinsurance coverage is also purchased. This coverage is provided by two contracts. The first contract provides for $30 million of coverage after $90 million of aggregated catastrophe losses has been reached. The first $10 million of each catastrophe loss contributes to the $90 million aggregation of losses. The second aggregate contract is the Stretch & Aggregate cover. It consists of a $35 million annual limit available either wholly or in part across two layers. The first layer is 8.75% of $400 million excess of $100 million on an occurrence basis. The second layer provides aggregate protection with subject loss of $35 million excess of $5 million of each catastrophe. Recoveries follow satisfaction of a $40 million annual aggregate deductible. This cover was placed at 90% on July 1, 2018. American National expects to place the cover again on July 1, 2019.

American National remains primarily liable with respect to any reinsurance ceded, and would bear the entire loss if the reinsurer does not meet their obligations under any reinsurance treaties. American National had amounts recoverable from reinsurers of $427,475,000 and $418,589,000 at December 31, 2018 and 2017, respectively. None of the amount outstanding at December 31, 2018 is the subject of litigation or is in dispute with the reinsurers involved. Management believes the unfavorable resolution of any dispute that may arise would not have a material impact on American National's consolidated financial statements.

The amounts in the consolidated financial statements include the impact of reinsurance. Information regarding the effect of reinsurance is shown below (in thousands):

	Years ended December 31,		
	2018	2017	2016
Direct premiums	$ 2,499,584	$ 2,341,088	$ 2,246,595
Reinsurance premiums assumed from other companies	286,165	227,053	194,910
Reinsurance premiums ceded to other companies	(557,556)	(500,939)	(444,857)
Net premiums	**$ 2,228,193**	**$ 2,067,202**	**$ 1,996,648**

Life insurance in-force and related reinsurance amounts are shown below (in thousands):

	December 31,		
	2018	2017	2016
Direct life insurance in-force	$ 110,125,270	$ 102,843,372	$ 95,439,425
Reinsurance risks assumed from other companies	230,845	257,552	181,655
Reinsurance risks ceded to other companies	(26,601,422)	(29,646,646)	(29,980,485)
Net life insurance in-force	**$ 83,754,693**	**$ 73,454,278**	**$ 65,640,595**

Note 14 – Federal Income Taxes

A reconciliation of the effective tax rate to the statutory federal tax rate is shown below (in thousands, except percentages):

	Years ended December 31,					
	2018		2017		2016	
	Amount	Rate	Amount*	Rate*	Amount*	Rate*
Income tax expense before tax on equity in earnings of unconsolidated affiliates	$ 29,643	18.2 %	$ 114,921	27.7 %	$ 73,708	27.5 %
Tax on equity in earnings of unconsolidated affiliates	4,469	2.8	30,336	7.3	20,020	7.5
Total expected income tax expense at the statutory rate	34,112	21.0	145,257	35.0	93,728	35.0
Tax-exempt investment income	(3,323)	(2.0)	(6,887)	(1.7)	(7,834)	(2.9)
Deferred tax change	(4,354)	(2.7)	(217,622)	(52.4)	6,699	2.5
Dividend exclusion	(4,080)	(2.5)	(8,701)	(2.1)	(8,490)	(3.2)
Miscellaneous tax credits, net	(7,802)	(4.8)	(9,524)	(2.3)	(9,993)	(3.7)
Low income housing tax credit expense	6,231	3.8	5,263	1.3	4,795	1.8
Change in valuation allowance	2,700	1.7	—	—	—	—
Tax accrual adjustment	(2,893)	(1.8)	—	—	—	—
Return to provision	(20,301)	(12.5)	—	—	—	—
Other items, net	1,155	0.6	1,905	0.5	(3,885)	(1.5)
Provision for federal income tax before interest expense	1,445	0.8	(90,309)	(21.7)	75,020	28.0
Interest expense (benefit)	—	—	(2,686)	(0.6)	2,686	1.0
Total	**$ 1,445**	**0.8%**	**$ (92,995)**	**(22.3)%**	**$ 77,706**	**29.0%**

* Prior years revised to reflect the January 1, 2018 adoption of ASU 2017-07 Compensation-Retirement Benefits: Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost. See Note 3, Recently Issued Accounting Pronouncements, of the Notes to the Consolidated Financial Statements.

During 2018, American National recorded an income tax benefit of $20,301,000 related to the filing of its 2017 tax return. The tax benefit was primarily a result of tax deductions taken at the prior year federal tax rate of 35% as opposed to the new federal tax rate of 21% primarily due to a pension plan contribution, depreciation on fixed assets and changes in our estimated income from joint ventures.

On December 22, 2017, the Tax Cuts and Jobs Act (“Tax Reform”) was enacted. The Tax Reform included numerous changes to existing federal income tax laws, including a permanent reduction in the federal corporate income tax rate from 35% to 21%. In addition, there were several changes that are specific to insurance companies, namely changes to the proration formula used to determine the amount of dividends eligible for the dividends-received deduction, and changes to the calculation of tax reserves associated with policyholder liabilities. As a result of the Tax Reform, we recorded a provisional tax benefit of $206.4 million in our 2017 financial statements. This tax benefit was primarily due to the remeasurement of our existing deferred tax balances to the new 21% corporate income tax rate. There were no adjustments in 2018 to the provisional tax benefit we recorded in 2017.

Note 14 – Federal Income Taxes—(Continued)

The tax effects of temporary differences that gave rise to the deferred tax assets and liabilities are shown below (in thousands):

	December 31, 2018	December 31, 2017
DEFERRED TAX ASSETS		
Invested assets, principally due to impairment losses	$ 18,148	$ 23,570
Investment in real estate and other invested assets, principally due to investment valuation allowances	8,424	8,547
Policyholder funds, principally due to policy reserve discount	91,362	90,480
Policyholder funds, principally due to unearned premium reserve	24,586	23,001
Participating policyholders' surplus	32,785	34,538
Pension	3,598	26,274
Commissions and other expenses	3,108	3,796
Other assets	9,756	15,745
Tax carryforwards	138	60
Gross deferred tax assets before valuation allowance	**191,905**	**226,011**
Valuation allowance	(2,700)	—
Gross deferred tax assets after valuation allowance	**189,205**	**226,011**
DEFERRED TAX LIABILITIES		
Marketable securities, principally due to net unrealized gains	161,256	253,526
Investment in bonds, principally due to differences between GAAP and tax basis	13,088	12,547
Deferred policy acquisition costs, due to difference between GAAP and tax amortization methods	240,731	220,809
Property, plant and equipment, principally due to difference between GAAP and tax depreciation methods	22,204	19,203
Other liabilities	16,111	36,296
Gross deferred tax liabilities	**453,390**	**542,381**
Total net deferred tax liability	**$ 264,185**	**$ 316,370**

American National made income tax payments of $22,234,000, $33,640,000 and $33,367,000 during 2018, 2017, and 2016, respectively.

GAAP requires us to evaluate the recoverability of our deferred tax assets and establish a valuation allowance, if necessary, to reduce our deferred tax assets to an amount that is more-likely-than-not to be realized. Considerable judgment is required in determining whether a valuation allowance is necessary, and if so, the amount of such valuation allowance. There were no material valuation allowances recorded during the years ended December 31, 2018 and 2017. Although realization is not assured, management believes it is more-likely-than-not that our remaining deferred tax assets will be realized and that no additional valuation allowance is necessary at this time.

As of December 31, 2018, American National has an alternative minimum tax ("AMT") credit carryforward of $6,933,000, a general business credit carryforward of $758,000 and capital loss carryforwards of $656,000. Under Tax Reform, AMT credit carryforwards may be utilized to offset regular tax liability. If not utilized, the credits are fully refundable by 2021. The general business credits and capital loss carryforwards will expire in 2037 and 2021, respectively, if not utilized.

American National's federal income tax returns for years 2015 to 2017 are subject to examination by the Internal Revenue Service. In the opinion of management, all prior year deficiencies have been paid or adequate provisions have been made for any tax deficiencies that may be upheld. No provision for penalties or interest were established during 2018 relating to a dispute with the Internal Revenue Service. As of December 31, 2018, American National had no provision for uncertain tax positions. In addition, management does not believe there are any uncertain tax benefits that could be recognized within the next twelve months that would impact American National's effective tax rate.

Note 15 – Accumulated Other Comprehensive Income (Loss)

The components of and changes in the accumulated other comprehensive income ("AOCI"), and the related tax effects, are shown below (in thousands):

	Net Unrealized Gains (Losses) on Securities	Defined Benefit Pension Plan Adjustments	Foreign Currency Adjustments	Accumulated other Comprehensive Income (Loss)
Balance at December 31, 2015	**$ 457,467**	**$ (101,679)**	**$ (3,168)**	**$ 352,620**
Amounts reclassified from AOCI (net of tax benefit $7,705 and expense $4,438)	(14,308)	8,242	—	(6,066)
Unrealized holding gains arising during the period (net of tax expense $71,859)	133,451	—	—	133,451
Unrealized adjustment to DAC (net of tax benefit $10,318)	(18,756)	—	—	(18,756)
Unrealized gains on investments attributable to participating policyholders' interest (net of tax benefit $3,599)	(6,683)	—	—	(6,683)
Actuarial gain arising during the period (net of tax expense of $562)	—	1,044	—	1,044
Foreign currency adjustment (net of tax expense $156)	—	—	289	289
Balance at December 31, 2016	**551,171**	**(92,393)**	**(2,879)**	**455,899**
Amounts reclassified from AOCI (net of tax benefit $18,789 and expense $5,005)	(34,895)	18,827	—	(16,068)
Unrealized holding gains arising during the period (net of tax expense $113,604)	210,595	—	—	210,595
Unrealized adjustment to DAC (net of tax benefit $729)	(1,354)	—	—	(1,354)
Unrealized gains on investments attributable to participating policyholders' interest (net of tax benefit $2,480)	(4,606)	—	—	(4,606)
Actuarial loss arising during the period (net of tax benefit of $796)	—	(2,996)	—	(2,996)
Foreign currency adjustment (net of tax expense $198)	—	—	746	746
Balance at December 31, 2017	**720,911**	**(76,562)**	**(2,133)**	**642,216**
Amounts reclassified from AOCI (net of tax benefit $561 and expense $1,532)	(2,111)	5,764	—	3,653
Unrealized holding losses arising during the period (net of tax benefit $46,812)	(183,981)	—	—	(183,981)
Unrealized adjustment to DAC (net of tax expense $10,903)	41,017	—	—	41,017
Unrealized gains on investments attributable to participating policyholders' interest (net of tax expense $2,343)	8,814	—	—	8,814
Actuarial gain arising during the period (net of tax expense of $4,402)	—	16,562	—	16,562
Foreign currency adjustment (net of tax benefit $239)	—	—	(900)	(900)
Cumulative effect of changes in accounting (net of tax benefit $334,955)	(627,119)	—	—	(627,119)
Balance at December 31, 2018	**$ (42,469)**	**$ (54,236)**	**$ (3,033)**	**$ (99,738)**

Note 16—Stockholders' Equity and Noncontrolling Interests

American National has one class of common stock with a par value of $1.00 per share and 50,000,000 authorized shares. The amounts outstanding at the dates indicated are shown below:

	Years ended December 31,		
	2018	2017	2016
Common stock			
Shares issued	30,832,449	30,832,449	30,832,449
Treasury shares	(3,947,000)	(3,900,565)	(3,917,933)
Outstanding shares	**26,885,449**	**26,931,884**	**26,914,516**
Restricted shares	(10,000)	(74,000)	(76,000)
Unrestricted outstanding shares	**26,875,449**	**26,857,884**	**26,838,516**

Stock-based compensation

American National has a stock-based compensation plan, which allows for grants of Non-Qualified Stock Options, Stock Appreciation Rights ("SAR"), Restricted Stock ("RS") Awards, Restricted Stock Units ("RSU"), Performance Awards, Incentive Awards or any combination thereof. This plan is administered by the American National Board Compensation Committee. To date, only SAR, RS and RSU awards have been made. All awards are subject to review and approval by the Board Compensation Committee both at the time of setting applicable performance objectives and at payment of the awards. The number of shares available for grants under the plan cannot exceed 2,900,000 shares, and no more than 200,000 shares may be granted to any one individual in any calendar year. Grants were made to certain officers meeting established performance objectives, and grants are made to directors as compensation and to align their interests with those of other shareholders.

SAR, RS and RSU information for the periods indicated are shown below:

	SAR		RS Shares		RS Units	
	Shares	Weighted-Average Grant Date Fair Value	Shares	Weighted-Average Grant Date Fair Value	Units	Weighted-Average Grant Date Fair Value
Outstanding at December 31, 2015	**38,092**	**$ 115.18**	**76,000**	**$ 110.73**	**135,725**	**$ 103.73**
Granted	—	—	—	—	36,849	103.58
Exercised	(15,375)	114.07	—	—	(66,581)	100.06
Forfeited	—	—	—	—	(5,548)	106.10
Expired	(16,564)	116.88	—	—	—	—
Outstanding at December 31, 2016	**6,153**	**113.36**	**76,000**	**110.73**	**100,445**	**105.97**
Granted	—	—	—	—	16,500	117.69
Exercised	(333)	116.48	(2,000)	130.52	(62,111)	108.90
Forfeited	—	—	—	—	(2,069)	104.17
Expired	(3,234)	118.37	—	—	—	—
Outstanding at December 31, 2017	**2,586**	**106.70**	**74,000**	**110.19**	**52,765**	**106.26**
Granted	—	—	—	—	8,250	121.93
Exercised	(650)	99.79	(64,000)	114.90	(41,949)	106.94
Forfeited	—	—	—	—	(750)	121.93
Expired	(1,601)	114.17	—	—	—	—
Outstanding at December 31, 2018	**335**	**$ 84.41**	**10,000**	**$ 80.05**	**18,316**	**$ 111.12**

	SAR	RS Shares	RS Units
Weighted-average contractual remaining life (in years)	0.54	4.17	0.29
Exercisable shares	335	N/A	N/A
Weighted-average exercise price	$ 84.54	$ 114.9	$ 106.94
Weighted-average exercise price exercisable shares	84.54	N/A	N/A
Compensation expense (credit)			
Year ended December 31, 2018	$ (28,000)	$ 328,000	$ 1,098,000
Year ended December 31, 2017	(15,000)	823,000	3,227,000
Year ended December 31, 2016	179,000	843,000	6,539,000
Fair value of liability award			
December 31, 2018	$ 33,000	N/A	$ 2,426,000
December 31, 2017	63,000	N/A	6,376,000

The SARs give the holder the right to cash compensation based on the difference between the stock price on the grant date and the stock price on the exercise date. The SARs vest at a rate of 20% per year for five years and expire five years after vesting.

RS awards entitle the participant to full dividend and voting rights. Each RS share awarded has the value of one share of restricted stock and vests 10 years from the grant date. Unvested shares are restricted as to disposition, and are subject to forfeiture under certain circumstances. Compensation expense is recognized over the vesting period. The restrictions on these awards lapse after 10 years and most of these awards feature a graded vesting schedule in the case of the retirement, death or disability of an award holder. Restricted stock awards for 350,334 shares have been granted at an exercise price of zero, of which 10,000 shares are unvested.

RSU awards allow the recipient of the awards to settle the vested RSUs in either shares of American National's common stock, cash or a combination of both. RSUs granted vest after a one-year or three-year graded vesting requirement or over a shorter period as a result of death, disability or retirement after age 65.

Earnings per share

Basic earnings per share were calculated using a weighted average number of shares outstanding. Diluted earnings per share include RS and RSU award shares.

	Years ended December 31,		
	2018	2017	2016
Weighted average shares outstanding	26,886,357	26,896,926	26,908,570
Incremental shares from RS awards and RSUs	30,286	63,769	58,502
Total shares for diluted calculations	**26,916,643**	**26,960,695**	**26,967,072**
Net income attributable to American National (in thousands)*	$ 158,995	$ 493,651	$ 181,003
Basic earnings per share*	$ 5.91	$ 18.35	$ 6.73
Diluted earnings per share*	$ 5.91	$ 18.31	$ 6.71

* This includes the impact of the U. S. Tax Cut and Jobs Act ("Tax Reform") of $206.4 million, primarily due to the remeasurement of our deferred tax balances to the new 21% corporate income tax rate. Excluding the impact of Tax Reform, the Company's 2017 net income would have been $287.3 million and net earnings per basic and diluted share of $10.68 and $10.65, respectively.

Statutory Capital and Surplus

Risk Based Capital ("RBC") is a measure insurance regulators use to evaluate the capital adequacy of American National Insurance Company and its insurance subsidiaries. RBC is calculated using formulas applied to certain financial balances and activities that consider, among other things, investment risks related to the type and quality of investments, insurance risks associated with products and liabilities, interest rate risks and general business risks. Insurance companies that do not maintain capital and surplus at a level at least 200% of the authorized control level RBC are required to take certain actions. At December 31, 2018 and 2017, American National Insurance Company's statutory capital and surplus was $3,162,808,000 and $3,293,474,000, respectively. American National Insurance Company and each of its insurance subsidiaries had statutory capital and surplus at December 31, 2018 and 2017, substantially above 200% of the authorized control level.

American National and its insurance subsidiaries prepare statutory-basis financial statements in accordance with statutory accounting practices prescribed or permitted by the insurance department of the state of domicile, which include certain components of the National Association of Insurance Commissioners' Codification of Statutory Accounting Principles ("NAIC Codification"). NAIC Codification is intended to standardize regulatory accounting and reporting to state insurance departments. However, statutory accounting practices continue to be established by individual state laws and permitted practices. Modifications by the various state insurance departments may impact the statutory capital and surplus of American National Insurance Company and its insurance subsidiaries.

Statutory accounting differs from GAAP primarily by charging policy acquisition costs to expense as incurred, establishing future policy benefit liabilities using different actuarial assumptions, and valuing securities on a different basis. In addition, certain assets are not admitted under statutory accounting principles and are charged directly to surplus.

One of American National's insurance subsidiaries has been granted a permitted practice from the Missouri Department of Insurance to record as the valuation of its investment in a wholly-owned subsidiary that is the attorney-in-fact for a Texas domiciled insurer, the statutory capital and surplus of the Texas domiciled insurer. This permitted practice increases the statutory capital and surplus of both American National Insurance Company and the Missouri domiciled insurance subsidiary by $69,787,000 and $66,625,000 at December 31, 2018 and 2017, respectively. The statutory capital and surplus of both American National Insurance Company and the Missouri domiciled insurance subsidiary would have remained substantially above the company action level RBC had it not used the permitted practice.

The statutory capital and surplus and net income of our life and property and casualty insurance entities in accordance with statutory accounting practices are shown below (in thousands):

	December 31,	
	2018	2017
Statutory capital and surplus		
Life insurance entities	$ 1,989,586	$ 2,141,573
Property and casualty insurance entities	1,183,913	1,162,761

	Years ended December 31,		
	2018	2017	2016
Statutory net income			
Life insurance entities	$ 59,909	$ 46,820	$ 82,101
Property and casualty insurance entities	66,680	72,267	48,378

Dividends

We paid a dividend of $0.82 per share each quarter of the years ended December 31, 2017 and 2018. We expect to continue to pay regular cash dividends, although there is no assurance as to future dividends because they depend on future earnings, capital requirements and financial conditions.

American National Insurance Company's payment of dividends to stockholders is restricted by insurance law. The restrictions require life insurance companies to maintain minimum amounts of capital and surplus, and in the absence of special approval, limit the payment of dividends to the greater of the prior year's statutory net income from operations, or 10% of prior year statutory surplus. American National Insurance Company is permitted without prior approval of the Texas Department of Insurance to pay total dividends of $316,281,000 during 2019. Similar restrictions on amounts that can transfer in the form of dividends, loans, or advances to American National Insurance Company apply to its insurance subsidiaries.

Note 16—Stockholders' Equity and Noncontrolling Interests—(Continued)

Noncontrolling interests

American National County Mutual Insurance Company ("County Mutual") is a mutual insurance company owned by its policyholders. American National has a management agreement that effectively gives it control of County Mutual. As a result, County Mutual is included in the consolidated financial statements of American National. Policyholder interests in the financial position of County Mutual are reflected as noncontrolling interest of $6,750,000 at December 31, 2018 and 2017.

American National Insurance Company and its subsidiaries exercise control or ownership of various joint ventures, resulting in their consolidation into American National's consolidated financial statements. The interests of the other partners in the consolidated joint ventures are shown as noncontrolling interests of $7,517,000 and $2,262,000 at December 31, 2018 and 2017, respectively.

Note 17 – Segment Information

Management organizes the business into five operating segments:

- Life—consists of whole, term, universal, indexed and variable life insurance. Products are primarily sold through career, multiple-line, and independent agents as well as direct marketing channels.
- Annuity—consists of fixed, indexed, and variable annuity products. Products are primarily sold through independent agents, brokers, and financial institutions, along with multiple-line and career agents.
- Health—consists of Medicare Supplement, stop loss, other supplemental health products and credit disability insurance. Products are typically distributed through independent agents and managing general underwriters.
- Property and Casualty—consists of personal, agricultural and targeted commercial coverages and credit-related property insurance. Products are primarily sold through multiple-line, independent agents and managing general agents.
- Corporate and Other—consists of net investment income from investments and certain expenses not allocated to the insurance segments and revenues and related expenses from non-insurance operations.

The accounting policies of the segments are the same as those described in Note 2 to the consolidated financial statements. All revenues and expenses specifically attributable to policy transactions are recorded directly to the appropriate operating segment. Revenues and expenses not specifically attributable to policy transactions are allocated to each segment as follows:

- Recurring income from bonds and mortgage loans is allocated based on the assets allocated to each line of business at the average yield available from these assets.
- Net investment income from all other assets is allocated to the insurance segments in accordance with the amount of capital allocated to each segment, with the remainder recorded in the Corporate and Other segment.
- Expenses are charged to segments through direct identification and allocations based upon various factors.

The following summarizes total assets by operating segments (in thousands):

	Years ended December 31,		
	2018	2017	2016
Total Assets			
Life	$ 6,263,366	$ 6,101,458	$ 5,921,208
Annuity	12,900,650	12,345,215	11,310,936
Health	527,525	468,947	472,369
Property and Casualty	2,216,628	2,189,515	2,046,303
Corporate and other	5,004,184	5,281,629	4,782,406
Total	**$ 26,912,353**	**$ 26,386,764**	**$ 24,533,222**

Note 17 – Segment Information – (Continued)

The results of operations measured as the income before federal income taxes and other items by operating segments are summarized below (in thousands):

	Year ended December 31, 2018					
	Life	Annuity	Health	Property & Casualty	Corporate & Other	Total
PREMIUMS AND OTHER REVENUES						
Premiums	$ 350,012	$ 231,027	$ 180,414	$ 1,466,740	$ —	$ 2,228,193
Other policy revenues	270,839	14,710	—	—	—	285,549
Net investment income	233,181	467,788	9,376	62,320	85,702	858,367
Net realized investment gains	—	—	—	—	16,931	16,931
Net losses on equity securities	—	—	—	—	(107,188)	(107,188)
Other income	2,266	2,611	24,185	10,628	4,840	44,530
Total premiums and other revenues	**856,298**	**716,136**	**213,975**	**1,539,688**	**285**	**3,326,382**
BENEFITS, LOSSES AND EXPENSES						
Policyholder benefits	417,702	290,611	—	—	—	708,313
Claims incurred	—	—	122,547	1,049,112	—	1,171,659
Interest credited to policyholders' account balances	54,249	261,435	—	—	—	315,684
Commissions for acquiring and servicing policies	158,657	94,879	32,516	278,002	—	564,054
Other operating expenses	190,835	46,859	41,819	186,019	31,479	497,011
Change in deferred policy acquisition costs	(33,893)	(35,135)	2,846	(5,315)	—	(71,497)
Total benefits, losses and expenses	**787,550**	**658,649**	**199,728**	**1,507,818**	**31,479**	**3,185,224**
Income before federal income tax and other items	**$ 68,748**	**$ 57,487**	**$ 14,247**	**$ 31,870**	**$ (31,194)**	**$ 141,158**

	Year ended December 31, 2017					
	Life	Annuity	Health	Property & Casualty	Corporate & Other	Total
PREMIUMS AND OTHER REVENUES						
Premiums	$ 328,570	$ 222,207	$ 156,436	$ 1,359,989	$ —	$ 2,067,202
Other policy revenues	234,979	13,547	—	—	—	248,526
Net investment income	245,835	573,789	9,538	61,688	75,227	966,077
Net realized investment gains	—	—	—	—	91,209	91,209
Other income	2,256	2,832	19,284	8,372	5,242	37,986
Total premiums and other revenues	**811,640**	**812,375**	**185,258**	**1,430,049**	**171,678**	**3,411,000**
BENEFITS, LOSSES AND EXPENSES						
Policyholder benefits	410,152	270,970	—	—	—	681,122
Claims incurred	—	—	103,037	934,044	—	1,037,081
Interest credited to policyholders' account balances	73,965	341,225	—	—	—	415,190
Commissions for acquiring and servicing policies	147,176	105,389	27,400	265,440	—	545,405
Other operating expenses	190,482	44,486	38,475	177,345	34,552	485,340
Change in deferred policy acquisition costs	(49,786)	(30,022)	3,814	(5,490)	—	(81,484)
Total benefits, losses and expenses	**771,989**	**732,048**	**172,726**	**1,371,339**	**34,552**	**3,082,654**
Income before federal income tax and other items	**$ 39,651**	**$ 80,327**	**$ 12,532**	**$ 58,710**	**$ 137,126**	**$ 328,346**

Note 17 – Segment Information – (Continued)

	Year ended December 31, 2016					
	Life	Annuity	Health	Property & Casualty	Corporate & Other	Total
PREMIUMS AND OTHER REVENUES						
Premiums	$ 318,953	$ 248,714	$ 175,589	$ 1,253,392	$ —	$ 1,996,648
Other policy revenues	295,289	11,591	—	—	—	306,880
Net investment income	227,923	500,726	9,942	57,091	64,553	860,235
Net realized investment gains	—	—	—	—	28,940	28,940
Other income	2,067	3,161	17,488	4,588	7,944	35,248
Total premiums and other revenues	**844,232**	**764,192**	**203,019**	**1,315,071**	**101,437**	**3,227,951**
BENEFITS, LOSSES AND EXPENSES						
Policyholder benefits	429,813	296,586	—	—	—	726,399
Claims incurred	—	—	132,390	883,219	—	1,015,609
Interest credited to policyholders' account balances	63,565	268,205	—	—	—	331,770
Commissions for acquiring and servicing policies	132,428	78,177	22,846	232,514	—	465,965
Other operating expenses	186,879	51,283	42,655	165,278	30,367	476,462
Change in deferred policy acquisition costs	3,887	(5,780)	3,770	(725)	—	1,152
Total benefits, losses and expenses	**816,572**	**688,471**	**201,661**	**1,280,286**	**30,367**	**3,017,357**
Income before federal income tax and other items	**$ 27,660**	**$ 75,721**	**$ 1,358**	**$ 34,785**	**$ 71,070**	**$ 210,594**

Note 18 – Pension and Postretirement Benefits

Savings plans

American National sponsors a qualified defined contribution (401(k) plan) for all employees, and non-qualified defined contribution plans for certain employees whose otherwise eligible earnings exceed the statutory limits under the qualified plans. The total expense associated with these plans was $10,157,000, $13,466,000, and $13,658,000 for 2018, 2017, and 2016, respectively.

Pension benefits

American National sponsors qualified and non-qualified defined benefit pension plans each of which have been frozen. As such, no additional benefits are accrued through these plans for additional years of service credit or future salary increase credit, and no new participants are added to the plans. Benefits earned by eligible employees prior to the plans being frozen have not been affected. In 2017, the Company commenced a one-time window offering to terminated, vested participants of our qualified defined benefit pension plans. The offer allowed participants to take a lump sum or annuity payout funded from pension plan assets. A $7.2 million pension expense was recognized in the second quarter of 2017 for this de-risking. There was an additional pension settlement expense of $5.3 million recognized in the fourth quarter of 2017. This was part of the normal year-end actuarial valuation process of the defined pension plans and is primarily the result of higher lump sum payouts in 2017 due to plan amendments to make this option available.

The qualified pension plans are noncontributory. The plans provide benefits for salaried and management employees and corporate clerical employees subject to a collective bargaining agreement based on years of service and employee compensation. The non-qualified pension plans cover key employees and restore benefits that would otherwise be curtailed by statutory limits on qualified plan benefits.

Note 18 – Pension and Postretirement Benefits – (Continued)

Amounts recognized in the consolidated statements of financial position consist of (in thousands):

	Qualified		Non-qualified	
	December 31,			
	2018	2017	2018	2017
Reconciliation of benefit obligation				
Obligation at January 1,	$ 386,672	$ 402,150	$ 104,166	$ 111,382
Service cost	433	—	65	63
Interest cost on projected benefit obligation	12,378	14,593	3,469	4,179
Actuarial (gain) loss	(56,672)	22,003	(1,631)	5,069
Benefits paid	(23,981)	(52,074)	(11,890)	(16,527)
Obligation at December 31,	318,830	386,672	94,179	104,166
Reconciliation of fair value of plan assets				
Fair value of plan assets at January 1,	351,958	336,174	30,766	31,059
Actual return on plan assets	(12,032)	42,858	(1,152)	4,000
Employer contributions	60,000	25,000	8,901	12,234
Benefits paid	(23,979)	(52,074)	(11,883)	(16,527)
Fair value of plan assets at December 31,	375,947	351,958	26,632	30,766
Funded status at December 31,	**$ 57,117**	**$ (34,714)**	**$ (67,547)**	**$ (73,400)**

The components of net periodic benefit cost for the defined benefit pension plans are shown below (in thousands):

	Years ended December 31,		
	2018	2017	2016
Service cost	$ 499	$ 63	$ 59
Interest cost	15,846	18,772	20,690
Expected return on plan assets	(24,164)	(23,579)	(22,013)
Amortization of net actuarial loss	8,560	23,832	12,680
Net periodic benefit cost	**$ 741**	**$ 19,088**	**$ 11,416**

Amounts related to the defined benefit pension plans recognized as a component of OCI are shown below (in thousands):

	Years ended December 31,		
	2018	2017	2016
Actuarial gain	$ 28,260	$ 20,040	$ 14,286
Deferred tax expense	(5,934)	(4,209)	(5,000)
Other comprehensive income, net of tax	**$ 22,326**	**$ 15,831**	**$ 9,286**

The estimated actuarial loss for the plan that will be amortized out of AOCI into the net periodic benefit cost over the next fiscal year is $9,646,000. Amounts recognized as a component of AOCI that have not been recognized as a component of the combined net periodic benefit cost of the defined benefit pension plans, are shown below (in thousands):

	Years ended December 31,	
	2018	2017
Net actuarial loss	$ (68,653)	$ (96,913)
Deferred tax benefit	14,417	20,351
Amounts included in AOCI	**$ (54,236)**	**$ (76,562)**

Note 18 – Pension and Postretirement Benefits – (Continued)

The weighted average assumptions used are shown below:

	Used for Net Benefit Cost in Fiscal Year 1/1/2018 to 12/31/2018	Used for Benefit Obligations as of 12/31/2018
Discount rate	3.44%	4.50%
Long-term rate of return	6.25	N/A

American National's funding policy for the qualified pension plans is to make annual contributions to meet the minimum funding standards of ERISA. American National contributed $60,000,000, $25,023,000, and $40,090,000 to the qualified pension plans in 2018, 2017 and 2016, respectively. American National and its affiliates do not expect to contribute to its qualified plans in 2019. The benefits paid from the non-qualified plans were $8,901,000, $12,212,000 and $12,287,000 in 2018, 2017 and 2016, respectively. Future payments from the non-qualified pension benefit plans will be funded out of general corporate assets.

The following table shows pension benefit payments, expected to be paid (in thousands):

2019	$ 41,558
2020	31,057
2021	33,098
2022	32,488
2023	30,768
2024-2028	139,897

American National utilizes third-party pricing services to estimate fair value measurements of its pension plan assets. Refer to Note 9 for further information concerning the valuation methodologies and related inputs utilized by the third-party pricing services. The fair value (hierarchy measurements) of the pension plan assets by asset category are shown below (in thousands):

	December 31, 2018			
	Total	Level 1	Level 2	Level 3
Asset Category				
Corporate debt securities	$ 140,836	$ —	$ 140,836	$ —
Residential mortgage-backed securities	4,644	—	4,644	—
Mutual fund	9,161	9,161	—	—
Equity securities by sector				
Consumer goods	44,746	44,746	—	—
Energy and utilities	23,844	23,844	—	—
Finance	45,131	45,131	—	—
Healthcare	31,259	31,259	—	—
Industrials	16,033	16,033	—	—
Information technology	47,226	47,226	—	—
Other	28,963	28,963	—	—
Commercial paper	6,836	—	6,836	—
Unallocated group annuity contract	1,131	—	1,131	—
Other	2,769	2,714	55	—
Total	**$ 402,579**	**$ 249,077**	**$ 153,502**	**$ —**

	December 31, 2017			
	Total	Level 1	Level 2	Level 3
Asset Category				
Corporate debt securities	$ 93,051	$ —	$ 93,051	$ —
Residential mortgage-backed securities	1,119	—	1,119	—
Mutual fund	9,513	9,513	—	—
Equity securities by sector				
Consumer goods	55,411	55,411	—	—
Energy and utilities	26,693	26,693	—	—
Finance	58,008	58,008	—	—
Healthcare	30,214	30,214	—	—
Industrials	20,141	20,141	—	—
Information technology	46,520	46,520	—	—
Other	31,545	31,545	—	—
Commercial paper	7,152	—	7,152	—
Unallocated group annuity contract	1,280	—	1,280	—
Other	2,077	1,991	86	—
Total	**$ 382,724**	**$ 280,036**	**$ 102,688**	**$ —**

The investment policy for the retirement plan assets is designed to provide the highest return possible commensurate with sound and prudent underwriting practices. The investment diversification goals are to have investments in cash and cash equivalents as necessary for liquidity, debt securities up to 100% and equity securities up to 75% of the total invested plan assets. The amount invested in any particular investment is limited based on credit quality, and no single investment may at the time of purchase be more than 5% of the total invested assets.

The corporate debt securities category are investment grade bonds of U.S and foreign issuers denominated and payable in U.S. dollars from diverse industries, with a maturity of 1 to 30 years. Foreign bonds in the aggregate shall not exceed 20% of the bond portfolio. Residential mortgage-backed securities represent asset-backed securities with a maturity date 1 to 30 years with a rating of NAIC 1 or 2.

Equity portfolio managers have discretion to choose the degree of concentration in various issues and industry sectors for the equity securities. Permitted securities are those for which there is an active market providing liquidity for the specific security.

Commercial paper investments generally have a credit rating of A2 Moody’s or P2 by Standard & Poor’s with at least BBB rating on the issuer’s outstanding debt, or selected issuers with no outstanding debt.

Postretirement life and health benefits

American National sponsors a contributory health and dental benefit plan to a closed block of retirees and their dependents who met certain age and length of service requirements as of December 31, 1993. The primary retiree health benefit plan provides Medicare Supplemental and prescription drug benefits. American National’s contribution is limited to $40 per month for retirees and spouses. Since American National’s contributions to the cost of the retiree benefits plans are fixed, the health care cost trend rate will have no effect on the future expense or the accumulated postretirement benefit obligation. Under American National’s various group benefit plans for active employees, life insurance benefits are provided upon retirement for eligible participants who meet certain age and length of service requirements.

The accrued postretirement benefit obligation, included in the liability for retirement benefits, was $6,085,000 and $6,424,000 at December 31, 2018 and 2017, respectively. These amounts were approximately equal to the unfunded accumulated postretirement benefit obligation.

Note 19 – Commitments and Contingencies

Commitments

American National and its subsidiaries lease insurance sales office space, technological equipment, and automobiles. The remaining long-term lease commitments at December 31, 2018 were approximately $13,781,000.

American National had aggregate commitments at December 31, 2018, to purchase, expand or improve real estate, to fund fixed interest rate mortgage loans, and to purchase other invested assets of $854,849,000 of which $534,162,000 is expected to be funded in 2019 with the remainder funded in 2020 and beyond.

American National has a $100,000,000 short-term variable rate borrowing facility containing a $55,000,000 sub-feature for the issuance of letters of credit. Borrowings under the facility are at the discretion of the lender and would be used only for funding working capital requirements. The combination of borrowings and outstanding letters of credit cannot exceed $100,000,000 at any time. As of December 31, 2018 and 2017, the outstanding letters of credit were $2,995,000 and $4,586,000, respectively, and there were no borrowings on this facility. This facility expires on October 31, 2019.

Federal Home Loan Bank (FHLB) Agreements

In May 2018, the Company became a member of the Federal Home Loan Bank of Dallas (“FHLB”) to augment its liquidity resources. As membership requires the ownership of member stock, the Company purchased $7.0 million of stock to meet the FHLB’s membership requirement. The FHLB member stock is recorded in other invested assets on the Company’s consolidated statements of financial position. Through its membership, the Company has access to the FHLB’s financial services including advances that provide an attractive funding source for short-term borrowing and for access to other funding agreements. As of December 31, 2018, certain collateralized mortgage obligations (CMO’s) with a fair value of approximately $120.5 million were on deposit with the FHLB as collateral for amounts subject to funding agreements. The deposited securities are included in bonds held-to-maturity on the Company’s consolidated statements of financial position.

Guarantees

American National has guaranteed bank loans for customers of a third-party marketing operation. The bank loans are used to fund premium payments on life insurance policies issued by American National. The loans are secured by the cash values of the life insurance policies. If the customer were to default on a bank loan, American National would be obligated to pay off the loan. As the cash values of the life insurance policies always equal or exceed the balance of the loans, management does not foresee any loss on these guarantees. The total amount of the guarantees outstanding as of December 31, 2018, was approximately $192,848,000, while the total cash value of the related life insurance policies was approximately $199,159,000.

Litigation

American National and certain subsidiaries, in common with the insurance industry in general, are defendants in various lawsuits concerning alleged breaches of contracts, various employment matters, allegedly deceptive insurance sales and marketing practices, and miscellaneous other causes of action arising in the ordinary course of operations. Certain of these lawsuits include claims for compensatory and punitive damages. We provide accruals for these items to the extent we deem the losses probable and reasonably estimable. After reviewing these matters with legal counsel, based upon information presently available, management is of the opinion that the ultimate resultant liability, if any, would not have a material adverse effect on American National’s consolidated financial position, liquidity or results of operations; however, assessing the eventual outcome of litigation necessarily involves forward-looking speculation as to judgments to be made by judges, juries and appellate courts in the future.

Such speculation warrants caution, as the frequency of large damage awards, which bear little or no relation to the economic damages incurred by plaintiffs in some jurisdictions, continues to create the potential for an unpredictable judgment in any given lawsuit. These lawsuits are in various stages of development, and future facts and circumstances could result in management changing its conclusions. It is possible that, if the defenses in these lawsuits are not successful, and the judgments are greater than management can anticipate, the resulting liability could have a material impact on our consolidated financial position, liquidity or results of operations. With respect to the existing litigation, management currently believes that the possibility of a material judgment adverse to American National is remote and no estimate of range can be made for loss contingencies that are at least reasonably possible but not accrued.

Note 20 – Related Party Transactions

American National has entered into recurring transactions and agreements with certain related parties. These include mortgage loans, management contracts, agency commission contracts, marketing agreements, health insurance contracts, and legal services. The impact on the consolidated financial statements of significant related party transactions is shown below (in thousands):

		Dollar Amount of Transactions		Amount due to (from) American National	
		Years ended December 31,		December 31,	
Related Party	Financial Statement Line Impacted	2018	2017	2018	2017
Gal-Tex Hotel Corporation	Mortgage loan on real estate	$ 1,647	$ 1,533	$ 576	$ 2,223
Gal-Tex Hotel Corporation	Net investment income	107	222	3	13
Greer, Herz & Adams, LLP	Other operating expenses	11,173	10,181	(329)	(386)

Mortgage Loans to Gal-Tex Hotel Corporation ("Gal-Tex"): American National holds a first mortgage loan originated in 1999, with an interest rate of 7.25% and final maturity date of April 1, 2019 issued to a subsidiary of Gal-Tex, which is collateralized by a hotel property in San Antonio, Texas. This loan is current as to principal and interest payments. The Moody Foundation owns 34.0% % of Gal-Tex and 22.75% % of American National, and the Libbie Shearn Moody Trust owns 50.2% % of Gal-Tex and 37.01%% of American National.

Transactions with Greer, Herz & Adams, LLP: Irwin M. Herz, Jr. is an American National director and a Partner with Greer, Herz & Adams, LLP, which serves as American National's General Counsel.

Note 21 – Selected Quarterly Financial Data

The unaudited selected quarterly financial data is shown below (in thousands, except per share data):

	Three months ended							
	March 31,		June 30,		September 30,		December 31,	
	2018	2017	2018	2017	2018	2017	2018	2017*
Total premiums and other revenues	$803,375	$ 779,797	$952,071	$834,093	$1,052,236	$ 872,750	$ 518,700	$ 924,360
Total benefits, losses and expenses	782,591	735,139	850,796	791,595	868,969	779,806	682,868	776,114
Income (loss) before federal income tax and other items	20,784	44,658	101,275	42,498	183,267	92,944	(164,168)	148,246
Total provision (benefit) for federal income taxes*	1,189	13,735	21,957	13,524	19,219	37,183	(40,920)	(157,437)
Equity in earnings of unconsolidated affiliates	(545)	9,500	6,421	12,313	13,029	22,387	2,376	42,474
Other components of net periodic pension benefit (costs), net of tax	(792)	(1,232)	(1,677)	(5,588)	(1,236)	(1,545)	3,133	(4,043)
Net income (loss)*	18,258	39,191	84,062	35,699	175,841	76,603	(117,739)	344,114
Net income (loss) attributable to noncontrolling interest, net of tax	(519)	(649)	(77)	(260)	2,377	3,334	(354)	(469)
Net income (loss) attributable to American National*	$ 18,777	$ 39,840	$ 84,139	$ 35,959	$ 173,464	$ 73,269	$(117,385)	$ 344,583
Earnings (loss) per share attributable to American National*								
Basic	$ 0.70	$ 1.48	$ 3.13	$ 1.34	$ 6.45	$ 2.72	$ (4.37)	$ 12.81
Diluted	0.70	1.48	3.12	1.33	6.44	2.72	(4.37)	12.78

* The fourth quarter of 2017 includes the impact of the U. S. Tax Cut and Jobs Act ("Tax Reform") of $206.4 million, in Q4 of 2017 primarily due to the remeasurement of our deferred tax balances to the new 21% corporate income tax rate. Excluding the impact of Tax Reform, the Company's net income for the three months ended December 31, 2017 would have been $138.2 million and net earnings per basic and diluted share of $5.14 and $5.12, respectively.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

The Company maintains disclosure controls and procedures (as that term is defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the "Exchange Act")) that are designed to provide reasonable assurance that information required to be disclosed in the Company's reports under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the Securities and Exchange Commission's rules and forms, and that such information is accumulated and communicated to the Company's management, including its Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosures.

The Company's management, with the participation of the Company's Chief Executive Officer and Chief Financial Officer, has evaluated the effectiveness of the design and operation of the Company's disclosure controls and procedures as of December 31, 2018. Based upon that evaluation and subject to the foregoing, the Company's Chief Executive Officer and Chief Financial Officer concluded that, as of December 31, 2018, the design and operation of the Company's disclosure controls and procedures were effective to accomplish their objectives at the reasonable assurance level.

Management's Annual Report on Internal Control over Financial Reporting

Management of the Company is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. The Company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of consolidated financial statements for external purposes in accordance with accounting principles generally accepted in the United States of America.

Because of inherent limitations, internal controls over financial reporting may not prevent or detect misstatements. In addition, projections of any evaluations of effectiveness to future periods are subject to the risks that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Management, including the Chief Executive Officer and Chief Financial Officer, has conducted an assessment, including testing, of the effectiveness of the Company's internal control over financial reporting as of December 31, 2018, based on the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in *Internal Control — An Integrated Framework* (2013). Based on this evaluation, management has concluded that our internal control over financial reporting was effective as of December 31, 2018.

The effectiveness of the company's internal control over financial reporting as of December 31, 2018, has been audited by KPMG LLP, an independent registered public accounting firm, as stated in their report.

Changes in Internal Control Over Financial Reporting

Management has monitored the internal controls over financial reporting, including any material changes to the internal control over financial reporting. Other than the remediation efforts described below, there were no changes in the Company's internal control over financial reporting (as that term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) that occurred during the year ended December 31, 2018 that have materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

None

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information required by this item is incorporated by reference from our definitive proxy statement for our Annual Meeting of Stockholders, which will be filed with the Securities and Exchange Commission within 120 days after December 31, 2018.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this item is incorporated by reference from our definitive proxy statement for our Annual Meeting of Stockholders, which will be filed with the Securities and Exchange Commission within 120 days after December 31, 2018.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information required by this item is incorporated by reference from our definitive proxy statement for our Annual Meeting of Stockholders, which will be filed with the Securities and Exchange Commission within 120 days after December 31, 2018.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE

The information required by this item is incorporated by reference from our definitive proxy statement for our Annual Meeting of Stockholders, which will be filed with the Securities and Exchange Commission within 120 days after December 31, 2018.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by this item is incorporated by reference from our definitive proxy statement for our Annual Meeting of Stockholders, which will be filed with the Securities and Exchange Commission within 120 days after December 31, 2018.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(a)(1) Financial Statements—(See Item 8: Financial Statements and Supplementary Data)

(a)(2) Supplementary Data and Financial Statement Schedules—are attached hereto at the following pages

All other schedules are omitted as the required information is inapplicable or the information is presented in the financial statements or related notes.

(b) Exhibits

Exhibit Number	Basic Documents
3.1	Restated Articles of Incorporation, as amended (incorporated by reference to Exhibit No. 3.1 to the registrant's Registration Statement on Form 10-12B filed April 10, 2009).
3.2	Amended and Restated Bylaws (incorporated by reference to Exhibit No. 3.2 to the registrant's Current Report on Form 8-K filed February 23, 2018).
4.1	Specimen copy of Stock Certificate (incorporated by reference to Exhibit No. 4.1 to the registrant's Registration Statement on Form 10-12B filed April 10, 2009).
10.1*	American National Insurance Company Amended and Restated 1999 Stock and Incentive Plan (the "Stock and Incentive Plan")(incorporated by reference to Exhibit No. 10.2 to the registrant's Registration Statement on Form 10-12B filed April 10, 2009).
10.2*	Form of Restricted Stock Agreement for Directors under the Stock and Incentive Plan (incorporated by reference to Exhibit No. 10.3 to the registrant's Registration Statement on Form 10-12B filed April 10, 2009).
10.3*	Form of Restricted Stock Agreement for Employees under the Stock and Incentive Plan (incorporated by reference to Exhibit No. 10.4 to the registrant's Registration Statement on Form 10-12B filed April 10, 2009).
10.4*	American National Insurance Company Nonqualified Retirement Plan for Certain Salaried Employees (incorporated by reference to Exhibit No. 10.6 to the registrant's Registration Statement on Form 10-12B filed April 10, 2009).
10.5*	Amendment to the American National Insurance Company Nonqualified Retirement Plan for Certain Salaried Employees (incorporated by reference to Exhibit No. 10.2 to the registrant's amended Current Report on Form 8-K/A filed on November 6, 2013).
10.6*	American National Family of Companies Executive Supplemental Savings Plan (incorporated by reference to Exhibit No. 10.3 to the registrant's amended Current Report on Form 8-K/A filed on November 6, 2013).

10.7*	Amendments One and Two to the American National Family of Companies Executive Supplemental Savings plan (incorporated by reference to Exhibit No. 10.15 to the registrant's Quarterly Report on Form 10-Q filed on May 8, 2015).
10.8*	Form of Restricted Stock Unit Agreement for Executive Officers under the Stock and Incentive Plan (incorporated by reference to Exhibit No. 10.16 to the registrant's Quarterly Report on Form 10-Q filed on May 8, 2015).
10.9*	Form of Restricted Stock Unit Agreement for Directors under the Stock and Incentive Plan (filed herewith).
21	Subsidiaries (filed herewith).
23	Consent of KPMG LLP (filed herewith).
31.1	Certification of the principal executive officer pursuant to Section 302 of the Sarbanes- Oxley Act of 2002 (filed herewith).
31.2	Certification of the principal financial officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 (filed herewith).
32.1	Certification of the principal executive officer and principal financial officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (filed herewith).
101	The following financial information from American National Insurance Company's Annual Report on Form 10-K for the year ended December 31, 2018 formatted in extensible Business Reporting Language ("XBRL"): (i) Consolidated Statements of Financial Position, (ii) Consolidated Statements of Operations, (iii) Consolidated Statements of Comprehensive Income, (iv) Consolidated Statements of Changes in Equity, (v) Consolidated Statements of Cash Flows, and (vi) Notes to the Consolidated Financial Statements.

* Management contract or compensatory plan or arrangement.

ITEM 16. FORM 10-K SUMMARY

Not applicable

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

AMERICAN NATIONAL INSURANCE COMPANY

By:	/s/ James E. Pozzi
Name:	James E. Pozzi
Title:	*President and Chief Executive Officer (Principal Executive Officer)*

Date: February 28, 2019

Pursuant to the requirements of the Securities and Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities indicated.

Signature	Title	Date
/s/ James E. Pozzi James E. Pozzi	President and Chief Executive Officer *(Principal Executive Officer)*	February 28, 2019
/s/ Timothy A. Walsh Timothy A. Walsh	Executive Vice President, CFO, Treasurer and ML and P&C Operations *(Principal Financial Officer)*	February 28, 2019
/s/ Michelle A. Gage Michelle A. Gage	Vice President, and Controller	February 28, 2019
/s/ William C. Ansell William C. Ansell	Director	February 28, 2019
/s/ Arthur O. Dummer Arthur O. Dummer	Director	February 28, 2019
/s/ Irwin M. Herz, Jr. Irwin M. Herz, Jr.	Director	February 28, 2019
/s/ E. Douglas McLeod E. Douglas McLeod	Director	February 28, 2019
/s/ Frances A. Moody-Dahlberg Frances A. Moody-Dahlberg	Director	February 28, 2019
/s/ Ross R. Moody Ross R. Moody	Director	February 28, 2019
/s/ James P. Payne James P. Payne	Director	February 28, 2019
/s/ E.J. Pederson E.J. Pederson	Director	February 28, 2019
/s/ James D. Yarbrough James D. Yarbrough	Director	February 28, 2019

AMERICAN NATIONAL INSURANCE COMPANY AND SUBSIDIARIES
SCHEDULE I - SUMMARY OF INVESTMENTS - OTHER THAN INVESTMENTS IN RELATED PARTIES
(In thousands)

Type of Investment	December 31, 2018 Cost or Amortized Cost [1]	December 31, 2018 Estimated Fair Value	December 31, 2018 Amount at Which Shown in the Balance Sheet
Fixed maturities			
Bonds held-to-maturity			
U.S. states and political subdivisions	$ 245,360	$ 250,899	$ 245,360
Foreign governments	3,961	4,430	3,961
Corporate debt securities	7,640,891	7,548,829	7,640,891
Residential mortgage-backed securities	315,306	319,910	315,306
Collateralized debt securities	5,214	5,285	5,214
Other debt securities	717	731	717
Bonds available-for-sale			
U.S.treasury and government	28,304	28,399	28,399
U.S. states and political subdivisions	848,228	862,030	862,030
Foreign governments	5,000	6,210	6,210
Corporate debt securities	5,345,579	5,283,818	5,283,818
Residential mortgage-backed securities	31,735	31,662	31,662
Collateralized debt securities	2,775	3,444	3,444
Equity securities			
Common stocks			
Consumer goods	148,635	322,934	322,934
Energy and utilities	91,725	121,756	121,756
Finance	127,396	259,918	259,918
Healthcare	68,731	206,399	206,399
Industrials	43,871	136,601	136,601
Information technology	118,495	346,384	346,384
Other	95,669	115,193	115,193
Preferred stocks	19,982	21,042	21,042
Other Investments			
Mortgage loans on real estate, net of allowance	5,124,707	5,049,468	5,124,707
Investment real estate, net of accumulated depreciation	544,823	—	544,823
Real estate acquired in satisfaction of debt	42,694	—	42,694
Policy loans	376,254	376,254	376,254
Options (2)	108,803	148,006	1,142
Other long-term investments	48,945	—	48,945
Short-term investments	206,760	206,760	206,760
Total investments	**$ 21,640,560**	**$ 21,656,362**	**$ 22,302,564**

(1) Original cost of equity securities and, as to fixed maturity securities, original cost reduced by repayments and valuation write-downs and adjusted for amortization of premiums or accrual of discounts.
(2) The amount shown in the Consolidated Statement of Financial Position represents options exposure net of collateral. See Note 7, Derivative Instruments, of the Notes to the Consolidated Financial Statements for more information.

See accompanying Report of Independent Registered Public Accounting Firm.

AMERICAN NATIONAL INSURANCE COMPANY (Parent Company Only)
SCHEDULE II - CONDENSED FINANCIAL INFORMATION OF REGISTRANT
(In thousands)

Condensed Statements of Financial Position	December 31, 2018	December 31, 2017
ASSETS		
Fixed maturity securities	$ 9,660,562	$ 9,093,442
Equity securities	6,252	4,976
Mortgage loans on real estate, net of allowance	4,772,085	4,533,620
Other invested assets	1,487,383	1,961,343
Investment in subsidiaries	3,121,901	3,090,883
Deferred policy acquisition costs	1,224,752	1,116,862
Separate account assets	918,369	969,764
Prepaid pension	57,117	—
Other assets	763,458	873,470
Total assets	**$ 22,011,879**	**$ 21,644,360**
LIABILITIES		
Policy liabilities	$ 4,373,398	$ 4,207,467
Policyholders' account balances	10,943,189	10,690,282
Separate account liabilities	918,369	969,764
Other liabilities	519,675	530,088
Total liabilities	**$ 16,754,631**	**$ 16,397,601**
EQUITY		
Common stock	30,832	30,832
Additional paid-in capital	20,694	19,193
Accumulated other comprehensive income	(99,738)	642,216
Retained earnings	5,413,952	4,656,134
Treasury stock, at cost	(108,492)	(101,616)
Total equity	**5,257,248**	**5,246,759**
Total liabilities and equity	**$ 22,011,879**	**$ 21,644,360**

The condensed financial statements should be read in conjunction with the consolidated financial statements and notes therein.

See accompanying Report of Independent Registered Public Accounting Firm.

AMERICAN NATIONAL INSURANCE COMPANY (Parent Company Only)
SCHEDULE II - CONDENSED FINANCIAL INFORMATION OF REGISTRANT
(In thousands)

Condensed Statements of Operations	Years ended December 31, 2018	2017	2016
PREMIUMS AND OTHER REVENUES			
Premiums and other policy revenues	$ 943,071	$ 889,346	$ 987,994
Net investment income	686,569	794,277	713,589
Net realized investment gains	2,053	21,052	16,111
Other-than-temporary impairments	(1,243)	(6,105)	(10)
Net losses on equity securities	(208)	—	—
Other income	19,028	17,558	15,944
Total premiums and other revenues	**1,649,270**	**1,716,128**	**1,733,628**
BENEFITS, LOSSES AND EXPENSES			
Policyholder benefits	716,959	682,707	749,179
Other operating expenses	773,329	871,935	843,500
Total benefits, losses and expenses	**1,490,288**	**1,554,642**	**1,592,679**
Income before federal income tax and other items	**158,982**	**161,486**	**140,949**
Provision (benefit) for federal income taxes	28,308	(53,728)	52,336
Equity in earnings of subsidiaries, net of tax	24,789	286,579	95,356
Other components of net periodic pension costs, net of tax	3,532	(8,142)	(2,966)
Net income attributable to American National	**$ 158,995**	**$ 493,651**	**$ 181,003**

The condensed financial statements should be read in conjunction with the consolidated financial statements and notes therein.

See accompanying Report of Independent Registered Public Accounting Firm.

AMERICAN NATIONAL INSURANCE COMPANY (Parent Company Only)
SCHEDULE II - CONDENSED FINANCIAL INFORMATION OF REGISTRANT
(In thousands)

Condensed Statements of Cash Flows	Years ended December 31, 2018	2017	2016
OPERATING ACTIVITIES			
Net income	$ 158,995	$ 493,651	$ 181,003
Adjustments to reconcile net income to net cash provided by operating activities			
Net realized investments gains	(2,053)	(21,052)	(16,111)
Other-than-temporary impairments	1,243	6,105	10
Accretion of premiums, discounts and loan origination fees	(11,236)	(6,615)	(7,675)
Net capitalized interest on policy loans and mortgage loans	(36,784)	(31,853)	(28,943)
Depreciation	30,492	32,991	28,510
Interest credited to policyholders' account balances	269,933	370,270	297,526
Charges to policyholders' account balances	(272,638)	(236,336)	(295,000)
Deferred federal income tax expense (benefit)	10,564	(57,337)	89,089
Equity in earnings of affiliates	(8,323)	(10,840)	(5,985)
Net income of subsidiaries	(16,466)	(275,739)	(89,371)
Distributions from equity method investments	5,319	—	—
Changes in			
Policyholder liabilities	165,931	179,497	186,472
Deferred policy acquisition costs	(61,881)	(66,219)	8,684
Reinsurance recoverables	(9,855)	584	11,545
Premiums due and other receivables	(1,302)	12,343	(8,427)
Prepaid reinsurance premiums	3,213	3,392	88
Accrued investment income	2,306	(3,138)	351
Current tax receivable/payable	79,168	1,725	(24,833)
Liability for retirement benefits	(64,824)	(31,830)	(29,678)
Fair value of option securities	50,299	(86,259)	(27,534)
Fair value of equity securities	208	—	—
Other, net	(17,943)	20,437	(48,112)
Net cash provided by operating activities	274,366	293,777	221,609
INVESTING ACTIVITIES			
Proceeds from sale/maturity/prepayment of			
Held-to-maturity securities	514,393	730,143	382,390
Available-for-sale securities	296,545	315,030	282,834
Equity securities	—	5,635	—
Investment real estate	3,782	58,840	6,651
Mortgage loans	799,413	794,011	547,553
Policy loans	42,407	44,253	49,260
Other invested assets	110,415	76,521	28,155
Disposals of property and equipment	—	158	13,171
Distributions from affiliates and subsidiaries	17,795	20,038	9,909
Payment for the purchase/origination of			
Held-to-maturity securities	(971,396)	(824,831)	(60,639)
Available-for-sale securities	(535,233)	(345,677)	(159,534)
Equity securities	(1,485)	(128)	(2,000)
Investment real estate	(23,790)	(26,936)	(31,234)
Mortgage loans	(1,021,303)	(1,117,320)	(1,327,395)
Policy loans	(23,014)	(22,978)	(21,526)
Other invested assets	(67,914)	(42,849)	(65,965)
Additions to property and equipment	(10,767)	(20,441)	(39,856)
Contributions to unconsolidated affiliates	(95,091)	(26,056)	(40,404)
Change in short-term investments	360,837	(401,110)	207,546
Change in investment in subsidiaries	100,000	—	20,044
Change in collateral held for derivatives	(63,069)	84,325	22,789
Other, net	191	15,751	17,167
Net cash used in investing activities	(567,284)	(683,621)	(161,084)
FINANCING ACTIVITIES			
Policyholders' account deposits	1,513,478	1,732,494	1,287,366
Policyholders' account withdrawals	(1,243,641)	(1,182,754)	(1,229,039)
Dividends to stockholders	(88,228)	(88,335)	(87,741)
Net cash provided by (used in) financing activities	181,609	461,405	(29,414)
NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS	(111,309)	71,561	31,111
Beginning of the period	262,901	191,340	160,229
End of the period	**$ 151,592**	**$ 262,901**	**$ 191,340**

The condensed financial statements should be read in conjunction with the consolidated financial statements and notes therein.

See accompanying Report of Independent Registered Public Accounting Firm.

AMERICAN NATIONAL INSURANCE COMPANY AND SUBSIDIARIES
SCHEDULE III - SUPPLEMENTARY INSURANCE INFORMATION
(In thousands)

Segment	Deferred Policy Acquisition Cost	Future Policy Benefits, Policyholders' Account Balances, Policy and Contract Claims and Other Policyholder Funds	Unearned Premiums	Premium Revenue	Net Investment Income [(1)]	Benefits, Claims, Losses and Settlement Expenses	Amortization of Deferred Policy Acquisition Costs	Other Operating Expenses [(2)]	Premiums Written
2018									
Life	$ 839,133	$ 5,158,377	$ 29,901	$ 350,012	$ 233,181	$ 417,702	$ 97,263	$ 190,835	$ —
Annuity	499,588	12,372,418	—	231,027	467,788	290,611	57,468	46,859	—
Health	33,960	319,789	37,261	180,414	9,376	122,547	15,436	41,819	—
Property & Casualty	124,580	1,034,265	841,694	1,466,740	62,320	1,049,112	309,990	186,019	1,514,563
Corporate & Other	—	—	—	—	85,702	—	—	31,479	—
Total	**$ 1,497,261**	**$ 18,884,849**	**$ 908,856**	**$ 2,228,193**	**$ 858,367**	**$ 1,879,972**	**$ 480,157**	**$ 497,011**	**$ 1,514,563**
2017									
Life	$ 791,276	$ 5,432,688	$ 33,298	$ 328,570	$ 245,835	$ 410,152	$ 74,068	$ 190,482	$ —
Annuity	426,497	11,533,813	—	222,207	573,789	270,970	74,750	44,486	—
Health	36,806	282,872	40,665	156,436	9,538	103,037	15,227	38,475	—
Property & Casualty	119,265	990,341	801,331	1,359,989	61,688	934,044	280,306	177,345	1,414,024
Corporate & Other	—	—	—	—	75,227	—	—	34,552	—
Total	**$ 1,373,844**	**$ 18,239,714**	**$ 875,294**	**$ 2,067,202**	**$ 966,077**	**$ 1,718,203**	**$ 444,351**	**$ 485,340**	**$ 1,414,024**
2016									
Life	$ 745,840	$ 4,937,467	$ 35,133	$ 318,953	$ 227,923	$ 429,813	$ 112,712	$ 186,879	$ —
Annuity	394,208	10,821,889	—	248,714	500,726	296,586	71,381	51,283	—
Health	40,620	272,802	43,155	175,589	9,942	132,390	14,973	42,655	—
Property & Casualty	113,775	935,998	745,650	1,253,392	57,091	883,219	262,299	165,278	1,282,876
Corporate & Other	—	—	—	—	64,553	—	—	30,367	—
Total	**$ 1,294,443**	**$ 16,968,156**	**$ 823,938**	**$ 1,996,648**	**$ 860,235**	**$ 1,742,008**	**$ 461,365**	**$ 476,462**	**$ 1,282,876**

(1) Net investment income from fixed income assets (bonds and mortgage loans on real estate) is allocated to insurance lines based on the funds generated by each line at the average yield available from these fixed income assets at the time such funds become available. Net investment income from policy loans is allocated to the insurance lines according to the amount of loans made by each line. Net investment income from all other assets is allocated to the insurance lines as necessary to support the equity assigned to that line with the remainder allocated to capital & surplus.

(2) Identifiable expenses are charged directly to the appropriate line of business. The remaining expenses are allocated to the lines based upon various factors including premium ratio within the respective lines.

See accompanying Report of Independent Registered Public Accounting Firm.

AMERICAN NATIONAL INSURANCE COMPANY AND SUBSIDIARIES
SCHEDULE IV - REINSURANCE INFORMATION
(In thousands)

	Direct Amount	Ceded to Other Companies	Assumed from Other Companies	Net Amount	Percentage of Amount Assumed to Net
Years Ended December 31, 2018					
Life insurance in-force	$ 110,125,270	$ 26,601,422	$ 230,845	$ 83,754,693	**0.3%**
Premiums earned					
Life and annuity	$ 684,399	$ 103,749	$ 389	$ 581,039	0.1
Health	209,109	303,623	274,928	180,414	152.4
Property and casualty	1,606,076	150,184	10,848	1,466,740	0.7
Total premiums	**$ 2,499,584**	**$ 557,556**	**$ 286,165**	**$ 2,228,193**	**12.8**
Years Ended December 31, 2017					
Life insurance in-force	$ 102,843,372	$ 29,646,646	$ 257,552	$ 73,454,278	0.4
Premiums earned					
Life and annuity	$ 654,086	$ 104,599	$ 1,290	$ 550,777	0.2
Health	194,516	253,110	215,030	156,436	137.5
Property and casualty	1,492,486	143,230	10,733	1,359,989	0.8
Total premiums	**$ 2,341,088**	**$ 500,939**	**$ 227,053**	**$ 2,067,202**	**11.0**
Years Ended December 31, 2016					
Life insurance in-force	$ 95,439,425	$ 29,980,485	$ 181,655	$ 65,640,595	0.3
Premiums earned					
Life and annuity	$ 669,607	$ 104,128	$ 2,188	$ 567,667	0.4
Health	227,691	235,807	183,705	175,589	104.6
Property and casualty	1,349,297	104,922	9,017	1,253,392	0.7
Total premiums	**$ 2,246,595**	**$ 444,857**	**$ 194,910**	**$ 1,996,648**	**9.8%**

See accompanying Report of Independent Registered Public Accounting Firm.

AMERICAN NATIONAL INSURANCE COMPANY AND SUBSIDIARIES
SCHEDULE V - VALUATION AND QUALIFYING ACCOUNTS
(In thousands)

		Additions	Deductions		
	Balance at Beginning of Period	Charged to costs and expenses	Written off	Change in Estimate	Balance at End of Period
2018					
Investment valuation allowances:					
Mortgage loans on real estate	$ 18,866	$ 4,798	$ (2,331)	$ —	$ 21,333
2017					
Investment valuation allowances:					
Mortgage loans on real estate	$ 12,490	$ 7,700	$ (1,324)	$ —	$ 18,866
2016					
Investment valuation allowances:					
Mortgage loans on real estate	$ 12,895	$ (405)	$ —	$ —	$ 12,490

See accompanying Report of Independent Registered Public Accounting Firm.

EXHIBIT M-1

UPDATED and REVISED Traffic Impact Analysis Report

TRAFFIC IMPACT ANALYSIS REPORT
PULELEHUA DEVELOPMENT

Lahaina, Maui, Hawaii

FINAL DRAFT

May 13, 2019

Prepared for:

Maui Oceanview LP
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Dallas, Texas 75201

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TRAFFIC IMPACT ANALYSIS REPORT

PULELEHUA DEVELOPMENT

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May 13, 2019

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APPENDICES

AUSTIN, TSUTSUMI & ASSOCIATES, INC. CIVIL ENGINEERS • SURVEYORS
CONTINUING THE ENGINEERING PRACTICE FOUNDED BY H. A. R. AUSTIN IN 1934

TERRANCE S. ARASHIRO, P.E.
ADRIENNE W.L.H. WONG, P.E., LEED AP
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MATT K. NAKAMOTO, P.E.
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TRAFFIC IMPACT ANALYSIS REPORT

PULELEHUA DEVELOPMENT

Lahaina, Maui, Hawaii

1. INTRODUCTION

This report documents the findings of a traffic study conducted by Austin, Tsutsumi & Associates, Inc. (ATA) to evaluate the potential traffic impacts resulting from the proposed Pulelehua Development (hereinafter referred to as the “Project”).

1.1 Location

The Project is located upon approximately 310 acres of undeveloped land in Lahaina on the island of Maui. The Project will be bounded by Honoapiilani Highway to the west and the Kapalua Airport to the east. See Figure 1.1 for the Project location.

1.2 Project Description

A Traffic Impact Analysis Report (TIAR) was completed for the Project in October 2008 and updated in May 2009. Since 2009, the Project’s site plan has undergone some modifications and currently proposes to develop approximately 310 acres of land to provide 100 single-family (SF) residential units, 800 multi-family (MF) residential units, an elementary school, a 10-acre park and three (3) retail centers, totaling 70,000 square feet. In addition, a new roadway will be constructed just east and parallel to Honoapiilani Highway that will provide vehicular, bike and pedestrian access to link the Project’s development north and south of Mahinahina Gulch. The Project will be constructed in seven (7) phases, but for purposes of this TIAR, will be analyzed as four (4) scenarios.

Figure 1.2 shows the Project site plan.

Scenario 1 – Develop Phase 1 with a build-out of 2022 that includes the following:

- 240 MF residential units north of Akahele Street, with direct access provided by a new Project roadway, Road A, intersecting Akahele Street, and a new right-in, right-out (RIRO) access via Honoapiilani Highway.

Scenario 2 - Develop Phases 2A and 2B with a build-out of 2025 that include the following:

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OFFICES IN:
HONOLULU, HAWAII
WAILUKU, MAUI, HAWAII
HILO, HAWAII

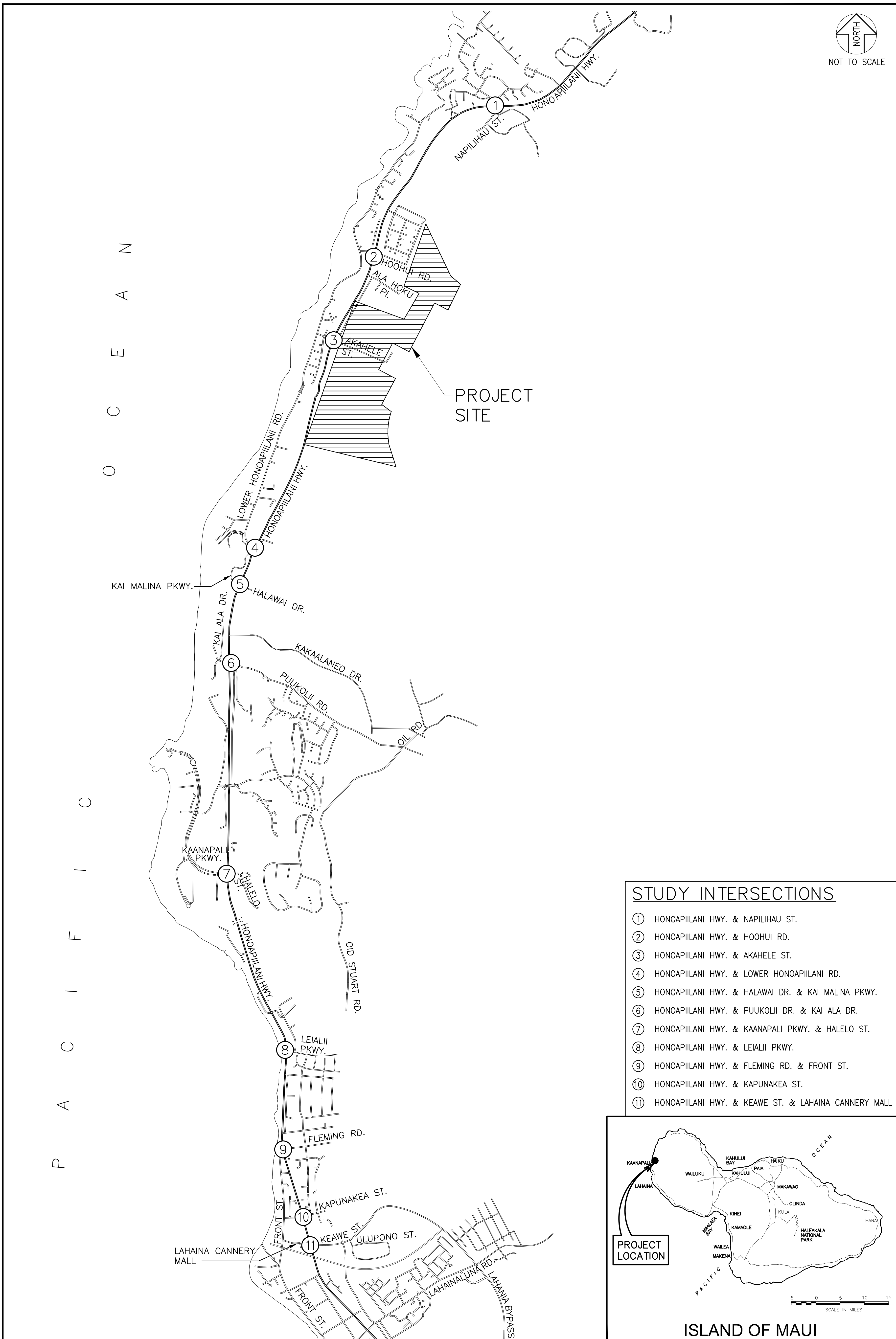
- 100 MF residential units (Phase 2A) south of Akahele Street with direct access provided by a new Project roadway, Road C, intersecting Akahele Street to the east of Road A.
- 250 MF residential units (Phase 2B) south of Akahele Street with direct access provided by Road A and Road C. 70 of the units will be located in live/work buildings.

Scenario 3 – Develop Phases 3-5 with a build-out of 2030 that include the following:

- 210 MF residential units (Phase 3) south of Mahinahina Gulch, with access provided by a new Project roadway, Road J, intersecting Honoapiilani Highway south of Mahinahina Gulch.
- 10-acre park (Phase 3) with two (2) practice fields south of Mahinahina Gulch, with access provided by Road J.
- North Central Neighborhood Retail (Phase 4) consisting of approximately 6,000 square feet of commercial space located north of Akahele Street near the Kapalua Airport, with access provided by Road C.
- South Core Retail (Phase 4) consisting of approximately 55,000 square feet of commercial space located on the southeast corner of the Honoapiilani Highway/Akahele Street intersection, with access provided by Road A.
- South Central Neighborhood Retail (Phase 4) consisting of approximately 9,000 square feet of commercial space located on the northeast corner of the proposed Honoapiilani Highway/Road J intersection, with access provided by Road J.
- 86 SF (Phase 5) residential units north of Akahele Street, with access provided by Road C.
- 14 SF residential units (Phase 5) south of Mahinahina Gulch, with access provided by Road J.

Scenario 4 – A future elementary school, to be planned/developed by the Department of Education (DOE). Since the development of the school is not in the direct controller of the Pulelehua development, the timeframe for this school has yet to be determined. For purposes of this TIAR, a forecast build-out of 2035 was assumed.

- 750-student elementary school, with access provided by Road A.



PULELEHUA	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE
	LOCATION MAP	**1.1**

NOTE: SITE PLAN OBTAINED FROM KIMLEY–HORN

PULELEHUA	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE
	SITE PLAN	1.2

2. METHODOLOGY

2.1 Study Methodology

This study will address the following:

- Assess existing traffic operating conditions at key intersections during the weekday morning (AM) and afternoon (PM) and Saturday midday (WE) peak hours of traffic within the study area.
- Traffic projections for Base Year 2022, 2025, 2030 and 2035 (without the Project) including traffic generated by other known developments in the vicinity of the Project in addition to an ambient growth rate. These other known developments are projects that are currently under construction or known new/future developments that are anticipated to affect traffic demand and operations within the study area.
- Trip generation and traffic assignment characteristics for the proposed Project.
- Traffic projections for Future Year 2022, 2025, 2030 and 2035, which includes Base Year traffic volumes in addition to traffic volumes generated by the four (4) Project scenarios.
- Recommendations for Base Year and Future Year roadway improvements or other mitigative measures, as appropriate, to reduce or eliminate the adverse impacts resulting from traffic generated by known developments in the region or the Project.

2.2 Intersection Analysis

Level of Service (LOS) is a qualitative measure used to describe the conditions of traffic flow at intersections, with values ranging from free-flow conditions at LOS A to congested conditions at LOS F. The Highway Capacity Manual (HCM), 6th Edition, dated 2016, includes methods for calculating volume to capacity ratios, delays, and corresponding Levels of Service that were utilized in this study. LOS definitions for signalized and unsignalized intersections are provided in Appendix B.

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

3. EXISTING CONDITIONS

3.1 Roadway System

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

Honoapiilani Highway – is a State highway that provides regional connection for the majority of West Maui. Honoapiilani Highway begins in Wailuku where it transitions from South High Street and continues southward toward Maalaea. The highway borders the coastline as it curves back around West Maui and northward again toward Kapalua, where it transitions into Kahekili Highway near Honokohau Bay. In the vicinity of the Project, Honoapiilani Highway is generally a two-way, two-lane undivided road with a posted speed limit of 45 miles per hour (mph) in the vicinity of the Project.

Napilihau Street – is a roadway that provides access to businesses and residential areas. The roadway begins to the northwest at its intersection with Lower Honoapiilani Road and travels southeast to Honoapiilani Highway before terminating to the southwest at Maui Preparatory Academy. In the vicinity of the Project, Napilihau Street is generally a two-way, one-lane undivided road with a posted speed limit of 20 mph.

Hoohui Road – is a roadway that provides access to businesses and residential areas. The roadway begins to the west at its intersection with Lower Honoapiilani Road and terminates to the east at its intersection with Kahana Ridge Drive. West of its intersection with Honoapiilani Highway, Hoohui Road is a two-way, one-lane undivided road with a speed limit of 20 mph. East of its intersection with Honoapiilani Highway, Hoohui Road is a two-way, two-lane undivided road with a posted speed limit of 25 mph.

Akahele Street – is a roadway that provides access to residential areas and the Kapalua Airport. The roadway begins to the west at its intersection with Lower Honoapiilani Road and terminates to the east at the Kapalua Airport. In the vicinity of the Project, Akahele Street is a two-way, one-lane undivided road with a posted speed limit of 30 mph.

Lower Honoapiilani Road – is a County collector that provides access to hotels, businesses and residential areas. The roadway begins at its intersection with Honoapiilani Highway and runs north parallel to the highway and the coast before terminating at its intersection with Office Road near the Kapalua Golf Course. In the vicinity of the Project, Lower Honoapiilani Road is generally a two-way, one-lane undivided road with a posted speed limit of 20 mph.

Halawai Drive/Kai Malina Parkway – is a roadway that provides access to various businesses and hotels. Halawai Drive is a roadway east of Honoapiilani Highway and Kai Malina Parkway is a roadway west of the highway, servicing Honua Kai Resort and Spa.

Puukolii Road – is a roadway that provides access to residential areas. The roadway begins to the west at its intersection with Honoapiilani Highway and terminates to the southeast at its intersection with Oil Road. In the vicinity of the Project, Puukolii Road is a two-way, one-lane undivided road with a posted speed limit of 30 mph.

Kai Ala Drive – is a County roadway that begins to the east at its intersection with Hononapiilani Highway and travels west to provide access to Kahekili Beach Park and several hotels. In the vicinity of the Project, Kai Ala Drive is a two-way, one-lane divided road.

Kaanapali Parkway – is a roadway that provides access to various hotels and businesses. The roadway begins to the east at its intersection with Honoapiilani Highway and travels northwest before terminating near the Royal Kaanapali Golf Course. In the vicinity of the Project, Kaanapali Parkway is a two-way, two-lane divided road.

Halelo Street – is a roadway that provides access to residential areas. The roadway begins to the west at its intersection with Honoapiilani Highway and travels southeast before terminating. In the vicinity of the Project, Halelo Street is a two-way, one-lane undivided road.

Leialii Parkway – is a collector road that provides access to residential areas, civic center and the post office. The roadway begins to the west at its intersection with Honoapiilani Highway and terminates to the east. In the vicinity of the Project, Leialii Parkway is a two-way, one-lane undivided road with a posted speed limit of 25 mph.

Fleming Road – is a roadway that provides access to residential areas. The roadway begins to the west at its intersection with Honoapiilani Highway and terminates to the east. In the vicinity of the Project, Fleming Road is a two-way, one-lane undivided road with a posted speed limit of 20 mph.

Front Street – is a County collector road that provides access to businesses and residential areas. The roadway begins to the south at its intersection with Honoapiilani Highway just north of Hokiokio Place. The road then travels north parallel to the coast and the highway before reconnecting with Honoapiilani Highway at Fleming Road. In the vicinity of the Project, Front Street is a two-way, one-lane undivided road with a posted speed limit of 20 mph.

Kapunakea Road – is a roadway that provides access to businesses and residential areas. The roadway begins to the west at its intersection with Front Street and terminates to the east past its intersection with Honoapiilani Highway. West of its intersection with Honoapiilani Highway, Kapunakea Road is a two-way, two-lane undivided roadway. East of its intersection with Honoapiilani Highway, Kapunakea Road is a two-way, one-lane undivided roadway.

Keawe Street – is a County collector road that provides access to businesses and residential areas. The roadway begins to the west at its intersection with Honoapiilani Highway and terminates to the east at its intersection with Lahaina Bypass Road. In the vicinity of the Project, Keawe Street is a two-way, two-lane divided roadway.

3.2 Existing Traffic Volumes

The AM peak hour turning movement data utilized in this report were collected on December 1, 2016 and December 7, 2016. The PM peak hour turning movement data were collected on November 30, 2016 and December 6, 2016. The WE hourly turning movement data were collected on December 10, 2016. Based on the proximity to the proposed Project site, the following intersections were studied in the existing conditions scenario.

- [1] Honoapiilani Highway/Napilihau Street (signalized)
- [2] Honoapiilani Highway/Hoohui Road (signalized)
- [3] Honoapiilani Highway/Akahele Street (signalized)
- [4] Honoapiilani Highway/Lower Honoapiilani Road (signalized)
- [5] Honoapiilani Highway/Halawai Drive/Kai Malina Parkway (signalized)

- [6] Honoapiilani Highway/Puukolii Road/Kai Ala Drive (signalized)
- [7] Honoapiilani Highway/Kaanapali Parkway/Halelo Street (signalized)
- [8] Honoapiilani Highway/Leialii Parkway (signalized)
- [9] Honoapiilani Highway/Fleming Road/Front Street (signalized)
- [10] Honoapiilani Highway/Kapunakea Road (signalized)
- [11] Honoapiilani Highway/Keawe Street/Lahaina Cannery Mall (signalized)

As a result of the completion of the Lahaina Bypass Road (LBR) Phase 1-B2 in 2018, changes were made to the lane configuration and traffic patterns at the Honoapiilani Highway/Keawe Street/Lahaina Cannery Mall intersection after traffic count data was collected. Updated traffic count data collected on May 22, 2018 for the AM and PM peak hours and on May 26, 2018 for the WE peak hour was utilized to reflect the completion of the LBR Phase 1-B2 for the existing conditions scenario.

Based on the count data, it was determined that the weekday AM peak hour of traffic occurs between 7:15 AM and 8:15 AM, the weekday PM peak hour of traffic occurs between 3:45 PM and 4:45 PM, and the Saturday WE peak hour of traffic occurs between 11:30 AM and 12:30 PM. The turning movement count data is included in Appendix A.

3.3 Existing Traffic Conditions Observations and Analysis

3.3.1 Regional Analysis

Honoapiilani Highway generally operates as a two (2) lane highway from Napilihau Street to Lower Honoapiilani Road and continues south as a four (4) lane highway from Lower Honoapiilani Road to beyond Keawe Street. As discussed in Section 3.3.2 below, various intersections along the highway operate with either fixed coordinated signal timing plans or uncoordinated plans with lengthy through volume green times. As a result, numerous mainline left-turn movements and minor street approaches at various study intersections operate at LOS E/F conditions due to lengthy delays from the signal timing plans that favor the through movements along Honoapiilani Highway. All vehicular movements at each study intersection operate adequately with under-capacity conditions. Signal coordination is currently provided along Honoapiilani Highway between Leialii Parkway to Keawe Street.

3.3.2 Existing Intersection Analysis

The observations and analysis described below are based on prevailing observations during the time at which the data was collected. Hereinafter, observations that are expressed as ongoing and current shall represent the conditions that prevailed at the time at which the data was collected. All movements at the study intersection generally operated adequately at LOS D or better and under-capacity conditions.

<u>[1] Honoapiilani Highway/Napilihau Street</u>

This intersection operated at overall LOS B during all peak hours of traffic. However, the southbound left-turn movement experienced LOS E/F during all peak hours due to low left-turn turning volumes (≤ 10 vehicles) and long cycle length.

[2] Honoapiilani Highway/Hoohui Road

This intersection operated at overall LOS B during all peak hours of traffic with all movements operating at LOS B or better.

[3] Honoapiilani Highway/Akahele Street

This intersection operated at overall LOS B during all peak hours of traffic. However, various left-turn movements operated at LOS E/F during all peak hours of traffic due to low left-turn turning volumes (≤ 10 vehicles) and long cycle length.

[4] Honoapiilani Highway/Lower Honoapiilani Road

This intersection operated at overall LOS B during all peak hours of traffic. However, the southbound left-turn movement experienced LOS E during the PM peak hour due to a low left-turn turning volume (1 vehicle) and long cycle length. Observations indicate the northbound left-turn movement would occasionally queue beyond its storage length. However, due to a long northbound left-turn signal phase, most vehicles would clear within a single signal cycle.

[5] Honoapiilani Highway/Kai Malina Parkway/Halawai Drive

This intersection operated at overall LOS A during all peak hours of traffic. However, the southbound left-turn movement experienced LOS E during the PM peak hour due to a low left-turn turning volume (8 vehicles) and long cycle length.

[6] Honoapiilani Highway/Puukolii Road/Kai Ala Drive

This intersection operated at overall LOS B during all peak hours of traffic. However, various major street left-turn movements and minor street approaches operated at LOS E/F during the AM and PM peak hours due to fixed signal cycle lengths from the weekday signal coordination.

[7] Honoapiilani Highway/Kaanapali Parkway/Halelo Street

This intersection operated at overall LOS D or better during all peak hours of traffic. All mainline through movements operated at LOS D or better at under-capacity conditions. Numerous major street left-turn movements and minor street approaches operate at LOS E/F conditions during the PM peak hour due to lengthy delays as a result of the through movement green time that can provide over 200 seconds per cycle. However, observations indicated that the through signal phase would often gap out prior to reaching its maximum through movement timing.

[8-10] Honoapiilani Highway from Leialii Parkway to Kapunakea Street

All intersections along this stretch are coordinated during all peak hours of traffic and operated at overall LOS B or better. Various major street left-turn movements and minor street approaches operated at LOS E/F during all peak hours due to fixed signal cycle lengths from the signal coordination timing plans.

[11] Honoapiilani Highway/Keawe Street/Lahaina Cannery Mall

This intersection is also coordinated with the above three (3) intersections and operated at overall LOS D or better during all peak hours of traffic. However, the northbound left-turn movement experienced LOS F during the AM peak hour due to low left-turn turning volumes (22 vehicles) and long cycle length. Various minor and turning movements were observed to operate adequately at LOS E during all peak hours. This intersection currently serves as the northern terminus connection to Honoapiilani Highway to/from the Lahaina Bypass Road and therefore experiences heavy through and turning volumes.

Figure 3.1 illustrates the existing lane configurations, volumes and LOS. See Table 3.1 for a summary of the existing conditions analysis.

LEGEND

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

X(X)[X] – AM(PM)[WE] LOS

Y X/X/X – SIGNALIZED INTERSECTION Y, OVERALL AM/PM/WE LOS

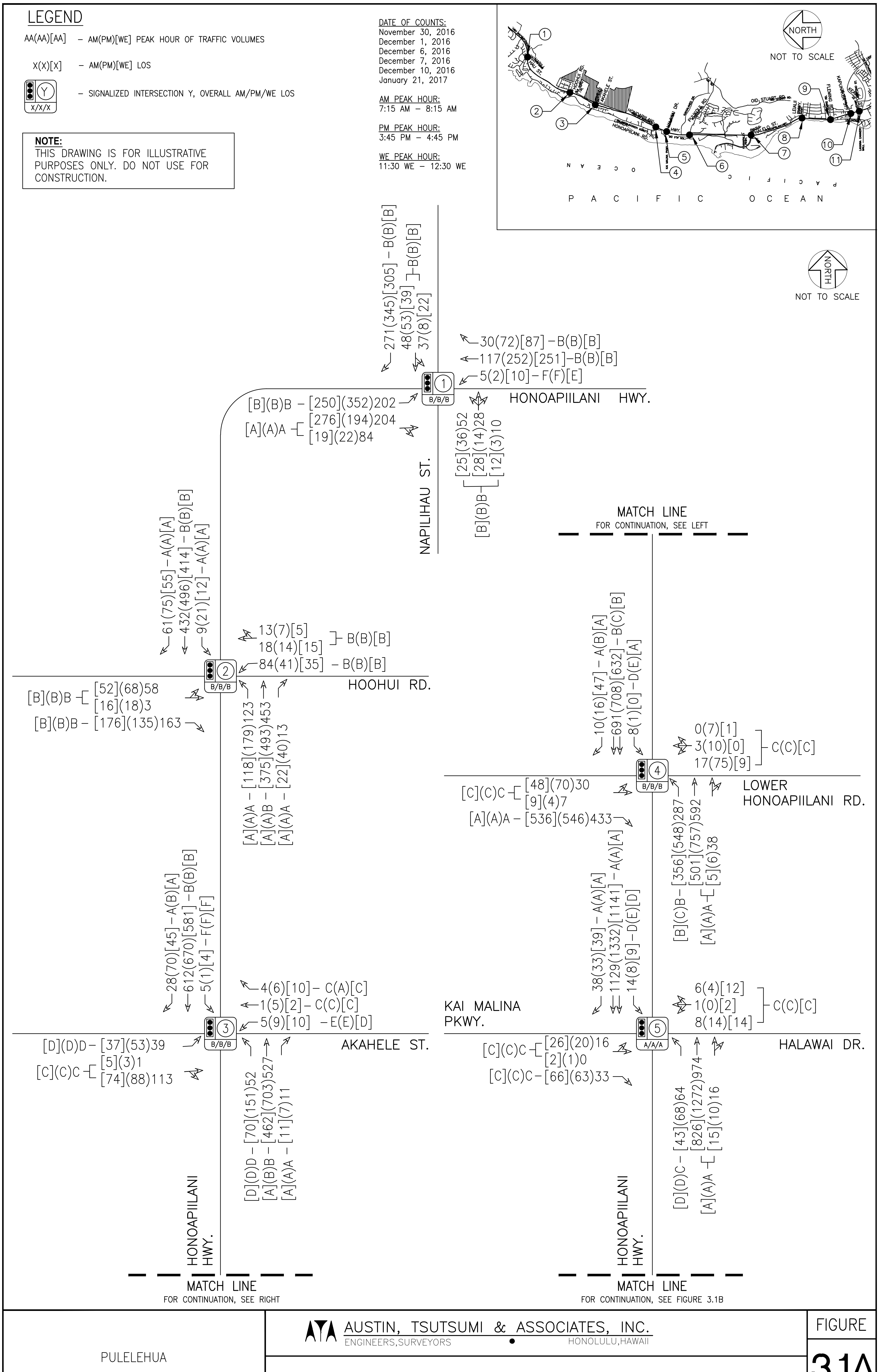
NOTE: THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. DO NOT USE FOR CONSTRUCTION.

DATE OF COUNTS:
November 30, 2016
December 1, 2016
December 6, 2016
December 7, 2016
December 10, 2016
January 21, 2017

AM PEAK HOUR:
7:15 AM – 8:15 AM

PM PEAK HOUR:
3:45 PM – 4:45 PM

WE PEAK HOUR:
11:30 WE – 12:30 WE



PULELEHUA

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ENGINEERS, SURVEYORS • HONOLULU, HAWAII

EXISTING LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 3.1A

LEGEND

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

X(X)[X] – AM(PM)[WE] LOS

Y X/X/X – SIGNALIZED INTERSECTION Y, OVERALL AM/PM/WE LOS

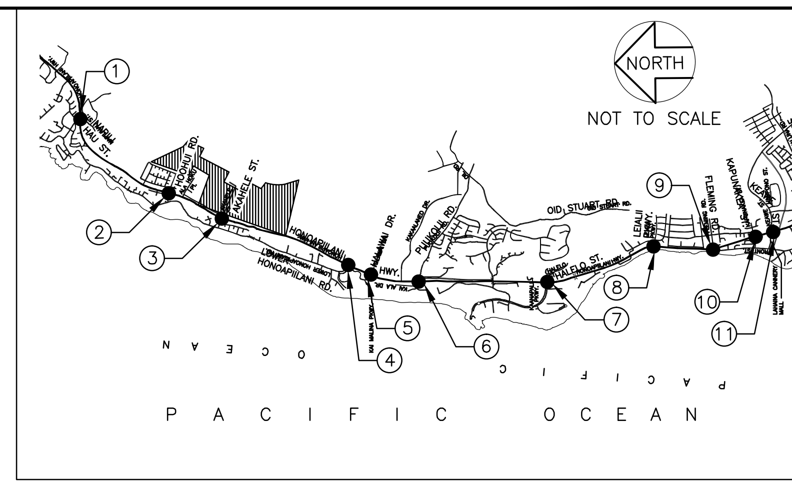
NOTE:
THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. DO NOT USE FOR CONSTRUCTION.

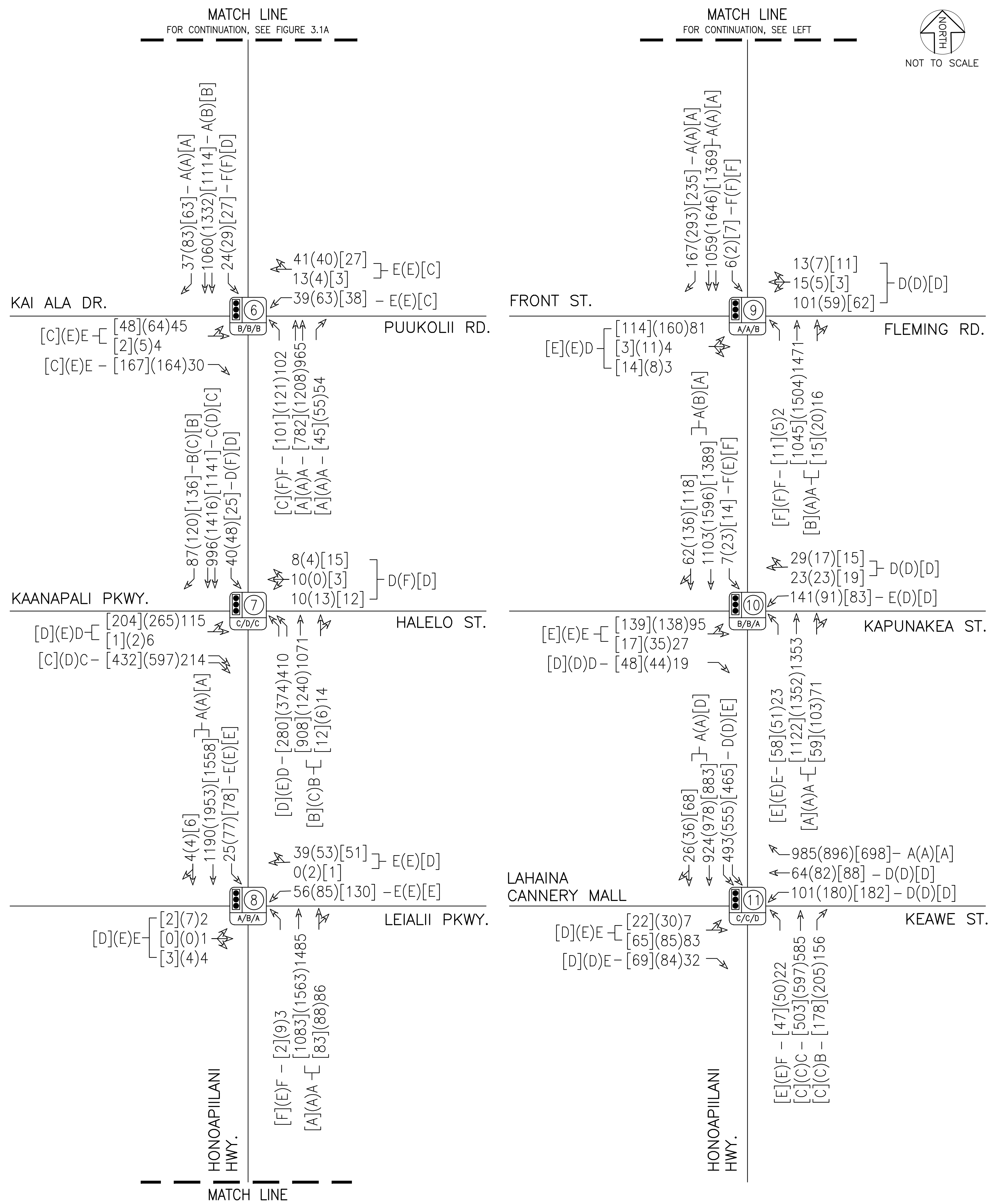
DATE OF COUNTS:
November 30, 2016
December 1, 2016
December 6, 2016
December 7, 2016
December 10, 2016
January 21, 2017

AM PEAK HOUR:
7:15 AM – 8:15 AM

PM PEAK HOUR:
3:45 PM – 4:45 PM

WE PEAK HOUR:
11:30 WE – 12:30 WE





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EXISTING LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 3.1B

Table 3.1: Existing Conditions Level of Service Summary

	Existing Conditions								
	AM			PM			WE		
Intersection	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Honoapiilani Highway & Napilihau Street									
NB LT	18.5	0.74	B	18.2	0.80	B	18.3	0.75	B
NB TH/RT	8.1	0.39	A	6.0	0.24	A	7.4	0.37	A
EB LT/TH	14.9	0.23	B	18.3	0.20	B	16.2	0.19	B
EB RT	14.5	0.16	B	18.0	0.13	B	16.0	0.15	B
WB LT/TH/RT	15.4	0.28	B	18.5	0.19	B	16.2	0.19	B
SB LT	96.2	0.69	F	94.1	0.50	F	66.5	0.72	E
SB TH	11.5	0.26	B	16.6	0.57	B	14.2	0.53	B
SB RT	10.3	0.02	B	12.5	0.05	B	10.9	0.07	B
Overall	13.5	-	B	15.2	-	B	13.9	-	B
2: Honoapiilani Highway & Hoohui Road									
NB LT	8.8	0.30	A	8.0	0.40	A	8.0	0.28	A
NB TH	10.4	0.61	B	8.6	0.59	A	8.8	0.52	A
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
EB LT/TH	15.4	0.16	B	17.8	0.28	B	14.5	0.19	B
EB RT	14.6	0.07	B	16.5	0.06	B	14.0	0.09	B
WB LT	17.5	0.25	B	19.4	0.17	B	15.6	0.11	B
WB TH/RT	14.5	0.06	B	16.6	0.07	B	13.9	0.06	B
SB LT	9.6	0.03	A	7.8	0.05	A	8.0	0.03	A
SB TH	14.1	0.72	B	12.3	0.73	B	11.9	0.69	B
SB RT	9.6	0.05	A	7.9	0.05	A	8.2	0.04	A
Overall	12.4	-	B	10.9	-	B	10.6	-	B
3: Honoapiilani Highway & Akahele Street									
NB LT	41.9	0.79	D	36.4	0.78	D	35.3	0.77	D
NB TH	10.8	0.64	B	11.6	0.71	B	9.9	0.56	A
NB RT	7.0	0.01	A	6.4	0.01	A	6.9	0.01	A
EB LT	36.7	0.67	D	49.0	0.78	D	35.7	0.66	D
EB TH/RT	20.3	0.07	C	26.9	0.05	C	20.3	0.05	C
WB LT	63.8	0.52	E	59.0	0.56	E	45.8	0.55	D
WB TH	21.3	0.01	C	28.8	0.03	C	21.1	0.01	C
WB RT	21.3	0.01	C	28.8	0.01	C	21.1	0.01	C
SB LT	105.2	0.70	F	113.6	0.40	F	116.6	0.69	F
SB TH	14.2	0.80	B	19.4	0.85	B	14.3	0.79	B
SB RT	8.1	0.02	A	10.6	0.05	B	8.4	0.03	A
Overall	15.1	-	B	18.7	-	B	15.0	-	B
4: Honoapiilani Highway & Lower Honoapiilani Road									
NB LT	19.3	0.80	B	24.4	0.91	C	18.5	0.83	B
NB TH/RT	4.8	0.31	A	4.4	0.32	A	2.6	0.21	A
EB LT/TH	21.1	0.15	C	32.1	0.31	C	22.3	0.24	C
EB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
WB LT/TH/RT	20.7	0.07	C	32.9	0.39	C	21.2	0.04	C
SB LT	48.1	0.72	D	73.5	0.41	E	0.0	0.00	A
SB TH	11.7	0.53	B	21.6	0.64	C	12.9	0.53	B
SB RT	8.7	0.00	A	16.0	0.01	B	9.9	0.03	A
Overall	10.9	-	B	17.1	-	B	11.2	-	B
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive									
NB LT	29.6	0.79	C	38.3	0.78	D	36.2	0.82	D
NB TH/RT	4.3	0.44	A	6.5	0.56	A	4.9	0.39	A
EB LT/TH	23.4	0.08	C	28.3	0.08	C	22.7	0.11	C
EB RT	23.6	0.02	C	28.3	0.01	C	22.7	0.01	C
WB LT/TH/RT	23.9	0.06	C	28.7	0.06	C	22.7	0.07	C
SB LT	43.2	0.75	D	62.1	0.74	E	50.1	0.73	D
SB TH	5.4	0.54	A	8.4	0.64	A	6.3	0.56	A
SB RT	3.4	0.03	A	4.7	0.02	A	3.9	0.03	A
Overall	6.0	-	A	8.7	-	A	6.9	-	A
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road									
NB LT	84.3	0.84	F	85.8	0.86	F	33.7	0.77	C
NB TH	5.0	0.37	A	7.6	0.48	A	8.0	0.41	A
NB RT	3.4	0.04	A	4.7	0.04	A	6.0	0.03	A
EB LT/TH	69.2	0.33	E	68.3	0.34	E	24.4	0.15	C
EB RT	64.6	0.01	E	64.2	0.02	E	24.0	0.07	C
WB LT	75.0	0.38	E	77.8	0.49	E	26.6	0.14	C
WB TH/RT	65.4	0.10	E	64.2	0.02	E	23.7	0.02	C
SB LT	82.5	0.67	F	90.7	0.77	F	35.2	0.52	D
SB TH	8.2	0.44	A	13.2	0.58	B	12.0	0.64	B
SB RT	5.3	0.02	A	7.6	0.06	A	7.6	0.04	A
Overall	13.6	-	B	17.2	-	B	12.4	-	B

Table 3.1: Existing Conditions Level of Service Summary Cont'd

Intersection	Existing Conditions								
	AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street									
NB LT	35.6	0.72	D	74.9	0.82	E	42.0	0.67	D
NB TH/RT	16.0	0.62	B	21.9	0.61	C	15.4	0.51	B
EB LT/TH	37.8	0.57	D	70.4	0.82	E	39.3	0.69	D
EB RT	23.0	0.10	C	46.9	0.49	D	26.8	0.30	C
WB LT/TH/RT	38.8	0.16	D	81.3	0.18	F	46.3	0.22	D
SB LT	40.0	0.31	D	83.9	0.57	F	44.2	0.22	D
SB TH	22.6	0.72	C	37.1	0.83	D	22.0	0.73	C
SB RT	15.6	0.07	B	21.6	0.11	C	14.9	0.14	B
Overall	22.9	-	C	39.6	-	D	23.5	-	C
8: Honoapiilani Highway & Leialii Parkway									
NB LT	81.0	0.43	F	71.0	0.48	E	83.2	0.42	F
NB TH/RT	7.1	0.59	A	9.1	0.64	A	1.9	0.48	A
EB LT/TH/RT	58.7	0.02	E	57.2	0.05	E	50.4	0.01	D
WB LT	62.2	0.35	E	62.8	0.53	E	58.4	0.62	E
WB TH/RT	58.9	0.01	E	57.1	0.04	E	50.7	0.03	D
SB LT	67.8	0.42	E	66.4	0.76	E	69.4	0.76	E
SB TH/RT	4.3	0.43	A	8.6	0.72	A	7.6	0.60	A
Overall	7.7	-	A	11.5	-	B	9.4	-	A
9: Honoapiilani Highway & Front Street/Flemming Road									
NB LT	121.8	0.70	F	101.1	0.74	F	94.7	0.83	F
NB TH/RT	6.1	0.56	A	1.4	0.60	A	12.9	0.40	B
EB LT/TH/RT	52.3	0.43	D	59.0	0.70	E	58.8	0.62	E
WB LT/TH/RT	54.4	0.60	D	51.5	0.25	D	54.5	0.33	D
SB LT	93.2	0.76	F	118.5	0.70	F	92.6	0.78	F
SB TH	4.3	0.41	A	8.7	0.66	A	5.6	0.53	A
SB RT	3.0	0.10	A	4.9	0.20	A	3.5	0.15	A
Overall	9.1	-	A	8.9	-	A	12.5	-	B
10: Honoapiilani Highway & Kapunakea Street									
NB LT	68.9	0.80	E	62.6	0.78	E	66.4	0.79	E
NB TH/RT	0.2	0.60	A	0.2	0.64	A	0.7	0.51	A
EB LT/TH	51.1	0.41	D	51.3	0.55	D	49.0	0.51	D
EB RT	44.9	0.01	D	41.8	0.02	D	41.2	0.02	D
WB LT	77.5	0.76	E	67.2	0.60	E	60.3	0.51	E
WB TH/RT	45.7	0.08	D	42.3	0.07	D	41.7	0.06	D
SB LT	104.0	0.78	F	77.1	0.80	E	90.3	0.85	F
SB TH/RT	11.2	0.50	B	20.1	0.79	C	6.7	0.69	A
Overall	11.7	-	B	16.1	-	B	9.9	-	A
11: Honoapiilani Highway & Keawe Street									
NB LT	81.8	0.80	F	70.0	0.77	E	67.5	0.77	E
NB TH	24.8	0.63	C	33.5	0.73	C	29.5	0.63	C
NB RT	16.0	0.12	B	21.2	0.19	C	20.8	0.16	C
EB LT/TH	61.4	0.46	E	56.2	0.49	E	51.6	0.35	D
EB RT	56.8	0.02	E	51.5	0.06	D	48.5	0.02	D
WB LT	50.7	0.44	D	51.4	0.67	D	41.9	0.54	D
WB TH	46.4	0.18	D	40.1	0.19	D	36.0	0.19	D
WB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
SB LT	52.1	0.91	D	49.2	0.92	D	61.5	0.86	E
SB TH/RT	0.8	0.41	A	0.9	0.49	A	35.6	0.48	D
Overall	24.2	-	C	27.1	-	C	40.3	-	D

* Denotes overcapacity condition, v/c ≥ 1.

4. BASE YEAR TRAFFIC CONDITIONS

The Base Years 2022, 2025, 2030 and 2035 were selected to reflect the completion years of Scenarios 1, 2, 3 and 4 of the Project, respectively. The Base Year scenarios represent the traffic conditions within the study area without the Project. Base Year traffic projections were formulated by applying a defacto growth rate to the existing 2016 traffic count volumes and adding trips generated by known future developments in the vicinity of the Project.

4.1 Defacto Growth Rate

Projections for Base Year traffic were based upon a correlation between the existing traffic counts collected by ATA, HDOT's Maui Regional Travel Demand Model (MRTDM) growth for forecast years between 2007 and 2035, and nearby developments in the immediate vicinity of the Project. Many of the known background developments that were added separately to the study network are included in the MRTDM. Therefore, an overall annual growth rate of 0.5% was applied along Honoapiilani Highway for Base Years 2022, 2025, 2030 and 2035.

4.2 Traffic Forecasts for Known Developments

4.2.1 Background Projects

By Year 2022, numerous developments are anticipated to be completed within the Project study area. Many of the following known developments were determined to be accounted for in the MRTDM. The known developments that are projected to be complete by Year 2022 and generate traffic within the Project study area are illustrated in Figure 4.1 and listed below based on the best information available:

1. Kahoma Village – This project is located south of the Lahaina Cannery Mall on 22 acres of land. The project proposes to develop 101 single-family homes and 102 multi-family homes. Construction of the project began in late 2016 with a portion completed and occupied in 2018. Full build out of the project is expected by 2022.
2. Kahoma Residential Subdivision – This project is located east of the proposed Kahoma Village and south of the Kahoma Stream Flood Control Channel. The project proposes to develop 68 single-family lots and a neighborhood park. 22 of the lots are being developed as affordable housing by Habitat for Humanity and Na Hale O Maui. There is currently no expected completion date for this project, however, it was assumed to be completed by 2022.
3. Lanikeha Kaanapali – This project is located east of Honoapiiliani Highway and across from Kaanapali Parkway. The project consists of 132 lots in a gated community, with Honoapiilani Highway access provided via Kekaa Drive and Kualapa Loop. At the time of this report, several lots are under construction with additional lots still available for purchase. Completion and occupancy of the project is conservatively assumed to occur by 2022.
4. Kaiaulu Affordable Homes – This project is located east of Honoapiilani Highway in the Kaanapali region. The project proposes to develop 33 affordable single-family homes with Honoapiilani Highway access provided via Kekaa Drive and Kualapa Loop. Completion of the project is expected in 2019.
5. Westin Nanea Ocean Villas – This project is located west of Honoapiilani Highway at the Honoapiilani Highway/Halawai Drive/Kai Malina Parkway intersection. The

project proposes to develop a 390-villa timeshare resort. The project was completed in 2017.

6. Wailele Ridge – Previously known as West Maui Village, this project is located south of Honoapiilani Highway just east of Maui Preparatory Academy. The project proposes to develop 158 single-family units in 25 buildings. Construction of the project is ongoing with completion expected by 2022.
7. West Maui Hospital and Medical Center – This project is located east of Honoapiilani Highway in the Kaanapali region. The project proposes to develop a critical access hospital, a skilled nursing facility, an assisted living facility, medical office buildings and a rehabilitation facility. At the time of this report, the project is currently on hold. However, it was conservatively assumed that the project would be completed by 2022 for the purposes of this report.
8. Honua Kai – This project is located west of Honoapiilani Highway in the Kaanapali region. The project's remaining component includes 72 luxury townhouses and is expected to be completed in 2020.

Forecasts for Base Year 2025, 2030 and 2035 include all background developments assumed to be completed by Year 2022. In addition, the following known development is projected to be complete by Years 2030 and 2035 and generate traffic within the Project study area. The development is illustrated in Figure 4.1 and described below based on best available information:

1. Kaanapali Golf Course Redevelopment – This project is located both mauka and makai of Honoapiilani Highway in the vicinity of the Honoapiilani Highway/Kaanapali Parkway/Halelo Street and Honoapiilani Highway/Kekaa Drive intersections. We understand the project proposes to redevelop the existing Kaanapali Golf Course to potentially provide a 136-room boutique hotel, 102 residential condos and an 80,000 square-foot shopping center. Completion is assumed to occur by Year 2030.

It is our understanding that the Department of Hawaiian Homelands (DHHL) owns approximately 850 acres of land on either side of the Honokowai Gulch just south of the Project. The land will ultimately support a master-planned DHHL community. Because anticipated land use breakdown and timeline for completion of the development have not yet been determined, the project was not included in this TIAR.

4.2.2 Trip Generation

The Institute of Transportation Engineers (ITE) publishes a book based on empirical data compiled from a body of more than 4,250 trip generation studies submitted by public agencies, developers, consulting firms, and associations. This publication, titled Trip Generation Manual, 10th Edition, provides trip rates and/or formulae based on graphs that correlate vehicular trips with independent variables. The independent variables can range from Dwelling Units (DU) for single-family attached homes to Gross Floor Area (GFA) for commercial or office development. These trip rates/formulae and their associated directional distributions were used to estimate the increase in the number of vehicular trips generated by the proposed Project. The rates selected were based on the land use description.

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

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BACKGROUND PROJECTS

FIGURE 4.1

Table 4.1: Background Projects Trip Generation Rates

Land Use (ITE Code)	Independent Variable	AM Peak Hour		PM Peak Hour		WE Peak Hour	
		Trip Rate	% Enter	Trip Rate	% Enter	Trip Rate	% Enter
Single-Family Detached Housing (210)	Dwelling Units (DU)	[a]	26%	[b]	64%	[c]	54%
Residential Condo/Townhouse (230)	Dwelling Units (DU)	[d]	17%	[e]	67%	[f]	54%
Luxury Condominium/Townhouse (233)	Dwelling Units (DU)	[g]	23%	[h]	63%	[h]	63%
Assisted Living (254)	Beds	0.18	68%	0.29	50%	0.36	51%
Resort Hotel (330)	Rooms	[i]	72%	0.42	43%	0.42	43%
Hospital (610)	Beds	1.32	72%	1.42	33%	1.00	47%
Nursing Home (620)	Beds	0.17	69%	0.22	33%	0.38	50%
Medical-Dental Office Building (720)	1000 SF GFA	2.39	79%	[j]	28%	3.63	57%
Shopping Center (820)	1000 SF GFA	[k]	62%	[l]	48%	[m]	52%

[a] T=0.70(X)+9.74
[b] LN(T)=0.90LN(X)+0.51
[c] T=0.89(X)+8.77
[d] LN(T)=0.80*LN(X)+0.26
[e] LN(T)=0.82*LN(X)+0.32

[f] T=0.29*X+42.63
[g] LN(T)=0.76LN(X)+0.54
[h] T=0.78(X)-25.38
[i] T=0.40(X)-40.79

[j] LN(T)=0.90LN(X)+1.53
[k] LN(T)=0.61LN(X)+2.24
[l] LN(T)=0.67LN(X)+3.31
[m] LN(T)=0.65LN(X)+3.78

Table 4.2: Background Projects Trip Generation

Land Use	Independent Variable	AM Peak Hour			PM Peak Hour			WE Peak Hour		
		Enter (vph)	Exit (vph)	Total (vph)	Enter (vph)	Exit (vph)	Total (vph)	Enter (vph)	Exit (vph)	Total (vph)
Kahoma Village	203 SF/MF DU	30	103	133	110	59	169	92	80	172
Kahoma Residential Subdivision	68 SF DU	15	43	58	48	27	75	38	32	70
Lanikeha Kaanapali	132 SF DU	27	76	103	90	49	135	69	58	127
Kai A Ulu Affordable Homes	33 SF DU	9	24	33	25	14	39	21	18	39
Westin Nanea Ocean Villas	390 Room Hotel	84	32	116	71	93	164	71	93	164
West Maui Village	158 SF DU	13	62	75	59	29	88	48	41	89
Honua Kai Townhouses	72 DU	10	35	45	20	11	31	20	11	31
West Maui Hospital and Medical Center	80 Bed Assisted Living Facility 25 Bed Hospital 60,000 Sq. Ft. Medical Office Bldg.	153	47	200	79	174	253	160	129	289
Kaanapali Golf Course Redevelopment [1]	102 Room Hotel 136 SF/MF DU 80,000 Sq. Ft. Retail	57	69	125	132	129	261	189	170	358
Total Background External Trips		**398**	**491**	**888**	**634**	**585**	**1215**	**708**	**632**	**1339**

Notes
- SF DU = Single-Family Dwelling Unit
- MF DU = Multi-Family Dwelling Unit
- Forecast trips derived from available TIAR's for each Project, ITE Trip Generation and/or updated to reflect current status.
- Table 4.2 shows total external trips generated by known developments in the vicinity of the Project.

1. Includes approximate 18% internal trip reduction consistent with ITE Trip Generation Handbook, 3rd Edition. Also includes 20% pass-by trip reductions to retail component. Trip reductions applied to only weekday PM and weekend trips.

4.3 Planned Roadway Improvements

The following roadway improvements are anticipated to be constructed to support various developments and overall growth of the Lahaina region.

Lahaina Bypass Road

The Lahaina Bypass Road (LBR) is a major bypass road that is expected to be completed in 4 phases to address regional traffic congestion near the historic town of Lahaina. The first two phases (1A and 1B-1) were completed in 2013 and constructed the bypass from Keawe Street to Hokiokio Place. Phase 1B-2 was completed in 2018 and extends the LBR from Hokiokio Place to its southern terminus with Honoapiilani Highway. Future Phases 1C and 1D will extend the bypass highway further north and result in the bypass highway stretching from Olowalu to just south of the existing Kapalua Airport. Allocation of State funds for construction of Phase 1C to extend the LBR to Kaanapali is currently under discussion. However, as funding has not been secured, future phases of the LBR were not included in this report.

Honoapiilani Highway/Napilihau Street

An exclusive right-turn lane on the northbound Honoapiilani Highway approach and an exclusive left-turn lane and shared through/right-turn lane on the westbound Napilihau Street approach is anticipated to be constructed as part of Wailele Ridge roadway improvements. These changes are expected to mitigate potential traffic problems from the proposed development. Completion of the roadway improvements is expected to occur by 2022 with completion of the development.

4.4 Base Year 2022 Analysis

It is anticipated that by Base Year 2022, traffic will have increased over existing conditions due to the development in the Lahaina and Kaanapali regions. Actual growth within the study region may vary based upon the actual construction of the various nearby developments.

4.4.1 Base Year 2022 Intersection Analysis

By Base Year 2022 without the Project, traffic at the study intersections along Honoapiilani Highway is estimated to increase overall by approximately 10-20% on various parts of the corridor during the AM, PM and WE peak hours of traffic. All study intersections are forecast to operate similar to existing conditions. Overall intersection delays generally increased by only 1-5 seconds at most study intersections. The majority of intersection movements currently operating at LOS E/F conditions will continue to operate similarly in Base Year 2022. The following intersections are expected to worsen compared to existing conditions:

[7] Honoapiilani Highway/Kaanapali Parkway/Halelo Street

During the PM peak hour, the eastbound shared left-turn/through movement is expected to operate at LOS F and overcapacity. Mitigation is proposed in Section 4.4.2.

[8-11] Honoapiilani Highway from Leialii Parkway to Keawe Street

Since the Honoapiilani Highway/Keawe Street intersection will be widened to provide dual southbound left-turn lanes, it was assumed that some of the signal timing plans for intersections along the coordinated corridor from Leialii Parkway to Keawe Street would be reoptimized to make signals run more efficient and improve throughput progression.

Figure 4.2 illustrates the Base Year 2022 forecast traffic volumes and LOS for the study intersection movements. Table 4.3 summarizes the Base Year 2022 LOS at the study intersections compared to existing conditions. LOS worksheets are provided in Appendix C.

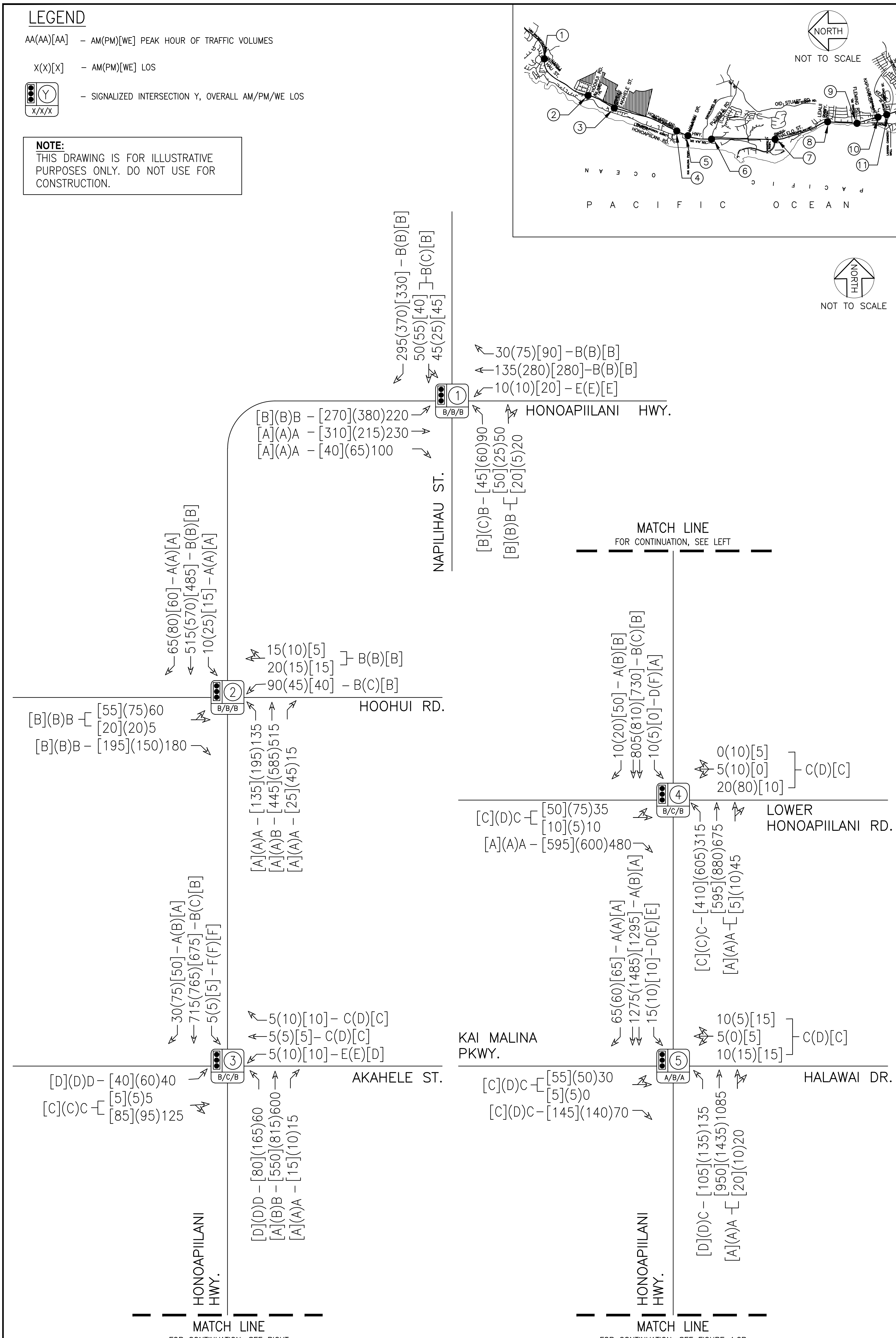
4.4.2 Base Year 2022 With Mitigation Intersection Analysis

[7] Honoapiilani Highway/Kaanapali Parkway/Halelo Street

- Modify the eastbound approach to incorporate a dedicated left-turn lane, a shared left-turn/through lane and two (2) dedicated right-turn lanes.

With the recommended mitigation, the intersection is anticipated to improve and operate adequately at overall LOS D or better during all peak hours of traffic. Similar to existing conditions, numerous minor street approaches and major street left-turn movements will continue operating at LOS E/F during the PM peak hour due to the long through movement green time and cycle length.

Figure 4.3 illustrates the Base Year 2022 with mitigation forecast traffic volumes and LOS for the study intersection movements. Table 4.3 summarizes the Base Year 2022 with mitigation LOS at the study intersections compared to Base Year 2022 without mitigation. LOS worksheets are provided in Appendix C.



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BASE YEAR 2022 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 4.2A

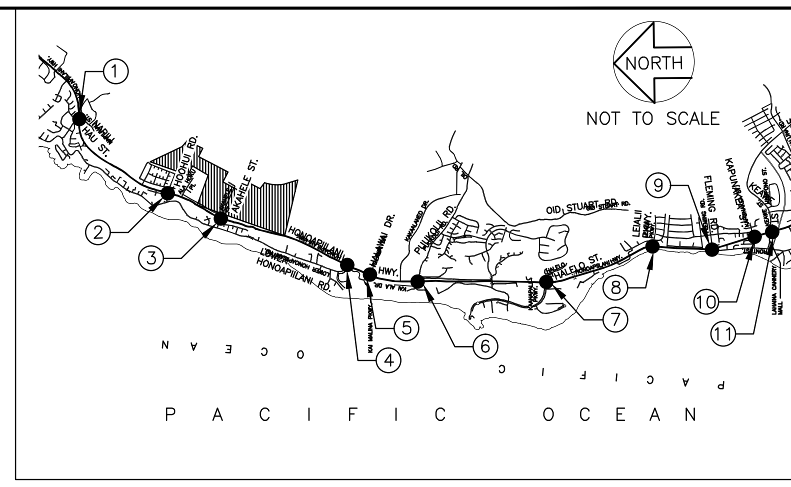
LEGEND

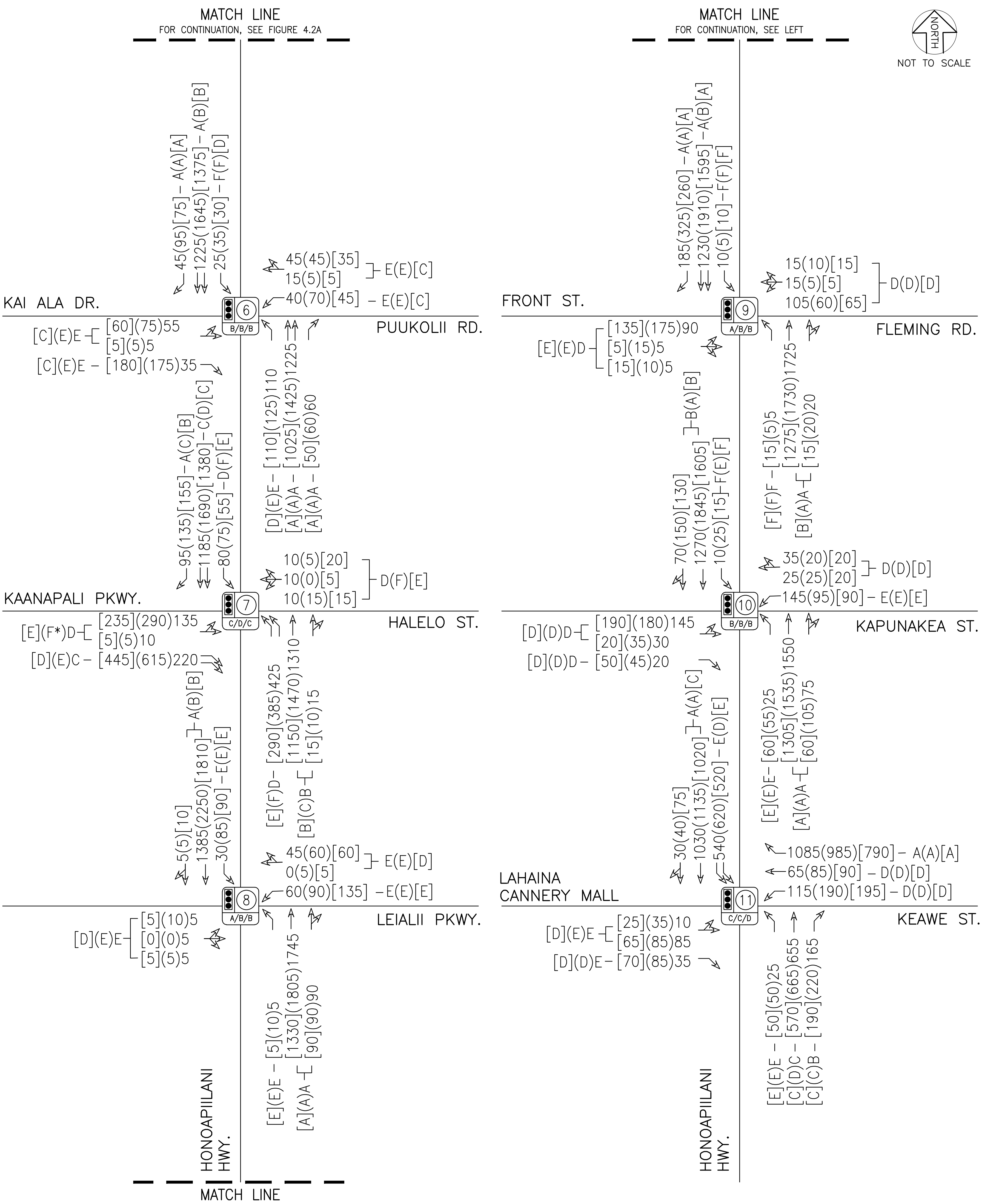
AA(AA)[AA] – AM(PM)[WE] PEAK HOUR OF TRAFFIC VOLUMES

X(X)[X] – AM(PM)[WE] LOS

Y X/X/X – SIGNALIZED INTERSECTION Y, OVERALL AM/PM/WE LOS

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





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ENGINEERS, SURVEYORS • HONOLULU, HAWAII

BASE YEAR 2022 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 4.2B

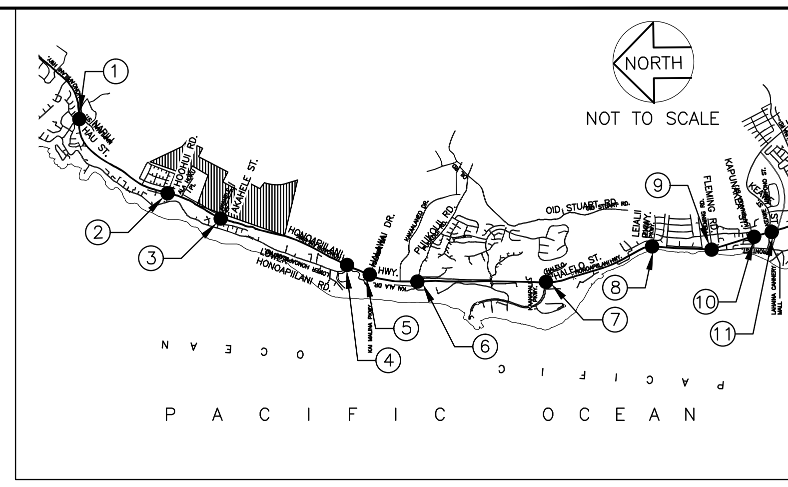
LEGEND

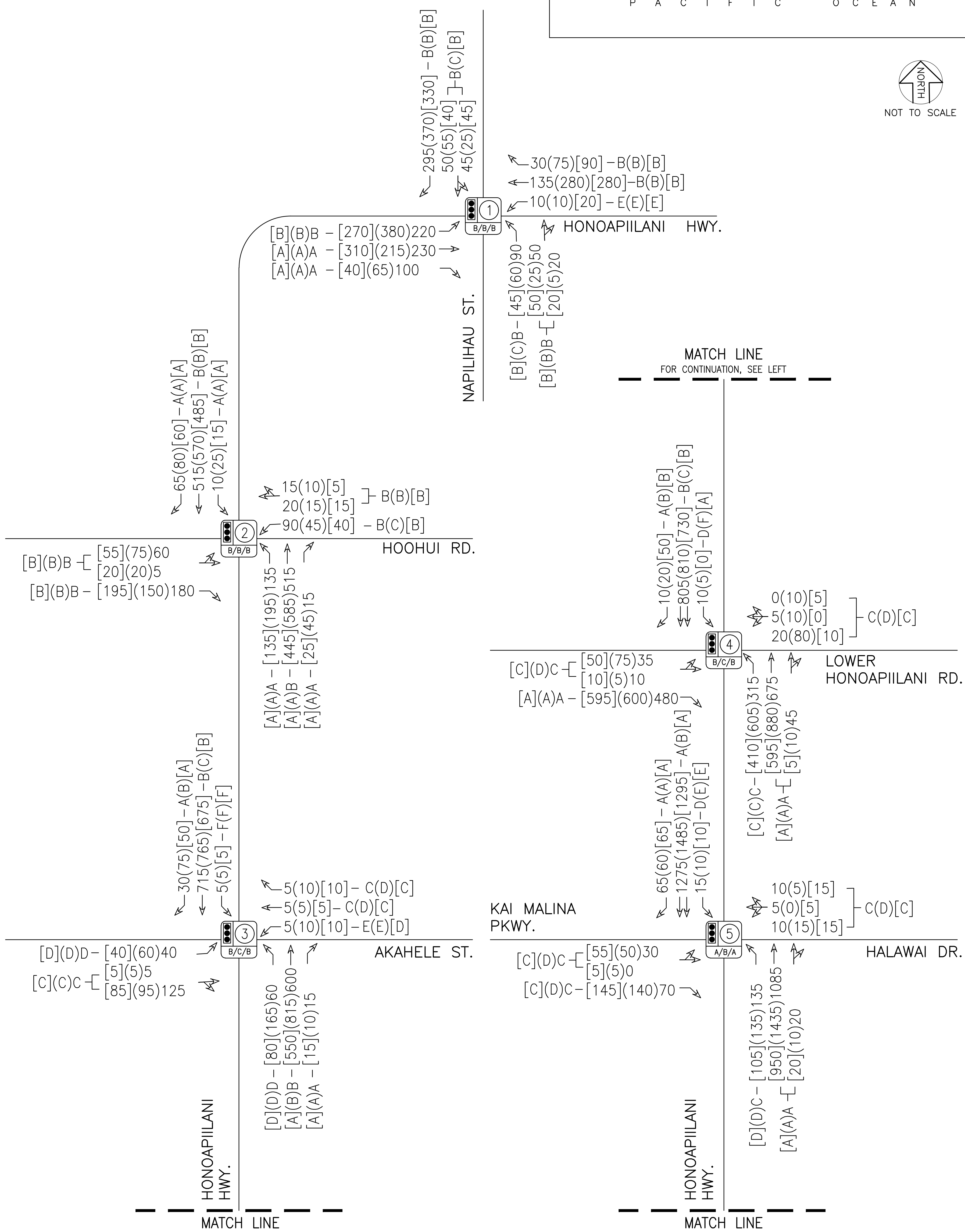
AA(AA)[AA] – AM(PM)[WE] PEAK HOUR OF TRAFFIC VOLUMES

X(X)[X] – AM(PM)[WE] LOS

Y X/X/X – SIGNALIZED INTERSECTION Y, OVERALL AM/PM/WE LOS

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





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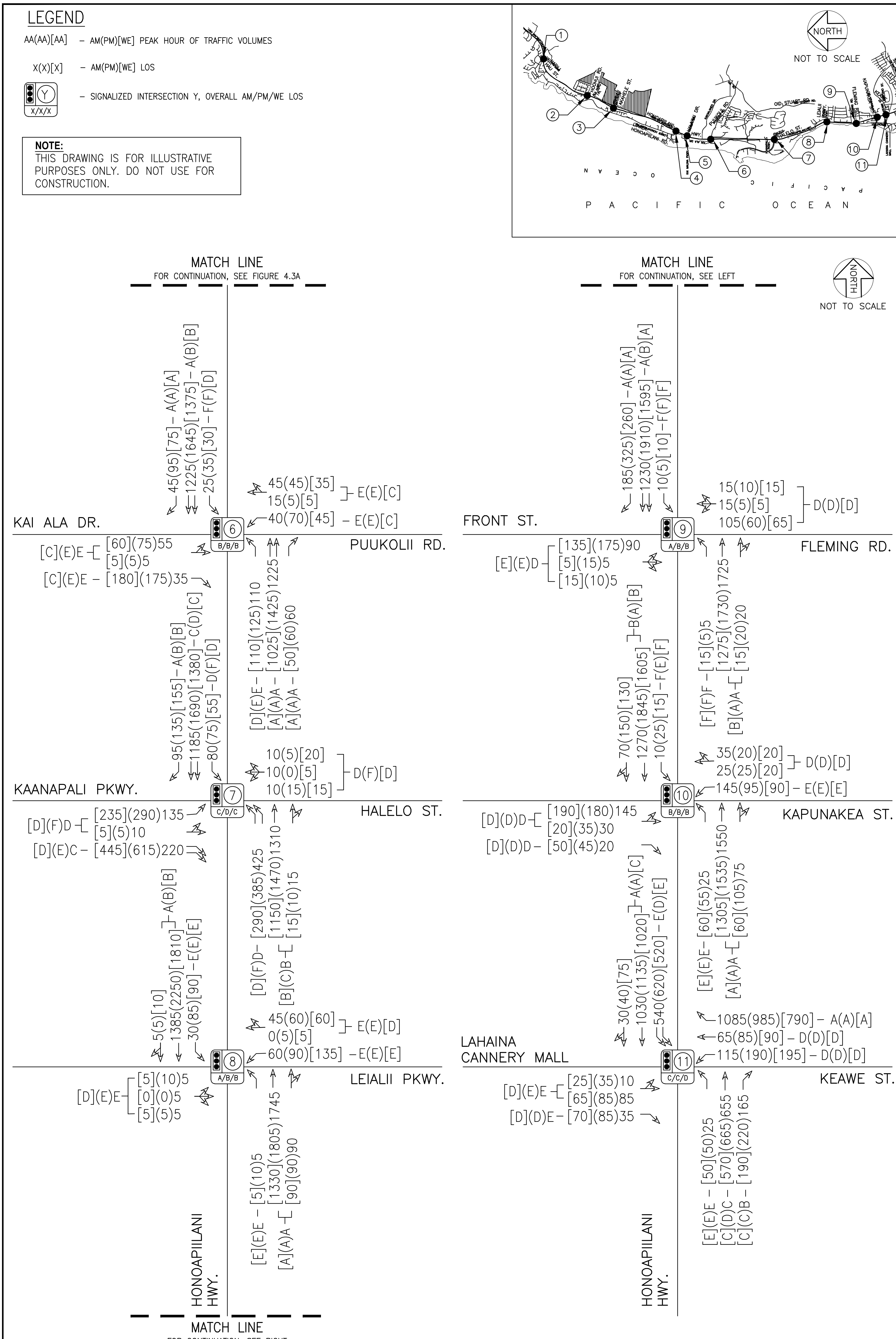
BASE YEAR 2022 WITH MITIGATION LANE CONFIGURATION, VOLUMES AND LOS

FIGURE
4.3A



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ENGINEERS, SURVEYORS • HONOLULU, HAWAII

BASE YEAR 2022 WITH MITIGATION LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 4.3B

Table 4.3: Existing Conditions, Base Year 2022 and Base Year 2022 with Mitigation Level of Service Summary

Intersection	Existing Conditions									Base Year 2022									Base Year 2022 with Mitigation								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Honoapiilani Highway & Napilihau Street																											
NB LT	18.5	0.74	B	18.2	0.80	B	18.3	0.75	B	18.8	0.75	B	19.6	0.82	B	19.4	0.77	B									
NB TH	-	-	-	-	-	-	-	-	-	8.1	0.32	A	6.0	0.23	A	7.6	0.37	A									
NB TH/RT	8.1	0.39	A	6.0	0.24	A	7.4	0.37	A	-	-	-	-	-	-	-	-	-									
NB RT	-	-	-	-	-	-	-	-	-	6.9	0.08	A	5.2	0.05	A	5.9	0.03	A									
EB LT/TH	14.9	0.23	B	18.3	0.20	B	16.2	0.19	B	15.0	0.25	B	20.4	0.28	C	17.8	0.28	B									
EB RT	14.5	0.16	B	18.0	0.13	B	16.0	0.15	B	14.5	0.16	B	19.4	0.13	B	17.2	0.17	B									
WB LT	-	-	-	-	-	-	-	-	-	17.4	0.30	B	22.7	0.27	C	19.4	0.18	B	**Same as Base Year 2022**								
WB TH/RT	-	-	-	-	-	-	-	-	-	14.7	0.22	B	19.4	0.13	B	17.6	0.27	B									
WB LT/TH/RT	15.4	0.28	B	18.5	0.19	B	16.2	0.19	B	-	-	-	-	-	-	-	-	-									
SB LT	96.2	0.69	F	94.1	0.50	F	66.5	0.72	E	66.2	0.72	E	72.3	0.72	E	55.0	0.77	E									
SB TH	11.5	0.26	B	16.6	0.57	B	14.2	0.53	B	12.8	0.31	B	17.8	0.60	B	15.2	0.57	B									
SB RT	10.3	0.02	B	12.5	0.05	B	10.9	0.07	B	11.2	0.02	B	13.1	0.05	B	11.3	0.06	B									
Overall	13.5	-	B	15.2	-	B	13.9	-	B	14.2	-	B	16.6	-	B	15.1	-	B									
2: Honoapiilani Highway & Hoohui Road																											
NB LT	8.8	0.30	A	8.0	0.40	A	8.0	0.28	A	9.7	0.36	A	9.2	0.47	A	8.3	0.33	A									
NB TH	10.4	0.61	B	8.6	0.59	A	8.8	0.52	A	10.7	0.64	B	9.3	0.66	A	8.9	0.57	A									
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A									
EB LT/TH	15.4	0.16	B	17.8	0.28	B	14.5	0.19	B	17.2	0.17	B	19.8	0.31	B	16.2	0.22	B									
EB RT	14.6	0.07	B	16.5	0.06	B	14.0	0.09	B	16.2	0.06	B	18.3	0.07	B	15.6	0.10	B									
WB LT	17.5	0.25	B	19.4	0.17	B	15.6	0.11	B	19.8	0.28	B	21.9	0.20	C	17.6	0.14	B	**Same as Base Year 2022**								
WB TH/RT	14.5	0.06	B	16.6	0.07	B	13.9	0.06	B	16.2	0.07	B	18.3	0.07	B	15.4	0.06	B									
SB LT	9.6	0.03	A	7.8	0.05	A	8.0	0.03	A	9.7	0.03	A	8.1	0.07	A	8.0	0.04	A									
SB TH	14.1	0.72	B	12.3	0.73	B	11.9	0.69	B	15.0	0.77	B	13.2	0.77	B	12.4	0.73	B									
SB RT	9.6	0.05	A	7.9	0.05	A	8.2	0.04	A	9.5	0.05	A	8.0	0.06	A	8.1	0.04	A									
Overall	12.4	-	B	10.9	-	B	10.6	-	B	13.2	-	B	11.8	-	B	11.1	-	B									
3: Honoapiilani Highway & Akahele Street																											
NB LT	41.9	0.79	D	36.4	0.78	D	35.3	0.77	D	42.5	0.77	D	42.4	0.81	D	37.0	0.76	D									
NB TH	10.8	0.64	B	11.6	0.71	B	9.9	0.56	A	10.6	0.64	B	13.0	0.76	B	10.0	0.60	A									
NB RT	7.0	0.01	A	6.4	0.01	A	6.9	0.01	A	6.5	0.01	A	5.9	0.01	A	6.4	0.01	A									
EB LT	36.7	0.67	D	49.0	0.78	D	35.7	0.66	D	43.6	0.71	D	52.6	0.77	D	42.2	0.71	D									
EB TH/RT	20.3	0.07	C	26.9	0.05	C	20.3	0.05	C	23.9	0.08	C	32.6	0.04	C	23.7	0.06	C									
WB LT	63.8	0.52	E	59.0	0.56	E	45.8	0.55	D	69.0	0.53	E	65.2	0.57	E	51.0	0.55	D	**Same as Base Year 2022**								
WB TH	21.3	0.01	C	28.8	0.03	C	21.1	0.01	C	25.2	0.03	C	35.3	0.03	D	24.8	0.03	C									
WB RT	21.3	0.01	C	28.8	0.01	C	21.1	0.01	C	25.1	0.01	C	35.2	0.01	D	24.7	0.01	C									
SB LT	105.2	0.70	F	113.6	0.40	F	116.6	0.69	F	111.0	0.70	F	125.3	0.71	F	109.9	0.70	F									
SB TH	14.2	0.80	B	19.4	0.85	B	14.3	0.79	B	15.3	0.83	B	22.7	0.88	C	15.5	0.83	B									
SB RT	8.1	0.02	A	10.6	0.05	B	8.4	0.03	A	7.8	0.02	A	10.6	0.06	B	8.3	0.03	A									
Overall	15.1	-	B	18.7	-	B	15.0	-	B	15.7	-	B	21.4	-	C	15.8	-	B									
4: Honoapiilani Highway & Lower Honoapiilani Road																											
NB LT	19.3	0.80	B	24.4	0.91	C	18.5	0.83	B	22.3	0.83	C	29.8	0.94	C	21.1	0.86	C									
NB TH/RT	4.8	0.31	A	4.4	0.32	A	2.6	0.21	A	4.7	0.33	A	4.4	0.36	A	2.4	0.24	A									
EB LT/TH	21.1	0.15	C	32.1	0.31	C	22.3	0.24	C	24.9	0.19	C	41.4	0.38	D	26.7	0.28	C									
EB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A									
WB LT/TH/RT	20.7	0.07	C	32.9	0.39	C	21.2	0.04	C	24.3	0.10	C	42.1	0.46	D	25.2	0.05	C	**Same as Base Year 2022**								
SB LT	48.1	0.72	D	73.5	0.41	E	0.0	0.00	A	50.2	0.73	D	86.4	0.72	F	0.0	0.00	A									
SB TH	11.7	0.53	B	21.6	0.64	C	12.9	0.53	B	12.9	0.57	B	27.1	0.70	C	14.7	0.57	B									
SB RT	8.7	0.00	A	16.0	0.01	B	9.9	0.03	A	9.2	0.00	A	19.4	0.01	B	10.9	0.03	B									
Overall	10.9	-	B	17.1	-	B	11.2	-	B	12.0	-	B	20.8	-	C	12.5	-	B									

Table 4.3: Existing Conditions, Base Year 2022 and Base Year 2022 with Mitigation Level of Service Summary Cont'd

	Existing Conditions									**Base Year 2022**									**Base Year 2022 with Mitigation**								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
Intersection	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive																											
NB LT	29.6	0.79	C	38.3	0.78	D	36.2	0.82	D	31.8	0.79	C	43.7	0.82	D	35.3	0.78	D									
NB TH/RT	4.3	0.44	A	6.5	0.56	A	4.9	0.39	A	4.1	0.45	A	7.0	0.59	A	4.9	0.41	A									
EB LT/TH	23.4	0.08	C	28.3	0.08	C	22.7	0.11	C	30.4	0.16	C	36.9	0.22	D	30.1	0.25	C									
EB RT	23.6	0.02	C	28.3	0.01	C	22.7	0.01	C	30.3	0.01	C	36.1	0.03	D	29.4	0.04	C									
WB LT/TH/RT	23.9	0.06	C	28.7	0.06	C	22.7	0.07	C	30.9	0.10	C	38.0	0.08	D	29.4	0.10	C	**Same as Base Year 2022**								
SB LT	43.2	0.75	D	62.1	0.74	E	50.1	0.73	D	53.1	0.78	D	72.5	0.77	E	59.3	0.75	E									
SB TH	5.4	0.54	A	8.4	0.64	A	6.3	0.56	A	7.7	0.61	A	12.4	0.72	B	8.7	0.63	A									
SB RT	3.4	0.03	A	4.7	0.02	A	3.9	0.03	A	4.5	0.04	A	6.4	0.04	A	5.1	0.04	A									
Overall	6.0	-	A	8.7	-	A	6.9	-	A	8.0	-	A	12.0	-	B	9.2	-	A									
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road																											
NB LT	84.3	0.84	F	85.8	0.86	F	33.7	0.77	C	74.1	0.84	E	78.1	0.86	E	39.7	0.78	D									
NB TH	5.0	0.37	A	7.6	0.48	A	8.0	0.41	A	6.2	0.48	A	9.7	0.58	A	8.2	0.49	A									
NB RT	3.4	0.04	A	4.7	0.04	A	6.0	0.03	A	3.8	0.04	A	5.3	0.04	A	5.5	0.03	A									
EB LT/TH	69.2	0.33	E	68.3	0.34	E	24.4	0.15	C	68.7	0.38	E	67.2	0.37	E	31.2	0.22	C									
EB RT	64.6	0.01	E	64.2	0.02	E	24.0	0.07	C	63.3	0.01	E	63.7	0.13	E	30.0	0.05	C	**Same as Base Year 2022**								
WB LT	75.0	0.38	E	77.8	0.49	E	26.6	0.14	C	75.0	0.39	E	78.4	0.54	E	34.5	0.21	C									
WB TH/RT	65.4	0.10	E	64.2	0.02	E	23.7	0.02	C	64.1	0.10	E	62.6	0.03	E	29.8	0.03	C									
SB LT	82.5	0.67	F	90.7	0.77	F	35.2	0.52	D	82.8	0.68	F	89.0	0.77	F	42.3	0.57	D									
SB TH	8.2	0.44	A	13.2	0.58	B	12.0	0.64	B	10.0	0.52	A	17.9	0.73	B	13.5	0.72	B									
SB RT	5.3	0.02	A	7.6	0.06	A	7.6	0.04	A	5.9	0.03	A	8.5	0.07	A	7.4	0.05	A									
Overall	13.6	-	B	17.2	-	B	12.4	-	B	13.8	-	B	19.8	-	B	13.6	-	B									
7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street																											
NB LT	35.6	0.72	D	74.9	0.82	E	42.0	0.67	D	45.4	0.77	D	92.7	0.85	F	59.8	0.74	E	40.5	0.75	D	91.1	0.85	F	49.5	0.71	D
NB TH/RT	16.0	0.62	B	21.9	0.61	C	15.4	0.51	B	18.9	0.70	B	22.8	0.66	C	18.3	0.59	B	16.1	0.68	B	22.1	0.66	C	13.8	0.56	B
EB LT/TH	37.8	0.57	D	70.4	0.82	E	39.3	0.69	D	47.9	0.67	D	191.4	1.15	F*	59.3	0.79	E	44.0	0.45	D	85.3	0.59	F	48.3	0.57	D
EB RT	23.0	0.10	C	46.9	0.49	D	26.8	0.30	C	28.6	0.08	C	66.0	0.58	E	38.0	0.34	D	28.2	0.08	C	63.6	0.51	E	36.2	0.35	D
WB LT/TH/RT	38.8	0.16	D	81.3	0.18	F	46.3	0.22	D	49.8	0.18	D	101.4	0.23	F	65.8	0.35	E	44.5	0.18	D	99.6	0.23	F	54.5	0.31	D
SB LT	40.0	0.31	D	83.9	0.57	F	44.2	0.22	D	51.5	0.59	D	114.3	0.72	F	64.9	0.55	E	46.0	0.56	D	111.6	0.72	F	53.8	0.50	D
SB TH	22.6	0.72	C	37.1	0.83	D	22.0	0.73	C	25.5	0.76	C	42.3	0.88	D	27.4	0.79	C	22.0	0.74	C	41.0	0.88	D	20.9	0.76	C
SB RT	15.6	0.07	B	21.6	0.11	C	14.9	0.14	B	9.6	0.08	A	20.0	0.12	C	16.6	0.15	B	9.8	0.08	A	19.5	0.12	B	12.7	0.14	B
Overall	22.9	-	C	39.6	-	D	23.5	-	C	26.9	-	C	53.2	-	D	30.5	-	C	23.6	-	C	45.1	-	D	24.4	-	C
8: Honoapiilani Highway & Leialii Parkway																											
NB LT	81.0	0.43	F	71.0	0.48	E	83.2	0.42	F	75.7	0.44	E	69.1	0.49	E	72.3	0.44	E									
NB TH/RT	7.1	0.59	A	9.1	0.64	A	1.9	0.48	A	8.7	0.69	A	2.3	0.75	A	2.9	0.60	A									
EB LT/TH/RT	58.7	0.02	E	57.2	0.05	E	50.4	0.01	D	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D									
WB LT	62.2	0.35	E	62.8	0.53	E	58.4	0.62	E	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E	**Same as Base Year 2022**								
WB TH/RT	58.9	0.01	E	57.1	0.04	E	50.7	0.03	D	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D									
SB LT	67.8	0.42	E	66.4	0.76	E	69.4	0.76	E	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E									
SB TH/RT	4.3	0.43	A	8.6	0.72	A	7.6	0.60	A	5.2	0.51	A	13.0	0.83	B	10.1	0.70	B									
Overall	7.7	-	A	11.5	-	B	9.4	-	A	9.0	-	A	10.7	-	B	10.9	-	B									
9: Honoapiilani Highway & Front Street/Flemming Road																											
NB LT	121.8	0.70	F	101.1	0.74	F	94.7	0.83	F	88.9	0.73	F	95.1	0.74	F	87.5	0.84	F									
NB TH/RT	6.1	0.56	A	1.4	0.60	A	12.9	0.40	B	7.5	0.66	A	1.8	0.70	A	16.2	0.50	B									
EB LT/TH/RT	52.3	0.43	D	59.0	0.70	E	58.8	0.62	E	52.7	0.48	D	59.5	0.72	E	57.8	0.66	E									
WB LT/TH/RT	54.4	0.60	D	51.5	0.25	D	54.5	0.33	D	54.3	0.61	D	49.8	0.24	D	52.4	0.32	D	**Same as Base Year 2022**								
SB LT	93.2	0.76	F	118.5	0.70	F	92.6	0.78	F	87.8	0.80	F	87.3	0.74	F	87.5	0.82	F									
SB TH	4.3	0.41	A	8.7	0.66	A	5.6	0.53	A	4.9	0.48	A	11.7	0.79	B	7.7	0.64	A									
SB RT	3.0	0.10	A	4.9	0.20	A	3.5	0.15	A	3.2	0.11	A	5.6	0.24	A	4.3	0.17	A									
Overall	9.1	-	A	8.9	-	A	12.5	-	B	9.9	-	A	10.3	-	B	14.7	-	B									

Table 4.3: Existing Conditions, Base Year 2022 and Base Year 2022 with Mitigation Level of Service Summary Cont'd

Intersection	Existing Conditions									Base Year 2022									Base Year 2022 with Mitigation								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
10: Honoapiilani Highway & Kapunakea Street																											
NB LT	68.9	0.80	E	62.6	0.78	E	66.4	0.79	E	68.5	0.79	E	62.7	0.79	E	64.0	0.78	E									
NB TH/RT	0.2	0.60	A	0.2	0.64	A	0.7	0.51	A	0.4	0.75	A	0.4	0.75	A	3.3	0.61	A									
EB LT/TH	51.1	0.41	D	51.3	0.55	D	49.0	0.51	D	47.1	0.48	D	52.4	0.64	D	52.1	0.65	D									
EB RT	44.9	0.01	D	41.8	0.02	D	41.2	0.02	D	38.7	0.01	D	39.5	0.02	D	39.5	0.03	D									
WB LT	77.5	0.76	E	67.2	0.60	E	60.3	0.51	E	69.8	0.70	E	76.6	0.70	E	76.4	0.70	E	**Same as Base Year 2022**								
WB TH/RT	45.7	0.08	D	42.3	0.07	D	41.7	0.06	D	39.4	0.07	D	40.1	0.07	D	39.8	0.06	D									
SB LT	104.0	0.78	F	77.1	0.80	E	90.3	0.85	F	101.3	0.83	F	72.4	0.80	E	85.4	0.84	F									
SB TH/RT	11.2	0.50	B	20.1	0.79	C	6.7	0.69	A	17.6	0.63	B	9.3	0.94	A	10.5	0.81	B									
Overall	11.7	-	B	16.1	-	B	9.9	-	A	13.9	-	B	11.7	-	B	13.6	-	B									
11: Honoapiilani Highway & Keawe Street																											
NB LT	81.8	0.80	F	70.0	0.77	E	67.5	0.77	E	79.7	0.79	E	70.1	0.77	E	67.0	0.77	E									
NB TH	24.8	0.63	C	33.5	0.73	C	29.5	0.63	C	29.3	0.73	C	42.3	0.85	D	35.0	0.75	C									
NB RT	16.0	0.12	B	21.2	0.19	C	20.8	0.16	C	17.3	0.13	B	23.0	0.22	C	22.2	0.17	C									
EB LT/TH	61.4	0.46	E	56.2	0.49	E	51.6	0.35	D	61.3	0.48	E	56.2	0.50	E	51.7	0.36	D									
EB RT	56.8	0.02	E	51.5	0.06	D	48.5	0.02	D	56.6	0.02	E	51.3	0.06	D	48.6	0.05	D	**Same as Base Year 2022**								
WB LT	50.7	0.44	D	51.4	0.67	D	41.9	0.54	D	50.6	0.49	D	54.3	0.71	D	43.0	0.59	D									
WB TH	46.4	0.18	D	40.1	0.19	D	36.0	0.19	D	45.7	0.18	D	40.0	0.20	D	36.0	0.19	D									
WB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A									
SB LT	52.1	0.91	D	49.2	0.92	D	61.5	0.86	E	61.5	0.94	E	47.1	0.95	D	57.8	0.88	E									
SB TH/RT	0.8	0.41	A	0.9	0.49	A	35.6	0.48	D	0.9	0.46	A	0.6	0.57	A	27.2	0.56	C									
Overall	24.2	-	C	27.1	-	C	40.3	-	D	27.0	-	C	28.1	-	C	37.5	-	D									

* Denotes overcapacity condition, v/c ≥ 1.

4.5 Base Year 2025 Analysis

It is anticipated that by Base Year 2025, traffic will have increased over Base Year 2022 conditions due to the continued development of the Lahaina and Kaanapali regions. Actual growth within the study region may vary based upon the actual construction of the various nearby developments.

4.5.1 Base Year 2025 Intersection Analysis

By Base Year 2025 without the Project, traffic at the study intersections along Honoapiilani Highway is anticipated to remain similar to Base Year 2022 conditions with a projected increase of approximately 1% for most parts along the corridor during the AM, PM and WE peak hours of traffic. Overall intersection delays are expected to increase by only 1-5 seconds at the study intersections from Base Year 2022 conditions. Intersection movements are expected to continue operating with LOS similar to Base Year 2022 in Base Year 2025.

Figure 4.4 illustrates the Base Year 2025 forecast traffic volumes and LOS for the study intersection movements. Table 4.4 summarizes the Base Year 2025 LOS at the study intersections compared to Base Year 2022 conditions. LOS worksheets are provided in Appendix C.

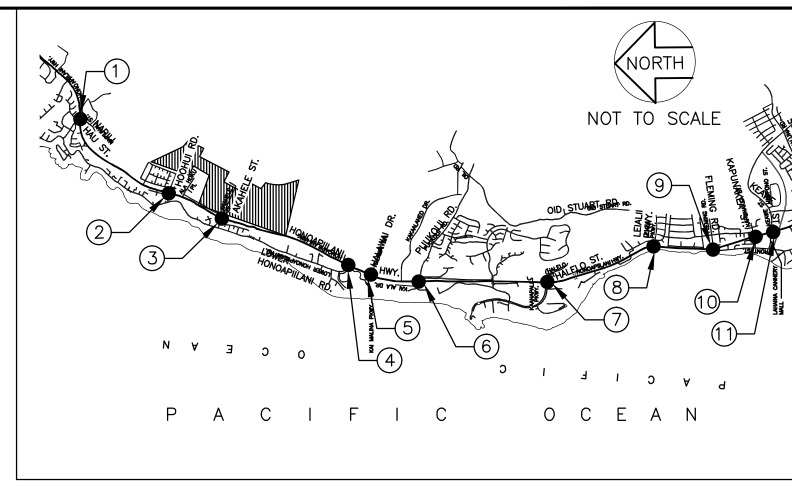
LEGEND

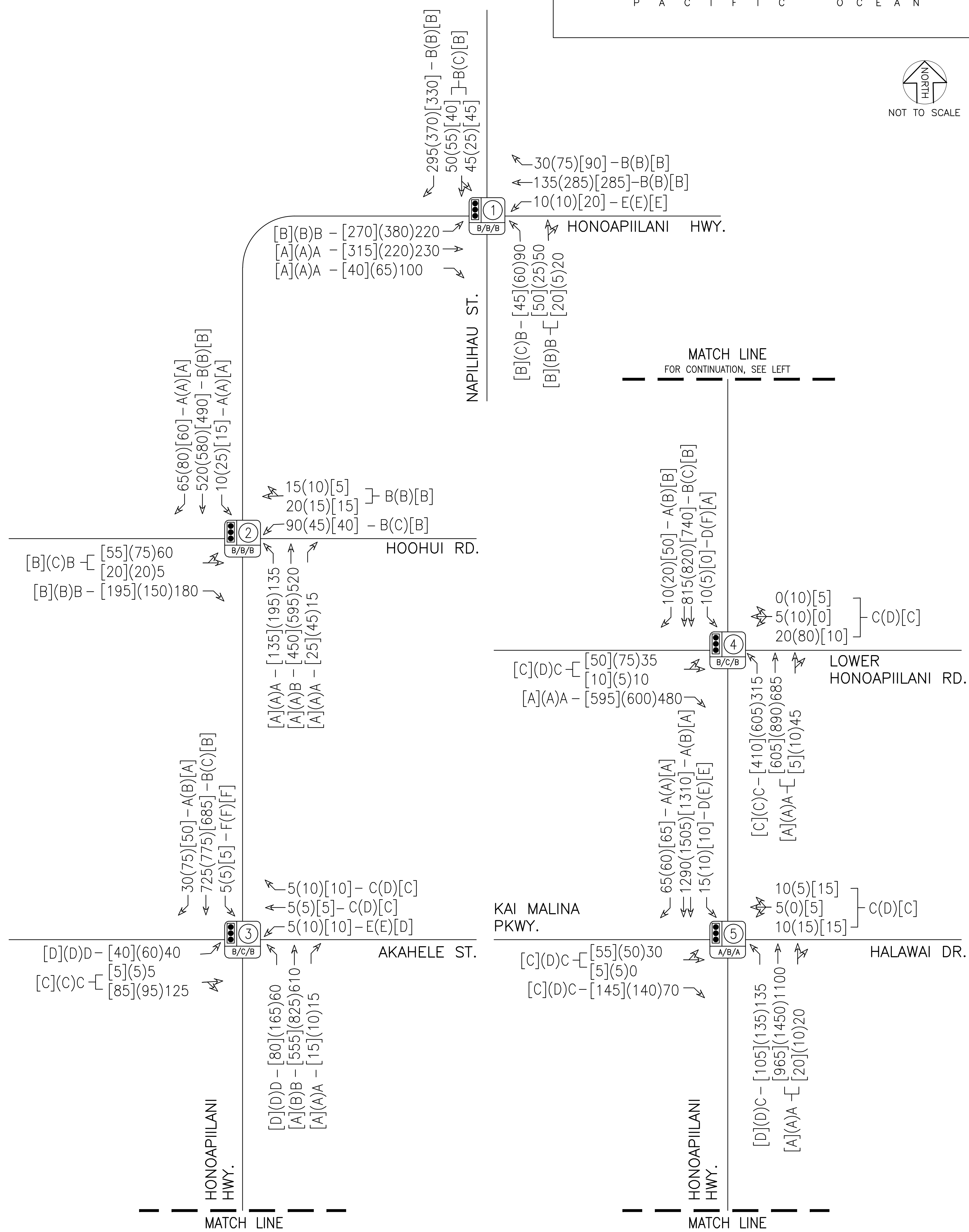
AA(AA)[AA] – AM(PM)[WE] PEAK HOUR OF TRAFFIC VOLUMES

X(X)[X] – AM(PM)[WE] LOS

Y X/X/X – SIGNALIZED INTERSECTION Y, OVERALL AM/PM/WE LOS

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





PULELEHUA	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE
	BASE YEAR 2025 LANE CONFIGURATION, VOLUMES AND LOS	4.4A

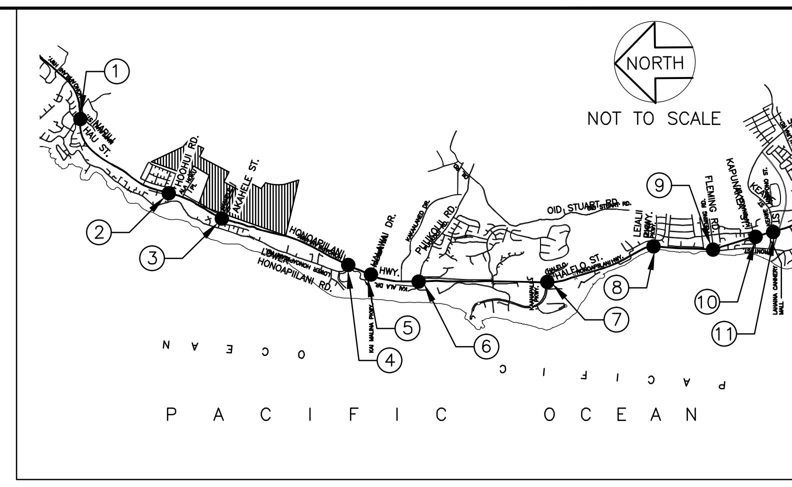
LEGEND

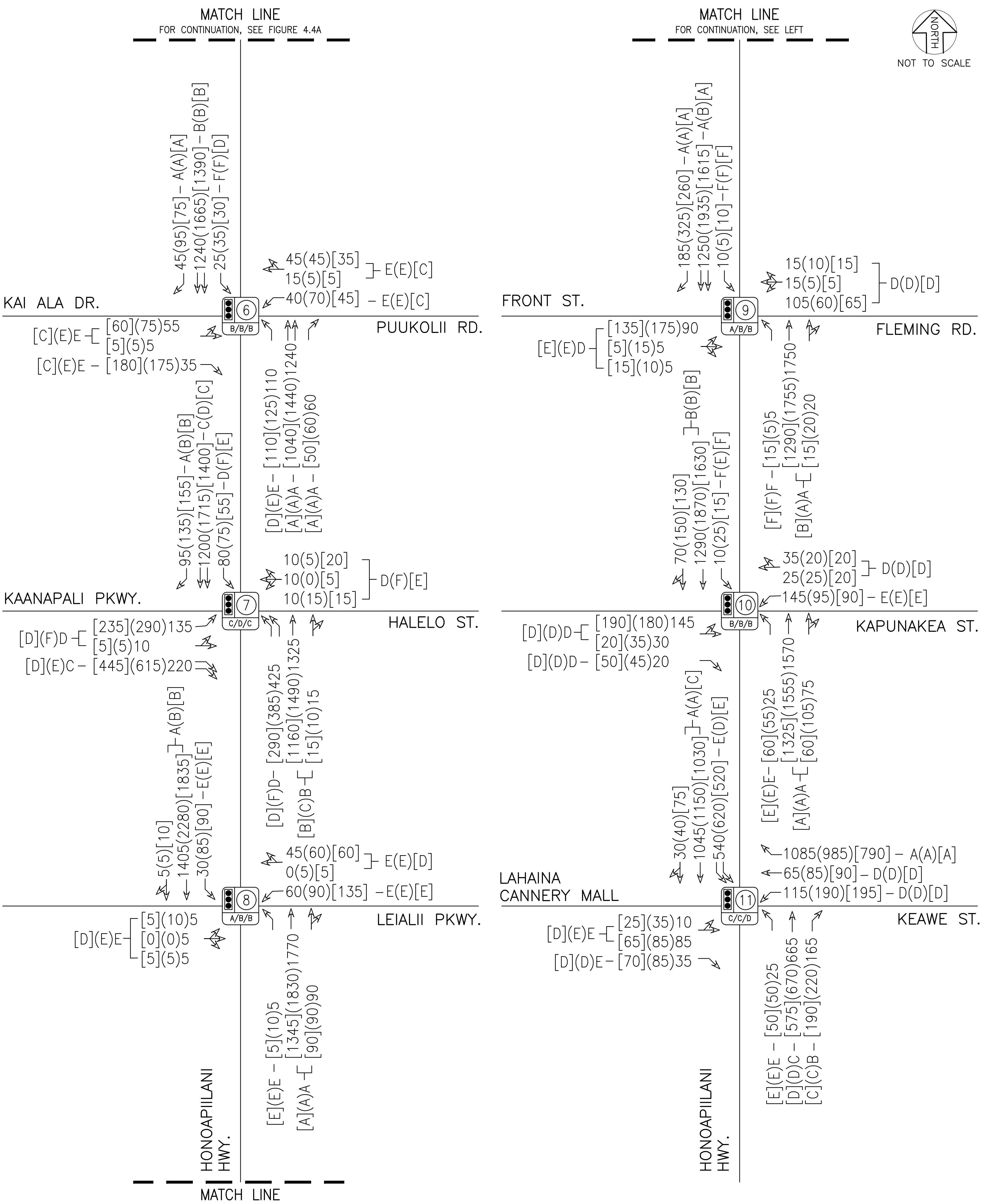
AA(AA)[AA] – AM(PM)[WE] PEAK HOUR OF TRAFFIC VOLUMES

X(X)[X] – AM(PM)[WE] LOS

Y X/X/X – SIGNALIZED INTERSECTION Y, OVERALL AM/PM/WE LOS

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





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BASE YEAR 2025 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 4.4B

Table 4.4: Base Year 2022 with Mitigation and Base Year 2025 Level of Service Summary

Intersection	Base Year 2022 with Mitigation									Base Year 2025								
	AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Honoapiilani Highway & Napilihau Street																		
NB LT	18.8	0.75	B	19.6	0.82	B	19.4	0.77	B	18.8	0.75	B	19.8	0.82	B	19.6	0.77	B
NB TH	8.1	0.32	A	6.0	0.23	A	7.6	0.37	A	8.1	0.32	A	6.0	0.23	A	7.6	0.37	A
NB RT	6.9	0.08	A	5.2	0.05	A	5.9	0.03	A	6.9	0.08	A	5.2	0.05	A	5.8	0.03	A
EB LT/TH	15.0	0.25	B	20.4	0.28	C	17.8	0.28	B	15.0	0.25	B	20.6	0.29	C	17.9	0.28	B
EB RT	14.5	0.16	B	19.4	0.13	B	17.2	0.17	B	14.5	0.16	B	19.6	0.13	B	17.3	0.17	B
WB LT	17.4	0.30	B	22.7	0.27	C	19.4	0.18	B	17.4	0.30	B	23.0	0.28	C	19.6	0.18	B
WB TH/RT	14.7	0.22	B	19.4	0.13	B	17.6	0.27	B	14.7	0.22	B	19.5	0.13	B	17.8	0.27	B
SB LT	66.2	0.72	E	72.3	0.72	E	55.0	0.77	E	66.2	0.72	E	72.5	0.72	E	55.3	0.77	E
SB TH	12.8	0.31	B	17.8	0.60	B	15.2	0.57	B	12.8	0.31	B	17.8	0.61	B	15.2	0.57	B
SB RT	11.2	0.02	B	13.1	0.05	B	11.3	0.06	B	11.2	0.02	B	13.1	0.05	B	11.3	0.06	B
Overall	14.2	-	B	16.6	-	B	15.1	-	B	14.2	-	B	16.7	-	B	15.1	-	B
2: Honoapiilani Highway & Hoohui Road																		
NB LT	9.7	0.36	A	9.2	0.47	A	8.3	0.33	A	9.8	0.36	A	9.3	0.48	A	8.4	0.33	A
NB TH	10.7	0.64	B	9.3	0.66	A	8.9	0.57	A	10.8	0.64	B	9.3	0.67	A	8.9	0.57	A
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
EB LT/TH	17.2	0.17	B	19.8	0.31	B	16.2	0.22	B	17.3	0.17	B	20.0	0.32	C	16.4	0.22	B
EB RT	16.2	0.06	B	18.3	0.07	B	15.6	0.10	B	16.3	0.06	B	18.5	0.06	B	15.7	0.10	B
WB LT	19.8	0.28	B	21.9	0.20	C	17.6	0.14	B	19.9	0.28	B	22.2	0.20	C	17.7	0.14	B
WB TH/RT	16.2	0.07	B	18.3	0.07	B	15.4	0.06	B	16.3	0.07	B	18.5	0.07	B	15.5	0.06	B
SB LT	9.7	0.03	A	8.1	0.07	A	8.0	0.04	A	9.7	0.03	A	8.1	0.07	A	8.0	0.04	A
SB TH	15.0	0.77	B	13.2	0.77	B	12.4	0.73	B	15.1	0.77	B	13.2	0.78	B	12.5	0.73	B
SB RT	9.5	0.05	A	8.0	0.06	A	8.1	0.04	A	9.5	0.05	A	8.0	0.06	A	8.0	0.04	A
Overall	13.2	-	B	11.8	-	B	11.1	-	B	13.3	-	B	11.8	-	B	11.1	-	B
3: Honoapiilani Highway & Akahele Street																		
NB LT	42.5	0.77	D	42.4	0.81	D	37.0	0.76	D	42.8	0.77	D	43.0	0.81	D	37.3	0.76	D
NB TH	10.6	0.64	B	13.0	0.76	B	10.0	0.60	A	10.6	0.65	B	13.1	0.76	B	9.9	0.60	A
NB RT	6.5	0.01	A	5.9	0.01	A	6.4	0.01	A	6.4	0.01	A	5.8	0.01	A	6.4	0.01	A
EB LT	43.6	0.71	D	52.6	0.77	D	42.2	0.71	D	44.2	0.71	D	53.1	0.77	D	42.7	0.71	D
EB TH/RT	23.9	0.08	C	32.6	0.04	C	23.7	0.06	C	24.3	0.07	C	33.1	0.04	C	24.0	0.06	C
WB LT	69.0	0.53	E	65.2	0.57	E	51.0	0.55	D	69.4	0.53	E	65.9	0.57	E	51.4	0.55	D
WB TH	25.2	0.03	C	35.3	0.03	D	24.8	0.03	C	25.6	0.03	C	35.8	0.03	D	25.1	0.03	C
WB RT	25.1	0.01	C	35.2	0.01	D	24.7	0.01	C	25.5	0.01	C	35.7	0.01	D	25.0	0.01	C
SB LT	111.0	0.70	F	125.3	0.71	F	109.9	0.70	F	111.5	0.70	F	126.1	0.71	F	110.3	0.70	F
SB TH	15.3	0.83	B	22.7	0.88	C	15.5	0.83	B	15.3	0.84	B	23.2	0.88	C	15.5	0.83	B
SB RT	7.8	0.02	A	10.6	0.06	B	8.3	0.03	A	7.7	0.02	A	10.5	0.05	B	8.3	0.04	A
Overall	15.7	-	B	21.4	-	C	15.8	-	B	15.7	-	B	21.7	-	C	15.8	-	B

Table 4.4: Base Year 2022 with Mitigation and Base Year 2025 Level of Service Summary Cont'd

Intersection	Base Year 2022 with Mitigation									Base Year 2025								
	AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
4: Honoapiilani Highway & Lower Honoapiilani Road																		
NB LT	22.3	0.83	C	29.8	0.94	C	21.1	0.86	C	22.6	0.83	C	30.2	0.94	C	21.4	0.87	C
NB TH/RT	4.7	0.33	A	4.4	0.36	A	2.4	0.24	A	4.7	0.34	A	4.4	0.36	A	2.4	0.24	A
EB LT/TH	24.9	0.19	C	41.4	0.38	D	26.7	0.28	C	25.2	0.19	C	41.9	0.38	D	27.0	0.28	C
EB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
WB LT/TH/RT	24.3	0.10	C	42.1	0.46	D	25.2	0.05	C	24.6	0.10	C	42.7	0.47	D	25.5	0.05	C
SB LT	50.2	0.73	D	86.4	0.72	F	0.0	0.00	A	50.6	0.73	D	87.1	0.72	F	0.0	0.00	A
SB TH	12.9	0.57	B	27.1	0.70	C	14.7	0.57	B	12.9	0.58	B	27.3	0.70	C	14.7	0.58	B
SB RT	9.2	0.00	A	19.4	0.01	B	10.9	0.03	B	9.2	0.00	A	19.4	0.01	B	10.9	0.03	B
Overall	12.0	-	B	20.8	-	C	12.5	-	B	12.0	-	B	21.0	-	C	12.6	-	B
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive																		
NB LT	31.8	0.79	C	43.7	0.82	D	35.3	0.78	D	32.2	0.79	C	44.3	0.82	D	35.7	0.78	D
NB TH/RT	4.1	0.45	A	7.0	0.59	A	4.9	0.41	A	4.1	0.46	A	7.1	0.60	A	4.9	0.42	A
EB LT/TH	30.4	0.16	C	36.9	0.22	D	30.1	0.25	C	30.9	0.16	C	37.5	0.22	D	30.6	0.25	C
EB RT	30.3	0.01	C	36.1	0.03	D	29.4	0.04	C	30.7	0.01	C	36.6	0.03	D	29.8	0.04	C
WB LT/TH/RT	30.9	0.10	C	38.0	0.08	D	29.4	0.10	C	31.3	0.11	C	38.6	0.08	D	29.9	0.10	C
SB LT	53.1	0.78	D	72.5	0.77	E	59.3	0.75	E	53.7	0.78	D	73.3	0.77	E	59.9	0.75	E
SB TH	7.7	0.61	A	12.4	0.72	B	8.7	0.63	A	7.7	0.61	A	12.6	0.73	B	8.8	0.63	A
SB RT	4.5	0.04	A	6.4	0.04	A	5.1	0.04	A	4.5	0.04	A	6.4	0.04	A	5.0	0.04	A
Overall	8.0	-	A	12.0	-	B	9.2	-	A	8.0	-	A	12.1	-	B	9.3	-	A
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road																		
NB LT	74.1	0.84	E	78.1	0.86	E	39.7	0.78	D	74.2	0.84	E	78.1	0.86	E	40.0	0.78	D
NB TH	6.2	0.48	A	9.7	0.58	A	8.2	0.49	A	6.2	0.48	A	9.8	0.59	A	8.2	0.50	A
NB RT	3.8	0.04	A	5.3	0.04	A	5.5	0.03	A	3.8	0.04	A	5.3	0.04	A	5.5	0.03	A
EB LT/TH	68.7	0.38	E	67.2	0.37	E	31.2	0.22	C	68.7	0.38	E	67.2	0.37	E	31.5	0.23	C
EB RT	63.3	0.01	E	63.7	0.13	E	30.0	0.05	C	63.3	0.01	E	63.7	0.13	E	30.3	0.05	C
WB LT	75.0	0.39	E	78.4	0.54	E	34.5	0.21	C	75.0	0.39	E	78.4	0.54	E	34.8	0.21	C
WB TH/RT	64.1	0.10	E	62.6	0.03	E	29.8	0.03	C	64.1	0.10	E	62.6	0.03	E	30.1	0.03	C
SB LT	82.8	0.68	F	89.0	0.77	F	42.3	0.57	D	82.8	0.68	F	89.0	0.77	F	42.6	0.58	D
SB TH	10.0	0.52	A	17.9	0.73	B	13.5	0.72	B	10.1	0.52	B	18.2	0.74	B	13.6	0.73	B
SB RT	5.9	0.03	A	8.5	0.07	A	7.4	0.05	A	5.9	0.03	A	8.5	0.07	A	7.3	0.05	A
Overall	13.8	-	B	19.8	-	B	13.6	-	B	13.9	-	B	19.9	-	B	13.6	-	B

Table 4.4: Base Year 2022 with Mitigation and Base Year 2025 Level of Service Summary Cont'd

	Base Year 2022 with Mitigation									Base Year 2025								
	AM			PM			WE			AM			PM			WE		
Intersection	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street																		
NB LT	40.5	0.75	D	91.1	0.85	F	49.5	0.71	D	41.0	0.75	D	93.2	0.85	F	50.7	0.71	D
NB TH/RT	16.1	0.68	B	22.1	0.66	C	13.8	0.56	B	16.1	0.69	B	22.4	0.67	C	13.8	0.56	B
EB LT/TH	44.0	0.45	D	85.3	0.59	F	48.3	0.57	D	44.6	0.46	D	87.6	0.59	F	49.5	0.57	D
EB RT	28.2	0.08	C	63.6	0.51	E	36.2	0.35	D	28.6	0.07	C	65.4	0.52	E	37.2	0.35	D
WB LT/TH/RT	44.5	0.18	D	99.6	0.23	F	54.5	0.31	D	45.1	0.17	D	102.0	0.23	F	55.8	0.32	E
SB LT	46.0	0.56	D	111.6	0.72	F	53.8	0.50	D	46.6	0.57	D	115.1	0.72	F	55.1	0.51	E
SB TH	22.0	0.74	C	41.0	0.88	D	20.9	0.76	C	22.0	0.75	C	42.2	0.88	D	21.1	0.76	C
SB RT	9.8	0.08	A	19.5	0.12	B	12.7	0.14	B	9.8	0.08	A	19.6	0.12	B	12.7	0.14	B
Overall	23.6	-	C	45.1	-	D	24.4	-	C	23.6	-	C	46.0	-	D	24.6	-	C
8: Honoapiilani Highway & Leialii Parkway																		
NB LT	75.7	0.44	E	69.1	0.49	E	72.3	0.44	E	75.6	0.44	E	69.0	0.49	E	72.2	0.44	E
NB TH/RT	8.7	0.69	A	2.3	0.75	A	2.9	0.60	A	8.8	0.70	A	2.3	0.76	A	2.9	0.60	A
EB LT/TH/RT	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D
WB LT	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E
WB TH/RT	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D
SB LT	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E
SB TH/RT	5.2	0.51	A	13.0	0.83	B	10.1	0.70	B	5.3	0.51	A	13.6	0.84	B	10.3	0.71	B
Overall	9.0	-	A	10.7	-	B	10.9	-	B	9.1	-	A	11.0	-	B	11.0	-	B
9: Honoapiilani Highway & Front Street/Flemming Road																		
NB LT	88.9	0.73	F	95.1	0.74	F	87.5	0.84	F	88.5	0.73	F	94.7	0.74	F	87.3	0.84	F
NB TH/RT	7.5	0.66	A	1.8	0.70	A	16.2	0.50	B	7.6	0.67	A	1.9	0.71	A	16.3	0.51	B
EB LT/TH/RT	52.7	0.48	D	59.5	0.72	E	57.8	0.66	E	52.7	0.48	D	59.5	0.72	E	57.8	0.66	E
WB LT/TH/RT	54.3	0.61	D	49.8	0.24	D	52.4	0.32	D	54.3	0.61	D	49.8	0.24	D	52.4	0.32	D
SB LT	87.8	0.80	F	87.3	0.74	F	87.5	0.82	F	87.5	0.80	F	86.4	0.74	F	87.2	0.82	F
SB TH	4.9	0.48	A	11.7	0.79	B	7.7	0.64	A	4.9	0.49	A	11.9	0.80	B	7.8	0.64	A
SB RT	3.2	0.11	A	5.6	0.24	A	4.3	0.17	A	3.2	0.11	A	5.6	0.24	A	4.3	0.17	A
Overall	9.9	-	A	10.3	-	B	14.7	-	B	9.9	-	A	10.3	-	B	14.8	-	B
10: Honoapiilani Highway & Kapunakea Street																		
NB LT	68.5	0.79	E	62.7	0.79	E	64.0	0.78	E	68.5	0.79	E	62.7	0.79	E	63.8	0.78	E
NB TH/RT	0.4	0.75	A	0.4	0.75	A	3.3	0.61	A	0.4	0.76	A	0.4	0.76	A	3.3	0.61	A
EB LT/TH	47.1	0.48	D	52.4	0.64	D	52.1	0.65	D	47.1	0.48	D	52.4	0.64	D	52.1	0.65	D
EB RT	38.7	0.01	D	39.5	0.02	D	39.5	0.03	D	38.7	0.01	D	39.5	0.02	D	39.5	0.03	D
WB LT	69.8	0.70	E	76.6	0.70	E	76.4	0.70	E	69.8	0.70	E	76.6	0.70	E	76.4	0.70	E
WB TH/RT	39.4	0.07	D	40.1	0.07	D	39.8	0.06	D	39.4	0.07	D	40.1	0.07	D	39.8	0.06	D
SB LT	101.3	0.83	F	72.4	0.80	E	85.4	0.84	F	101.0	0.83	F	72.1	0.80	E	85.2	0.84	F
SB TH/RT	17.6	0.63	B	9.3	0.94	A	10.5	0.81	B	17.8	0.64	B	10.4	0.95	B	10.9	0.82	B
Overall	13.9	-	B	11.7	-	B	13.6	-	B	14.0	-	B	12.3	-	B	13.7	-	B

Table 4.4: Base Year 2022 with Mitigation and Base Year 2025 Level of Service Summary Cont'd

Intersection	Base Year 2022 with Mitigation									Base Year 2025								
	AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
11: Honoapiilani Highway & Keawe Street																		
NB LT	79.7	0.79	E	70.1	0.77	E	67.0	0.77	E	79.7	0.79	E	70.1	0.77	E	67.0	0.77	E
NB TH	29.3	0.73	C	42.3	0.85	D	35.0	0.75	C	29.7	0.74	C	42.8	0.86	D	35.2	0.75	D
NB RT	17.3	0.13	B	23.0	0.22	C	22.2	0.17	C	17.3	0.13	B	23.0	0.22	C	22.2	0.17	C
EB LT/TH	61.3	0.48	E	56.2	0.50	E	51.7	0.36	D	61.3	0.48	E	56.2	0.50	E	51.7	0.36	D
EB RT	56.6	0.02	E	51.3	0.06	D	48.6	0.05	D	56.6	0.02	E	51.3	0.06	D	48.6	0.05	D
WB LT	50.6	0.49	D	54.3	0.71	D	43.0	0.59	D	50.6	0.49	D	54.3	0.71	D	43.0	0.59	D
WB TH	45.7	0.18	D	40.0	0.20	D	36.0	0.19	D	45.7	0.18	D	40.0	0.20	D	36.0	0.19	D
WB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
SB LT	61.5	0.94	E	47.1	0.95	D	57.8	0.88	E	61.3	0.94	E	46.4	0.95	D	57.7	0.88	E
SB TH/RT	0.9	0.46	A	0.6	0.57	A	27.2	0.56	C	1.0	0.47	A	0.6	0.57	A	27.3	0.56	C
Overall	27.0	-	C	28.1	-	C	37.5	-	D	27.0	-	C	27.9	-	C	37.5	-	D

* Denotes overcapacity condition, v/c ≥ 1.

4.6 Base Year 2030 Analysis

It is anticipated that by Base Year 2030, traffic will have increased over Base Year 2025 conditions due to the continued development of the Lahaina and Kaanapali regions. Actual growth within the study region may vary based upon the actual construction of the various nearby developments.

4.6.1 Base Year 2030 Intersection Analysis

By Base Year 2030 without the Project, traffic at the study intersections along Honoapiilani Highway is estimated to generally increase by an additional 5-15% for most parts along the corridor during the AM, PM and WE peak hours of traffic over Base Year 2025 conditions. The majority of study intersections are forecast to operate similar to Base Year 2025 conditions. Overall intersection delays generally increased by only 1-5 seconds at most study intersections from Base Year 2025 conditions. The following intersections are expected to worsen compared to Base Year 2025 conditions:

<u>[7] Honoapiilani Highway/Kaanapali Parkway/Halelo Street</u>

With the proposed developments in the Kaanapali region, delay is expected to increase at this intersection. The intersection will worsen from overall LOS C(D)[C] during Base Year 2025 to LOS C(E)[D] during Base Year 2030. However, the major through movements will continue operating at LOS D or better during all peak hours. No mitigation is proposed beyond that recommended for Base Year 2022.

<u>[10] Honoapiilani Highway/Kapunakea Street</u>

With the continued growth along Honoapiilani Highway, this intersection is expected to experience increased delays during the PM peak hour of traffic. During the PM peak, the westbound left-turn is expected to operate at LOS F and overcapacity conditions with the southbound through/right-turn movement approaching capacity. Mitigation is proposed in Section 4.6.2.

<u>[11] Honoapiilani Highway/Keawe Street</u>

During the PM peak hour of traffic, the northbound through movement along Honoapiilani Highway is anticipated to operate at LOS F and overcapacity conditions due to continued growth in the region adding to traffic along the highway. As noted in Section 4.3, the LBR Phase 1B-2, which extended the LBR to its southern terminus in Olowalu, was completed in 2018. Because all vehicles exit the LBR prior to or at Keawe Street, the Honoapiilani Highway/Keawe Street intersection experiences high volumes heading further north to Kaanapali and beyond. Phase 1C and Phase 1D of the LBR to extend the bypass to Kaanapali and just south of the Kapalua Airport, respectively, have been identified but are not currently planned. However, allocation of State funds for construction of Phase 1C to extend the LBR to Kaanapali is currently under discussion. Because funding has not been secured for construction of Phase 1C, the roadway improvement was not assumed to be completed by Base Year 2030. However, upon completion, it is likely that the Honoapiilani Highway/Keawe Street intersection will experience significant reductions in traffic which will likely alleviate the majority of forecast deficient LOS and capacity conditions.

Figure 4.5 illustrates the Base Year 2030 forecast traffic volumes and LOS for the study intersection movements. Table 4.5 summarizes the Base Year 2030 LOS at the study intersections compared to Base Year 2025 conditions. LOS worksheets are provided in Appendix C.

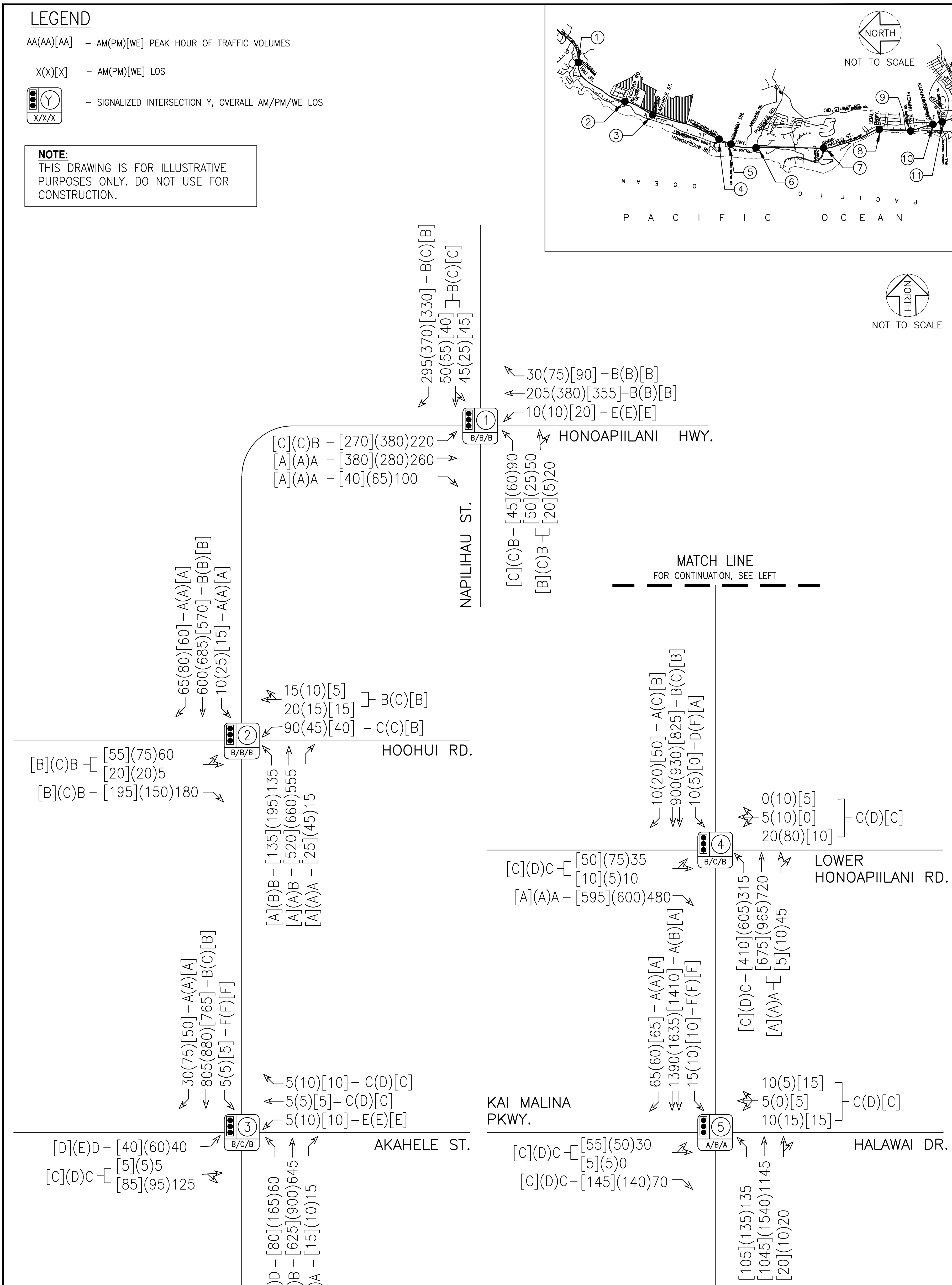
4.6.2 Base Year 2030 With Mitigation Intersection Analysis

[10] Honoapiilani Highway/Kapunakea Street

- Restripe the eastbound approach to provide an exclusive left-turn lane and a shared through/right-turn lane.

Restriping the eastbound approach will provide lane configuration consistent with the westbound approach. With the restriping, the intersection is anticipated to operate with all movements under capacity during all peak hours of traffic. As in Base Year 2025, various left-turn movements are expected to operate at LOS E/F.

Figure 4.6 illustrates the Base Year 2030 with mitigation forecast traffic volumes and LOS for the study intersection movements. Table 4.5 summarizes the Base Year 2030 with mitigation LOS at the study intersections compared to Base Year 2030 without mitigation. LOS worksheets are provided in Appendix C.



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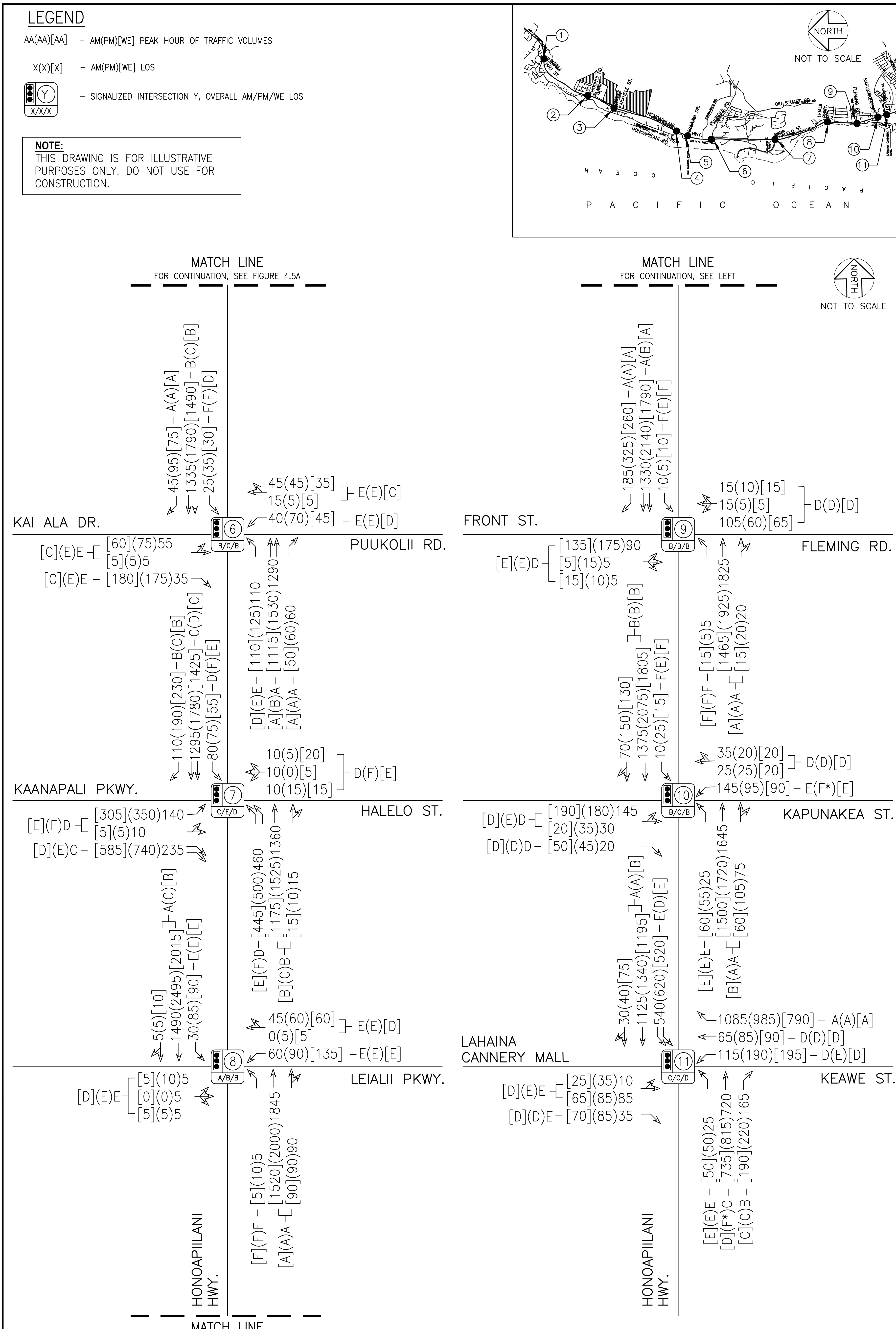
BASE YEAR 2030 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 4.5A



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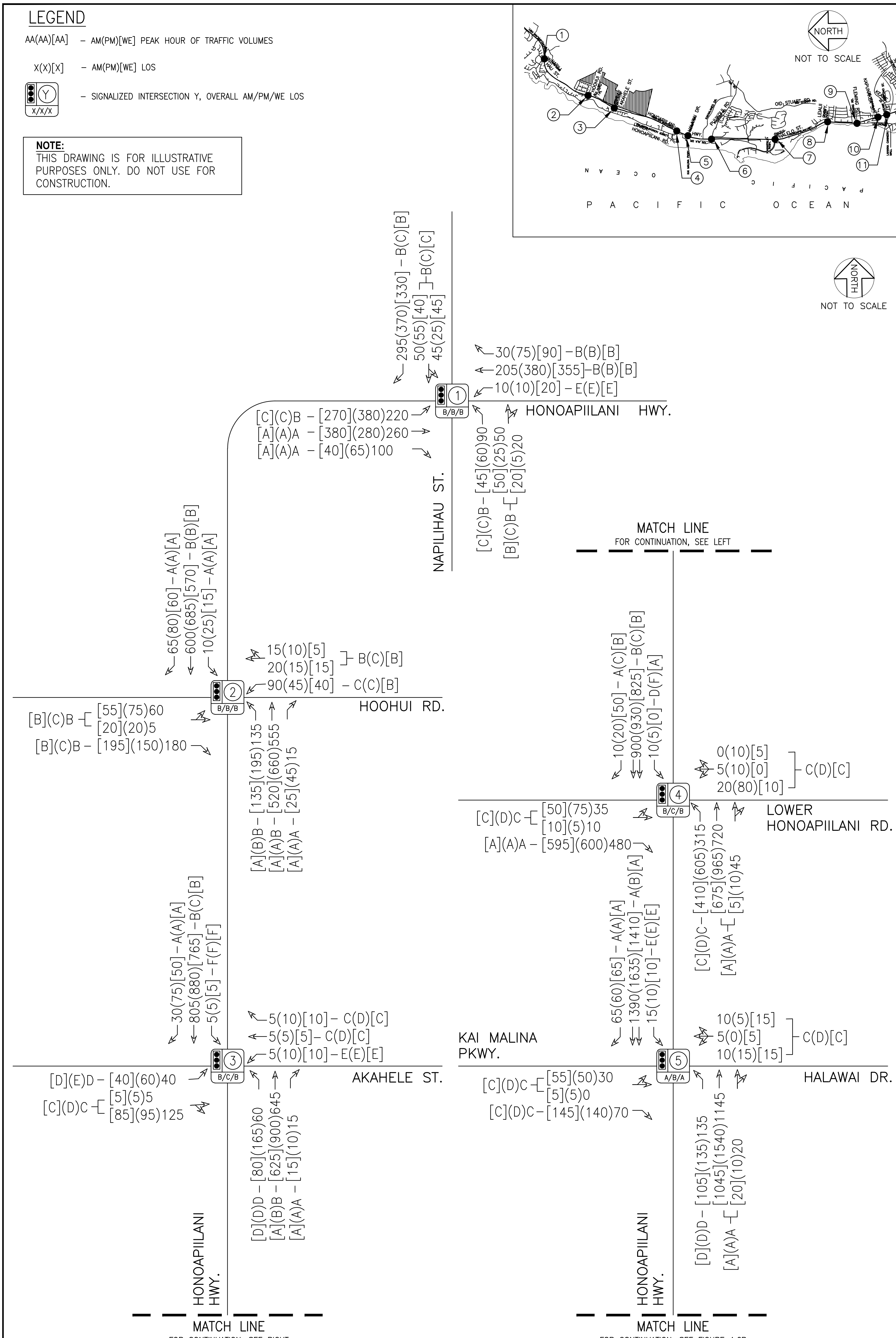
BASE YEAR 2030 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 4.5B



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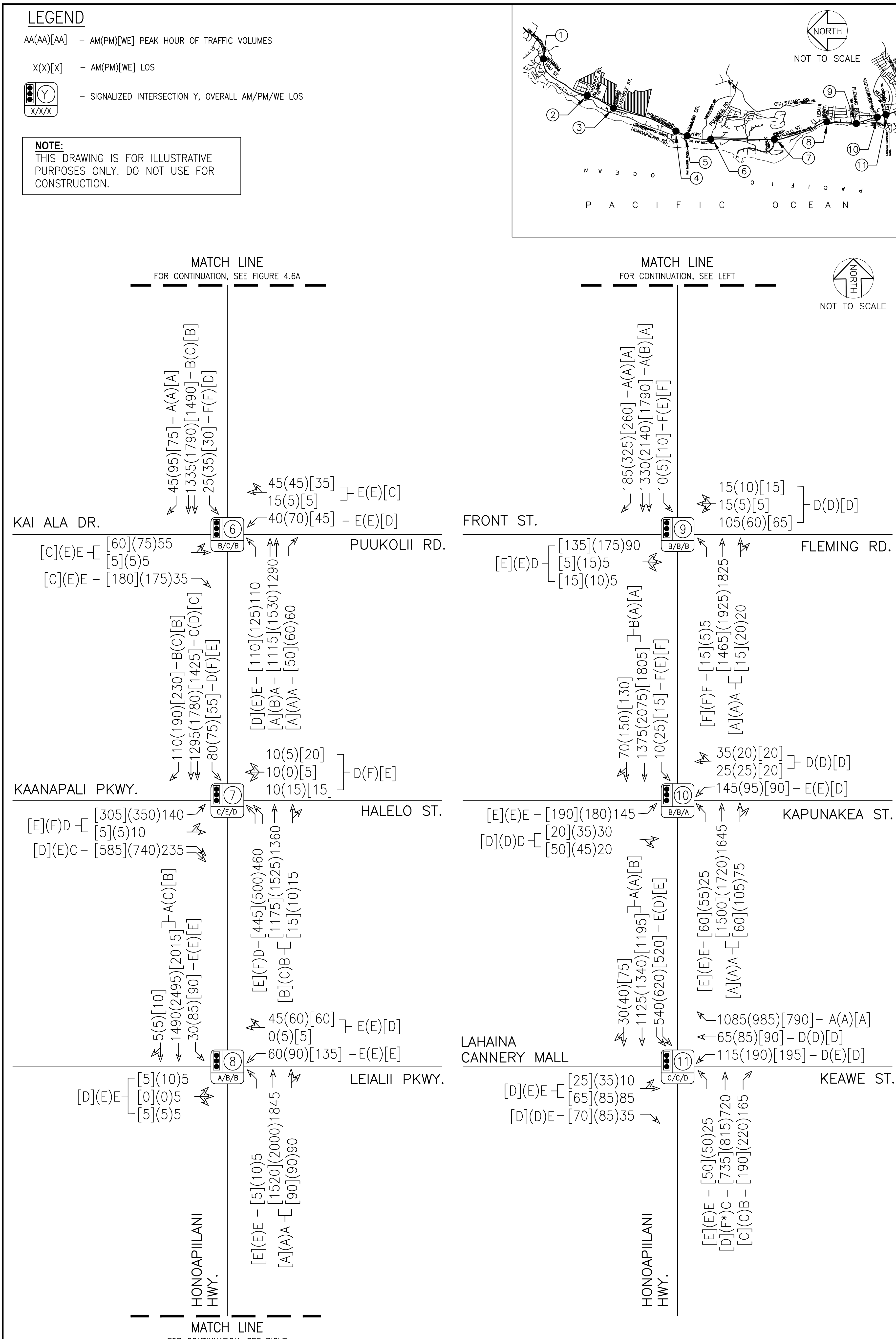
BASE YEAR 2030 WITH MITIGATION LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 4.6A



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BASE YEAR 2030 WITH MITIGATION LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 4.6B

Table 4.5: Base Year 2025, Base Year 2030 and Base Year 2030 with Mitigation Level of Service Summary

Intersection	Base Year 2025									Base Year 2030									Base Year 2030 with Mitigation								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Honoapiilani Highway & Napilihau Street																											
NB LT	18.8	0.75	B	19.8	0.82	B	19.6	0.77	B	18.8	0.75	B	23.3	0.84	C	21.5	0.78	C									
NB TH	8.1	0.32	A	6.0	0.23	A	7.6	0.37	A	8.3	0.36	A	5.7	0.27	A	7.4	0.42	A									
NB RT	6.9	0.08	A	5.2	0.05	A	5.8	0.03	A	6.9	0.08	A	4.7	0.05	A	5.4	0.03	A									
EB LT/TH	15.0	0.25	B	20.6	0.29	C	17.9	0.28	B	15.0	0.26	B	24.3	0.32	C	20.3	0.31	C									
EB RT	14.5	0.16	B	19.6	0.13	B	17.3	0.17	B	14.5	0.15	B	23.0	0.13	C	19.3	0.17	B	**Same as Base Year 2030**								
WB LT	17.4	0.30	B	23.0	0.28	C	19.6	0.18	B	17.4	0.30	B	27.3	0.32	C	22.3	0.21	C									
WB TH/RT	14.7	0.22	B	19.5	0.13	B	17.8	0.27	B	14.7	0.22	B	23.0	0.14	C	20.0	0.29	B									
SB LT	66.2	0.72	E	72.5	0.72	E	55.3	0.77	E	66.2	0.72	E	78.0	0.73	E	58.9	0.78	E									
SB TH	12.8	0.31	B	17.8	0.61	B	15.2	0.57	B	14.1	0.47	B	18.7	0.67	B	15.4	0.61	B									
SB RT	11.2	0.02	B	13.1	0.05	B	11.3	0.06	B	11.2	0.02	B	12.8	0.05	B	10.9	0.06	B									
Overall	14.2	-	B	16.7	-	B	15.1	-	B	14.2	-	B	18.0	-	B	15.6	-	B									
2: Honoapiilani Highway & Hoohui Road																											
NB LT	9.8	0.36	A	9.3	0.48	A	8.4	0.33	A	10.8	0.39	B	11.2	0.53	B	8.7	0.35	A									
NB TH	10.8	0.64	B	9.3	0.67	A	8.9	0.57	A	10.7	0.64	B	9.4	0.68	A	8.9	0.61	A									
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A									
EB LT/TH	17.3	0.17	B	20.0	0.32	C	16.4	0.22	B	19.3	0.18	B	22.9	0.33	C	18.1	0.23	B									
EB RT	16.3	0.06	B	18.5	0.06	B	15.7	0.10	B	18.1	0.06	B	21.1	0.06	C	17.3	0.08	B	**Same as Base Year 2030**								
WB LT	19.9	0.28	B	22.2	0.20	C	17.7	0.14	B	22.2	0.30	C	25.4	0.22	C	19.7	0.15	B									
WB TH/RT	16.3	0.07	B	18.5	0.07	B	15.5	0.06	B	18.2	0.07	B	21.2	0.07	C	17.2	0.07	B									
SB LT	9.7	0.03	A	8.1	0.07	A	8.0	0.04	A	9.5	0.03	A	8.0	0.07	A	7.7	0.04	A									
SB TH	15.1	0.77	B	13.2	0.78	B	12.5	0.73	B	15.7	0.81	B	13.9	0.82	B	12.6	0.77	B									
SB RT	9.5	0.05	A	8.0	0.06	A	8.0	0.04	A	9.1	0.05	A	7.5	0.06	A	7.6	0.04	A									
Overall	13.3	-	B	11.8	-	B	11.1	-	B	13.9	-	B	12.6	-	B	11.3	-	B									
3: Honoapiilani Highway & Akahele Street																											
NB LT	42.8	0.77	D	43.0	0.81	D	37.3	0.76	D	45.9	0.77	D	50.1	0.83	D	40.5	0.76	D									
NB TH	10.6	0.65	B	13.1	0.76	B	9.9	0.60	A	10.0	0.64	B	14.1	0.78	B	9.7	0.62	A									
NB RT	6.4	0.01	A	5.8	0.01	A	6.4	0.01	A	5.9	0.01	A	5.3	0.01	A	5.9	0.01	A									
EB LT	44.2	0.71	D	53.1	0.77	D	42.7	0.71	D	50.0	0.74	D	59.6	0.77	E	48.3	0.73	D									
EB TH/RT	24.3	0.07	C	33.1	0.04	C	24.0	0.06	C	27.5	0.07	C	39.5	0.05	D	27.2	0.05	C									
WB LT	69.4	0.53	E	65.9	0.57	E	51.4	0.55	D	73.5	0.53	E	74.2	0.59	E	55.5	0.56	E	**Same as Base Year 2030**								
WB TH	25.6	0.03	C	35.8	0.03	D	25.1	0.03	C	29.0	0.03	C	42.7	0.04	D	28.4	0.03	C									
WB RT	25.5	0.01	C	35.7	0.01	D	25.0	0.01	C	28.9	0.01	C	42.6	0.01	D	28.3	0.01	C									
SB LT	111.5	0.70	F	126.1	0.71	F	110.3	0.70	F	116.1	0.71	F	135.0	0.72	F	114.8	0.71	F									
SB TH	15.3	0.84	B	23.2	0.88	C	15.5	0.83	B	15.8	0.86	B	29.8	0.92	C	16.0	0.85	B									
SB RT	7.7	0.02	A	10.5	0.05	B	8.3	0.04	A	7.3	0.02	A	10.0	0.05	A	7.8	0.04	A									
Overall	15.7	-	B	21.7	-	C	15.8	-	B	15.9	-	B	25.5	-	C	16.0	-	B									
4: Honoapiilani Highway & Lower Honoapiilani Road																											
NB LT	22.6	0.83	C	30.2	0.94	C	21.4	0.87	C	24.8	0.84	C	38.6	0.94	D	23.5	0.87	C									
NB TH/RT	4.7	0.34	A	4.4	0.36	A	2.4	0.24	A	4.5	0.34	A	4.3	0.38	A	2.4	0.26	A									
EB LT/TH	25.2	0.19	C	41.9	0.38	D	27.0	0.28	C	27.6	0.21	C	48.8	0.42	D	29.8	0.30	C									
EB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	**Same as Base Year 2030**								
WB LT/TH/RT	24.6	0.10	C	42.7	0.47	D	25.5	0.05	C	27.0	0.11	C	49.6	0.50	D	28.0	0.05	C									
SB LT	50.6	0.73	D	87.1	0.72	F	0.0	0.00	A	53.7	0.74	D	95.3	0.73	F	0.0	0.00	A									
SB TH	12.9	0.58	B	27.3	0.70	C	14.7	0.58	B	13.2	0.60	B	30.2	0.74	C	15.2	0.60	B									
SB RT	9.2	0.00	A	19.4	0.01	B	10.9	0.03	B	9.1	0.01	A	20.5	0.01	C	10.9	0.03	B									
Overall	12.0	-	B	21.0	-	C	12.6	-	B	12.4	-	B	24.1	-	C	13.0	-	B									

Table 4.5: Base Year 2025, Base Year 2030 and Base Year 2030 with Mitigation Level of Service Summary Cont'd

Intersection	Base Year 2025									Base Year 2030									Base Year 2030 with Mitigation								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive																											
NB LT	32.2	0.79	C	44.3	0.82	D	35.7	0.78	D	35.0	0.80	D	47.9	0.82	D	38.6	0.78	D									
NB TH/RT	4.1	0.46	A	7.1	0.60	A	4.9	0.42	A	3.9	0.46	A	7.4	0.62	A	4.8	0.44	A									
EB LT/TH	30.9	0.16	C	37.5	0.22	D	30.6	0.25	C	33.8	0.18	C	40.7	0.23	D	33.5	0.27	C									
EB RT	30.7	0.01	C	36.6	0.03	D	29.8	0.04	C	33.6	0.01	C	39.7	0.03	D	32.6	0.04	C	**Same as Base Year 2030**								
WB LT/TH/RT	31.3	0.11	C	38.6	0.08	D	29.9	0.10	C	34.1	0.11	C	42.0	0.09	D	32.8	0.11	C									
SB LT	53.7	0.78	D	73.3	0.77	E	59.9	0.75	E	57.8	0.79	E	78.1	0.78	E	63.8	0.76	E									
SB TH	7.7	0.61	A	12.6	0.73	B	8.8	0.63	A	8.0	0.64	A	14.0	0.77	B	9.1	0.66	A									
SB RT	4.5	0.04	A	6.4	0.04	A	5.0	0.04	A	4.4	0.04	A	6.4	0.04	A	4.9	0.04	A									
Overall	8.0	-	A	12.1	-	B	9.3	-	A	8.2	-	A	13.0	-	B	9.5	-	A									
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road																											
NB LT	74.2	0.84	E	78.1	0.86	E	40.0	0.78	D	74.2	0.84	E	77.9	0.86	E	41.8	0.78	D									
NB TH	6.2	0.48	A	9.8	0.59	A	8.2	0.50	A	6.4	0.50	A	10.4	0.62	B	8.3	0.52	A									
NB RT	3.8	0.04	A	5.3	0.04	A	5.5	0.03	A	3.8	0.04	A	5.3	0.04	A	5.3	0.03	A									
EB LT/TH	68.7	0.38	E	67.2	0.37	E	31.5	0.23	C	68.7	0.38	E	67.2	0.37	E	33.4	0.24	C									
EB RT	63.3	0.01	E	63.7	0.13	E	30.3	0.05	C	63.3	0.01	E	63.7	0.13	E	32.1	0.05	C	**Same as Base Year 2030**								
WB LT	75.0	0.39	E	78.4	0.54	E	34.8	0.21	C	75.0	0.39	E	78.4	0.54	E	37.0	0.23	D									
WB TH/RT	64.1	0.10	E	62.6	0.03	E	30.1	0.03	C	64.1	0.10	E	62.6	0.03	E	31.9	0.03	C									
SB LT	82.8	0.68	F	89.0	0.77	F	42.6	0.58	D	82.8	0.68	F	89.0	0.77	F	44.6	0.58	D									
SB TH	10.1	0.52	B	18.2	0.74	B	13.6	0.73	B	10.6	0.56	B	20.3	0.79	C	14.4	0.76	B									
SB RT	5.9	0.03	A	8.5	0.07	A	7.3	0.05	A	6.0	0.03	A	8.5	0.07	A	7.2	0.05	A									
Overall	13.9	-	B	19.9	-	B	13.6	-	B	13.9	-	B	20.8	-	C	14.1	-	B									
7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street																											
NB LT	41.0	0.75	D	93.2	0.85	F	50.7	0.71	D	46.8	0.79	D	110.3	0.90	F	66.4	0.83	E									
NB TH/RT	16.1	0.69	B	22.4	0.67	C	13.8	0.56	B	15.6	0.66	B	21.2	0.65	C	16.0	0.55	B									
EB LT/TH	44.6	0.46	D	87.6	0.59	F	49.5	0.57	D	51.6	0.50	D	113.5	0.80	F	64.6	0.61	E									
EB RT	28.6	0.07	C	65.4	0.52	E	37.2	0.35	D	32.6	0.08	C	77.8	0.67	E	44.2	0.44	D	**Same as Base Year 2030**								
WB LT/TH/RT	45.1	0.17	D	102.0	0.23	F	55.8	0.32	E	52.1	0.19	D	118.7	0.27	F	77.6	0.40	E									
SB LT	46.6	0.57	D	115.1	0.72	F	55.1	0.51	E	53.9	0.60	D	142.6	0.77	F	76.5	0.58	E									
SB TH	22.0	0.75	C	42.2	0.88	D	21.1	0.76	C	24.0	0.77	C	53.6	0.92	D	31.8	0.81	C									
SB RT	9.8	0.08	A	19.6	0.12	B	12.7	0.14	B	10.2	0.10	B	23.8	0.18	C	19.9	0.23	B									
Overall	23.6	-	C	46.0	-	D	24.6	-	C	25.5	-	C	57.1	-	E	35.1	-	D									
8: Honoapiilani Highway & Leialii Parkway																											
NB LT	75.6	0.44	E	69.0	0.49	E	72.2	0.44	E	75.1	0.44	E	68.9	0.49	E	71.6	0.44	E									
NB TH/RT	8.8	0.70	A	2.3	0.76	A	2.9	0.60	A	9.3	0.73	A	2.8	0.82	A	3.4	0.67	A									
EB LT/TH/RT	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D									
WB LT	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E	**Same as Base Year 2030**								
WB TH/RT	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D									
SB LT	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E									
SB TH/RT	5.3	0.51	A	13.6	0.84	B	10.3	0.71	B	5.6	0.54	A	20.4	0.92	C	12.6	0.78	B									
Overall	9.1	-	A	11.0	-	B	11.0	-	B	9.5	-	A	14.5	-	B	12.0	-	B									
9: Honoapiilani Highway & Front Street/Flemming Road																											
NB LT	88.5	0.73	F	94.7	0.74	F	87.3	0.84	F	86.5	0.73	F	91.0	0.74	F	84.9	0.84	F									
NB TH/RT	7.6	0.67	A	1.9	0.71	A	16.3	0.51	B	8.0	0.70	A	2.3	0.78	A	7.4	0.57	A									
EB LT/TH/RT	52.7	0.48	D	59.5	0.72	E	57.8	0.66	E	52.7	0.48	D	59.5	0.72	E	57.8	0.66	E									
WB LT/TH/RT	54.3	0.61	D	49.8	0.24	D	52.4	0.32	D	54.3	0.61	D	49.8	0.24	D	52.4	0.32	D	**Same as Base Year 2030**								
SB LT	87.5	0.80	F	86.4	0.74	F	87.2	0.82	F	87.0	0.80	F	77.7	0.74	E	83.7	0.82	F									
SB TH	4.9	0.49	A	11.9	0.80	B	7.8	0.64	A	5.2	0.52	A	13.9	0.88	B	8.7	0.71	A									
SB RT	3.2	0.11	A	5.6	0.24	A	4.3	0.17	A	3.2	0.12	A	5.5	0.24	A	4.3	0.18	A									
Overall	9.9	-	A	10.3	-	B	14.8	-	B	10.0	-	B	11.1	-	B	11.4	-	B									

Table 4.5: Base Year 2025, Base Year 2030 and Base Year 2030 with Mitigation Level of Service Summary Cont'd

Intersection	Base Year 2025									Base Year 2030									Base Year 2030 with Mitigation								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
10: Honoapiilani Highway & Kapunakea Street																											
NB LT	68.5	0.79	E	62.7	0.79	E	63.8	0.78	E	68.5	0.79	E	62.7	0.79	E	63.0	0.78	E	68.5	0.79	E	62.7	0.79	E	62.1	0.78	E
NB TH/RT	0.4	0.76	A	0.4	0.76	A	3.3	0.61	A	0.5	0.79	A	0.5	0.78	A	13.2	0.69	B	0.3	0.69	A	0.4	0.74	A	1.4	0.65	A
EB LT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	59.4	0.61	E	70.6	0.77	E	58.5	0.71	E
EB LT/TH	47.1	0.48	D	52.4	0.64	D	52.1	0.65	D	47.1	0.48	D	62.8	0.75	E	52.1	0.65	D	-	-	-	-	-	-	-	-	-
EB TH/RT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49.9	0.11	D	48.9	0.17	D	44.3	0.09	D
EB RT	38.7	0.01	D	39.5	0.02	D	39.5	0.03	D	38.7	0.01	D	43.4	0.02	D	39.5	0.03	D	-	-	-	-	-	-	-	-	-
WB LT	69.8	0.70	E	76.6	0.70	E	76.4	0.70	E	69.8	0.70	E	214.2	1.17	F*	76.4	0.70	E	59.9	0.62	E	55.6	0.44	E	49.0	0.34	D
WB TH/RT	39.4	0.07	D	40.1	0.07	D	39.8	0.06	D	39.4	0.07	D	44.0	0.08	D	39.8	0.06	D	49.8	0.10	D	48.2	0.10	D	44.2	0.07	D
SB LT	101.0	0.83	F	72.1	0.80	E	85.2	0.84	F	100.4	0.83	F	70.5	0.80	E	82.6	0.84	F	100.4	0.83	F	70.5	0.80	E	82.2	0.84	F
SB TH/RT	17.8	0.64	B	10.4	0.95	B	10.9	0.82	B	18.9	0.68	B	19.8	0.99	B	14.6	0.90	B	10.7	0.59	B	8.5	0.94	A	4.6	0.85	A
Overall	14.0	-	B	12.3	-	B	13.7	-	B	14.3	-	B	20.6	-	C	19.2	-	B	11.0	-	B	10.9	-	B	8.8	-	A
11: Honoapiilani Highway & Keawe Street																											
NB LT	79.7	0.79	E	70.1	0.77	E	67.0	0.77	E	79.7	0.79	E	70.1	0.77	E	67.0	0.77	E									
NB TH	29.7	0.74	C	42.8	0.86	D	35.2	0.75	D	32.7	0.80	C	67.1	1.01	F*	52.1	0.95	D									
NB RT	17.3	0.13	B	23.0	0.22	C	22.2	0.17	C	17.3	0.13	B	21.9	0.22	C	22.2	0.21	C									
EB LT/TH	61.3	0.48	E	56.2	0.50	E	51.7	0.36	D	61.3	0.48	E	56.3	0.50	E	51.7	0.36	D									
EB RT	56.6	0.02	E	51.3	0.06	D	48.6	0.05	D	56.6	0.02	E	51.2	0.04	D	48.6	0.05	D	**Same as Base Year 2030**								
WB LT	50.6	0.49	D	54.3	0.71	D	43.0	0.59	D	50.6	0.49	D	64.4	0.79	E	43.0	0.59	D									
WB TH	45.7	0.18	D	40.0	0.20	D	36.0	0.19	D	45.7	0.18	D	41.6	0.21	D	36.0	0.19	D									
WB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A									
SB LT	61.3	0.94	E	46.4	0.95	D	57.7	0.88	E	60.7	0.94	E	42.3	0.95	D	58.0	0.91	E									
SB TH/RT	1.0	0.47	A	0.6	0.57	A	27.3	0.56	C	1.0	0.50	A	0.3	0.65	A	18.7	0.64	B									
Overall	27.0	-	C	27.9	-	C	37.5	-	D	26.9	-	C	32.5	-	C	37.3	-	D									

* Denotes overcapacity condition, v/c ≥ 1.

4.7 Base Year 2035 Analysis

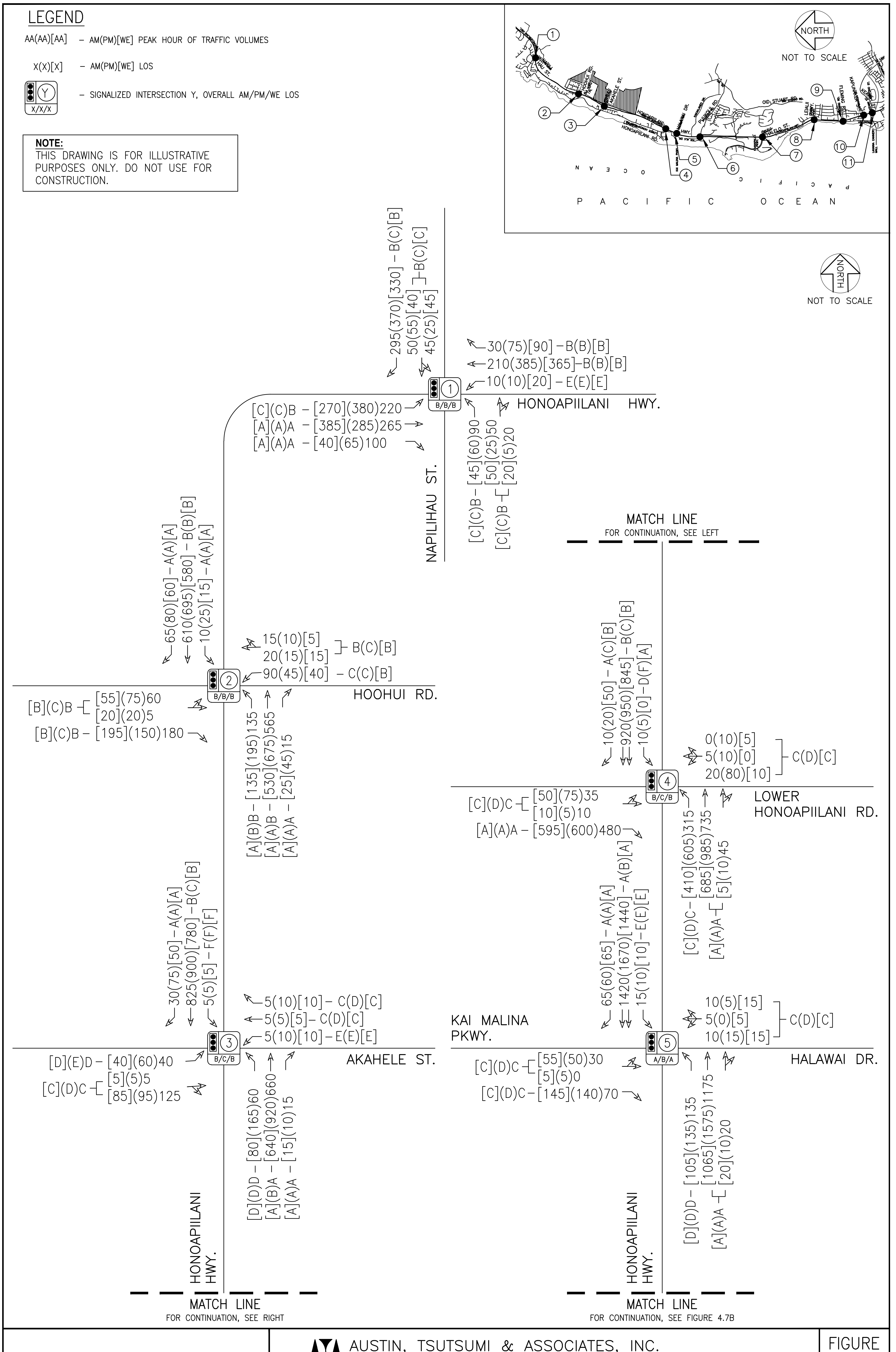
It is anticipated that by Base Year 2035, traffic will have increased over Base Year 2030 conditions due to the continued development of the Lahaina and Kaanapali regions. Actual growth within the study region may vary based upon the actual construction of the various nearby developments.

4.7.1 Base Year 2035 Intersection Analysis

By Base Year 2035 without the Project, traffic at the study intersections along Honoapiilani Highway is estimated to generally increase by an additional 2% along the corridor during the AM, PM and WE peak hours of traffic over Base Year 2030 conditions. The majority of study intersections are forecast to operate similar to Base Year 2030. Overall intersection delays are anticipated to increase by only 1-5 seconds at the study intersections from Base Year 2030 conditions. Intersection movements are expected to continue operating with LOS similar to Base Year 2030 in Base Year 2035.

As noted in Section 4.6.1, the northbound approach of Honoapiilani Highway is forecast to operate at overcapacity conditions at the Honoapiilani Highway/Keawe Street intersection during the PM peak hour of traffic. No mitigation is proposed at this intersection; however, it should be noted that the intersection is anticipated to experience significant reductions in traffic upon completion of the LBR Phase 1C which will extend the bypass road to Kaanapali. At the time of this report, allocation of State funds for construction of Phase 1C is currently under discussion.

Figure 4.7 illustrates the Base Year 2035 forecast traffic volumes and LOS for the study intersection movements. Table 4.6 summarizes the Base Year 2035 LOS at the study intersections compared to Base Year 2030 conditions. LOS worksheets are provided in Appendix C. Full Base Year 2022, 2025, 2030 and 2035 roadway improvements are listed in Appendix D.



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BASE YEAR 2035 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 4.7A

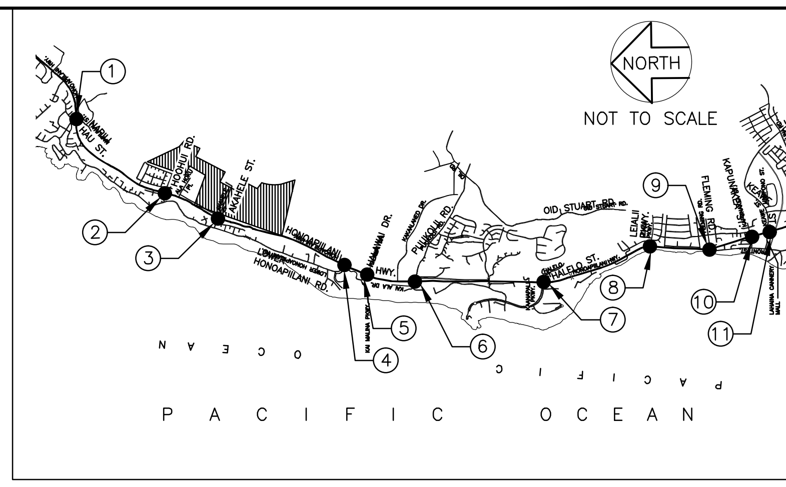
LEGEND

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

X(X)[X] – AM(PM)[WE] LOS

Y X/X/X – SIGNALIZED INTERSECTION Y, OVERALL AM/PM/WE LOS

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



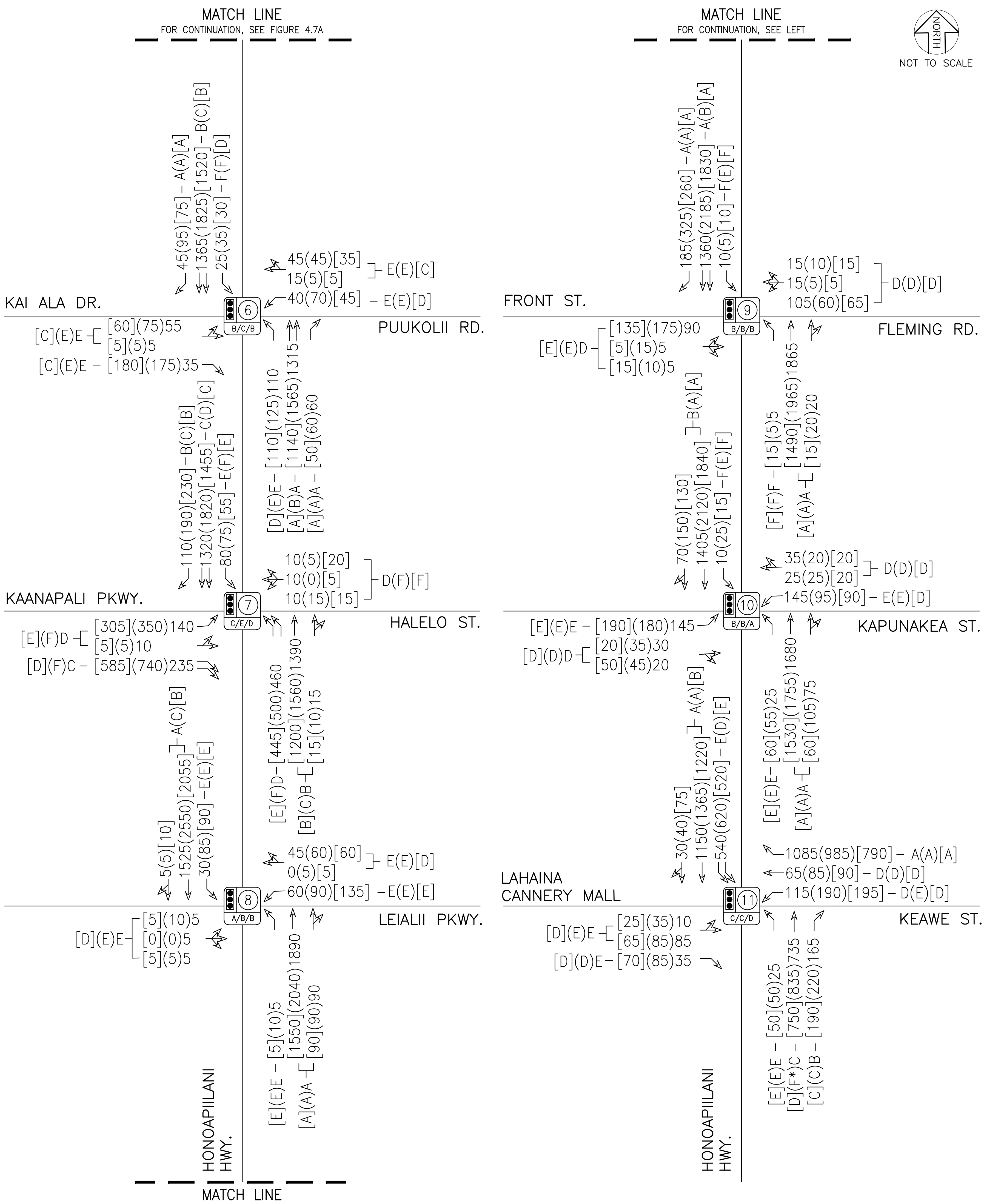


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FIGURE 4.7B

BASE YEAR 2035 LANE CONFIGURATION, VOLUMES AND LOS

Table 4.6: Base Year 2030 with Mitigation and Base Year 2035 Level of Service Summary

	Base Year 2030 with Mitigation									**Base Year 2035**								
	AM			PM			WE			AM			PM			WE		
Intersection	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Honoapiilani Highway & Napilihau Street																		
NB LT	18.8	0.75	B	23.3	0.84	C	21.5	0.78	C	18.8	0.75	B	23.5	0.85	C	21.9	0.79	C
NB TH	8.3	0.36	A	5.7	0.27	A	7.4	0.42	A	8.4	0.36	A	5.7	0.28	A	7.4	0.42	A
NB RT	6.9	0.08	A	4.7	0.05	A	5.4	0.03	A	6.9	0.08	A	4.7	0.05	A	5.4	0.03	A
EB LT/TH	15.0	0.26	B	24.3	0.32	C	20.3	0.31	C	15.0	0.26	B	24.5	0.32	C	20.6	0.31	C
EB RT	14.5	0.15	B	23.0	0.13	C	19.3	0.17	B	14.5	0.15	B	23.1	0.12	C	19.6	0.17	B
WB LT	17.4	0.30	B	27.3	0.32	C	22.3	0.21	C	17.4	0.30	B	27.5	0.32	C	22.7	0.21	C
WB TH/RT	14.7	0.22	B	23.0	0.14	C	20.0	0.29	B	14.7	0.22	B	23.1	0.14	C	20.3	0.29	C
SB LT	66.2	0.72	E	78.0	0.73	E	58.9	0.78	E	66.2	0.72	E	78.3	0.73	E	59.5	0.78	E
SB TH	14.1	0.47	B	18.7	0.67	B	15.4	0.61	B	14.2	0.48	B	18.8	0.67	B	15.5	0.62	B
SB RT	11.2	0.02	B	12.8	0.05	B	10.9	0.06	B	11.2	0.02	B	12.8	0.05	B	10.9	0.06	B
Overall	14.2	-	B	18.0	-	B	15.6	-	B	14.2	-	B	18.1	-	B	15.7	-	B
2: Honoapiilani Highway & Hoohui Road																		
NB LT	10.8	0.39	B	11.2	0.53	B	8.7	0.35	A	11.0	0.40	B	11.5	0.54	B	8.8	0.36	A
NB TH	10.7	0.64	B	9.4	0.68	A	8.9	0.61	A	10.7	0.64	B	9.5	0.69	A	8.9	0.61	A
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
EB LT/TH	19.3	0.18	B	22.9	0.33	C	18.1	0.23	B	19.6	0.18	B	23.2	0.34	C	18.4	0.24	B
EB RT	18.1	0.06	B	21.1	0.06	C	17.3	0.08	B	18.4	0.06	B	21.4	0.06	C	17.5	0.08	B
WB LT	22.2	0.30	C	25.4	0.22	C	19.7	0.15	B	22.5	0.30	C	25.7	0.22	C	19.9	0.15	B
WB TH/RT	18.2	0.07	B	21.2	0.07	C	17.2	0.07	B	18.4	0.07	B	21.4	0.07	C	17.4	0.07	B
SB LT	9.5	0.03	A	8.0	0.07	A	7.7	0.04	A	9.5	0.03	A	8.1	0.07	A	7.7	0.04	A
SB TH	15.7	0.81	B	13.9	0.82	B	12.6	0.77	B	15.8	0.81	B	14.0	0.82	B	12.7	0.77	B
SB RT	9.1	0.05	A	7.5	0.06	A	7.6	0.04	A	9.1	0.05	A	7.5	0.06	A	7.5	0.04	A
Overall	13.9	-	B	12.6	-	B	11.3	-	B	13.9	-	B	12.7	-	B	11.4	-	B
3: Honoapiilani Highway & Akahele Street																		
NB LT	45.9	0.77	D	50.1	0.83	D	40.5	0.76	D	46.8	0.77	D	51.4	0.83	D	41.2	0.76	D
NB TH	10.0	0.64	B	14.1	0.78	B	9.7	0.62	A	10.0	0.64	A	14.4	0.79	B	9.8	0.63	A
NB RT	5.9	0.01	A	5.3	0.01	A	5.9	0.01	A	5.8	0.01	A	5.2	0.01	A	5.8	0.01	A
EB LT	50.0	0.74	D	59.6	0.77	E	48.3	0.73	D	51.8	0.75	D	60.8	0.77	E	49.5	0.74	D
EB TH/RT	27.5	0.07	C	39.5	0.05	D	27.2	0.05	C	28.4	0.07	C	40.6	0.05	D	27.8	0.05	C
WB LT	73.5	0.53	E	74.2	0.59	E	55.5	0.56	E	74.6	0.53	E	75.7	0.59	E	56.3	0.56	E
WB TH	29.0	0.03	C	42.7	0.04	D	28.4	0.03	C	29.9	0.03	C	44.0	0.04	D	29.1	0.03	C
WB RT	28.9	0.01	C	42.6	0.01	D	28.3	0.01	C	29.8	0.01	C	43.8	0.01	D	29.0	0.01	C
SB LT	116.1	0.71	F	135.0	0.72	F	114.8	0.71	F	117.4	0.71	F	136.6	0.72	F	115.7	0.71	F
SB TH	15.8	0.86	B	29.8	0.92	C	16.0	0.85	B	16.4	0.87	B	31.5	0.93	C	16.1	0.86	B
SB RT	7.3	0.02	A	10.0	0.05	A	7.8	0.04	A	7.2	0.02	A	9.9	0.05	A	7.7	0.04	A
Overall	15.9	-	B	25.5	-	C	16.0	-	B	16.2	-	B	26.4	-	C	16.1	-	B

Table 4.6: Base Year 2030 with Mitigation and Base Year 2035 Level of Service Summary Cont'd

Intersection	Base Year 2030 with Mitigation									Base Year 2035								
	AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
4: Honoapiilani Highway & Lower Honoapiilani Road																		
NB LT	24.8	0.84	C	38.6	0.94	D	23.5	0.87	C	25.3	0.85	C	40.3	0.95	D	24.0	0.88	C
NB TH/RT	4.5	0.34	A	4.3	0.38	A	2.4	0.26	A	4.5	0.34	A	4.3	0.38	A	2.3	0.27	A
EB LT/TH	27.6	0.21	C	48.8	0.42	D	29.8	0.30	C	28.2	0.21	C	50.1	0.42	D	30.4	0.31	C
EB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
WB LT/TH/RT	27.0	0.11	C	49.6	0.50	D	28.0	0.05	C	27.6	0.11	C	50.9	0.51	D	28.6	0.05	C
SB LT	53.7	0.74	D	95.3	0.73	F	0.0	0.00	A	54.5	0.74	D	96.9	0.73	F	0.0	0.00	A
SB TH	13.2	0.60	B	30.2	0.74	C	15.2	0.60	B	13.3	0.60	B	30.8	0.74	C	15.3	0.61	B
SB RT	9.1	0.01	A	20.5	0.01	C	10.9	0.03	B	9.1	0.01	A	20.7	0.01	C	10.9	0.03	B
Overall	12.4	-	B	24.1	-	C	13.0	-	B	12.5	-	B	24.6	-	C	13.1	-	B
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive																		
NB LT	35.0	0.80	D	47.9	0.82	D	38.6	0.78	D	35.9	0.80	D	48.7	0.83	D	39.4	0.78	D
NB TH/RT	3.9	0.46	A	7.4	0.62	A	4.8	0.44	A	3.9	0.47	A	7.6	0.64	A	4.8	0.44	A
EB LT/TH	33.8	0.18	C	40.7	0.23	D	33.5	0.27	C	34.7	0.18	C	41.5	0.24	D	34.3	0.27	C
EB RT	33.6	0.01	C	39.7	0.03	D	32.6	0.04	C	34.4	0.01	C	40.5	0.03	D	33.4	0.04	C
WB LT/TH/RT	34.1	0.11	C	42.0	0.09	D	32.8	0.11	C	35.0	0.12	C	42.8	0.09	D	33.7	0.12	C
SB LT	57.8	0.79	E	78.1	0.78	E	63.8	0.76	E	59.1	0.79	E	79.3	0.78	E	64.9	0.76	E
SB TH	8.0	0.64	A	14.0	0.77	B	9.1	0.66	A	8.0	0.65	A	14.5	0.78	B	9.2	0.67	A
SB RT	4.4	0.04	A	6.4	0.04	A	4.9	0.04	A	4.3	0.04	A	6.4	0.04	A	4.9	0.04	A
Overall	8.2	-	A	13.0	-	B	9.5	-	A	8.3	-	A	13.3	-	B	9.5	-	A
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road																		
NB LT	74.2	0.84	E	77.9	0.86	E	41.8	0.78	D	74.2	0.84	E	77.8	0.86	E	42.3	0.78	D
NB TH	6.4	0.50	A	10.4	0.62	B	8.3	0.52	A	6.5	0.51	A	10.6	0.64	B	8.3	0.53	A
NB RT	3.8	0.04	A	5.3	0.04	A	5.3	0.03	A	3.8	0.04	A	5.3	0.04	A	5.3	0.03	A
EB LT/TH	68.7	0.38	E	67.2	0.37	E	33.4	0.24	C	68.7	0.38	E	67.2	0.37	E	33.9	0.24	C
EB RT	63.3	0.01	E	63.7	0.13	E	32.1	0.05	C	63.3	0.01	E	63.7	0.13	E	32.6	0.05	C
WB LT	75.0	0.39	E	78.4	0.54	E	37.0	0.23	D	75.0	0.39	E	78.4	0.54	E	37.5	0.23	D
WB TH/RT	64.1	0.10	E	62.6	0.03	E	31.9	0.03	C	64.1	0.10	E	62.6	0.03	E	32.4	0.03	C
SB LT	82.8	0.68	F	89.0	0.77	F	44.6	0.58	D	82.8	0.68	F	89.0	0.77	F	45.2	0.59	D
SB TH	10.6	0.56	B	20.3	0.79	C	14.4	0.76	B	10.8	0.57	B	21.0	0.81	C	14.7	0.77	B
SB RT	6.0	0.03	A	8.5	0.07	A	7.2	0.05	A	6.0	0.03	A	8.5	0.07	A	7.1	0.05	A
Overall	13.9	-	B	20.8	-	C	14.1	-	B	14.0	-	B	21.1	-	C	14.2	-	B

Table 4.6: Base Year 2030 with Mitigation and Base Year 2035 Level of Service Summary Cont'd

Intersection	Base Year 2030 with Mitigation									Base Year 2035								
	AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street																		
NB LT	46.8	0.79	D	110.3	0.90	F	66.4	0.83	E	48.2	0.79	D	118.3	0.91	F	68.9	0.84	E
NB TH/RT	15.6	0.66	B	21.2	0.65	C	16.0	0.55	B	15.8	0.67	B	21.2	0.66	C	16.1	0.55	B
EB LT/TH	51.6	0.50	D	113.5	0.80	F	64.6	0.61	E	53.1	0.50	D	120.4	0.82	F	67.2	0.62	E
EB RT	32.6	0.08	C	77.8	0.67	E	44.2	0.44	D	33.6	0.08	C	81.9	0.69	F	46.1	0.44	D
WB LT/TH/RT	52.1	0.19	D	118.7	0.27	F	77.6	0.40	E	53.6	0.19	D	122.8	0.27	F	80.5	0.41	F
SB LT	53.9	0.60	D	142.6	0.77	F	76.5	0.58	E	55.4	0.61	E	152.4	0.80	F	79.4	0.59	E
SB TH	24.0	0.77	C	53.6	0.92	D	31.8	0.81	C	24.2	0.77	C	54.9	0.93	D	32.4	0.82	C
SB RT	10.2	0.10	B	23.8	0.18	C	19.9	0.23	B	10.2	0.09	B	23.6	0.18	C	20.0	0.23	B
Overall	25.5	-	C	57.1	-	E	35.1	-	D	25.9	-	C	59.2	-	E	35.9	-	D
8: Honoapiilani Highway & Leialii Parkway																		
NB LT	75.1	0.44	E	68.9	0.49	E	71.6	0.44	E	74.9	0.44	E	68.7	0.49	E	71.5	0.44	E
NB TH/RT	9.3	0.73	A	2.8	0.82	A	3.4	0.67	A	9.7	0.75	A	2.9	0.84	A	3.5	0.69	A
EB LT/TH/RT	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D
WB LT	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E
WB TH/RT	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D
SB LT	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E
SB TH/RT	5.6	0.54	A	20.4	0.92	C	12.6	0.78	B	5.8	0.56	A	23.2	0.94	C	13.2	0.79	B
Overall	9.5	-	A	14.5	-	B	12.0	-	B	9.7	-	A	16.0	-	B	12.3	-	B
9: Honoapiilani Highway & Front Street/Flemming Road																		
NB LT	86.5	0.73	F	91.0	0.74	F	84.9	0.84	F	88.1	0.73	F	91.8	0.74	F	84.4	0.84	F
NB TH/RT	8.0	0.70	A	2.3	0.78	A	7.4	0.57	A	8.4	0.72	A	2.6	0.80	A	7.5	0.58	A
EB LT/TH/RT	52.7	0.48	D	59.5	0.72	E	57.8	0.66	E	52.7	0.48	D	59.5	0.72	E	57.8	0.66	E
WB LT/TH/RT	54.3	0.61	D	49.8	0.24	D	52.4	0.32	D	54.3	0.61	D	49.8	0.24	D	52.4	0.32	D
SB LT	87.0	0.80	F	77.7	0.74	E	83.7	0.82	F	86.7	0.80	F	75.6	0.74	E	83.1	0.82	F
SB TH	5.2	0.52	A	13.9	0.88	B	8.7	0.71	A	5.3	0.53	A	14.3	0.90	B	8.9	0.73	A
SB RT	3.2	0.12	A	5.5	0.24	A	4.3	0.18	A	3.2	0.12	A	5.5	0.24	A	4.3	0.18	A
Overall	10.0	-	B	11.1	-	B	11.4	-	B	10.2	-	B	11.4	-	B	11.4	-	B
10: Honoapiilani Highway & Kapunakea Street																		
NB LT	68.5	0.79	E	62.7	0.79	E	62.1	0.78	E	68.5	0.79	E	62.7	0.79	E	62.1	0.78	E
NB TH/RT	0.3	0.69	A	0.4	0.74	A	1.4	0.65	A	0.3	0.71	A	0.4	0.75	A	1.4	0.66	A
EB LT	59.4	0.61	E	70.6	0.77	E	58.5	0.71	E	59.4	0.61	E	75.1	0.80	E	58.5	0.71	E
EB TH/RT	49.9	0.11	D	48.9	0.17	D	44.3	0.09	D	49.9	0.11	D	49.8	0.18	D	44.3	0.09	D
WB LT	59.9	0.62	E	55.6	0.44	E	49.0	0.34	D	59.9	0.62	E	56.6	0.45	E	49.0	0.34	D
WB TH/RT	49.8	0.10	D	48.2	0.10	D	44.2	0.07	D	49.8	0.10	D	49.0	0.10	D	44.2	0.07	D
SB LT	100.4	0.83	F	70.5	0.80	E	82.2	0.84	F	100.1	0.83	F	69.9	0.80	E	81.4	0.84	F
SB TH/RT	10.7	0.59	B	8.5	0.94	A	4.6	0.85	A	10.9	0.60	B	8.0	0.95	A	4.9	0.86	A
Overall	11.0	-	B	10.9	-	B	8.8	-	A	11.0	-	B	10.8	-	B	8.9	-	A

Table 4.6: Base Year 2030 with Mitigation and Base Year 2035 Level of Service Summary Cont'd

Intersection	Base Year 2030 with Mitigation									Base Year 2035								
	AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
11: Honoapiilani Highway & Keawe Street																		
NB LT	79.7	0.79	E	70.1	0.77	E	67.0	0.77	E	79.7	0.79	E	70.1	0.77	E	67.1	0.77	E
NB TH	32.7	0.80	C	67.1	1.01	F*	52.1	0.95	D	33.6	0.81	C	74.1	1.04	F*	50.2	0.94	D
NB RT	17.3	0.13	B	21.9	0.22	C	22.2	0.21	C	17.3	0.13	B	21.9	0.22	C	21.3	0.20	C
EB LT/TH	61.3	0.48	E	56.3	0.50	E	51.7	0.36	D	61.3	0.48	E	56.3	0.50	E	51.7	0.36	D
EB RT	56.6	0.02	E	51.2	0.04	D	48.6	0.05	D	56.6	0.02	E	51.2	0.04	D	48.6	0.05	D
WB LT	50.6	0.49	D	64.4	0.79	E	43.0	0.59	D	50.6	0.49	D	64.4	0.79	E	44.5	0.61	D
WB TH	45.7	0.18	D	41.6	0.21	D	36.0	0.19	D	45.7	0.18	D	41.6	0.21	D	36.8	0.19	D
WB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
SB LT	60.7	0.94	E	42.3	0.95	D	58.0	0.91	E	61.3	0.94	E	43.9	0.95	D	61.7	0.93	E
SB TH/RT	1.0	0.50	A	0.3	0.65	A	18.7	0.64	B	1.1	0.51	A	0.5	0.66	A	18.2	0.65	B
Overall	26.9	-	C	32.5	-	C	37.3	-	D	27.2	-	C	34.5	-	C	37.2	-	D

* Denotes overcapacity condition, v/c ≥ 1.

5. FUTURE YEAR SCENARIOS

5.1 Background

The Project is located upon approximately 310 acres of undeveloped land in Lahaina, bounded by Honoapiilani Highway to the west and the Kapalua Airport to the east. The Project proposes to provide 100 single-family (SF) residential units, 800 multi-family (MF) residential units, an elementary school, a 10-acre park and three (3) retail centers, totaling 70,000 square feet. In addition, a new roadway will be constructed just east and parallel to Honoapiilani Highway that will provide vehicular, bike and pedestrian access to link the Project's development north and south of Mahinahina Gulch. The Project will be constructed in seven (7) phases, but for purposes of this TIAR, will be analyzed as four (4) scenarios.

<u>Scenario 1</u> – Develop Phase 1 with a build-out of 2022 that includes the following:

- 240 MF residential units north of Akahele Street, with direct access provided by a new Project roadway, Road A, intersecting Akahele Street, and a new right-in, right-out (RIRO) access via Honoapiilani Highway.

<u>Scenario 2</u> - Develop Phases 2A and 2B with a build-out of 2025 that include the following:

- 100 MF residential units (Phase 2A) south of Akahele Street with direct access provided by a new Project roadway, Road C, intersecting Akahele Street to the east of Road A.
- 250 MF residential units (Phase 2B) south of Akahele Street with direct access provided by Road A and Road C. 70 of the units will be located in live/work buildings.

<u>Scenario 3</u> – Develop Phases 3-5 with a build-out of 2030 that include the following:

- 210 MF residential units (Phase 3) south of Mahinahina Gulch, with access provided by a new Project roadway, Road J, intersecting Honoapiilani Highway south of Mahinahina Gulch.
- 10-acre park (Phase 3) with two (2) practice fields south of Mahinahina Gulch, with access provided by Road J.
- North Central Neighborhood Retail (Phase 4) consisting of approximately 6,000 square feet of commercial space located north of Akahele Street near the Kapalua Airport, with access provided by Road C.
- South Core Retail (Phase 4) consisting of approximately 55,000 square feet of commercial space located on the southeast corner of the Honoapiilani Highway/Akahele Street intersection, with access provided by Road A.
- South Central Neighborhood Retail (Phase 4) consisting of approximately 9,000 square feet of commercial space located on the northeast corner of the proposed Honoapiilani Highway/Road J intersection, with access provided by Road J.
- 86 SF (Phase 5) residential units north of Akahele Street, with access provided by Road C.
- 14 SF residential units (Phase 5) south of Mahinahina Gulch, with access provided by Road J.

Scenario 4 – A future elementary school, to be planned/developed by the Department of Education (DOE). Since the development of the school is not in the direct controller of the Pulelehua development, the timeframe for this school has yet to be determined. For purposes of this TIAR, a forecast build-out of 2035 was assumed.

- 750-student elementary school, with access provided by Road A.

5.1.1 Travel Demand Estimations

The State of Hawaii Department of Transportation (HDOT) and Maui County provide various Transportation Demand Management (TDM) programs that promote the use of transit, walking, biking and alternative modes of transportation to reduce the use of single-occupant vehicles on roadways. These TDM measures have only been identified and conservatively assumed to yield no vehicular reductions for Project generated traffic.

Maui County currently provides a bus system that offers several routes that connect the major areas in Maui. The Lahaina Islander Route #20 provides regional connectivity between Lahaina and Kahului. The Lahaina Villager Route #23, Kaanapali Islander Route #25 and West Maui Islander Route #28 provide transportation within the towns of Lahaina, Kaanapali and Napili.

HDOT currently provides the Bike Plan Hawaii Master Plan, which identifies existing and proposed bicycle routes that could potentially be implemented in the future. In the vicinity of the Project, a signed shared roadway is currently provided along the 24.4 mile route along Honoapiilani Highway between Waiale Road in Wailuku and Fleming Beach Park in Kapalua. A signed shared roadway is also proposed along the 5.2 mile stretch of Lower Honoapiilani Highway from Lower Aloe Drive to Honoapiilani Highway.

5.1.2 Trip Generation

The Institute of Transportation Engineers (ITE) publishes a book based on empirical data compiled from a body of more than 4,250 trip generation studies submitted by public agencies, developers, consulting firms, and associations. This publication, titled Trip Generation Manual, 10th Edition, provides trip rates and/or formulae based on graphs that correlate vehicular trips with independent variables. The independent variables can range from Dwelling Units (DU) for single-family detached homes to Gross Floor Area (GFA) for commercial or office development. These trip rates/formulae and their associated directional distributions were used to estimate the increase in the number of vehicular trips generated by the proposed Project. The rates selected were based on the land use description.

The Project's mixture of residential and retail land uses interact to create vehicle trips that can be considered internal to the development. Calculation of internal trip capture rates was done using the ITE Trip Generation Handbook, 3rd Edition for retail and residential land uses and generally resulted in an approximate 16% internal capture reduction for the PM peak hour. A minimal 1% internal capture reduction was applied to AM peak hour and no reduction for WE peak hour. Pass-by trip reductions were also applied and based upon information within the ITE Trip Generation Handbook. As a conservative measure, a pass-by rate of 20% was applied to the retail component for the PM and WE peak hours of traffic. No pass-by reductions were applied to the AM peak hour. See Tables 5.1 and 5.2 for Trip Generation formulae and projections for the Project.

5.1.3 Trip Distribution and Assignment

Trips generated by the Project were assigned throughout the study area generally based upon existing travel patterns. The traffic generated by the Project was added to the forecast Base Year 2022, 2025, 2030 and 2035 traffic volumes within the vicinity of the Project to constitute the traffic volumes for Future Year traffic conditions. Figures 5.1, 5.3, 5.6 and 5.8 illustrate the Project-generated trip distribution for Future Year 2022, 2025, 2030 and 2035, respectively.

Table 5.1: Trip Generation Rates

Land Use (ITE Code)	Independent Variable	AM Peak Hour		PM Peak Hour		WE Peak Hour	
		Trip Rate	% Enter	Trip Rate	% Enter	Trip Rate	% Enter
Single-Family Detached Housing (210)	Dwelling Units (DU)	[a]	26%	[b]	64%	[c]	54%
Low-Rise Apartment (220)	Occupied Dwelling Units (DU)	[d]	21%	[e]	65%	[f]	54%
Mid-Rise Residential with 1st-Floor Commercial (231)	Occupied Dwelling Units (DU)	0.45	23%	0.37	71%	-	-
Shopping Center (820)	1,000 SQ FT	[g]	62%	[h]	48%	[i]	52%
Elementary School (520)	Students	0.67	54%	0.17	48%	0.00	0%
Soccer Complex (488)	Fields	0.99	61%	16.43	66%	[j]	48%

[a] T=0.71(X)+4.80

[b] LN(T)=0.96*LN(X)+0.20

[c] T=0.84(X)+17.99

[d] LN(T)=0.92*LN(X)-0.51

[e] LN(T)=0.98*LN(X)-0.52

[f] T=0.48(X)+15.60

[g] T=0.50(X)+151.78

[h] LN(T)=0.74*LN(X)+2.89

[i] LN(T)=0.79*LN(X)+2.79

[j] LN(T)=0.96*LN(X)+3.72

Table 5.2: Project-Generated Trips

	Land Use (ITE Code)	Variable	AM Peak Hour			PM Peak Hour			WE Peak Hour		
			Enter (vph)	Exit (vph)	Total (vph)	Enter (vph)	Exit (vph)	Total (vph)	Enter (vph)	Exit (vph)	Total (vph)
Scenario 1 (2022)	Low-Rise Apartment (220)	240 DU	17	68	85	79	46	125	65	55	120
		Subtotal	17	68	85	79	46	125	65	55	120
	Internal Capture (Residential)[1]		(1)	(8)	(10)	(17)	(7)	(23)	0	0	0
	Total NEW External Project Year 2022 Scenario 1 Trips		**16**	**60**	**75**	**62**	**39**	**102**	**65**	**55**	**120**
Scenario 2 (2025)	Low-Rise Apartment (220)	280 DU	20	79	99	92	54	146	94	80	175
	Mid-Rise Residential with 1st-Floor Commercial (231)	70 DU[2]	7	24	32	18	8	26	0	0	0
		Subtotal	27	103	131	110	62	174	94	80	175
	Internal Capture (Residential)[1]		(3)	(12)	(15)	(25)	(10)	(35)	0	0	0
	Total NEW External Project Year 2025 Scenario 2 Trips		**24**	**91**	**116**	**85**	**52**	**139**	**94**	**80**	**175**
Scenario 3 (2030)	Single-Family Detached Housing (210)	100 DU	19	57	76	64	38	102	55	47	102
	Low-Rise Apartment (220)	210 DU	15	60	74	69	40	109	57	48	105
	Shopping Center (820)	70,000 SQ FT	116	71	187	200	217	417	243	224	467
	Soccer Complex (488)	2 Fields	1	1	2	13	19	33	39	42	80
		Subtotal	151	189	339	346	314	661	394	361	754
	Internal Capture (Residential)[1]		(1)	(11)	(13)	(22)	(10)	(30)	0	0	0
	Internal Capture (Retail)[1]		(3)	(2)	(5)	(20)	(56)	(76)	0	0	0
	Pass-by (Retail)		0	0	0	(40)	(40)	(80)	(45)	(45)	(90)
	Total NEW External Project Year 2030 Scenario 3 Trips		**147**	**176**	**321**	**264**	**208**	**475**	**349**	**316**	**664**
Scenario 4 (2035)	Elementary School (520)	750 Students	271	231	503	61	66	128	0	0	0
		Subtotal	271	231	503	61	66	128	0	0	0
	Internal Capture (School)[1]		(27)	(5)	(32)	(6)	(7)	(13)	0	0	0
	Total NEW External Project Year 2035 Scenario 4 Trips		**244**	**226**	**471**	**55**	**59**	**115**	**0**	**0**	**0**
Total NEW External Project Scenario 1 to 4 Trips			**429**	**554**	**983**	**468**	**360**	**828**	**507**	**452**	**959**

Notes:
1. Internal capture trip volumes assume full build out of the Project. Trips are assumed to be external until future land uses are constructed.
2. Trip generation for live/work units determined using ITE Code 231 Mid-Rise Residential with 1st-Floor Commercial for AM and PM peak hours. Due to lack of WE peak hour data, ITE Code 220 Low-Rise Apartment used to generate trips for live/work units for WE peak hour.

5.2 Future Year 2022 Scenario 1 Analysis

By completion of Scenario 1 in Future Year 2022, the Project is projected to generate a total of 75(102)[120] new external trips during the AM(PM)[WE] peak hours of traffic. Trips generated by the Project are expected to result in growth along major roadways in the study area. All generated traffic will access the site via Honoapiilani Highway at its intersections with Akahele Street and a new right-in, right-out (RIRO) access north of Akahele Street. Due to the relatively minimal traffic increases due to Scenario 1, regional traffic at the study intersections (those not providing direct access to the Project) along Honoapiilani Highway is estimated to increase overall by less than 5%, while local traffic at the study intersections (those providing direct access to the Project) along Honoapiilani Highway is estimated to increase overall by less than 10% from Base Year 2022 without the Project scenario, during the AM, PM and WE peak hours of traffic.

5.2.1 Future Year 2022 Scenario 1 Intersection Analysis

All study intersections are forecast to operate similar to Base Year 2022. The majority of intersection movements forecast to operate at LOS E/F for Base Year 2022 conditions will continue to operate similarly with Future Year 2022 Scenario 1 of the Project. The majority of high volume through movements only experienced delay increases ranging from 1-5 seconds. The main Project access intersections are discussed below.

[3] Honoapiilani Highway/Akahele Street

Since this intersection is the main access from Honoapiilani Highway into the Project's Scenario 1 site, turning movements into and out of Akahele Street will increase. As a result, the intersection will worsen from Base Year 2022, but will continue to operate adequately at overall LOS B(C)[B] for the Future Year 2022 Scenario 1. Various left-turn movements will continue to operate at LOS E/F conditions during all peak hours, mainly due to those left-turn volumes remaining relatively low. It is recommended that the existing signal timing be optimized to accommodate turning movement increases.

Based on A Policy on Geometric Design of Highways and Streets, by the American Association of State Highway and Transportation Officials, dated 2011 (hereinafter referred to as the "AASHTO Green Book"), left-turn storage lane lengths at the Honoapiilani Highway/Akahele Street intersection were determined. See Table 5.3 for the recommended storage lane lengths. Based on the AASHTO Green Book, all anticipated left-turn storage at the intersection is currently accommodated, and no extensions will be required upon completion of Scenario 1.

[12] Honoapiilani Highway/Project RIRO

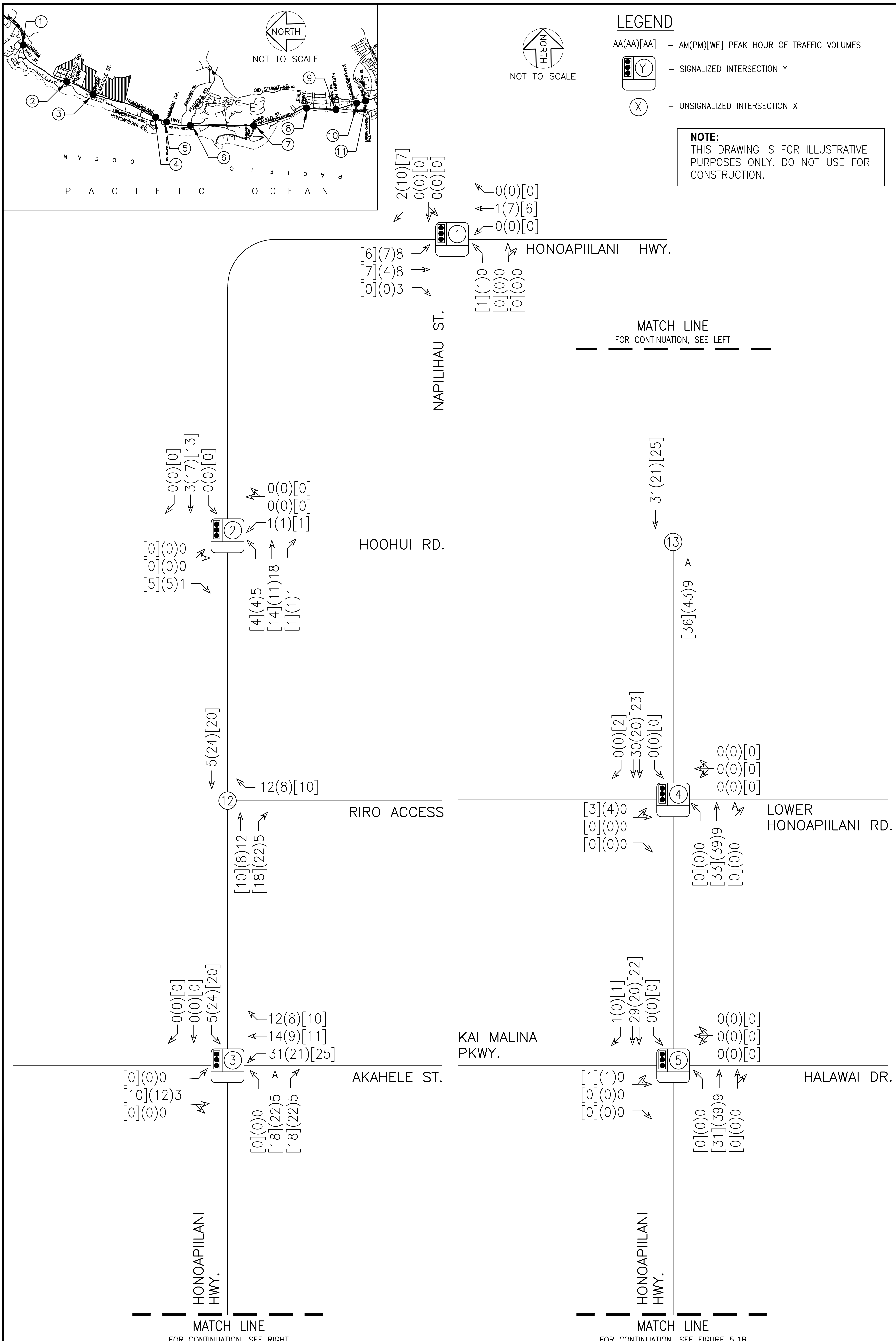
The new RIRO access along Honoapiilani Highway, north of Akahele Street, was analyzed as a stop-controlled intersection with stop control on the westbound right-turn movement out of the Project. The westbound right-turn movement is expected to operate adequately with LOS C or better during all peak hours. It is recommended that a northbound right-turn deceleration lane be provided for entry into the Project at the RIRO. Based on the AASHTO Green Book, the following is recommended:

- Northbound right-turn lane → Provide at least 100 feet of storage space. Additional taper length and/or deceleration length to be provided based upon design and constraints related to access location to nearby Honoapiilani Highway/Akahele Street intersection. Based on AASHTO Green Book, 425 feet accommodates full deceleration length with a design speed of 50 mph.

[14] Akahele Street/Road A

Akahele Street currently services very low existing traffic, with through volumes under 25 vehicles in each direction for all peak hours of traffic, resulting in lengthy gaps along Akahele Street. With the proposed Scenario 1, the northern approach of Road A will be constructed along Akahele Street to provide a new T-intersection. Forecast volumes at the Akahele Street/Road A intersection are anticipated to reach a maximum of 150 vehicles for all peak hours. The intersection is expected to operate adequately with minimal vehicular delays.

Figure 5.1 illustrates the Project-generated trips for Future Year 2022 Scenario 1. Figure 5.2 illustrates the Future Year 2022 Scenario 1 forecast traffic volumes and LOS for the study intersection movements. Figure 5.3 illustrates the Future Year 2022 Scenario 1 forecast traffic volumes, LOS and intersection laneage along Akahele Street. Table 5.4 summarizes the Future Year 2022 Scenario 1 LOS at the study intersections compared to Base Year 2022 with mitigation conditions. LOS worksheets are provided in Appendix C.



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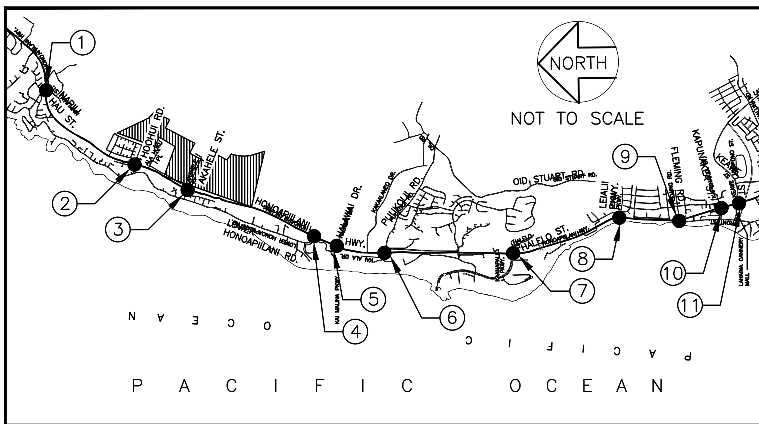
YEAR 2022 SCENARIO 1 PROJECT-GENERATED TRAFFIC

FIGURE 5.1A



NORTH
NOT TO SCALE

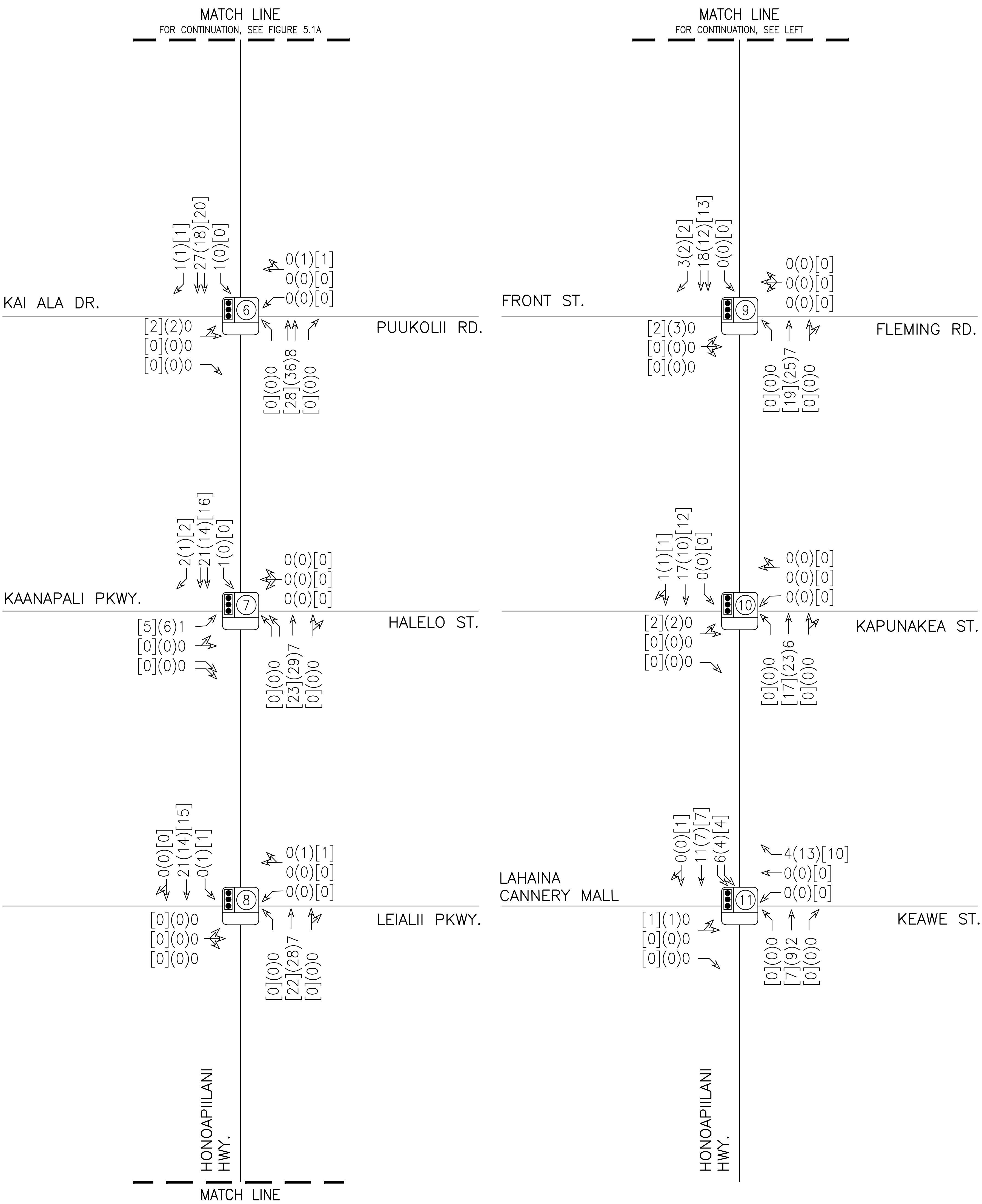
LEGEND

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

Y – SIGNALIZED INTERSECTION Y

X – UNSIGNALIZED INTERSECTION X

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



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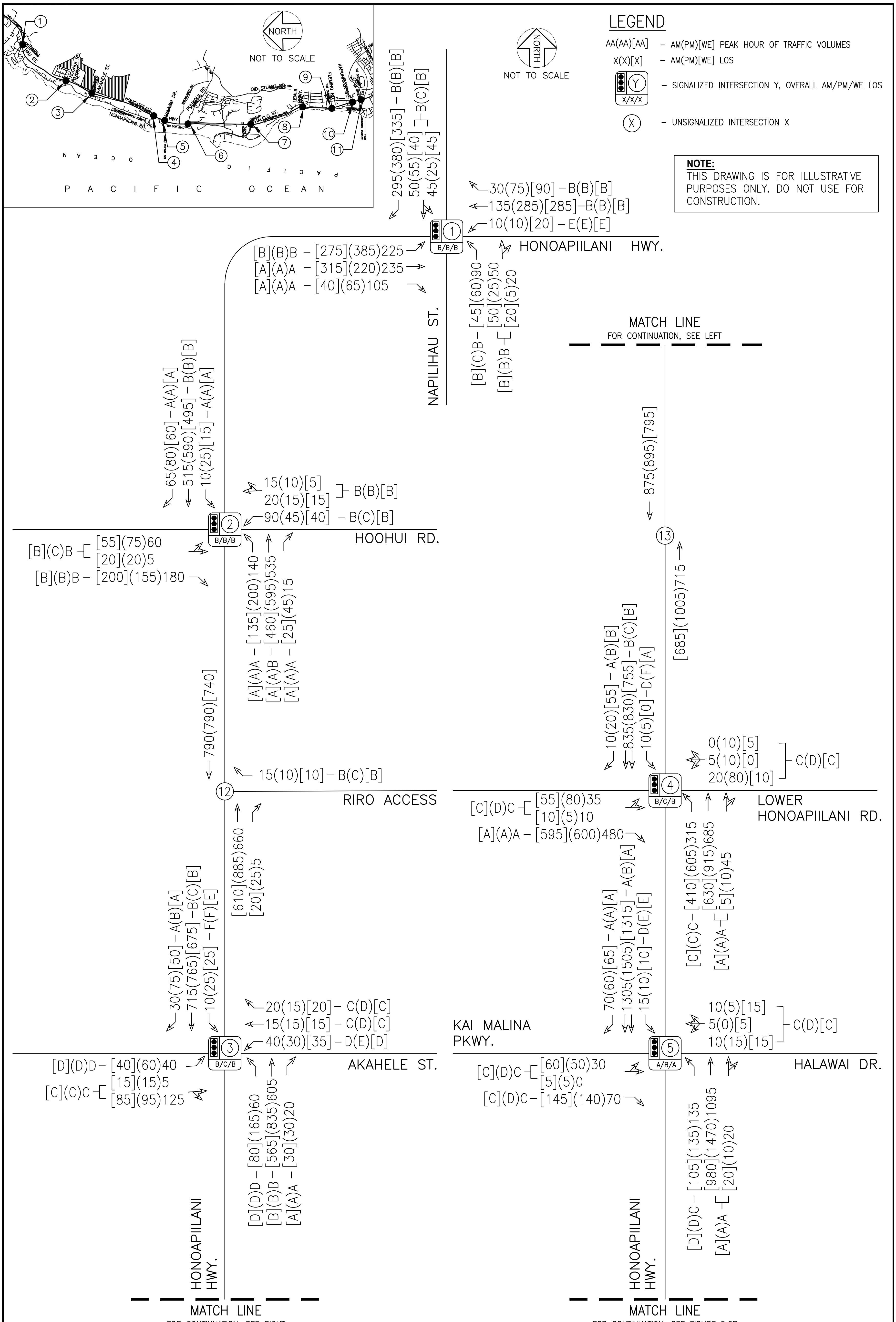
YEAR 2022 SCENARIO 1 PROJECT-GENERATED TRAFFIC

FIGURE 5.1B



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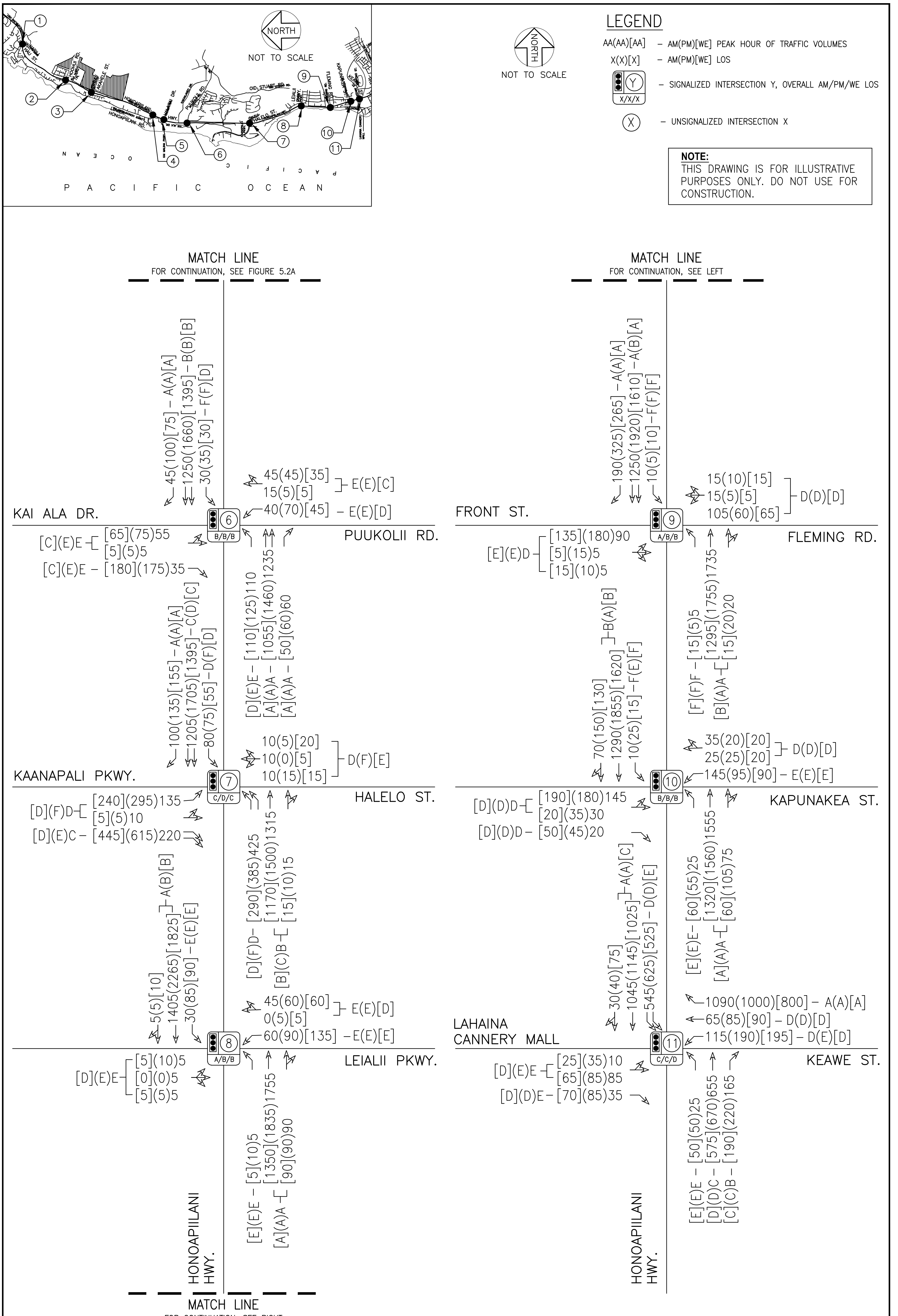
FUTURE YEAR 2022 SCENARIO 1 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 5.2A



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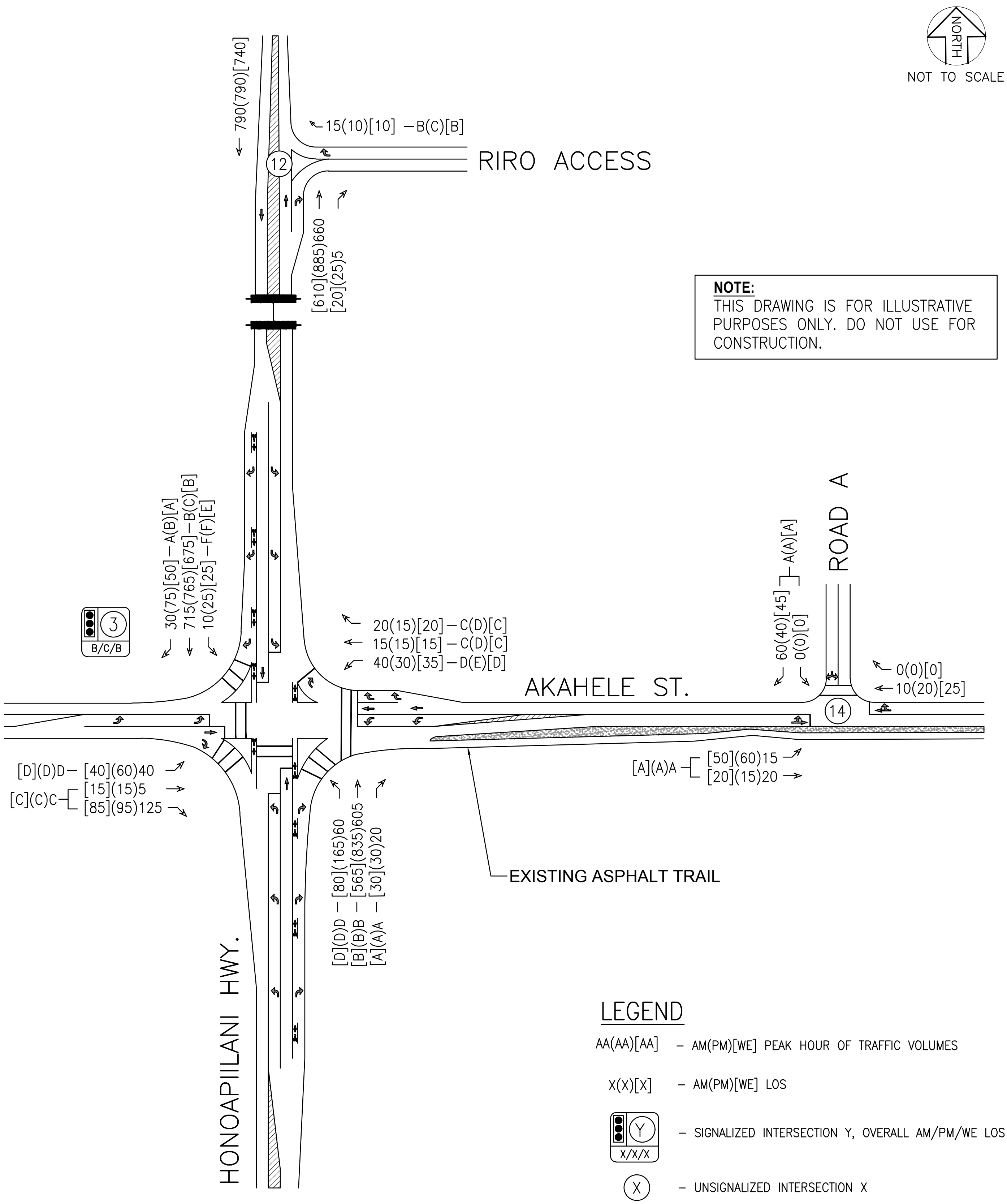
FUTURE YEAR 2022 SCENARIO 1 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 5.2B



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FUTURE YEAR 2022 AKAHELE STREET LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 5.3

Table 5.3: Future Year 2022 (Scenario 1)
Left-Turn Storage Lane Length Calculations

Honoapiilani Highway & Akahele Street Intersection								
			AASHTO					
Movement	Peak Hour	Design Volume per lane (veh)	Cycle Length (sec) [1]	Cycles per Hour	Average Veh. per Cycle	Minimum Storage Length (1.5 factor) [2]		Recommended storage length [3]
						Veh	Ft	
Northbound Left-turn lane [4]	AM	60	100	36	2	3	75	Storage accommodated. Max queue could encroach into taper.
	PM	165	100	36	5	7	**175**	
	WE	80	100	36	3	4	100	
Southbound Left-turn lane	AM	10	100	36	1	1	60	Storage accommodated
	PM	25	100	36	1	2	60	
	WE	25	100	36	1	2	**60**	
Eastbound Left-turn lane	AM	40	100	36	2	2	60	Storage accommodated
	PM	60	100	36	2	3	**75**	
	WE	40	100	36	2	2	60	
Westbound Left-turn lane	AM	40	100	36	2	2	60	Storage accommodated
	PM	30	100	36	1	2	60	
	WE	35	100	36	1	2	**60**	

Notes:

1. Cycle Length based on existing observation. Majority of cycles < 100 seconds.
2. Minimum storage length is 1.5 times the average number of vehicles per cycle; assume 1 vehicle length = 25 ft.
3. Recommended storage length is exclusive of taper length or deceleration length. To be verified upon design.
4. Observations: Existing NBLT majority average 1-3 car queue (75 ft storage) with a few occassional maximum 7 car queue (175 ft storage)

Table 5.4: Base Year 2022 with Mitigation and Future Year 2022 Scenario 1 Level of Service Summary

	Base Year 2022 with Mitigation									**Future Year 2022 Scenario 1**								
	AM			PM			WE			AM			PM			WE		
Intersection	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Honoapiilani Highway & Napilihau Street																		
NB LT	18.8	0.75	B	19.6	0.82	B	19.4	0.77	B	18.8	0.75	B	19.8	0.83	B	19.6	0.77	B
NB TH	8.1	0.32	A	6.0	0.23	A	7.6	0.37	A	8.1	0.32	A	6.0	0.23	A	7.5	0.37	A
NB RT	6.9	0.08	A	5.2	0.05	A	5.9	0.03	A	6.9	0.08	A	5.2	0.05	A	5.8	0.03	A
EB LT/TH	15.0	0.25	B	20.4	0.28	C	17.8	0.28	B	15.1	0.26	B	20.7	0.29	C	18.1	0.28	B
EB RT	14.5	0.16	B	19.4	0.13	B	17.2	0.17	B	14.6	0.16	B	19.7	0.13	B	17.5	0.17	B
WB LT	17.4	0.30	B	22.7	0.27	C	19.4	0.18	B	17.5	0.30	B	23.1	0.28	C	19.8	0.19	B
WB TH/RT	14.7	0.22	B	19.4	0.13	B	17.6	0.27	B	14.8	0.22	B	19.7	0.13	B	17.9	0.27	B
SB LT	66.2	0.72	E	72.3	0.72	E	55.0	0.77	E	66.4	0.72	E	72.7	0.73	E	55.5	0.77	E
SB TH	12.8	0.31	B	17.8	0.60	B	15.2	0.57	B	13.0	0.31	B	18.0	0.61	B	15.3	0.57	B
SB RT	11.2	0.02	B	13.1	0.05	B	11.3	0.06	B	11.3	0.02	B	13.2	0.05	B	11.4	0.06	B
Overall	14.2	-	B	16.6	-	B	15.1	-	B	14.2	-	B	16.8	-	B	15.2	-	B
2: Honoapiilani Highway & Hoohui Road																		
NB LT	9.7	0.36	A	9.2	0.47	A	8.3	0.33	A	9.8	0.37	A	9.5	0.49	A	8.4	0.33	A
NB TH	10.7	0.64	B	9.3	0.66	A	8.9	0.57	A	11.0	0.66	B	9.2	0.66	A	9.0	0.58	A
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
EB LT/TH	17.2	0.17	B	19.8	0.31	B	16.2	0.22	B	17.3	0.17	B	20.4	0.32	C	16.4	0.22	B
EB RT	16.2	0.06	B	18.3	0.07	B	15.6	0.10	B	16.3	0.06	B	18.8	0.07	B	15.8	0.10	B
WB LT	19.8	0.28	B	21.9	0.20	C	17.6	0.14	B	19.9	0.28	B	22.5	0.21	C	17.8	0.14	B
WB TH/RT	16.2	0.07	B	18.3	0.07	B	15.4	0.06	B	16.3	0.07	B	18.8	0.07	B	15.6	0.06	B
SB LT	9.7	0.03	A	8.1	0.07	A	8.0	0.04	A	9.8	0.03	A	8.1	0.07	A	8.0	0.04	A
SB TH	15.0	0.77	B	13.2	0.77	B	12.4	0.73	B	15.1	0.77	B	13.4	0.78	B	12.5	0.73	B
SB RT	9.5	0.05	A	8.0	0.06	A	8.1	0.04	A	9.5	0.05	A	8.0	0.06	A	8.0	0.04	A
Overall	13.2	-	B	11.8	-	B	11.1	-	B	13.3	-	B	11.9	-	B	11.2	-	B
3: Honoapiilani Highway & Akahele Street																		
NB LT	42.5	0.77	D	42.4	0.81	D	37.0	0.76	D	44.5	0.77	D	44.6	0.81	D	39.1	0.76	D
NB TH	10.6	0.64	B	13.0	0.76	B	10.0	0.60	A	11.9	0.66	B	16.1	0.80	B	11.9	0.64	B
NB RT	6.5	0.01	A	5.9	0.01	A	6.4	0.01	A	7.3	0.01	A	6.9	0.02	A	7.6	0.02	A
EB LT	43.6	0.71	D	52.6	0.77	D	42.2	0.71	D	47.3	0.73	D	54.6	0.76	D	45.8	0.72	D
EB TH/RT	23.9	0.08	C	32.6	0.04	C	23.7	0.06	C	25.5	0.06	C	34.4	0.09	C	25.0	0.09	C
WB LT	69.0	0.53	E	65.2	0.57	E	51.0	0.55	D	47.3	0.73	D	63.1	0.74	E	45.4	0.69	D
WB TH	25.2	0.03	C	35.3	0.03	D	24.8	0.03	C	25.6	0.07	C	36.1	0.09	D	25.1	0.07	C
WB RT	25.1	0.01	C	35.2	0.01	D	24.7	0.01	C	25.3	0.01	C	35.6	0.01	D	24.8	0.01	C
SB LT	111.0	0.70	F	125.3	0.71	F	109.9	0.70	F	85.0	0.74	F	80.0	0.82	F	73.4	0.85	E
SB TH	15.3	0.83	B	22.7	0.88	C	15.5	0.83	B	16.8	0.85	B	24.8	0.89	C	17.1	0.84	B
SB RT	7.8	0.02	A	10.6	0.06	B	8.3	0.03	A	8.6	0.02	A	11.2	0.05	B	9.2	0.04	A
Overall	15.7	-	B	21.4	-	C	15.8	-	B	18.0	-	B	24.7	-	C	18.6	-	B

Table 5.4: Base Year 2022 with Mitigation and Future Year 2022 Scenario 1 Level of Service Summary Cont'd

Intersection	Base Year 2022 with Mitigation									Future Year 2022 Scenario 1								
	AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
4: Honoapiilani Highway & Lower Honoapiilani Road																		
NB LT	22.3	0.83	C	29.8	0.94	C	21.1	0.86	C	23.1	0.84	C	30.5	0.94	C	21.9	0.87	C
NB TH/RT	4.7	0.33	A	4.4	0.36	A	2.4	0.24	A	4.6	0.33	A	4.4	0.37	A	2.5	0.25	A
EB LT/TH	24.9	0.19	C	41.4	0.38	D	26.7	0.28	C	25.7	0.20	C	42.7	0.41	D	27.7	0.31	C
EB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
WB LT/TH/RT	24.3	0.10	C	42.1	0.46	D	25.2	0.05	C	25.1	0.11	C	43.3	0.47	D	26.0	0.05	C
SB LT	50.2	0.73	D	86.4	0.72	F	0.0	0.00	A	51.3	0.74	D	87.7	0.72	F	0.0	0.00	A
SB TH	12.9	0.57	B	27.1	0.70	C	14.7	0.57	B	13.0	0.58	B	27.5	0.70	C	14.9	0.58	B
SB RT	9.2	0.00	A	19.4	0.01	B	10.9	0.03	B	9.2	0.00	A	19.5	0.01	B	11.0	0.03	B
Overall	12.0	-	B	20.8	-	C	12.5	-	B	12.1	-	B	21.1	-	C	12.7	-	B
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive																		
NB LT	31.8	0.79	C	43.7	0.82	D	35.3	0.78	D	32.7	0.79	C	44.3	0.82	D	35.9	0.78	D
NB TH/RT	4.1	0.45	A	7.0	0.59	A	4.9	0.41	A	4.0	0.45	A	7.2	0.61	A	4.9	0.42	A
EB LT/TH	30.4	0.16	C	36.9	0.22	D	30.1	0.25	C	31.3	0.17	C	37.5	0.22	D	30.8	0.27	C
EB RT	30.3	0.01	C	36.1	0.03	D	29.4	0.04	C	31.2	0.01	C	36.6	0.03	D	30.0	0.05	C
WB LT/TH/RT	30.9	0.10	C	38.0	0.08	D	29.4	0.10	C	31.8	0.11	C	38.6	0.08	D	30.0	0.11	C
SB LT	53.1	0.78	D	72.5	0.77	E	59.3	0.75	E	54.4	0.78	D	73.3	0.77	E	60.2	0.75	E
SB TH	7.7	0.61	A	12.4	0.72	B	8.7	0.63	A	7.7	0.62	A	12.6	0.73	B	8.8	0.64	A
SB RT	4.5	0.04	A	6.4	0.04	A	5.1	0.04	A	4.5	0.05	A	6.4	0.04	A	5.1	0.04	A
Overall	8.0	-	A	12.0	-	B	9.2	-	A	8.1	-	A	12.1	-	B	9.3	-	A
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road																		
NB LT	74.1	0.84	E	78.1	0.86	E	39.7	0.78	D	74.2	0.84	E	78.1	0.86	E	40.2	0.78	D
NB TH	6.2	0.48	A	9.7	0.58	A	8.2	0.49	A	6.3	0.48	A	9.9	0.59	A	8.3	0.50	A
NB RT	3.8	0.04	A	5.3	0.04	A	5.5	0.03	A	3.8	0.04	A	5.3	0.04	A	5.5	0.03	A
EB LT/TH	68.7	0.38	E	67.2	0.37	E	31.2	0.22	C	68.7	0.38	E	67.2	0.37	E	31.8	0.25	C
EB RT	63.3	0.01	E	63.7	0.13	E	30.0	0.05	C	63.3	0.01	E	63.7	0.13	E	30.4	0.05	C
WB LT	75.0	0.39	E	78.4	0.54	E	34.5	0.21	C	75.0	0.39	E	78.4	0.54	E	35.3	0.22	D
WB TH/RT	64.1	0.10	E	62.6	0.03	E	29.8	0.03	C	64.1	0.10	E	62.6	0.03	E	30.2	0.03	C
SB LT	82.8	0.68	F	89.0	0.77	F	42.3	0.57	D	84.7	0.76	F	89.0	0.77	F	42.8	0.58	D
SB TH	10.0	0.52	A	17.9	0.73	B	13.5	0.72	B	10.1	0.53	B	18.1	0.74	B	13.7	0.73	B
SB RT	5.9	0.03	A	8.5	0.07	A	7.4	0.05	A	5.9	0.03	A	8.5	0.08	A	7.4	0.05	A
Overall	13.8	-	B	19.8	-	B	13.6	-	B	14.1	-	B	19.9	-	B	13.7	-	B

Table 5.4: Base Year 2022 with Mitigation and Future Year 2022 Scenario 1 Level of Service Summary Cont'd

	Base Year 2022 with Mitigation									Future Year 2022 Scenario 1								
	AM			PM			WE			AM			PM			WE		
Intersection	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street																		
NB LT	40.5	0.75	D	91.1	0.85	F	49.5	0.71	D	41.3	0.75	D	92.1	0.85	F	50.3	0.71	D
NB TH/RT	16.1	0.68	B	22.1	0.66	C	13.8	0.56	B	15.9	0.68	B	22.3	0.67	C	13.8	0.57	B
EB LT/TH	44.0	0.45	D	85.3	0.59	F	48.3	0.57	D	44.9	0.46	D	87.0	0.61	F	49.3	0.59	D
EB RT	28.2	0.08	C	63.6	0.51	E	36.2	0.35	D	28.8	0.07	C	64.5	0.51	E	36.9	0.34	D
WB LT/TH/RT	44.5	0.18	D	99.6	0.23	F	54.5	0.31	D	45.4	0.17	D	100.7	0.23	F	55.4	0.32	E
SB LT	46.0	0.56	D	111.6	0.72	F	53.8	0.50	D	47.0	0.57	D	113.2	0.72	F	54.7	0.51	D
SB TH	22.0	0.74	C	41.0	0.88	D	20.9	0.76	C	22.1	0.75	C	41.3	0.88	D	20.9	0.76	C
SB RT	9.8	0.08	A	19.5	0.12	B	12.7	0.14	B	9.8	0.09	A	8.1	0.11	A	6.8	0.12	A
Overall	23.6	-	C	45.1	-	D	24.4	-	C	23.7	-	C	45.0	-	D	24.3	-	C
8: Honoapiilani Highway & Leialii Parkway																		
NB LT	75.7	0.44	E	69.1	0.49	E	72.3	0.44	E	75.6	0.44	E	69.0	0.49	E	72.2	0.44	E
NB TH/RT	8.7	0.69	A	2.3	0.75	A	2.9	0.60	A	8.7	0.70	A	2.4	0.76	A	2.9	0.60	A
EB LT/TH/RT	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D
WB LT	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E
WB TH/RT	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D
SB LT	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E
SB TH/RT	5.2	0.51	A	13.0	0.83	B	10.1	0.70	B	5.3	0.51	A	13.3	0.83	B	10.2	0.70	B
Overall	9.0	-	A	10.7	-	B	10.9	-	B	9.1	-	A	10.8	-	B	11.0	-	B
9: Honoapiilani Highway & Front Street/Flemming Road																		
NB LT	88.9	0.73	F	95.1	0.74	F	87.5	0.84	F	88.9	0.73	F	94.7	0.74	F	87.3	0.84	F
NB TH/RT	7.5	0.66	A	1.8	0.70	A	16.2	0.50	B	7.6	0.67	A	1.9	0.72	A	16.4	0.51	B
EB LT/TH/RT	52.7	0.48	D	59.5	0.72	E	57.8	0.66	E	52.7	0.48	D	59.7	0.73	E	57.8	0.66	E
WB LT/TH/RT	54.3	0.61	D	49.8	0.24	D	52.4	0.32	D	54.3	0.61	D	49.3	0.24	D	52.4	0.32	D
SB LT	87.8	0.80	F	87.3	0.74	F	87.5	0.82	F	87.5	0.80	F	86.8	0.74	F	87.2	0.82	F
SB TH	4.9	0.48	A	11.7	0.79	B	7.7	0.64	A	4.9	0.49	A	12.2	0.79	B	7.7	0.64	A
SB RT	3.2	0.11	A	5.6	0.24	A	4.3	0.17	A	3.2	0.12	A	5.8	0.24	A	4.3	0.17	A
Overall	9.9	-	A	10.3	-	B	14.7	-	B	9.9	-	A	10.5	-	B	14.8	-	B
10: Honoapiilani Highway & Kapunakea Street																		
NB LT	68.5	0.79	E	62.7	0.79	E	64.0	0.78	E	68.5	0.79	E	62.7	0.79	E	63.4	0.78	E
NB TH/RT	0.4	0.75	A	0.4	0.75	A	3.3	0.61	A	0.4	0.75	A	0.4	0.76	A	3.2	0.61	A
EB LT/TH	47.1	0.48	D	52.4	0.64	D	52.1	0.65	D	47.1	0.48	D	52.4	0.64	D	52.1	0.65	D
EB RT	38.7	0.01	D	39.5	0.02	D	39.5	0.03	D	38.7	0.01	D	39.5	0.02	D	39.5	0.03	D
WB LT	69.8	0.70	E	76.6	0.70	E	76.4	0.70	E	69.8	0.70	E	76.6	0.70	E	76.4	0.70	E
WB TH/RT	39.4	0.07	D	40.1	0.07	D	39.8	0.06	D	39.4	0.07	D	40.1	0.07	D	39.8	0.06	D
SB LT	101.3	0.83	F	72.4	0.80	E	85.4	0.84	F	101.0	0.83	F	72.1	0.80	E	85.2	0.84	F
SB TH/RT	17.6	0.63	B	9.3	0.94	A	10.5	0.81	B	17.8	0.64	B	9.5	0.94	A	10.7	0.82	B
Overall	13.9	-	B	11.7	-	B	13.6	-	B	14.0	-	B	11.8	-	B	13.6	-	B

Table 5.4: Base Year 2022 with Mitigation and Future Year 2022 Scenario 1 Level of Service Summary Cont'd

	Base Year 2022 with Mitigation									**Future Year 2022 Scenario 1**								
	AM			PM			WE			AM			PM			WE		
Intersection	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
11: Honoapiilani Highway & Keawe Street																		
NB LT	79.7	0.79	E	70.1	0.77	E	67.0	0.77	E	79.7	0.79	E	70.1	0.77	E	67.0	0.77	E
NB TH	29.3	0.73	C	42.3	0.85	D	35.0	0.75	C	30.2	0.73	C	41.3	0.85	D	35.5	0.76	D
NB RT	17.3	0.13	B	23.0	0.22	C	22.2	0.17	C	17.7	0.13	B	22.5	0.22	C	22.4	0.17	C
EB LT/TH	61.3	0.48	E	56.2	0.50	E	51.7	0.36	D	61.3	0.48	E	56.2	0.50	E	51.7	0.36	D
EB RT	56.6	0.02	E	51.3	0.06	D	48.6	0.05	D	56.6	0.02	E	51.3	0.06	D	48.6	0.05	D
WB LT	50.6	0.49	D	54.3	0.71	D	43.0	0.59	D	50.6	0.49	D	58.7	0.75	E	43.0	0.59	D
WB TH	45.7	0.18	D	40.0	0.20	D	36.0	0.19	D	45.7	0.18	D	40.8	0.20	D	36.0	0.19	D
WB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
SB LT	61.5	0.94	E	47.1	0.95	D	57.8	0.88	E	51.3	0.92	D	46.9	0.95	D	57.7	0.88	E
SB TH/RT	0.9	0.46	A	0.6	0.57	A	27.2	0.56	C	1.0	0.47	A	0.6	0.57	A	27.2	0.56	C
Overall	27.0	-	C	28.1	-	C	37.5	-	D	25.1	-	C	28.0	-	C	37.6	-	D
12: RIRO Access & Honoapiilani Highway																		
WB RT										13.7	0.04	B	17.0	0.04	C	13.0	0.02	B
Overall										0.1	-	-	0.1	-	-	0.1	-	-
14: Akahele Street & Road A																		
EB LT/TH										7.3	0.01	A	7.4	0.04	A	7.4	0.03	A
SB LT/RT										8.6	0.06	A	8.6	0.04	A	8.6	0.05	A
Overall										5.9	-	-	5.8	-	-	5.4	-	-

5.3 Future Year 2025 Scenario 2 Analysis

By completion of Scenario 2 in Future Year 2025, the Project is projected to generate a total of 116(139)[175] new external trips during the AM(PM)[WE] peak hours of traffic. Trips generated by the Project are expected to result in growth along major roadways in the study area. Traffic will access the site via Honoapiilani Highway at its intersections with Akahele Street and the Project's RIRO driveway.

By Future Year 2025 with the cumulative increases of Project Scenarios 1 and 2, regional traffic at the study intersections (those not providing direct access to the Project) along Honoapiilani Highway is estimated to increase overall by approximately 5-10%, while local traffic at the study intersections (those providing direct access to the Project) along Honoapiilani Highway is estimated to increase overall by approximately 10-20% from Base Year 2025 without the Project scenario, during the AM, PM and WE peak hours of traffic.

5.3.1 Future Year 2025 Scenario 2 Intersection Analysis

All study intersections are forecast to operate similar to Future Year 2022 Scenario 1 with the majority of intersection movements forecast to experience delay increases ranging from 1-5 seconds. Movements operating at LOS E/F for Future Year 2022 Scenario 1 conditions will continue to operate similarly under Future Year 2025 Scenario 2. The main Project access intersections are discussed further below.

<u>[3] Honoapiilani Highway/Akahele Street</u>

Since this intersection is the primary access from Honoapiilani Highway into the Project's Scenario 2 site, turning movements into and out of Akahele Street will increase. As a result, the intersection will worsen, but operate adequately from an overall LOS B(C)[B] during the Future Year 2022 Scenario 1 condition to an overall LOS C(C)[C] during the Future Year 2025 Scenario 2 condition. Various left-turn movements will operate at LOS E/F conditions during all peak hours due to the long cycle length and generally low turning movement volumes at the intersection. However, all movements will continue to operate under capacity. It is recommended that the existing signal timing be optimized to accommodate turning movement increases.

<u>[3] Honoapiilani Highway/Akahele Street</u>

Since this intersection is the main access from Honoapiilani Highway into the Project's Scenario 1 site, turning movements into and out of Akahele Street will increase. As a result, the intersection will worsen from Base Year 2022, but will continue to operate adequately at overall LOS B(C)[B] for the Future Year 2022 Scenario 1. Various left-turn movements will continue to operate at LOS E/F conditions during all peak hours, mainly due to those left-turn volumes remaining relatively low. It is recommended that the existing signal timing be optimized to accommodate turning movement increases.

Based on the AASHTO Green Book, left-turn storage lane lengths at the Honoapiilani Highway/Akahele Street intersection were determined. See Table 5.5 for the recommended storage lane lengths. Based on the AASHTO Green Book, all anticipated left-turn storage at the intersection is currently accommodated, and no extensions will be required upon completion of Scenario 2.

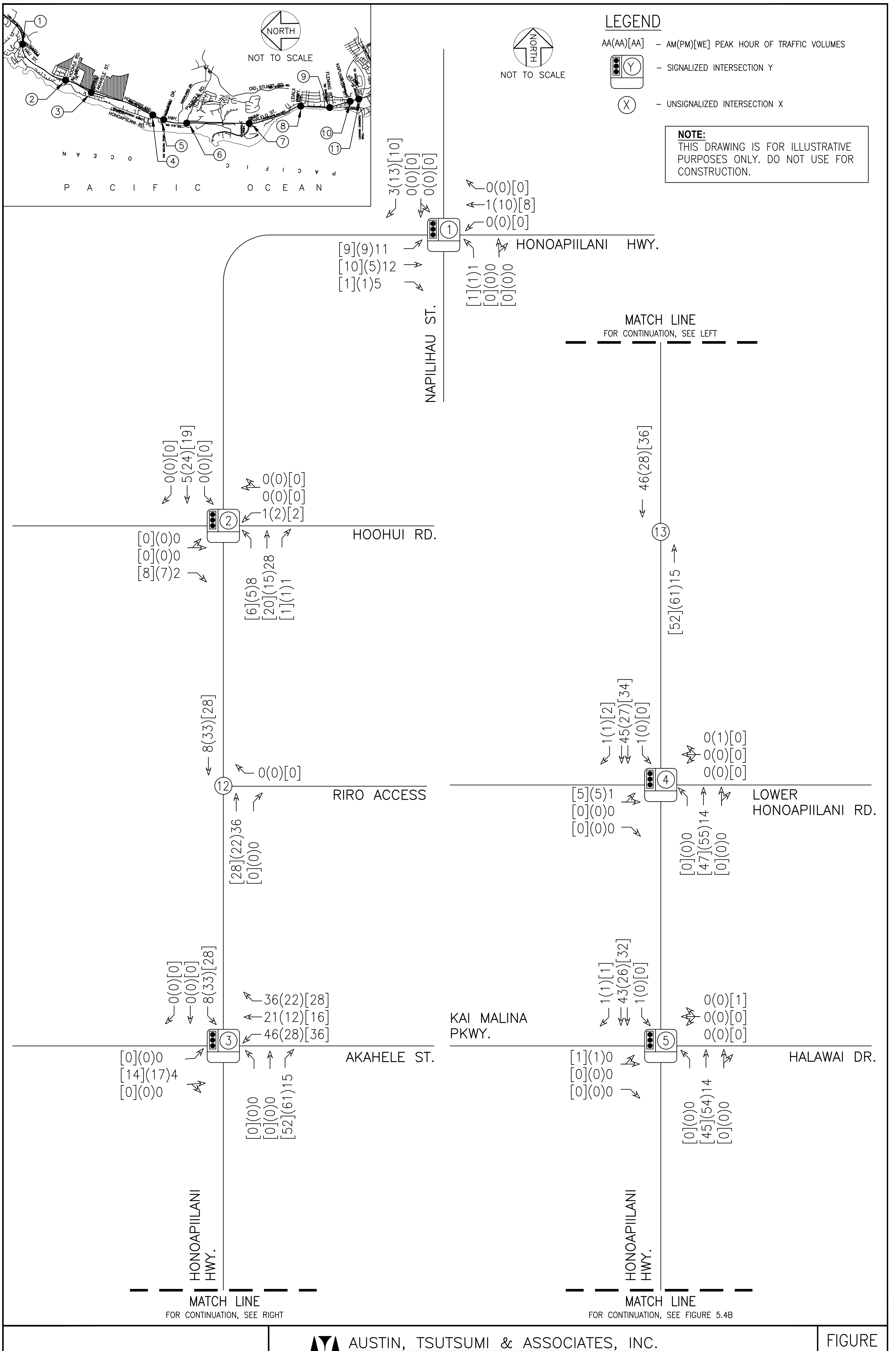
[14] Akahele Street/Road A

Continuation of Road A to extend south of Akahele Street is proposed with Scenario 2 of the Project. As in Future Year 2022 Scenario 1, lengthy gaps in through traffic are expected along Akahele Street to help prevent long queues for opposing left-turn movements turning from Akahele Street. However, as traffic begins to increase along Akahele Street as a result of the Project, exclusive left-turn storage lanes should be considered to remove left-turns from the through lanes on Akahele Street. Based on AASHTO guidance, a minimum of 100 feet storage for the eastbound left-turn and 50 feet storage for the westbound left-turn lanes should be provided, exclusive of taper and deceleration length.

[15] Akahele Street/Road C

Road C is proposed with the completion of Scenario 2 of the Project. Upon completion of Scenario 2, forecast volumes at the Akahele Street/Road C intersection are anticipated to reach a maximum of 185 vehicles for all peak hours with under 25 through vehicles along Akahele Street in each direction. However, exclusive left-turn storage lanes should be considered to remove left-turns from the through lanes on Akahele Street. Based on AASHTO guidance, a minimum of 100 feet storage for the eastbound left-turn and 50 feet storage for the westbound left-turn lanes should be provided, exclusive of taper and deceleration length.

Figure 5.4 illustrates the Project-generated trips for Future Year 2025 Scenario 2. Figure 5.5 illustrates the Future Year 2025 Scenario 2 forecast traffic volumes and LOS for the study intersection movements. Figure 5.6 illustrates the Future Year 2025 Scenario 2 forecast traffic volumes, LOS and intersection laneage at the two Project accesses along Akahele Street and at the Project RIRO access along Honoapiilani Highway. Table 5.6 summarizes the Future Year 2025 Scenario 2 LOS at the study intersections compared to Base Year 2025 and Future Year 2022 Scenario 1 conditions. LOS worksheets are provided in Appendix C.



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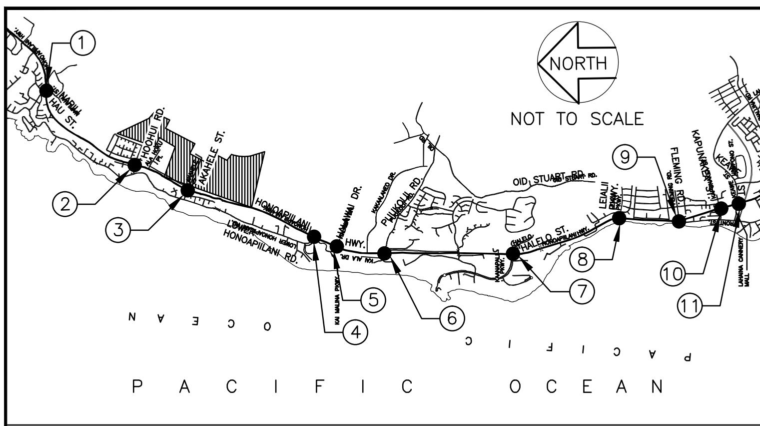
YEAR 2025 SCENARIO 2 PROJECT-GENERATED TRAFFIC

FIGURE 5.4A



LEGEND

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

(Y) – SIGNALIZED INTERSECTION Y

(X) – UNSIGNALIZED INTERSECTION X

NOTE:
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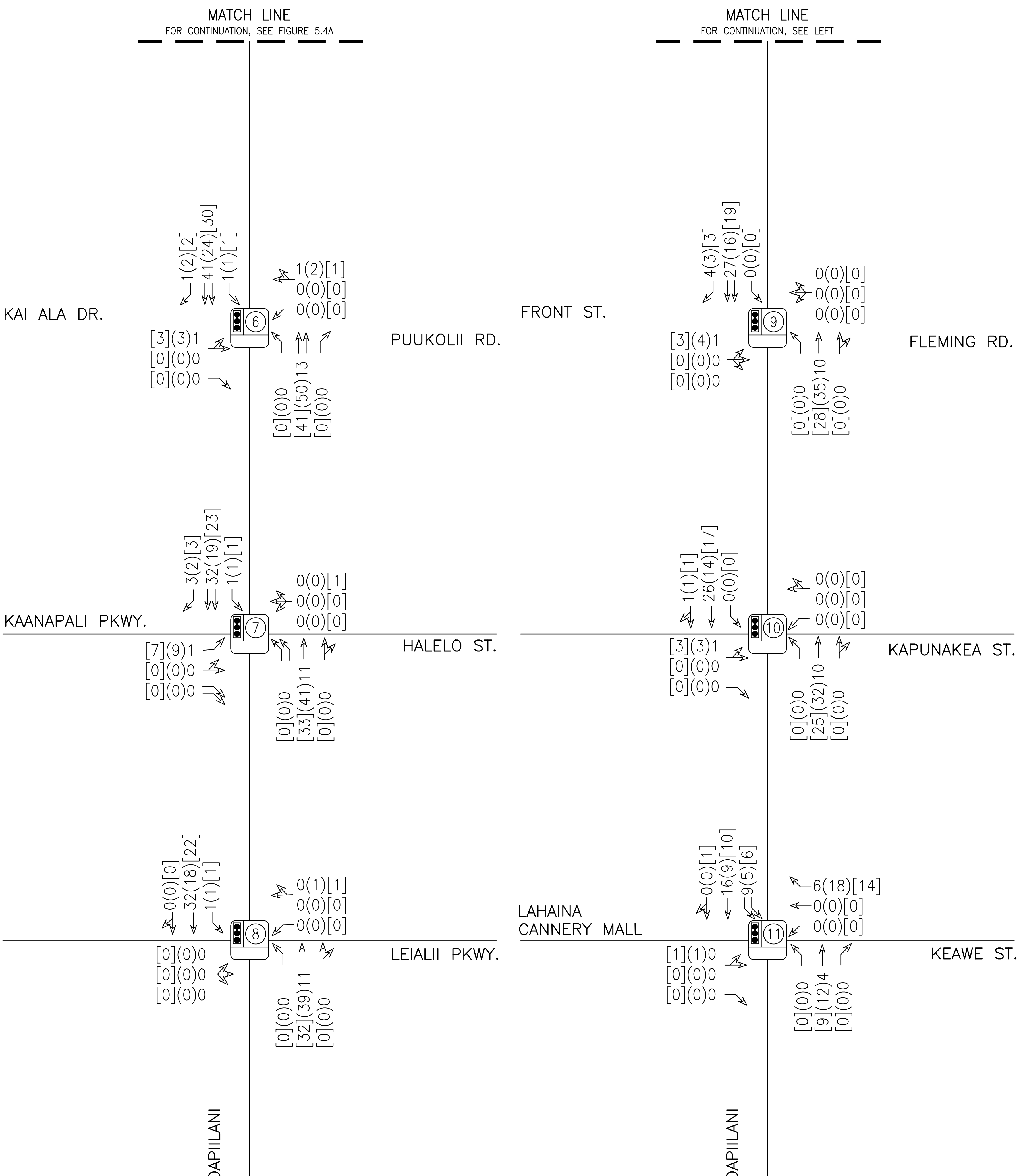

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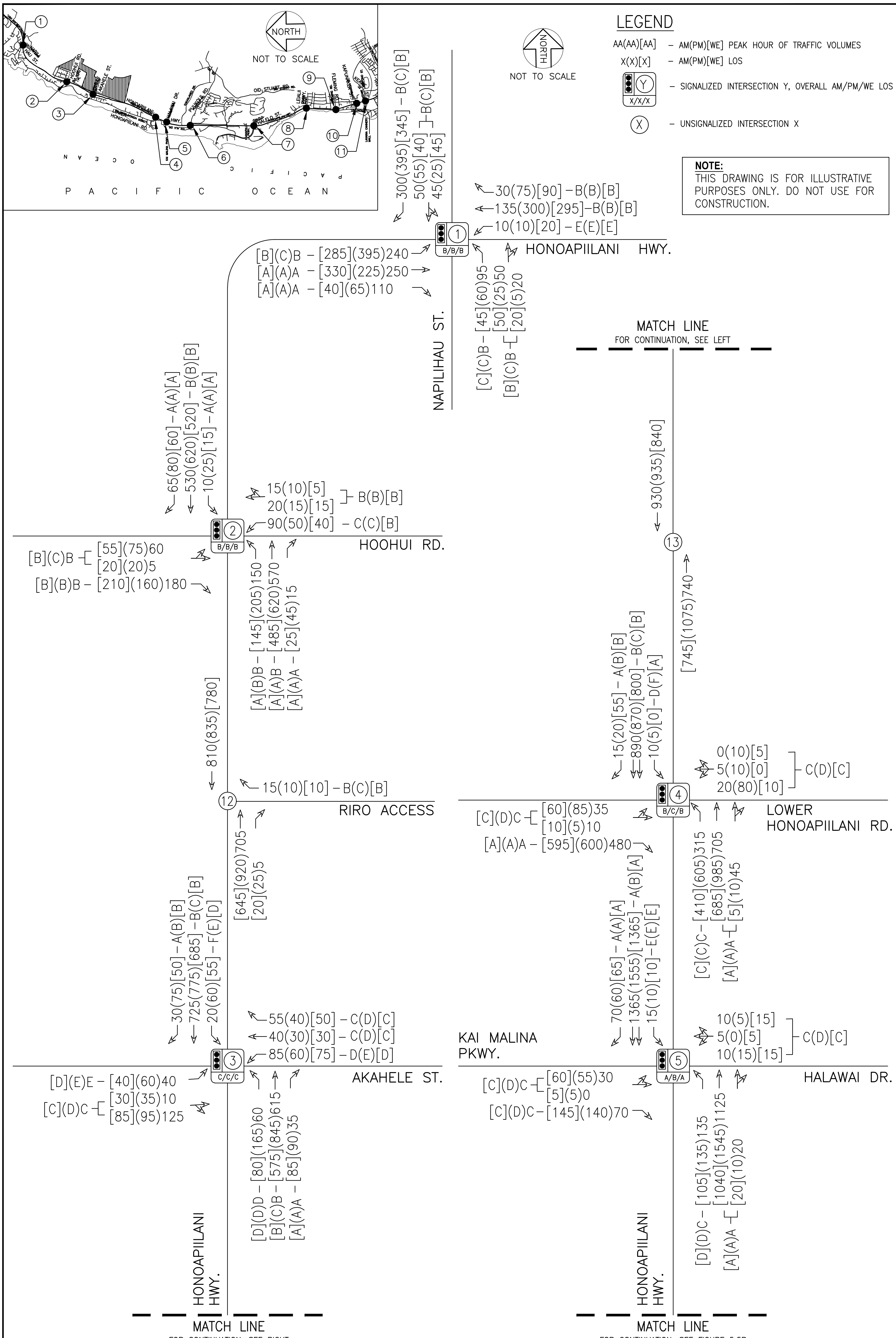
FIGURE 5.4B



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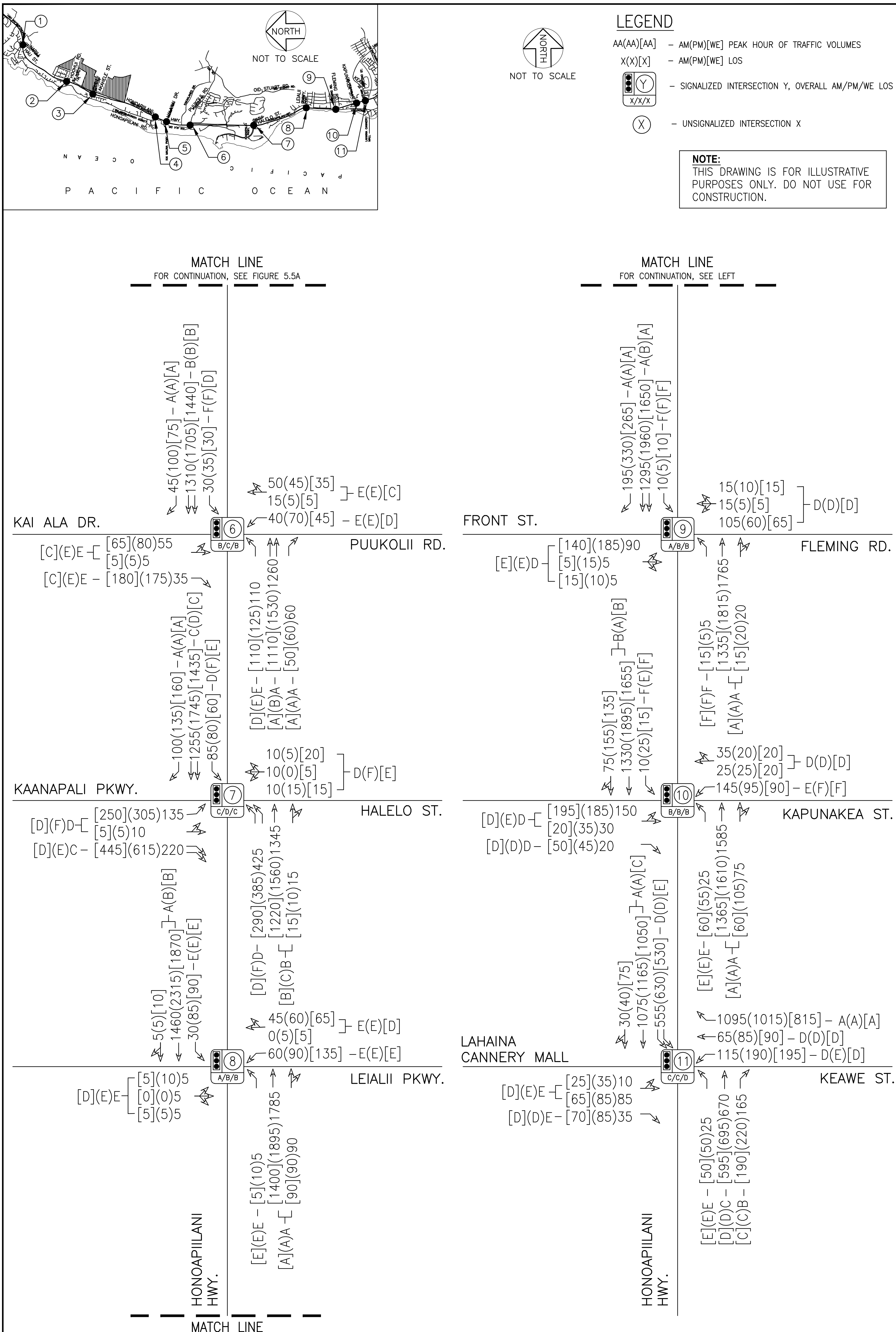
FUTURE YEAR 2025 SCENARIO 2 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 5.5A



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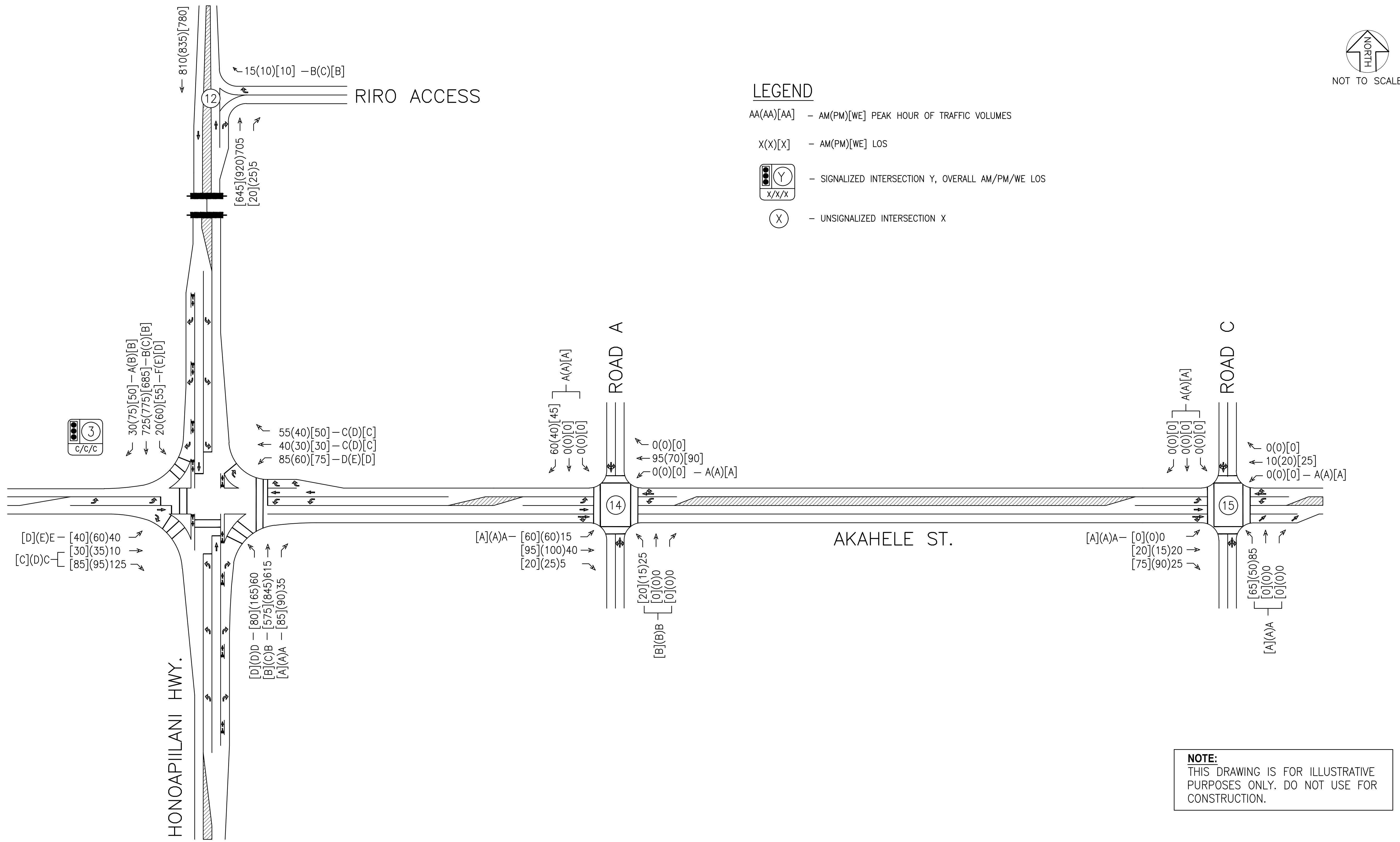
FUTURE YEAR 2025 SCENARIO 2 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE
5.5B



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	FUTURE YEAR 2025 SCENARIO 2 AKAHELE STREET LANE CONFIGURATION, VOLUMES AND LOS	5.6

Table 5.5: Future Year 2025 (Scenario 2)
Left-Turn Storage Lane Length Calculations

Honoapiilani Highway & Akahele Street Intersection								
			AASHTO					Recommended storage length [3]
Movement	Peak Hour	Design Volume per lane (veh)	Cycle Length (sec) [1]	Cycles per Hour	Average Veh. per Cycle	Minimum Storage Length (1.5 factor) [2]		
						Veh	Ft	
Northbound Left-turn lane	AM	60	75	48	2	2	60	Storage accommodated. Max queue could encroach into taper.
	PM	165	95	38	5	7	**175**	
	WE	80	75	48	2	3	75	
Southbound Left-turn lane	AM	20	75	48	1	1	60	Storage accommodated
	PM	60	95	38	2	3	**75**	
	WE	55	75	48	2	2	60	
Eastbound Left-turn lane	AM	40	75	48	1	2	60	Storage accommodated
	PM	60	95	38	2	3	**75**	
	WE	40	75	48	1	2	60	
Westbound Left-turn lane	AM	85	75	48	2	3	75	Storage accommodated
	PM	60	95	38	2	3	75	
	WE	75	75	48	2	3	**75**	

Notes:

1. Cycle length based on Highway Capacity Manual (HCM), 6th Edition equilibrium cycle length.
2. Minimum storage length is 1.5 times the average number of vehicles per cycle; assume 1 vehicle length = 25 ft.
3. Recommended storage length is exclusive of taper length or deceleration length. To be verified upon design.

Table 5.6: Base Year 2025, Future Year 2022 Scenario 1 and Future Year 2025 Scenario 2 Level of Service Summary

	Base Year 2025									**Future Year 2022 Scenario 1**									**Future Year 2025 Scenario 2**								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
Intersection	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Honoapiilani Highway & Napilihau Street																											
NB LT	18.8	0.75	B	19.8	0.82	B	19.6	0.77	B	18.8	0.75	B	19.8	0.83	B	19.6	0.77	B	18.9	0.75	B	20.4	0.83	C	19.9	0.78	B
NB TH	8.1	0.32	A	6.0	0.23	A	7.6	0.37	A	8.1	0.32	A	6.0	0.23	A	7.5	0.37	A	8.3	0.34	A	5.8	0.23	A	7.5	0.38	A
NB RT	6.9	0.08	A	5.2	0.05	A	5.8	0.03	A	6.9	0.08	A	5.2	0.05	A	5.8	0.03	A	7.0	0.08	A	5.0	0.05	A	5.7	0.03	A
EB LT/TH	15.0	0.25	B	20.6	0.29	C	17.9	0.28	B	15.1	0.26	B	20.7	0.29	C	18.1	0.28	B	15.3	0.25	B	21.6	0.30	C	18.7	0.29	B
EB RT	14.5	0.16	B	19.6	0.13	B	17.3	0.17	B	14.6	0.16	B	19.7	0.13	B	17.5	0.17	B	14.8	0.16	B	20.6	0.15	C	18.0	0.18	B
WB LT	17.4	0.30	B	23.0	0.28	C	19.6	0.18	B	17.5	0.30	B	23.1	0.28	C	19.8	0.19	B	17.8	0.31	B	24.1	0.29	C	20.5	0.19	C
WB TH/RT	14.7	0.22	B	19.5	0.13	B	17.8	0.27	B	14.8	0.22	B	19.7	0.13	B	17.9	0.27	B	15.0	0.21	B	20.4	0.13	C	18.5	0.28	B
SB LT	66.2	0.72	E	72.5	0.72	E	55.3	0.77	E	66.4	0.72	E	72.7	0.73	E	55.5	0.77	E	67.0	0.72	E	73.8	0.73	E	56.4	0.77	E
SB TH	12.8	0.31	B	17.8	0.61	B	15.2	0.57	B	13.0	0.31	B	18.0	0.61	B	15.3	0.57	B	13.5	0.32	B	18.3	0.62	B	15.6	0.58	B
SB RT	11.2	0.02	B	13.1	0.05	B	11.3	0.06	B	11.3	0.02	B	13.2	0.05	B	11.4	0.06	B	11.7	0.02	B	13.3	0.05	B	11.5	0.06	B
Overall	14.2	-	B	16.7	-	B	15.1	-	B	14.2	-	B	16.8	-	B	15.2	-	B	14.4	-	B	17.2	-	B	15.4	-	B
2: Honoapiilani Highway & Hoohui Road																											
NB LT	9.8	0.36	A	9.3	0.48	A	8.4	0.33	A	9.8	0.37	A	9.5	0.49	A	8.4	0.33	A	10.0	0.40	B	10.3	0.52	B	8.5	0.36	A
NB TH	10.8	0.64	B	9.3	0.67	A	8.9	0.57	A	11.0	0.66	B	9.2	0.66	A	9.0	0.58	A	11.3	0.69	B	9.4	0.67	A	8.9	0.59	A
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
EB LT/TH	17.3	0.17	B	20.0	0.32	C	16.4	0.22	B	17.3	0.17	B	20.4	0.32	C	16.4	0.22	B	17.8	0.17	B	21.2	0.32	C	17.2	0.23	B
EB RT	16.3	0.06	B	18.5	0.06	B	15.7	0.10	B	16.3	0.06	B	18.8	0.07	B	15.8	0.10	B	16.7	0.06	B	19.6	0.07	B	16.4	0.09	B
WB LT	19.9	0.28	B	22.2	0.20	C	17.7	0.14	B	19.9	0.28	B	22.5	0.21	C	17.8	0.14	B	20.4	0.29	C	23.6	0.23	C	18.6	0.14	B
WB TH/RT	16.3	0.07	B	18.5	0.07	B	15.5	0.06	B	16.3	0.07	B	18.8	0.07	B	15.6	0.06	B	16.7	0.07	B	19.6	0.07	B	16.3	0.06	B
SB LT	9.7	0.03	A	8.1	0.07	A	8.0	0.04	A	9.8	0.03	A	8.1	0.07	A	8.0	0.04	A	10.0	0.03	A	8.2	0.07	A	8.0	0.04	A
SB TH	15.1	0.77	B	13.2	0.78	B	12.5	0.73	B	15.1	0.77	B	13.4	0.78	B	12.5	0.73	B	15.3	0.78	B	13.8	0.80	B	12.7	0.75	B
SB RT	9.5	0.05	A	8.0	0.06	A	8.0	0.04	A	9.5	0.05	A	8.0	0.06	A	8.0	0.04	A	9.6	0.05	A	8.0	0.06	A	7.9	0.04	A
Overall	13.3	-	B	11.8	-	B	11.1	-	B	13.3	-	B	11.9	-	B	11.2	-	B	13.6	-	B	12.3	-	B	11.2	-	B
3: Honoapiilani Highway & Akahele Street																											
NB LT	42.8	0.77	D	43.0	0.81	D	37.3	0.76	D	44.5	0.77	D	44.6	0.81	D	39.1	0.76	D	48.5	0.76	D	48.5	0.82	D	43.0	0.76	D
NB TH	10.6	0.65	B	13.1	0.76	B	9.9	0.60	A	11.9	0.66	B	16.1	0.80	B	11.9	0.64	B	14.3	0.69	B	22.0	0.85	C	15.3	0.69	B
NB RT	6.4	0.01	A	5.8	0.01	A	6.4	0.01	A	7.3	0.01	A	6.9	0.02	A	7.6	0.02	A	8.8	0.03	A	9.0	0.07	A	9.9	0.06	A
EB LT	44.2	0.71	D	53.1	0.77	D	42.7	0.71	D	47.3	0.73	D	54.6	0.76	D	45.8	0.72	D	55.2	0.77	E	58.1	0.76	E	52.8	0.75	D
EB TH/RT	24.3	0.07	C	33.1	0.04	C	24.0	0.06	C	25.5	0.06	C	34.4	0.09	C	25.0	0.09	C	28.8	0.07	C	39.3	0.33	D	28.6	0.23	C
WB LT	69.4	0.53	E	65.9	0.57	E	51.4	0.55	D	47.3	0.73	D	63.1	0.74	E	45.4	0.69	D	43.8	0.76	D	58.1	0.76	E	43.9	0.76	D
WB TH	25.6	0.03	C	35.8	0.03	D	25.1	0.03	C	25.6	0.07	C	36.1	0.09	D	25.1	0.07	C	26.9	0.14	C	37.9	0.15	D	26.1	0.11	C
WB RT	25.5	0.01	C	35.7	0.01	D	25.0	0.01	C	25.3	0.01	C	35.6	0.01	D	24.8	0.01	C	26.2	0.02	C	37.0	0.01	D	25.5	0.01	C
SB LT	111.5	0.70	F	126.1	0.71	F	110.3	0.70	F	85.0	0.74	F	80.0	0.82	F	73.4	0.85	E	84.0	0.84	F	57.9	0.76	E	48.8	0.77	D
SB TH	15.3	0.84	B	23.2	0.88	C	15.5	0.83	B	16.8	0.85	B	24.8	0.89	C	17.1	0.84	B	19.6	0.86	B	28.6	0.90	C	19.7	0.86	B
SB RT	7.7	0.02	A	10.5	0.05	B	8.3	0.04	A	8.6	0.02	A	11.2	0.05	B	9.2	0.04	A	10.0	0.02	A	12.2	0.05	B	10.5	0.03	B
Overall	15.7	-	B	21.7	-	C	15.8	-	B	18.0	-	B	24.7	-	C	18.6	-	B	21.7	-	C	29.6	-	C	22.1	-	C
4: Honoapiilani Highway & Lower Honoapiilani Road																											
NB LT	22.6	0.83	C	30.2	0.94	C	21.4	0.87	C	23.1	0.84	C	30.5	0.94	C	21.9	0.87	C	24.5	0.84	C	33.4	0.94	C	23.3	0.87	C
NB TH/RT	4.7	0.34	A	4.4	0.36	A	2.4	0.24	A	4.6	0.33	A	4.4	0.37	A	2.5	0.25	A	4.5	0.33	A	4.5	0.39	A	2.5	0.27	A
EB LT/TH	25.2	0.19	C	41.9	0.38	D	27.0	0.28	C	25.7	0.20	C	42.7	0.41	D	27.7	0.31	C	27.3	0.21	C	45.4	0.45	D	29.3	0.33	C
EB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
WB LT/TH/RT	24.6	0.10	C	42.7	0.47	D	25.5	0.05	C	25.1	0.11	C	43.3	0.47	D	26.0	0.05	C	26.7	0.11	C	45.7	0.48	D	27.3	0.05	C
SB LT	50.6	0.73	D	87.1	0.72	F	0.0	0.00	A	51.3	0.74	D	87.7	0.72	F	0.0	0.00	A	53.4	0.74	D	90.5	0.72	F	0.0	0.00	A
SB TH	12.9	0.58	B	27.3	0.70	C	14.7	0.58	B	13.0	0.58	B	27.5	0.70	C	14.9	0.58	B	13.2	0.60	B	28.4	0.72	C	15.4	0.60	B
SB RT	9.2	0.00	A	19.4	0.01	B	10.9	0.03	B	9.2	0.00	A	19.5	0.01	B	11.0	0.03	B	9.1	0.01	A	19.8	0.01	B	11.2	0.03	B
Overall	12.0	-	B	21.0	-	C	12.6	-	B	12.1	-	B	21.1	-	C	12.7	-	B	12.4	-	B	21.9	-	C	13.1	-	B

Table 5.6: Base Year 2025, Future Year 2022 Scenario 1 and Future Year 2025 Scenario 2 Level of Service Summary Cont'd

	Base Year 2025									Future Year 2022 Scenario 1									Future Year 2025 Scenario 2								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
Intersection	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive																											
NB LT	32.2	0.79	C	44.3	0.82	D	35.7	0.78	D	32.7	0.79	C	44.3	0.82	D	35.9	0.78	D	34.4	0.79	C	46.0	0.82	D	37.4	0.78	D
NB TH/RT	4.1	0.46	A	7.1	0.60	A	4.9	0.42	A	4.0	0.45	A	7.2	0.61	A	4.9	0.42	A	4.0	0.46	A	7.6	0.63	A	5.0	0.44	A
EB LT/TH	30.9	0.16	C	37.5	0.22	D	30.6	0.25	C	31.3	0.17	C	37.5	0.22	D	30.8	0.27	C	33.1	0.17	C	38.9	0.25	D	32.3	0.28	C
EB RT	30.7	0.01	C	36.6	0.03	D	29.8	0.04	C	31.2	0.01	C	36.6	0.03	D	30.0	0.05	C	32.9	0.01	C	37.9	0.03	D	31.4	0.04	C
WB LT/TH/RT	31.3	0.11	C	38.6	0.08	D	29.9	0.10	C	31.8	0.11	C	38.6	0.08	D	30.0	0.11	C	33.5	0.11	C	40.2	0.08	D	31.5	0.11	C
SB LT	53.7	0.78	D	73.3	0.77	E	59.9	0.75	E	54.4	0.78	D	73.3	0.77	E	60.2	0.75	E	56.9	0.79	E	75.6	0.78	E	62.1	0.75	E
SB TH	7.7	0.61	A	12.6	0.73	B	8.8	0.63	A	7.7	0.62	A	12.6	0.73	B	8.8	0.64	A	7.9	0.64	A	13.3	0.74	B	9.0	0.65	A
SB RT	4.5	0.04	A	6.4	0.04	A	5.0	0.04	A	4.5	0.05	A	6.4	0.04	A	5.1	0.04	A	4.4	0.05	A	6.5	0.04	A	5.0	0.04	A
Overall	8.0	-	A	12.1	-	B	9.3	-	A	8.1	-	A	12.1	-	B	9.3	-	A	8.2	-	A	12.7	-	B	9.4	-	A
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road																											
NB LT	74.2	0.84	E	78.1	0.86	E	40.0	0.78	D	74.2	0.84	E	78.1	0.86	E	40.2	0.78	D	74.2	0.84	E	77.8	0.86	E	41.0	0.78	D
NB TH	6.2	0.48	A	9.8	0.59	A	8.2	0.50	A	6.3	0.48	A	9.9	0.59	A	8.3	0.50	A	6.4	0.49	A	10.6	0.63	B	8.4	0.53	A
NB RT	3.8	0.04	A	5.3	0.04	A	5.5	0.03	A	3.8	0.04	A	5.3	0.04	A	5.5	0.03	A	3.8	0.04	A	5.5	0.04	A	5.4	0.03	A
EB LT/TH	68.7	0.38	E	67.2	0.37	E	31.5	0.23	C	68.7	0.38	E	67.2	0.37	E	31.8	0.25	C	68.7	0.38	E	67.1	0.39	E	32.7	0.25	C
EB RT	63.3	0.01	E	63.7	0.13	E	30.3	0.05	C	63.3	0.01	E	63.7	0.13	E	30.4	0.05	C	63.3	0.01	E	63.8	0.18	E	31.2	0.05	C
WB LT	75.0	0.39	E	78.4	0.54	E	34.8	0.21	C	75.0	0.39	E	78.4	0.54	E	35.3	0.22	D	75.0	0.39	E	78.6	0.54	E	36.3	0.22	D
WB TH/RT	64.1	0.10	E	62.6	0.03	E	30.1	0.03	C	64.1	0.10	E	62.6	0.03	E	30.2	0.03	C	64.1	0.10	E	62.1	0.02	E	31.0	0.03	C
SB LT	82.8	0.68	F	89.0	0.77	F	42.6	0.58	D	84.7	0.76	F	89.0	0.77	F	42.8	0.58	D	84.7	0.76	F	89.0	0.77	F	43.7	0.58	D
SB TH	10.1	0.52	B	18.2	0.74	B	13.6	0.73	B	10.1	0.53	B	18.1	0.74	B	13.7	0.73	B	10.5	0.55	B	19.2	0.76	B	14.0	0.74	B
SB RT	5.9	0.03	A	8.5	0.07	A	7.3	0.05	A	5.9	0.03	A	8.5	0.08	A	7.4	0.05	A	5.9	0.03	A	8.7	0.08	A	7.3	0.05	A
Overall	13.9	-	B	19.9	-	B	13.6	-	B	14.1	-	B	19.9	-	B	13.7	-	B	14.1	-	B	20.6	-	C	13.9	-	B
7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street																											
NB LT	41.0	0.75	D	93.2	0.85	F	50.7	0.71	D	41.3	0.75	D	92.1	0.85	F	50.3	0.71	D	43.7	0.76	D	95.6	0.86	F	53.3	0.72	D
NB TH/RT	16.1	0.69	B	22.4	0.67	C	13.8	0.56	B	15.9	0.68	B	22.3	0.67	C	13.8	0.57	B	16.1	0.68	B	23.7	0.70	C	14.3	0.59	B
EB LT/TH	44.6	0.46	D	87.6	0.59	F	49.5	0.57	D	44.9	0.46	D	87.0	0.61	F	49.3	0.59	D	47.5	0.47	D	91.3	0.63	F	52.1	0.61	D
EB RT	28.6	0.07	C	65.4	0.52	E	37.2	0.35	D	28.8	0.07	C	64.5	0.51	E	36.9	0.34	D	30.6	0.08	C	67.3	0.52	E	39.0	0.35	D
WB LT/TH/RT	45.1	0.17	D	102.0	0.23	F	55.8	0.32	E	45.4	0.17	D	100.7	0.23	F	55.4	0.32	E	47.9	0.18	D	104.5	0.23	F	58.6	0.33	E
SB LT	46.6	0.57	D	115.1	0.72	F	55.1	0.51	E	47.0	0.57	D	113.2	0.72	F	54.7	0.51	D	49.4	0.59	D	121.6	0.74	F	57.7	0.54	E
SB TH	22.0	0.75	C	42.2	0.88	D	21.1	0.76	C	22.1	0.75	C	41.3	0.88	D	20.9	0.76	C	22.5	0.76	C	43.4	0.89	D	21.5	0.77	C
SB RT	9.8	0.08	A	19.6	0.12	B	12.7	0.14	B	9.8	0.09	A	8.1	0.11	A	6.8	0.12	A	9.7	0.09	A	8.2	0.11	A	6.7	0.13	A
Overall	23.6	-	C	46.0	-	D	24.6	-	C	23.7	-	C	45.0	-	D	24.3	-	C	24.3	-	C	47.1	-	D	25.2	-	C
8: Honoapiilani Highway & Leialii Parkway																											
NB LT	75.6	0.44	E	69.0	0.49	E	72.2	0.44	E	75.6	0.44	E	69.0	0.49	E	72.2	0.44	E	75.5	0.44	E	69.2	0.49	E	72.2	0.44	E
NB TH/RT	8.8	0.70	A	2.3	0.76	A	2.9	0.60	A	8.7	0.70	A	2.4	0.76	A	2.9	0.60	A	8.9	0.71	A	2.5	0.78	A	3.1	0.63	A
EB LT/TH/RT	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D
WB LT	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E
WB TH/RT	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D
SB LT	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E
SB TH/RT	5.3	0.51	A	13.6	0.84	B	10.3	0.71	B	5.3	0.51	A	13.3	0.83	B	10.2	0.70	B	5.5	0.53	A	14.4	0.85	B	10.7	0.72	B
Overall	9.1	-	A	11.0	-	B	11.0	-	B	9.1	-	A	10.8	-	B	11.0	-	B	9.2	-	A	11.3	-	B	11.2	-	B
9: Honoapiilani Highway & Front Street/Flemming Road																											
NB LT	88.5	0.73	F	94.7	0.74	F	87.3	0.84	F	88.9	0.73	F	94.7	0.74	F	87.3	0.84	F	88.1	0.73	F	93.5	0.74	F	86.6	0.84	F
NB TH/RT	7.6	0.67	A	1.9	0.71	A	16.3	0.51	B	7.6	0.67	A	1.9	0.72	A	16.4	0.51	B	7.7	0.68	A	2.1	0.74	A	7.1	0.53	A
EB LT/TH/RT	52.7	0.48	D	59.5	0.72	E	57.8	0.66	E	52.7	0.48	D	59.7	0.73	E	57.8	0.66	E	52.7	0.48	D	59.8	0.73	E	57.5	0.67	E
WB LT/TH/RT	54.3	0.61	D	49.8	0.24	D	52.4	0.32	D	54.3	0.61	D	49.3	0.24	D	52.4	0.32	D	54.3	0.61	D	48.9	0.23	D	51.9	0.31	D
SB LT	87.5	0.80	F	86.4	0.74	F	87.2	0.82	F	87.5	0.80	F	86.8	0.74	F	87.2	0.82	F	87.2	0.80	F	85.0	0.74	F	86.6	0.82	F
SB TH	4.9	0.49	A	11.9	0.80	B	7.8	0.64	A	4.9	0.49	A	12.2	0.79	B	7.7	0.64	A	5.1	0.50	A	12.8	0.82	B	8.2	0.66	A
SB RT	3.2	0.11	A	5.6	0.24	A	4.3	0.17	A	3.2	0.12	A	5.8	0.24	A	4.3	0.17	A	3.2	0.12	A	5.9	0.24	A	4.4	0.18	A
Overall	9.9	-	A	10.3	-	B	14.8	-	B	9.9	-	A	10.5	-	B	14.8	-	B	9.9	-	A	10.9	-	B	11.3	-	B

Table 5.6: Base Year 2025, Future Year 2022 Scenario 1 and Future Year 2025 Scenario 2 Level of Service Summary Cont'd

	Base Year 2025									Future Year 2022 Scenario 1									Future Year 2025 Scenario 2								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
Intersection	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
10: Honoapiilani Highway & Kapunakea Street																											
NB LT	68.5	0.79	E	62.7	0.79	E	63.8	0.78	E	68.5	0.79	E	62.7	0.79	E	63.4	0.78	E	68.5	0.79	E	62.7	0.79	E	62.1	0.78	E
NB TH/RT	0.4	0.76	A	0.4	0.76	A	3.3	0.61	A	0.4	0.75	A	0.4	0.76	A	3.2	0.61	A	0.4	0.76	A	0.4	0.76	A	3.1	0.63	A
EB LT/TH	47.1	0.48	D	52.4	0.64	D	52.1	0.65	D	47.1	0.48	D	52.4	0.64	D	52.1	0.65	D	47.4	0.50	D	56.8	0.69	E	53.0	0.66	D
EB RT	38.7	0.01	D	39.5	0.02	D	39.5	0.03	D	38.7	0.01	D	39.5	0.02	D	39.5	0.03	D	38.7	0.01	D	41.1	0.02	D	39.5	0.03	D
WB LT	69.8	0.70	E	76.6	0.70	E	76.4	0.70	E	69.8	0.70	E	76.6	0.70	E	76.4	0.70	E	71.7	0.72	E	113.0	0.88	F	82.5	0.74	F
WB TH/RT	39.4	0.07	D	40.1	0.07	D	39.8	0.06	D	39.4	0.07	D	40.1	0.07	D	39.8	0.06	D	39.4	0.07	D	41.7	0.08	D	39.9	0.06	D
SB LT	101.0	0.83	F	72.1	0.80	E	85.2	0.84	F	101.0	0.83	F	72.1	0.80	E	85.2	0.84	F	100.7	0.83	F	71.6	0.80	E	84.7	0.84	F
SB TH/RT	17.8	0.64	B	10.4	0.95	B	10.9	0.82	B	17.8	0.64	B	9.5	0.94	A	10.7	0.82	B	18.4	0.66	B	8.8	0.94	A	11.3	0.83	B
Overall	14.0	-	B	12.3	-	B	13.7	-	B	14.0	-	B	11.8	-	B	13.6	-	B	14.3	-	B	12.3	-	B	14.0	-	B
11: Honoapiilani Highway & Keawe Street																											
NB LT	79.7	0.79	E	70.1	0.77	E	67.0	0.77	E	79.7	0.79	E	70.1	0.77	E	67.0	0.77	E	79.7	0.79	E	70.1	0.77	E	67.0	0.77	E
NB TH	29.7	0.74	C	42.8	0.86	D	35.2	0.75	D	30.2	0.73	C	41.3	0.85	D	35.5	0.76	D	31.3	0.76	C	42.4	0.87	D	37.1	0.79	D
NB RT	17.3	0.13	B	23.0	0.22	C	22.2	0.17	C	17.7	0.13	B	22.5	0.22	C	22.4	0.17	C	17.9	0.13	B	22.0	0.22	C	22.5	0.17	C
EB LT/TH	61.3	0.48	E	56.2	0.50	E	51.7	0.36	D	61.3	0.48	E	56.2	0.50	E	51.7	0.36	D	61.3	0.48	E	56.2	0.50	E	51.7	0.36	D
EB RT	56.6	0.02	E	51.3	0.06	D	48.6	0.05	D	56.6	0.02	E	51.3	0.06	D	48.6	0.05	D	56.6	0.02	E	51.3	0.06	D	48.6	0.05	D
WB LT	50.6	0.49	D	54.3	0.71	D	43.0	0.59	D	50.6	0.49	D	58.7	0.75	E	43.0	0.59	D	50.6	0.49	D	64.3	0.78	E	43.0	0.59	D
WB TH	45.7	0.18	D	40.0	0.20	D	36.0	0.19	D	45.7	0.18	D	40.8	0.20	D	36.0	0.19	D	45.7	0.18	D	41.6	0.21	D	36.0	0.19	D
WB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
SB LT	61.3	0.94	E	46.4	0.95	D	57.7	0.88	E	51.3	0.92	D	46.9	0.95	D	57.7	0.88	E	51.0	0.92	D	46.0	0.95	D	57.6	0.88	E
SB TH/RT	1.0	0.47	A	0.6	0.57	A	27.3	0.56	C	1.0	0.47	A	0.6	0.57	A	27.2	0.56	C	1.0	0.48	A	0.5	0.57	A	27.5	0.57	C
Overall	27.0	-	C	27.9	-	C	37.5	-	D	25.1	-	C	28.0	-	C	37.6	-	D	25.2	-	C	28.4	-	C	38.0	-	D
12: RIRO Access & Honoapiilani Highway																											
WB RT										13.7	0.04	B	17.0	0.04	C	13.0	0.02	B	14.3	0.04	B	17.7	0.04	C	13.4	0.03	B
Overall										0.1	-	-	0.1	-	-	0.1	-	-	0.1	-	-	0.1	-	-	0.1	-	-
14: Road A & Akahele Street																											
NB LT/TH/RT										-	-	-	-	-	-	-	-	-	10.5	0.04	B	11.8	0.03	B	11.8	0.04	B
EB LT										-	-	-	-	-	-	-	-	-	7.4	0.01	A	7.5	0.04	A	7.5	0.04	A
EB LT/TH										7.3	0.01	A	7.4	0.04	A	7.4	0.03	A	-	-	-	-	-	-	-	-	-
WB LT										-	-	-	-	-	-	-	-	-	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
SB LT/TH/RT										-	-	-	-	-	-	-	-	-	9.1	0.07	A	8.8	0.04	A	9.0	0.05	A
SB LT/RT										8.6	0.06	A	8.6	0.04	A	8.6	0.05	A	-	-	-	-	-	-	-	-	-
Overall										5.9	-	-	5.8	-	-	5.4	-	-	3.8	-	-	3.1	-	-	3.2	-	-
15: Road C & Akahele Street																											
NB LT/TH/RT																			9.2	0.10	A	9.3	0.06	A	9.4	0.08	A
EB LT																			0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
WB LT																			0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
SB LT/TH/RT																			0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
Overall																			5.6	-	-	2.7	-	-	3.3	-	-

5.4 Future Year 2030 Scenario 3 Analysis

By completion of Scenario 3 in Future Year 2030, the Project is projected to generate an additional 321(475)[664] new external trips during the AM(PM)[WE] peak hours of traffic. Trips generated by the Project are expected to result in growth along major roadways in the study area. Traffic generated by Project Scenario 3 will access the site via Akahele Street, the RIRO access and a new Road J which is proposed to connect to Honoapiilani Highway and service the areas south of Mahinahina Gulch. In addition, the proposed vehicular, bike and pedestrian access across Mahinahina Gulch was assumed to be constructed with Scenario 3 to provide access between the residential and retail areas north and south of the gulch.

By Future Year 2030 with the cumulative increases of Project Scenarios 1, 2 and 3, regional traffic at the study intersections (those not providing direct access to the Project) along Honoapiilani Highway is estimated to increase overall by approximately 5-20%, while local traffic at the study intersections (those providing direct access to the Project) along Honoapiilani Highway is estimated to increase overall by approximately 10-50% from Base Year 2030 without the Project scenario, during the AM, PM and WE peak hours of traffic.

5.4.1 Future Year 2030 Scenario 3 Intersection Analysis

With the additional trips generated by background developments and Scenario 3 of the Project, traffic volumes are expected to increase along Honoapiilani Highway, causing longer delays at the study intersections compared to Future Year 2025 with Scenario 2. All intersection movements forecast to operate at LOS E/F for Future Year 2025 Scenario 2 conditions will continue to operate at LOS E/F conditions during Future Year 2030 Scenario 3. The following intersections are expected to increased delays:

<u>[3] Honoapiilani Highway/Akahele Street</u>

Due to the continued development of areas north of Mahinahina Gulch, turning movements into and out of Akahele Street will increase. As a result, the intersection will worsen, but continue to operate adequately at an overall LOS C(D)[C] during Future Year 2030 Scenario 3. The majority of left-turn movements will operate at LOS E/F conditions during all peak hours, due to the long cycle length and increased turning movements at the intersection. In addition, the eastbound through/right-turn movement is expected to operate at LOS E during the PM peak hour. However, all movements will continue to operate under capacity.

Based on the AASHTO Green Book, left-turn storage lane lengths at the Honoapiilani Highway/Akahele Street intersection were determined. See Table 5.7 for the recommended storage lane lengths. Based on the AASHTO Green Book, the following is recommended. Note, additional taper length and/or deceleration length to be provided/verified upon design:

- Northbound left-turn lane → Lengthen left-turn lane to provide at least 250 feet of storage space.
- Westbound left-turn lane → Lengthen left-turn lane to provide at least 200 feet of storage space.

<u>[7] Honoapiilani Highway/Kaanapali Parkway</u>

By Future Year 2030 with Scenario 3 of the Project, the majority of left-turn and minor street movements are anticipated to operate at LOS E/F during all peak hours of traffic. In addition, the major southbound through movement is expected to operate at LOS E during the PM peak hour. Although longer delays are expected, all movements will continue to operate under capacity.

[10] Honoapiilani Highway/Kapunakea Street

Due to the continued development of the Project and background projects in the region, Honoapiilani Highway is expected to serve increasing volumes of traffic. By Future Year 2030, the northbound through movement at this intersection is anticipated to operate near capacity during the PM peak hour of traffic. As noted previously, the LBR Phase 1C is forecast to decrease traffic along the highway and help to reduce delay at the study intersections; however, as State funding for the roadway improvement is currently under discussion, the extension of the bypass road was not assumed to be completed by Future Year 2030.

[11] Honoapiilani Highway/Keawe Street

Due to the continued development of the Project and background projects in the region, Honoapiilani Highway is expected to serve increasing volumes of traffic. Similar to Base Year 2030, the northbound through movement is expected to operate at LOS F and overcapacity conditions during the PM peak hour of traffic. As noted previously, the LBR Phase 1C is anticipated to improve operations at several study intersections but was not included due to ongoing discussions regarding allocation of State funds for the roadway improvement project.

[13] Honoapiilani Highway/Road J

The proposed Honoapiilani Highway/Road J intersection was analyzed as an unsignalized intersection, which includes exclusive westbound left-turn and right-turn lanes, an exclusive southbound left-turn lane and an exclusive northbound right-turn lane. A southbound median refuge lane along Honoapiilani Highway may be constructed to facilitate westbound vehicles making the left-turn movement from Road J onto Honoapiilani Highway. Based on the Manual on Uniform Traffic Control Devices (MUTCD), Federal Highway Administration, dated 2009, Four-Hour Vehicular Volume traffic signal warrant, a traffic signal is not forecast to be warranted based on weekday forecast volumes. However, the intersection should be monitored to determine if or when a traffic signal is warranted. Signal warrant figures are shown in Appendix D. Based on the AASHTO Green Book, the following is recommended:

- Northbound Approach → Provide one (1) through lane and a new right-turn deceleration lane with at least 100 feet of storage space. Additional taper length and/or deceleration length to be provided based upon design. AASHTO Green Book recommends 425 feet to accommodate full deceleration length with a design speed of 50 mph.
- Southbound Approach → Provide one (1) through lane and a new left-turn storage lane with at least 100 feet of storage space. Additional taper length and/or deceleration length to be provided based upon design. AASHTO Green Book recommends 425 feet to accommodate full deceleration length with a design speed of 50 mph.
    - A median refuge lane may be constructed to facilitate westbound left-turn traffic exiting Road J going onto Honoapiilani Highway.
- Westbound Approach → Provide a new left-turn storage lane and a new 100 feet right-turn storage lane.

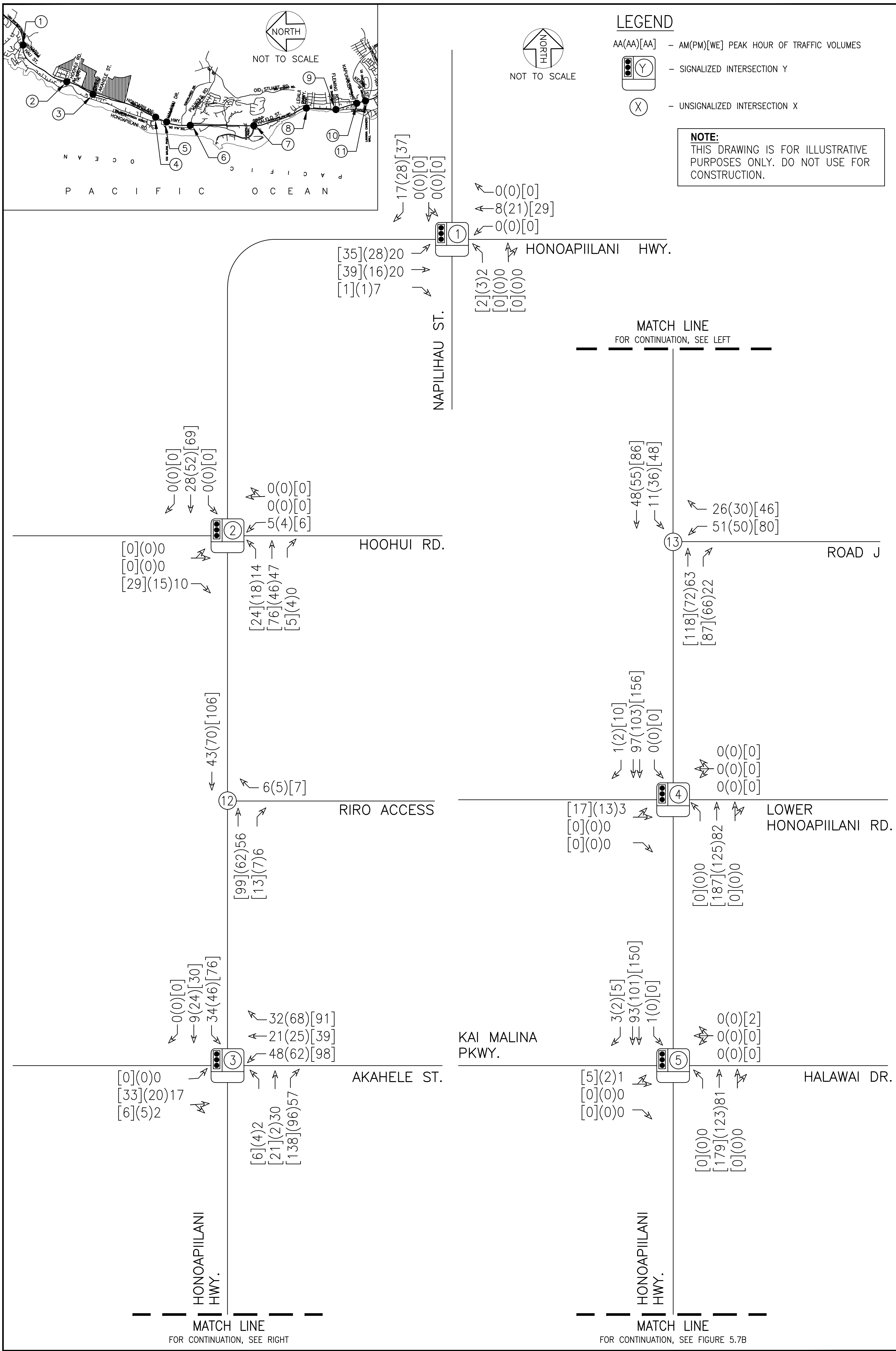
Based on the above configuration, the westbound left-turn out of the Project is expected to operate at LOS E/F during all peak hours of traffic. However, gaps in through traffic along Honoapiilani Highway will help facilitate westbound left-turn movements due to traffic being controlled by the upstream signal at Akahele Street to the north and downstream signal at Lower Honoapiilani Road to the south. Additionally, a median refuge lane may be constructed to provide two-stage movement for left-turn vehicles to cross one direction at a time.

It should be noted that Maui Land and Pineapple Company (ML&P) owns land mauka of the Project and the Kapalua Airport. Although ML&P does not have current plans to develop this land, the Project developer is agreeable to allowing traffic access the ML&P parcel via the proposed Road J. The Project proposes to provide a 100-foot right-of-way (ROW) along Road J as a provision to accommodate any future traffic demands along the roadway as a result of potential development by ML&P.

<u>[14-15] Akahele Street intersection with Road A and Road C</u>

With the proposed left-turn storage lanes at the Road A and Road C intersections, both intersections are expected to continue operating adequately at LOS D or better. As in Future Year 2025 Scenario 2, lengthy gaps in through traffic are expected along Akahele Street to help prevent long queues for opposing left-turn movements turning from Akahele Street. Similar to Scenario 2, based on AASHTO guidance, a minimum of 100’ storage for the eastbound left-turn and 50’ storage for the westbound left-turn lanes should be provided, exclusive of taper and deceleration length

Figure 5.7 illustrates the Project-generated trips for Future Year 2030 Scenario 3. Figure 5.8 illustrates the Future Year 2030 Scenario 3 forecast traffic volumes and LOS for the study intersection movements. Figure 5.9 illustrates the Future Year 2030 Scenario 3 forecast traffic volumes, LOS and intersection laneage at the two Project accesses along Akahele Street and at the Project RIRO access along Honoapiilani Highway. Table 5.8 summarizes the Future Year 2030 Scenario 3 LOS at the study intersections compared to Base Year 2030 with mitigation and Future Year 2025 Scenario 2. LOS worksheets are provided in Appendix C.



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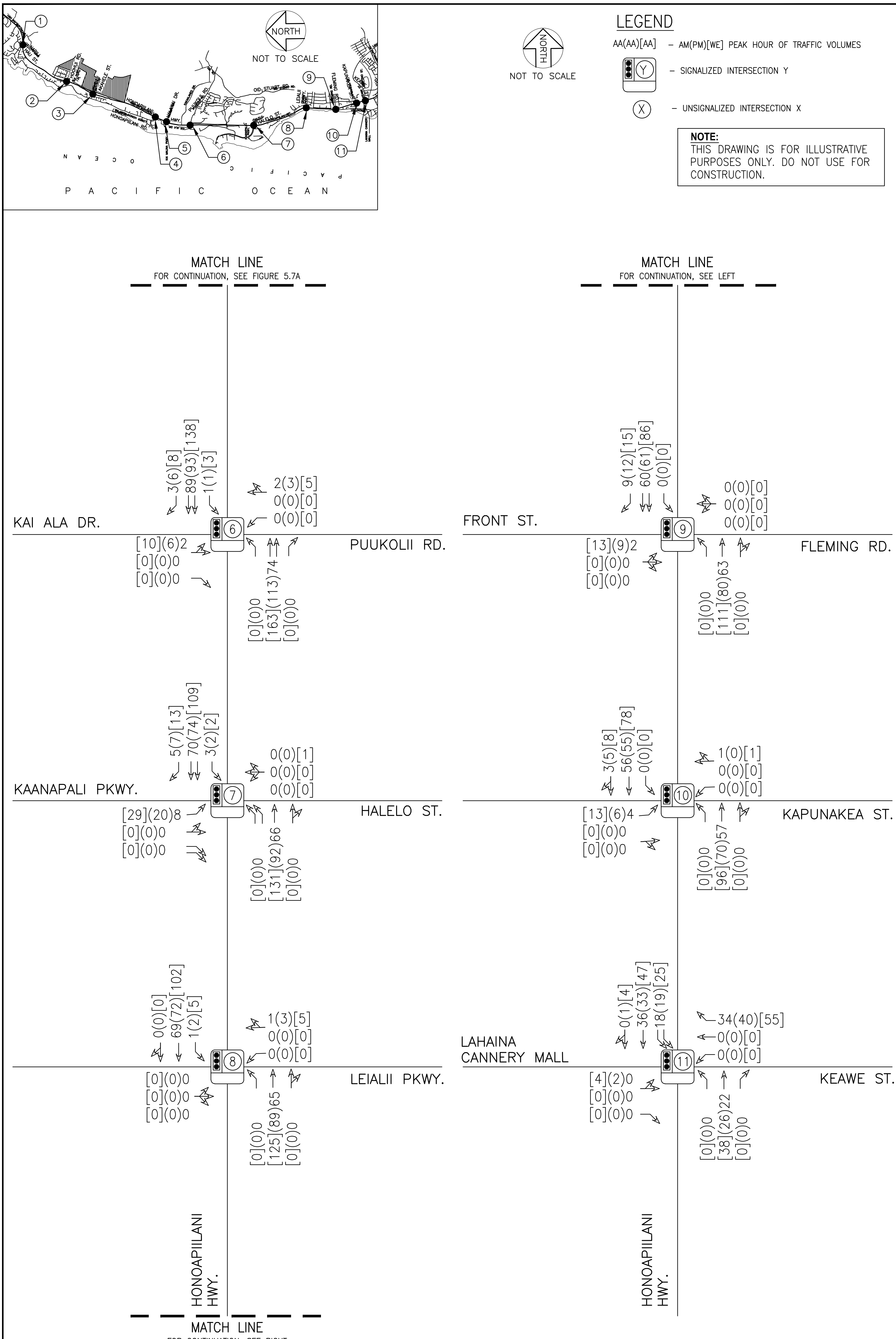
YEAR 2030 SCENARIO 3 PROJECT-GENERATED TRAFFIC

FIGURE 5.7A



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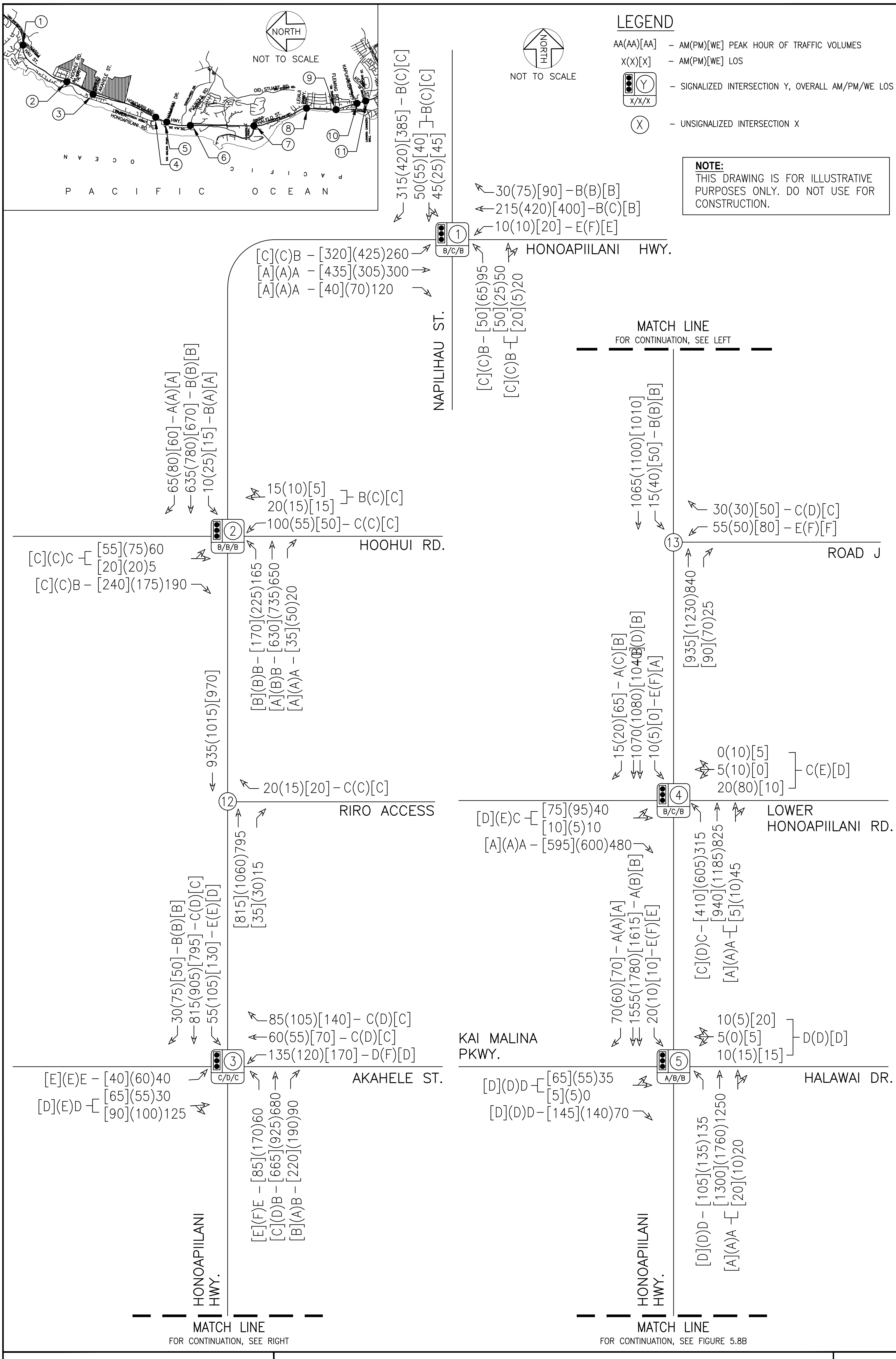
YEAR 2030 SCENARIO 3 PROJECT-GENERATED TRAFFIC

FIGURE 5.7B



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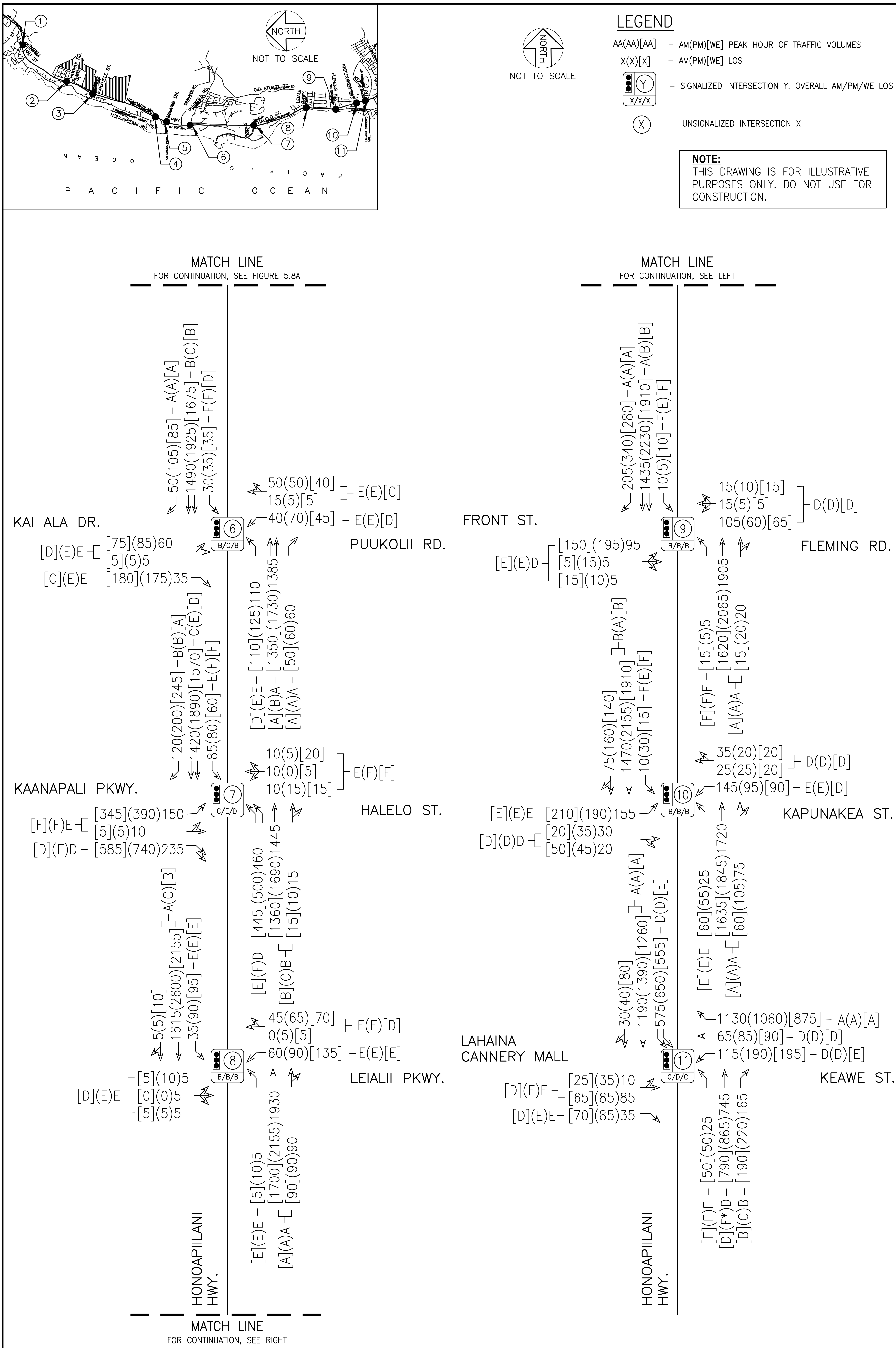
FUTURE YEAR 2030 SCENARIO 3 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 5.8A



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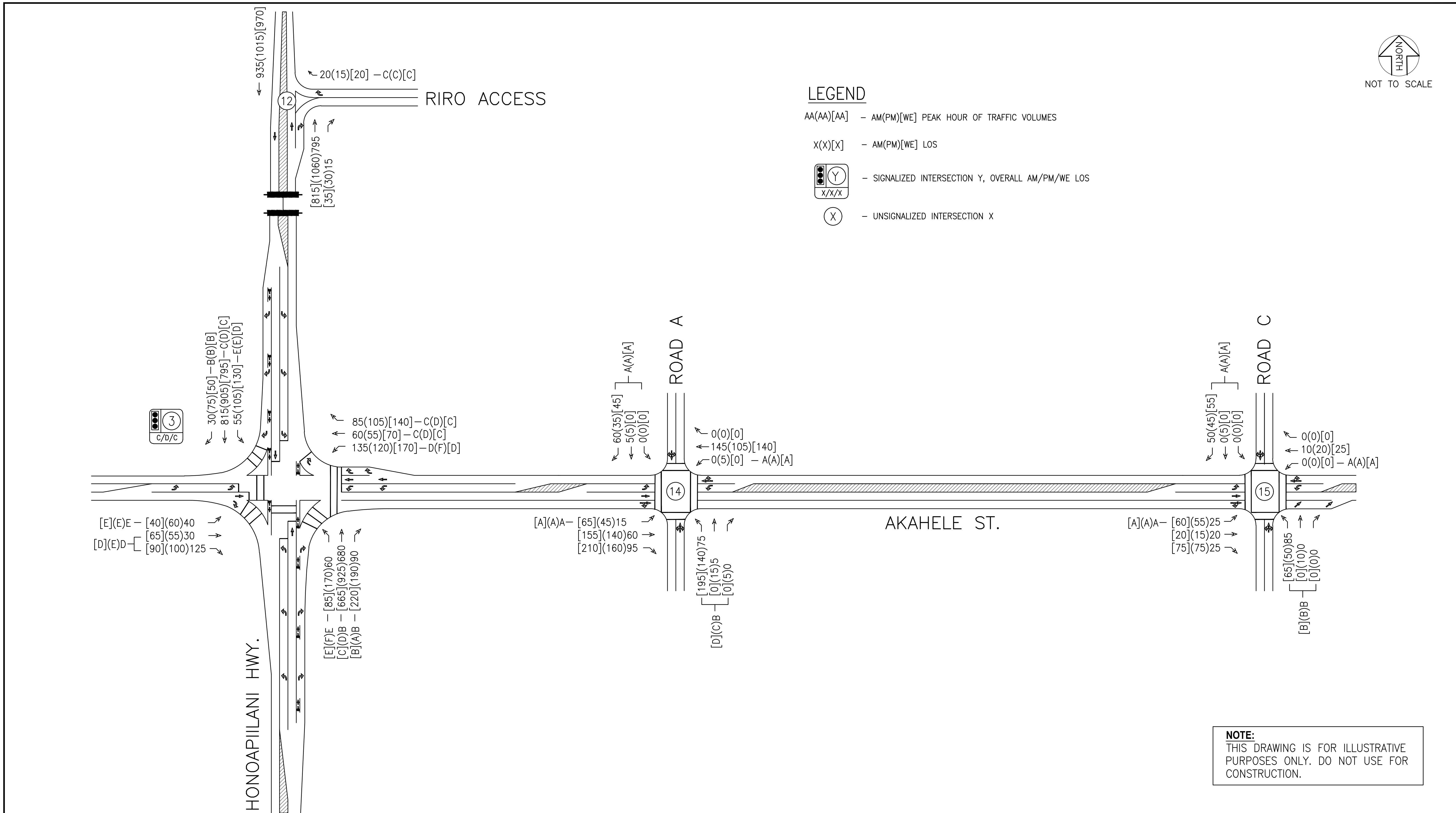
FUTURE YEAR 2030 SCENARIO 3 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 5.8B



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FUTURE YEAR 2030 SCENARIO 3
AKAHELE STREET LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 5.9

Table 5.7: Future Year 2030 (Scenario 3)
Left-Turn Storage Lane Length Calculations

Honoapiilani Highway & Akahele Street Intersection									
			AASHTO						Recommended storage length [3]
Movement	Peak Hour	Design Volume per lane (veh)	Cycle Length (sec) [1]	Cycles per Hour	Average Veh. per Cycle	Minimum Storage Length (1.5 factor) [2]			
						Veh	Ft		
Northbound Left-turn lane	AM	60	95	38	2	3	75	250 ft	
	PM	170	140	26	7	10	**250**		
	WE	85	100	36	3	4	100		
Southbound Left-turn lane	AM	55	95	38	2	3	75	Storage accommodated. Max queue could encroach into taper.	
	PM	105	140	26	5	7	**175**		
	WE	130	100	36	4	6	150		
Eastbound Left-turn lane	AM	40	95	38	2	2	60	Storage accommodated	
	PM	60	140	26	3	4	**100**		
	WE	40	100	36	2	2	60		
Westbound Left-turn lane	AM	135	95	38	4	6	150	200 ft	
	PM	120	140	26	5	7	175		
	WE	170	100	36	5	8	**200**		

Notes:

1. Cycle length based on Highway Capacity Manual (HCM), 6th Edition equilibrium cycle length.
2. Minimum storage length is 1.5 times the average number of vehicles per cycle; assume 1 vehicle length = 25 ft.
3. Recommended storage length is exclusive of taper length or deceleration length. To be verified upon design.

Table 5.8: Base Year 2030 with Mitigation, Future Year 2025 Scenario 2 and Future Year 2030 Scenario 3 Level of Service Summary

Intersection	Base Year 2030 with Mitigation									Future Year 2025 Scenario 2									Future Year 2030 Scenario 3								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Honoapiilani Highway & Napilihau Street																											
NB LT	18.8	0.75	B	23.3	0.84	C	21.5	0.78	C	18.9	0.75	B	20.4	0.83	C	19.9	0.78	B	18.8	0.76	B	28.9	0.88	C	24.1	0.82	C
NB TH	8.3	0.36	A	5.7	0.27	A	7.4	0.42	A	8.3	0.34	A	5.8	0.23	A	7.5	0.38	A	8.6	0.40	A	5.6	0.28	A	7.4	0.44	A
NB RT	6.9	0.08	A	4.7	0.05	A	5.4	0.03	A	7.0	0.08	A	5.0	0.05	A	5.7	0.03	A	7.0	0.10	A	4.6	0.05	A	5.2	0.03	A
EB LT/TH	15.0	0.26	B	24.3	0.32	C	20.3	0.31	C	15.3	0.25	B	21.6	0.30	C	18.7	0.29	B	15.6	0.26	B	27.8	0.32	C	23.2	0.32	C
EB RT	14.5	0.15	B	23.0	0.13	C	19.3	0.17	B	14.8	0.16	B	20.6	0.15	C	18.0	0.18	B	15.1	0.16	B	26.5	0.15	C	22.2	0.16	C
WB LT	17.4	0.30	B	27.3	0.32	C	22.3	0.21	C	17.8	0.31	B	24.1	0.29	C	20.5	0.19	C	18.2	0.32	B	31.4	0.36	C	25.7	0.25	C
WB TH/RT	14.7	0.22	B	23.0	0.14	C	20.0	0.29	B	15.0	0.21	B	20.4	0.13	C	18.5	0.28	B	15.3	0.21	B	26.3	0.13	C	22.9	0.29	C
SB LT	66.2	0.72	E	78.0	0.73	E	58.9	0.78	E	67.0	0.72	E	73.8	0.73	E	56.4	0.77	E	67.6	0.72	E	84.7	0.74	F	65.6	0.79	E
SB TH	14.1	0.47	B	18.7	0.67	B	15.4	0.61	B	13.5	0.32	B	18.3	0.62	B	15.6	0.58	B	15.8	0.52	B	21.6	0.71	C	17.6	0.66	B
SB RT	11.2	0.02	B	12.8	0.05	B	10.9	0.06	B	11.7	0.02	B	13.3	0.05	B	11.5	0.06	B	12.2	0.02	B	14.3	0.05	B	12.0	0.06	B
Overall	14.2	-	B	18.0	-	B	15.6	-	B	14.4	-	B	17.2	-	B	15.4	-	B	14.7	-	B	21.1	-	C	17.2	-	B
2: Honoapiilani Highway & Hoohui Road																											
NB LT	10.8	0.39	B	11.2	0.53	B	8.7	0.35	A	10.0	0.40	B	10.3	0.52	B	8.5	0.36	A	12.4	0.49	B	15.5	0.68	B	10.7	0.48	B
NB TH	10.7	0.64	B	9.4	0.68	A	8.9	0.61	A	11.3	0.69	B	9.4	0.67	A	8.9	0.59	A	11.9	0.72	B	10.1	0.71	B	9.3	0.66	A
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
EB LT/TH	19.3	0.18	B	22.9	0.33	C	18.1	0.23	B	17.8	0.17	B	21.2	0.32	C	17.2	0.23	B	20.8	0.18	C	26.8	0.35	C	21.4	0.25	C
EB RT	18.1	0.06	B	21.1	0.06	C	17.3	0.08	B	16.7	0.06	B	19.6	0.07	B	16.4	0.09	B	19.5	0.06	B	24.7	0.05	C	20.4	0.09	C
WB LT	22.2	0.30	C	25.4	0.22	C	19.7	0.15	B	20.4	0.29	C	23.6	0.23	C	18.6	0.14	B	24.2	0.34	C	30.1	0.29	C	23.5	0.21	C
WB TH/RT	18.2	0.07	B	21.2	0.07	C	17.2	0.07	B	16.7	0.07	B	19.6	0.07	B	16.3	0.06	B	19.5	0.07	B	24.8	0.07	C	20.2	0.07	C
SB LT	9.5	0.03	A	8.0	0.07	A	7.7	0.04	A	10.0	0.03	A	8.2	0.07	A	8.0	0.04	A	10.4	0.04	B	8.6	0.08	A	8.1	0.04	A
SB TH	15.7	0.81	B	13.9	0.82	B	12.6	0.77	B	15.3	0.78	B	13.8	0.80	B	12.7	0.75	B	16.8	0.83	B	16.9	0.86	B	14.0	0.82	B
SB RT	9.1	0.05	A	7.5	0.06	A	7.6	0.04	A	9.6	0.05	A	8.0	0.06	A	7.9	0.04	A	9.4	0.04	A	7.6	0.06	A	7.6	0.04	A
Overall	13.9	-	B	12.6	-	B	11.3	-	B	13.6	-	B	12.3	-	B	11.2	-	B	15.0	-	B	14.9	-	B	12.5	-	B
3: Honoapiilani Highway & Akahele Street																											
NB LT	45.9	0.77	D	50.1	0.83	D	40.5	0.76	D	48.5	0.76	D	48.5	0.82	D	43.0	0.76	D	57.6	0.76	E	95.7	0.90	F	56.3	0.77	E
NB TH	10.0	0.64	B	14.1	0.78	B	9.7	0.62	A	14.3	0.69	B	22.0	0.85	C	15.3	0.69	B	19.2	0.75	B	35.2	0.91	D	25.7	0.81	C
NB RT	5.9	0.01	A	5.3	0.01	A	5.9	0.01	A	8.8	0.03	A	9.0	0.07	A	9.9	0.06	A	11.0	0.07	B	0.0	0.00	A	15.6	0.22	B
EB LT	50.0	0.74	D	59.6	0.77	E	48.3	0.73	D	55.2	0.77	E	58.1	0.76	E	52.8	0.75	D	66.2	0.78	E	79.5	0.78	E	68.9	0.78	E
EB TH/RT	27.5	0.07	C	39.5	0.05	D	27.2	0.05	C	28.8	0.07	C	39.3	0.33	D	28.6	0.23	C	39.3	0.30	D	67.3	0.73	E	50.1	0.75	D
WB LT	73.5	0.53	E	74.2	0.59	E	55.5	0.56	E	43.8	0.76	D	58.1	0.76	E	43.9	0.76	D	49.7	0.81	D	91.7	0.85	F	52.8	0.84	D
WB TH	29.0	0.03	C	42.7	0.04	D	28.4	0.03	C	26.9	0.14	C	37.9	0.15	D	26.1	0.11	C	32.7	0.19	C	53.4	0.23	D	34.2	0.21	C
WB RT	28.9	0.01	C	42.6	0.01	D	28.3	0.01	C	26.2	0.02	C	37.0	0.01	D	25.5	0.01	C	31.6	0.03	C	51.5	0.03	D	33.1	0.06	C
SB LT	116.1	0.71	F	135.0	0.72	F	114.8	0.71	F	84.0	0.84	F	57.9	0.76	E	48.8	0.77	D	58.9	0.76	E	78.2	0.83	E	52.9	0.81	D
SB TH	15.8	0.86	B	29.8	0.92	C	16.0	0.85	B	19.6	0.86	B	28.6	0.90	C	19.7	0.86	B	27.9	0.90	C	44.5	0.95	D	31.5	0.91	C
SB RT	7.3	0.02	A	10.0	0.05	A	7.8	0.04	A	10.0	0.02	A	12.2	0.05	B	10.5	0.03	B	10.8	0.02	B	14.1	0.04	B	12.4	0.03	B
Overall	15.9	-	B	25.5	-	C	16.0	-	B	21.7	-	C	29.6	-	C	22.1	-	C	28.9	-	C	49.9	-	D	34.0	-	C
4: Honoapiilani Highway & Lower Honoapiilani Road																											
NB LT	24.8	0.84	C	38.6	0.94	D	23.5	0.87	C	24.5	0.84	C	33.4	0.94	C	23.3	0.87	C	29.9	0.86	C	52.4	0.95	D	32.3	0.90	C
NB TH/RT	4.5	0.34	A	4.3	0.38	A	2.4	0.26	A	4.5	0.33	A	4.5	0.39	A	2.5	0.27	A	4.2	0.36	A	4.7	0.45	A	2.9	0.36	A
EB LT/TH	27.6	0.21	C	48.8	0.42	D	29.8	0.30	C	27.3	0.21	C	45.4	0.45	D	29.3	0.33	C	33.4	0.26	C	60.7	0.56	E	39.4	0.43	D
EB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
WB LT/TH/RT	27.0	0.11	C	49.6	0.50	D	28.0	0.05	C	26.7	0.11	C	45.7	0.48	D	27.3	0.05	C	32.5	0.12	C	59.7	0.52	E	36.0	0.05	D
SB LT	53.7	0.74	D	95.3	0.73	F	0.0	0.00	A	53.4	0.74	D	90.5	0.72	F	0.0	0.00	A	61.1	0.75	E	108.4	0.74	F	0.0	0.00	A
SB TH	13.2	0.60	B	30.2	0.74	C	15.2	0.60	B	13.2	0.60	B	28.4	0.72	C	15.4	0.60	B	14.1	0.64	B	36.4	0.80	D	18.8	0.68	B
SB RT	9.1	0.01	A	20.5	0.01	C	10.9	0.03	B	9.1	0.01	A	19.8	0.01	B	11.2	0.03	B	9.0	0.01	A	22.6	0.01	C	12.4	0.05	B
Overall	12.4	-	B	24.1	-	C	13.0	-	B	12.4	-	B	21.9	-	C	13.1	-	B	13.3	-	B	28.8	-	C	15.7	-	B

Table 5.8: Base Year 2030 with Mitigation, Future Year 2025 Scenario 2 and Future Year 2030 Scenario 3 Level of Service Summary Cont'd

	Base Year 2030 with Mitigation									Future Year 2025 Scenario 2									Future Year 2030 Scenario 3								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
Intersection	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive																											
NB LT	35.0	0.80	D	47.9	0.82	D	38.6	0.78	D	34.4	0.79	C	46.0	0.82	D	37.4	0.78	D	39.7	0.81	D	51.2	0.83	D	44.9	0.79	D
NB TH/RT	3.9	0.46	A	7.4	0.62	A	4.8	0.44	A	4.0	0.46	A	7.6	0.63	A	5.0	0.44	A	4.0	0.49	A	9.1	0.70	A	5.5	0.53	A
EB LT/TH	33.8	0.18	C	40.7	0.23	D	33.5	0.27	C	33.1	0.17	C	38.9	0.25	D	32.3	0.28	C	38.6	0.22	D	43.6	0.26	D	39.2	0.32	D
EB RT	33.6	0.01	C	39.7	0.03	D	32.6	0.04	C	32.9	0.01	C	37.9	0.03	D	31.4	0.04	C	38.1	0.01	D	42.4	0.03	D	37.9	0.04	D
WB LT/TH/RT	34.1	0.11	C	42.0	0.09	D	32.8	0.11	C	33.5	0.11	C	40.2	0.08	D	31.5	0.11	C	38.6	0.12	D	45.1	0.09	D	38.6	0.13	D
SB LT	57.8	0.79	E	78.1	0.78	E	63.8	0.76	E	56.9	0.79	E	75.6	0.78	E	62.1	0.75	E	64.5	0.85	E	82.7	0.79	F	72.3	0.77	E
SB TH	8.0	0.64	A	14.0	0.77	B	9.1	0.66	A	7.9	0.64	A	13.3	0.74	B	9.0	0.65	A	8.6	0.69	A	16.4	0.83	B	10.7	0.73	B
SB RT	4.4	0.04	A	6.4	0.04	A	4.9	0.04	A	4.4	0.05	A	6.5	0.04	A	5.0	0.04	A	4.3	0.05	A	6.5	0.04	A	5.0	0.04	A
Overall	8.2	-	A	13.0	-	B	9.5	-	A	8.2	-	A	12.7	-	B	9.4	-	A	8.9	-	A	14.9	-	B	10.6	-	B
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road																											
NB LT	74.2	0.84	E	77.9	0.86	E	41.8	0.78	D	74.2	0.84	E	77.8	0.86	E	41.0	0.78	D	74.1	0.84	E	77.4	0.86	E	44.5	0.79	D
NB TH	6.4	0.50	A	10.4	0.62	B	8.3	0.52	A	6.4	0.49	A	10.6	0.63	B	8.4	0.53	A	7.1	0.54	A	12.4	0.71	B	9.3	0.62	A
NB RT	3.8	0.04	A	5.3	0.04	A	5.3	0.03	A	3.8	0.04	A	5.5	0.04	A	5.4	0.03	A	3.9	0.04	A	5.6	0.04	A	5.2	0.03	A
EB LT/TH	68.7	0.38	E	67.2	0.37	E	33.4	0.24	C	68.7	0.38	E	67.1	0.39	E	32.7	0.25	C	68.5	0.40	E	67.0	0.40	E	36.9	0.31	D
EB RT	63.3	0.01	E	63.7	0.13	E	32.1	0.05	C	63.3	0.01	E	63.8	0.18	E	31.2	0.05	C	62.9	0.01	E	63.6	0.20	E	34.6	0.05	C
WB LT	75.0	0.39	E	78.4	0.54	E	37.0	0.23	D	75.0	0.39	E	78.6	0.54	E	36.3	0.22	D	75.0	0.39	E	79.1	0.55	E	41.2	0.26	D
WB TH/RT	64.1	0.10	E	62.6	0.03	E	31.9	0.03	C	64.1	0.10	E	62.1	0.02	E	31.0	0.03	C	63.6	0.09	E	61.7	0.03	E	34.5	0.03	C
SB LT	82.8	0.68	F	89.0	0.77	F	44.6	0.58	D	84.7	0.76	F	89.0	0.77	F	43.7	0.58	D	84.7	0.76	F	89.0	0.77	F	47.7	0.63	D
SB TH	10.6	0.56	B	20.3	0.79	C	14.4	0.76	B	10.5	0.55	B	19.2	0.76	B	14.0	0.74	B	12.0	0.63	B	24.5	0.86	C	16.9	0.83	B
SB RT	6.0	0.03	A	8.5	0.07	A	7.2	0.05	A	5.9	0.03	A	8.7	0.08	A	7.3	0.05	A	6.1	0.03	A	8.9	0.08	A	7.1	0.06	A
Overall	13.9	-	B	20.8	-	C	14.1	-	B	14.1	-	B	20.6	-	C	13.9	-	B	14.7	-	B	23.3	-	C	15.7	-	B
7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street																											
NB LT	46.8	0.79	D	110.3	0.90	F	66.4	0.83	E	43.7	0.76	D	95.6	0.86	F	53.3	0.72	D	55.0	0.81	D	133.3	0.94	F	80.0	0.85	E
NB TH/RT	15.6	0.66	B	21.2	0.65	C	16.0	0.55	B	16.1	0.68	B	23.7	0.70	C	14.3	0.59	B	16.1	0.67	B	22.8	0.70	C	17.6	0.60	B
EB LT/TH	51.6	0.50	D	113.5	0.80	F	64.6	0.61	E	47.5	0.47	D	91.3	0.63	F	52.1	0.61	D	60.4	0.55	E	146.0	0.95	F	81.2	0.73	F
EB RT	32.6	0.08	C	77.8	0.67	E	44.2	0.44	D	30.6	0.08	C	67.3	0.52	E	39.0	0.35	D	38.5	0.08	D	87.3	0.70	F	54.2	0.45	D
WB LT/TH/RT	52.1	0.19	D	118.7	0.27	F	77.6	0.40	E	47.9	0.18	D	104.5	0.23	F	58.6	0.33	E	61.1	0.20	E	127.2	0.27	F	93.4	0.45	F
SB LT	53.9	0.60	D	142.6	0.77	F	76.5	0.58	E	49.4	0.59	D	121.6	0.74	F	57.7	0.54	E	62.9	0.65	E	176.9	0.87	F	91.8	0.64	F
SB TH	24.0	0.77	C	53.6	0.92	D	31.8	0.81	C	22.5	0.76	C	43.4	0.89	D	21.5	0.77	C	25.8	0.79	C	57.5	0.95	E	36.3	0.84	D
SB RT	10.2	0.10	B	23.8	0.18	C	19.9	0.23	B	9.7	0.09	A	8.2	0.11	A	6.7	0.13	A	10.2	0.10	B	10.8	0.16	B	9.4	0.20	A
Overall	25.5	-	C	57.1	-	E	35.1	-	D	24.3	-	C	47.1	-	D	25.2	-	C	27.9	-	C	63.9	-	E	39.9	-	D
8: Honoapiilani Highway & Leialii Parkway																											
NB LT	75.1	0.44	E	68.9	0.49	E	71.6	0.44	E	75.5	0.44	E	69.2	0.49	E	72.2	0.44	E	74.7	0.44	E	73.2	0.50	E	70.8	0.44	E
NB TH/RT	9.3	0.73	A	2.8	0.82	A	3.4	0.67	A	8.9	0.71	A	2.5	0.78	A	3.1	0.63	A	9.9	0.76	A	3.2	0.88	A	4.2	0.75	A
EB LT/TH/RT	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D	58.6	0.06	E	61.5	0.07	E	50.0	0.03	D
WB LT	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E	62.0	0.37	E	67.4	0.56	E	58.1	0.63	E
WB TH/RT	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D	58.6	0.01	E	61.1	0.05	E	50.4	0.05	D
SB LT	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E	69.8	0.60	E	77.8	0.80	E	78.3	0.80	E
SB TH/RT	5.6	0.54	A	20.4	0.92	C	12.6	0.78	B	5.5	0.53	A	14.4	0.85	B	10.7	0.72	B	6.2	0.59	A	24.9	0.95	C	15.1	0.83	B
Overall	9.5	-	A	14.5	-	B	12.0	-	B	9.2	-	A	11.3	-	B	11.2	-	B	10.0	-	B	17.1	-	B	13.5	-	B
9: Honoapiilani Highway & Front Street/Flemming Road																											
NB LT	86.5	0.73	F	91.0	0.74	F	84.9	0.84	F	88.1	0.73	F	93.5	0.74	F	86.6	0.84	F	87.3	0.73	F	93.9	0.74	F	82.3	0.84	F
NB TH/RT	8.0	0.70	A	2.3	0.78	A	7.4	0.57	A	7.7	0.68	A	2.1	0.74	A	7.1	0.53	A	8.7	0.73	A	3.0	0.84	A	8.8	0.64	A
EB LT/TH/RT	52.7	0.48	D	59.5	0.72	E	57.8	0.66	E	52.7	0.48	D	59.8	0.73	E	57.5	0.67	E	53.1	0.50	D	66.1	0.76	E	57.6	0.68	E
WB LT/TH/RT	54.3	0.61	D	49.8	0.24	D	52.4	0.32	D	54.3	0.61	D	48.9	0.23	D	51.9	0.31	D	54.4	0.61	D	51.7	0.22	D	50.9	0.30	D
SB LT	87.0	0.80	F	77.7	0.74	E	83.7	0.82	F	87.2	0.80	F	85.0	0.74	F	86.6	0.82	F	85.9	0.80	F	79.8	0.74	E	80.7	0.82	F
SB TH	5.2	0.52	A	13.9	0.88	B	8.7	0.71	A	5.1	0.50	A	12.8	0.82	B	8.2	0.66	A	5.5	0.56	A	17.0	0.93	B	10.4	0.77	B
SB RT	3.2	0.12	A	5.5	0.24	A	4.3	0.18	A	3.2	0.12	A	5.9	0.24	A	4.4	0.18	A	3.2	0.13	A	6.3	0.26	A	4.8	0.20	A
Overall	10.0	-	B	11.1	-	B	11.4	-	B	9.9	-	A	10.9	-	B	11.3	-	B	10.3	-	B	13.3	-	B	12.6	-	B

Table 5.8: Base Year 2030 with Mitigation, Future Year 2025 Scenario 2 and Future Year 2030 Scenario 3 Level of Service Summary Cont'd

Intersection	Base Year 2030 with Mitigation									Future Year 2025 Scenario 2									Future Year 2030 Scenario 3								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
10: Honoapiilani Highway & Kapunakea Street																											
NB LT	68.5	0.79	E	62.7	0.79	E	62.1	0.78	E	68.5	0.79	E	62.7	0.79	E	62.1	0.78	E	68.5	0.79	E	71.9	0.81	E	62.1	0.78	E
NB TH/RT	0.3	0.69	A	0.4	0.74	A	1.4	0.65	A	0.4	0.76	A	0.4	0.76	A	3.1	0.63	A	0.3	0.72	A	0.5	0.80	A	2.2	0.72	A
EB LT	59.4	0.61	E	70.6	0.77	E	58.5	0.71	E	-	-	-	-	-	-	-	-	-	61.5	0.65	E	79.7	0.81	E	58.2	0.73	E
EB LT/TH	-	-	-	-	-	-	-	-	-	47.4	0.50	D	56.8	0.69	E	53.0	0.66	D	-	-	-	-	-	-	-	-	-
EB TH/RT	49.9	0.11	D	48.9	0.17	D	44.3	0.09	D	-	-	-	-	-	-	-	-	-	49.9	0.11	D	52.3	0.18	D	42.7	0.08	D
EB RT	-	-	-	-	-	-	-	-	-	38.7	0.01	D	41.1	0.02	D	39.5	0.03	D	-	-	-	-	-	-	-	-	-
WB LT	59.9	0.62	E	55.6	0.44	E	49.0	0.34	D	71.7	0.72	E	113.0	0.88	F	82.5	0.74	F	60.4	0.63	E	59.4	0.44	E	47.2	0.32	D
WB TH/RT	49.8	0.10	D	48.2	0.10	D	44.2	0.07	D	39.4	0.07	D	41.7	0.08	D	39.9	0.06	D	49.8	0.10	D	51.5	0.10	D	42.6	0.07	D
SB LT	100.4	0.83	F	70.5	0.80	E	82.2	0.84	F	100.7	0.83	F	71.6	0.80	E	84.7	0.84	F	99.2	0.83	F	71.6	0.78	E	80.2	0.84	F
SB TH/RT	10.7	0.59	B	8.5	0.94	A	4.6	0.85	A	18.4	0.66	B	8.8	0.94	A	11.3	0.83	B	11.3	0.63	B	7.2	0.97	A	12.6	0.92	B
Overall	11.0	-	B	10.9	-	B	8.8	-	A	14.3	-	B	12.3	-	B	14.0	-	B	11.3	-	B	11.2	-	B	13.2	-	B
11: Honoapiilani Highway & Keawe Street																											
NB LT	79.7	0.79	E	70.1	0.77	E	67.0	0.77	E	79.7	0.79	E	70.1	0.77	E	67.0	0.77	E	79.7	0.79	E	75.1	0.78	E	67.0	0.77	E
NB TH	32.7	0.80	C	67.1	1.01	F*	52.1	0.95	D	31.3	0.76	C	42.4	0.87	D	37.1	0.79	D	38.5	0.86	D	123.2	1.16	F*	48.8	0.95	D
NB RT	17.3	0.13	B	21.9	0.22	C	22.2	0.21	C	17.9	0.13	B	22.0	0.22	C	22.5	0.17	C	18.6	0.12	B	26.6	0.24	C	19.6	0.20	B
EB LT/TH	61.3	0.48	E	56.3	0.50	E	51.7	0.36	D	61.3	0.48	E	56.2	0.50	E	51.7	0.36	D	61.3	0.48	E	61.2	0.53	E	51.7	0.36	D
EB RT	56.6	0.02	E	51.2	0.04	D	48.6	0.05	D	56.6	0.02	E	51.3	0.06	D	48.6	0.05	D	56.7	0.04	E	55.5	0.05	E	48.5	0.04	D
WB LT	50.6	0.49	D	64.4	0.79	E	43.0	0.59	D	50.6	0.49	D	64.3	0.78	E	43.0	0.59	D	49.8	0.47	D	51.2	0.65	D	56.3	0.72	E
WB TH	45.7	0.18	D	41.6	0.21	D	36.0	0.19	D	45.7	0.18	D	41.6	0.21	D	36.0	0.19	D	45.1	0.18	D	41.3	0.18	D	40.0	0.22	D
WB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
SB LT	60.7	0.94	E	42.3	0.95	D	58.0	0.91	E	51.0	0.92	D	46.0	0.95	D	57.6	0.88	E	51.1	0.92	D	43.5	0.95	D	56.3	0.95	E
SB TH/RT	1.0	0.50	A	0.3	0.65	A	18.7	0.64	B	1.0	0.48	A	0.5	0.57	A	27.5	0.57	C	1.2	0.54	A	0.4	0.70	A	6.1	0.64	A
Overall	26.9	-	C	32.5	-	C	37.3	-	D	25.2	-	C	28.4	-	C	38.0	-	D	26.6	-	C	46.3	-	D	31.9	-	C
12: RIRO Access & Honoapiilani Highway																											
WB RT										14.3	0.04	B	17.7	0.04	C	13.4	0.03	B	15.8	0.06	C	21.0	0.07	C	16.2	0.06	C
Overall										0.1	-	-	0.1	-	-	0.1	-	-	0.2	-	-	0.1	-	-	0.2	-	-
13: Honoapiilani Highway & Road J																											
WB LT																			37.2	0.35	E	64.3	0.49	F	64.8	0.62	F
WB RT																			17.1	0.10	C	28.3	0.17	D	20.3	0.19	C
SB LT																			10.1	0.02	B	13.2	0.09	B	11.3	0.09	B
Overall																			1.3	-	-	1.8	-	-	3.0	-	-
14: Road A & Akahele Street																											
NB LT/TH/RT										10.5	0.04	B	11.8	0.03	B	11.8	0.04	B	12.8	0.16	B	17.8	0.38	C	25.1	0.55	D
EB LT										7.4	0.01	A	7.5	0.04	A	7.5	0.04	A	7.6	0.01	A	7.5	0.03	A	7.6	0.04	A
WB LT										0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	7.9	0.00	A	0.0	0.00	A
SB LT/TH/RT										9.1	0.07	A	8.8	0.04	A	9.0	0.05	A	9.6	0.08	A	9.7	0.05	A	9.3	0.06	A
Overall										3.8	-	-	3.1	-	-	3.2	-	-	3.8	-	-	5.5	-	-	7.2	-	-
15: Road C & Akahele Street																											
NB LT/TH/RT										9.2	0.10	A	9.3	0.06	A	9.4	0.08	A	10.2	0.12	B	11.0	0.09	B	11.4	0.11	B
EB LT										0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	7.3	0.02	A	7.3	0.04	A	7.4	0.04	A
WB LT										0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
SB LT/TH/RT										0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	8.5	0.05	A	8.8	0.06	A	8.6	0.06	A
Overall										5.6	-	-	2.7	-	-	3.3	-	-	6.9	-	-	5.4	-	-	5.5	-	-
16: Road G & Road J																											
NB LT/TH/RT																			9.5	0.01	A	10.1	0.03	B	10.8	0.07	B
EB LT/TH/RT																			7.4	0.01	A	7.4	0.02	A	7.4	0.03	A
WB LT/TH/RT																			0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
SB LT/TH/RT																			8.7	0.01	A	9.2	0.05	A	8.7	0.03	A
Overall																			1.9	-	-	3.5	-	-	3.7	-	-
17: Road F & Road J																											
NB LT/RT																			8.9	0.04	A	9.1	0.03	A	9.1	0.04	A
WB LT/TH																			0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
Overall																			3.5	-	-	1.7	-	-	2.1	-	-

5.5 Future Year 2035 Scenario 4 Analysis

As discussed previously, a future elementary school will be planned/developed by the Department of Education (DOE) on the Project site. Since the development of the school is not in the direct controller of the Pulelehua development, the timeframe for this school has yet to be determined. For the purposes of this TIAR, a forecast build-out of 2035 with inclusion of the elementary school as part of the Project was assumed as Scenario 4 for the TIAR.

By completion of Scenario 4 in Future Year 2035, the Project is projected to generate an additional 471(115)[0] new external trips during the AM(PM)[WE] peak hours of traffic. Elementary school students in Lahaina are currently serviced primarily by Princess Nahienaena Elementary School and King Kamehameha III Elementary School, located further south of Keawe Street. It's anticipated that upon opening of the new Elementary School in the Project site, many students will transfer to this site from the Kaanapali, Honokowai, Kahana, Napili and Kapalua regions. Trips generated by the new elementary school were rerouted from existing traffic along Honoapiilani Highway to the new site. As a result, the majority of traffic increases were turning movement traffic turning into and out of Akahele Street on the east leg of its intersection with Honoapiilani Highway. Traffic reductions to various through movements along the highway were a result of the reroute.

5.5.1 Future Year 2035 Scenario 4 Intersection Analysis

With the additional trips generated by Scenario 4, several study intersections are forecast to operate with increased delay over Future Year 2030 Scenario 3 conditions. However, the majority of movements are expected to operate similar to Future Year 2030 Scenario 3 with all intersection movements forecast to operate at LOS E/F for Future Year 2030 Scenario 3 conditions anticipated to continue operating at LOS E/F conditions during Future Year 2035 Scenario 4.

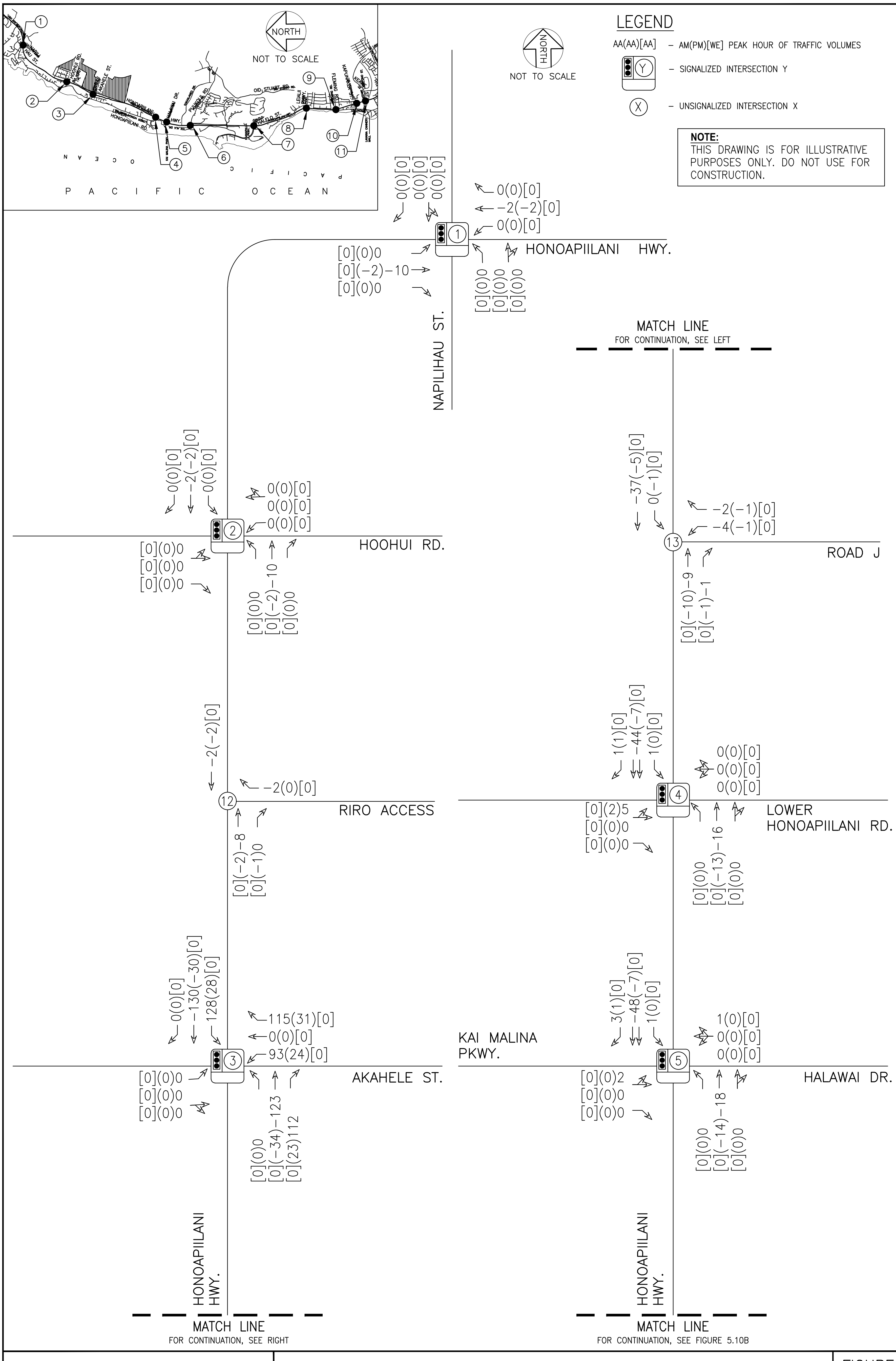
<u>[3] Honoapiilani Highway/Akahele Street</u>

As noted previously, some deficiencies in capacity and delay are forecast along northbound Honoapiilani Highway in the vicinity of the current northern terminus of the LBR at Keawe Street. Upon completion of the LBR Phase 1C, which will extend the bypass road to Kaanapali, the majority of capacity and delay issues are anticipated to be resolved as a portion of vehicles will continue further north on the LBR rather than exiting to Honoapiilani Highway at Keawe Street. Because allocation of State funds for Phase 1C of the LBR is currently under discussion, the bypass extension was not assumed to be completed by Future Year 2035.

Based on the AASHTO Green Book, left-turn storage lane lengths at the Honoapiilani Highway/Akahele Street intersection were determined. See Table 5.9 for the recommended storage lane lengths. Based on the AASHTO Green Book, the following is recommended. Note, additional taper length and/or deceleration length to be provided/verified upon design:

- Northbound left-turn lane → Lengthen left-turn lane to provide at least 275 feet of storage space.
- Southbound left-turn lane → Lengthen left-turn lane to provide at least 250 feet of storage space.
- Westbound left-turn lane → Lengthen left-turn lane to provide at least 250 feet of storage space.

Figure 5.10 illustrates the Project-generated trips for Future Year 2035 Scenario 4. Figure 5.11 illustrates the Future Year 2035 Scenario 4 forecast traffic volumes and LOS for the study intersection movements. Figure 5.12 illustrates the Future Year 2035 Scenario 4 forecast traffic volumes, LOS and intersection laneage at the two Project accesses along Akahele Street and at the Project RIRO access along Honoapiilani Highway. Table 5.10 summarizes the Future Year 2035 Scenario 4 LOS at the study intersections compared to Base Year 2035 and Future Year 2030 Scenario 3. LOS worksheets are provided in Appendix C. Full Future Year 2022, 2025, 2030 and 2035 roadway improvements for Scenarios 1-4 are listed in Appendix D.



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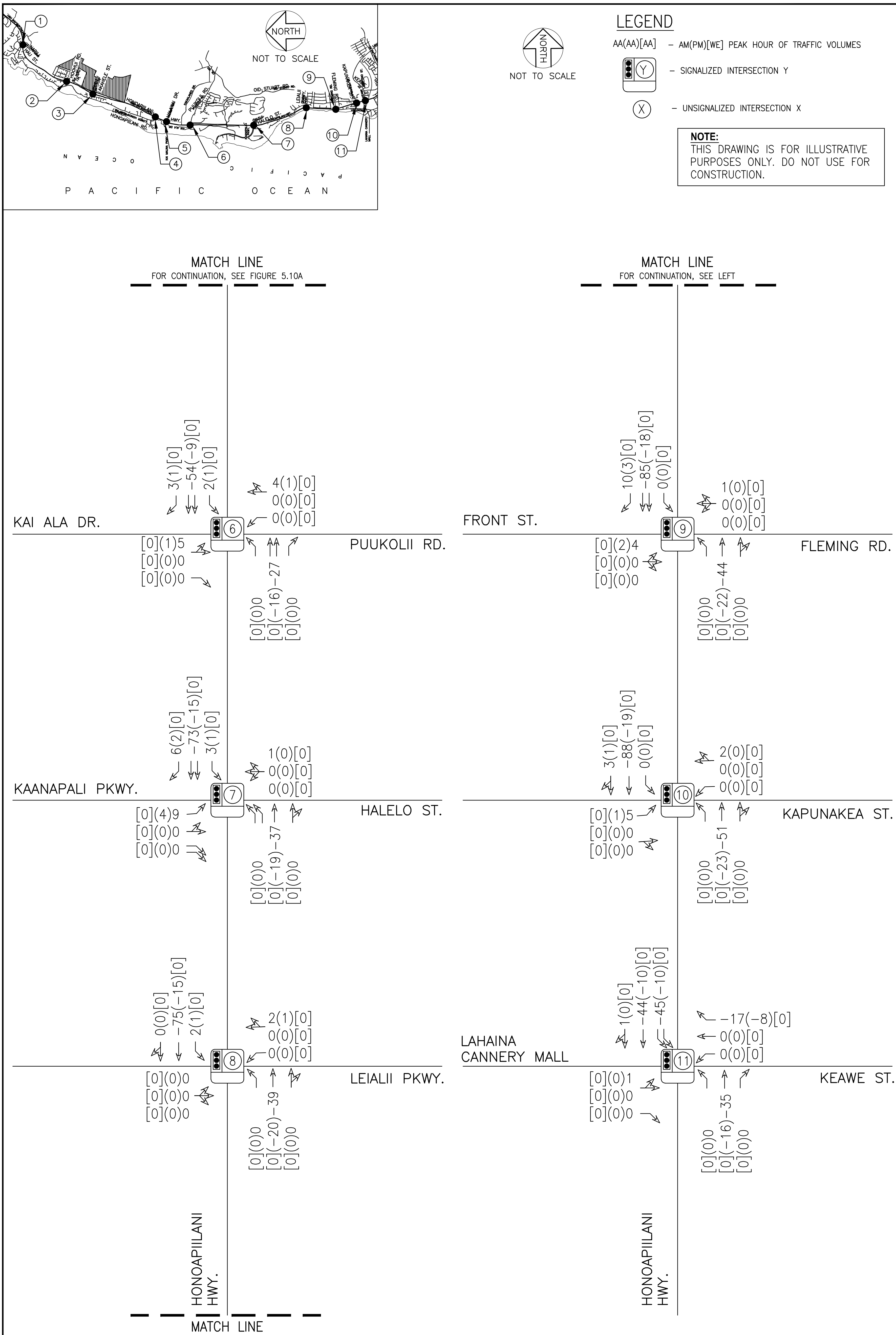
YEAR 2035 SCENARIO 4 PROJECT-GENERATED TRAFFIC

FIGURE 5.10A



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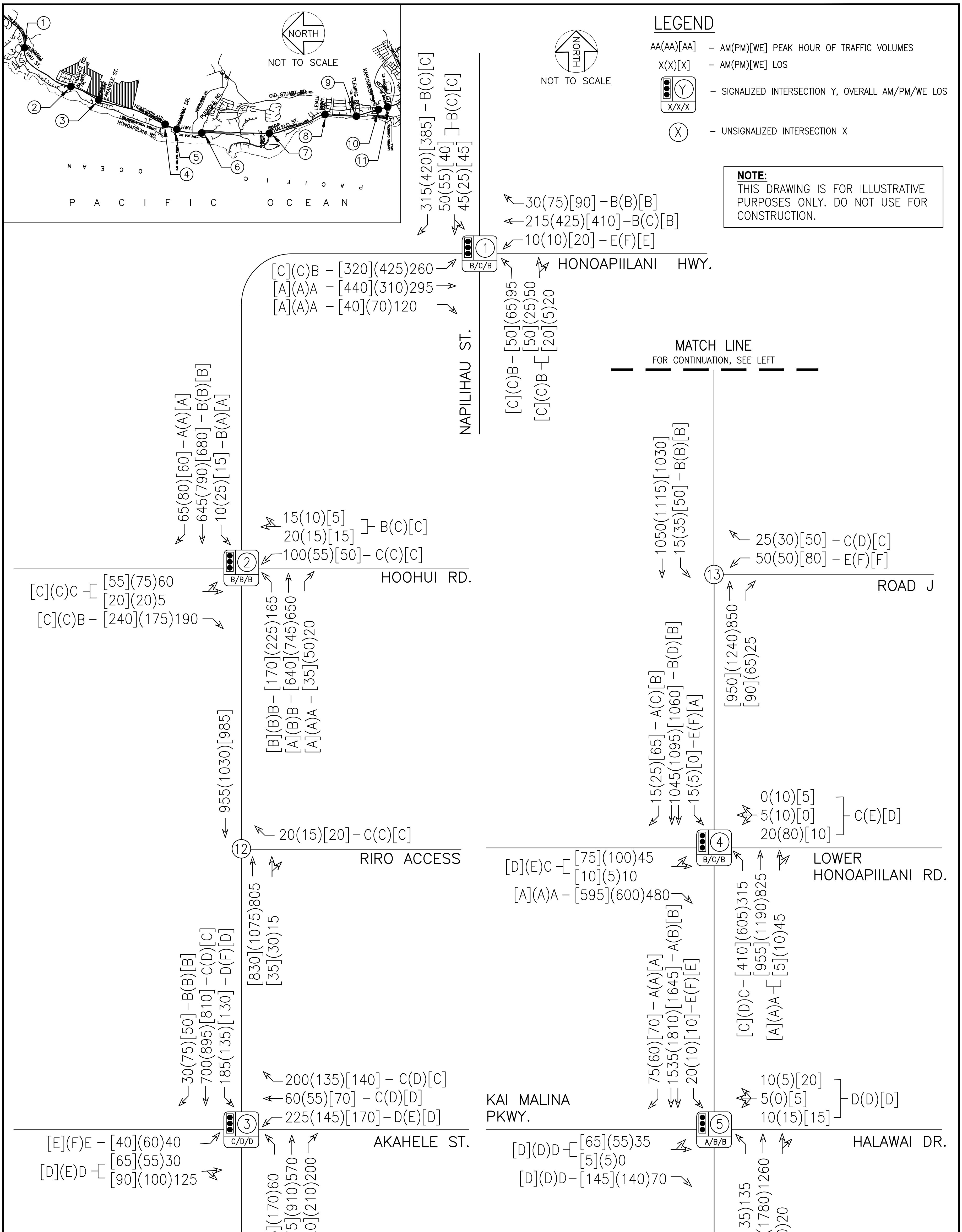
YEAR 2035 SCENARIO 4 PROJECT-GENERATED TRAFFIC

FIGURE 5.10B



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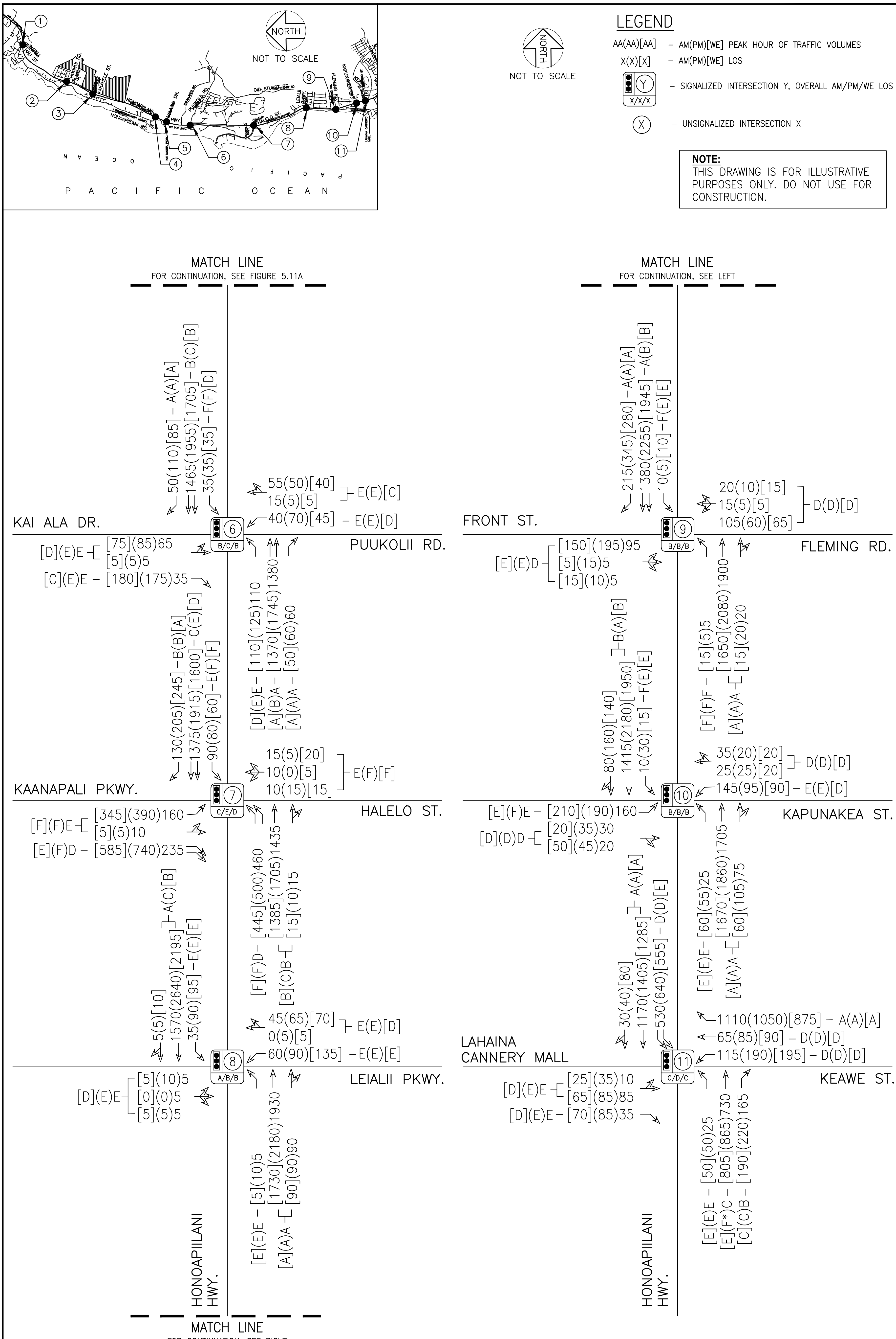
FUTURE YEAR 2035 SCENARIO 4 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 5.11A



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FUTURE YEAR 2035 SCENARIO 4 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 5.11B

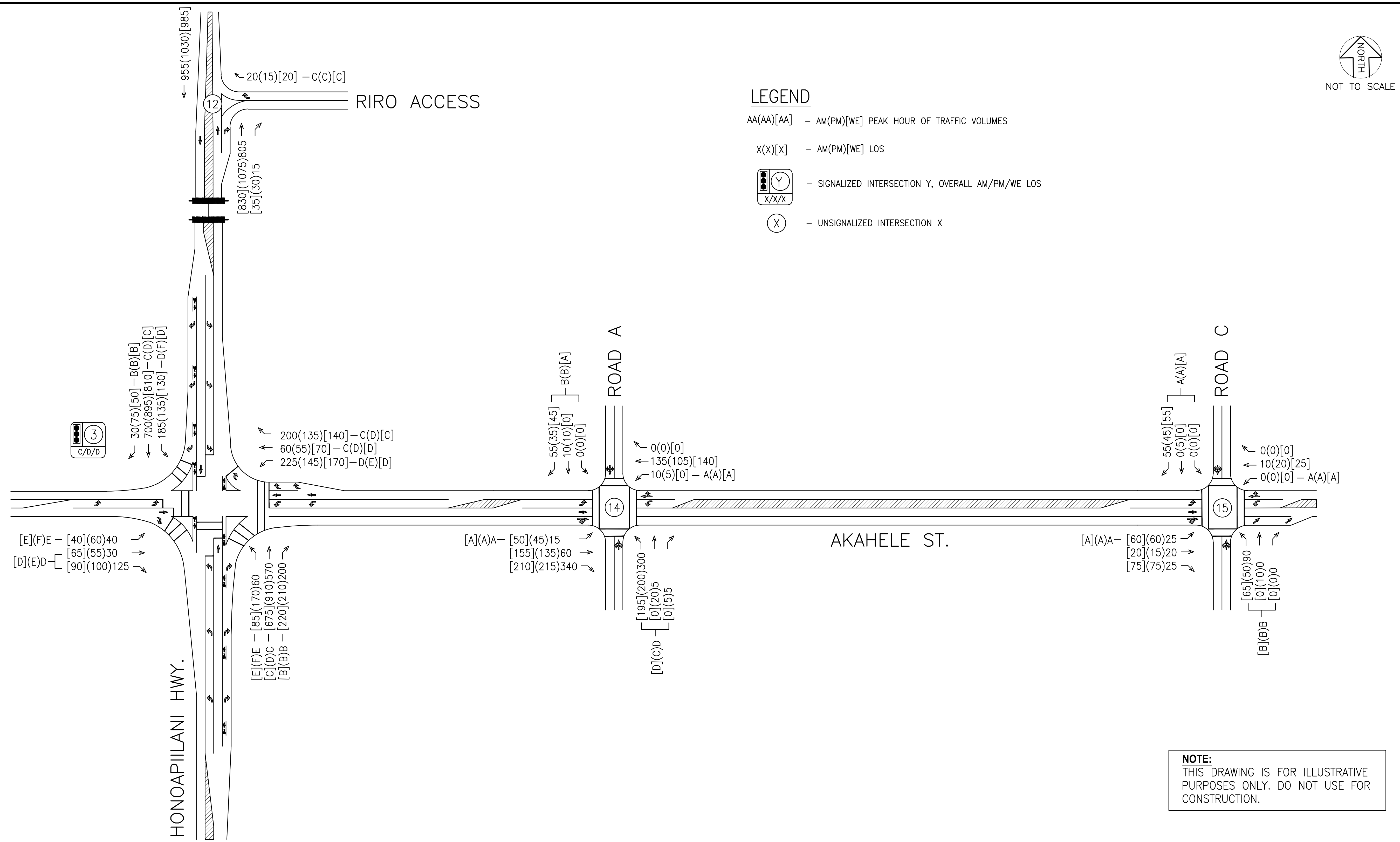

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FIGURE 5.12

FUTURE YEAR 2035 SCENARIO 4
AKAHELE STREET LANE CONFIGURATION, VOLUMES AND LOS

Table 5.9: Future Year 2035 (Scenario 4)
Left-Turn Storage Lane Length Calculations

Honoapiilani Highway & Akahele Street Intersection										
			AASHTO					SIMULATION		Recommended storage length [3]
Movement	Peak Hour	Design Volume per lane (veh)	Cycle Length (sec) [1]	Cycles per Hour	Average Veh. per Cycle	Minimum Storage Length (1.5 factor) [2]		Average Queue	95th Percentile Queue	
						Veh	Ft	Ft	Ft	
Northbound Left-turn lane	AM	60	95	38	2	3	75	54	155	275 ft
	PM	170	150	24	8	11	**275**	149	**254**	
	WE	85	105	34	3	4	100	62	109	
Southbound Left-turn lane	AM	185	95	38	5	8	200	135	251	250 ft
	PM	135	150	24	6	9	**225**	126	213	
	WE	130	105	34	4	6	150	118	**254**	
Eastbound Left-turn lane	AM	40	95	38	2	2	60	40	95	Storage accommodated
	PM	60	150	24	3	4	**100**	57	**119**	
	WE	40	105	34	2	2	60	35	88	
Westbound Left-turn lane	AM	225	95	38	6	9	225	162	**251**	250 ft
	PM	145	150	24	7	10	**250**	138	232	
	WE	170	105	34	5	8	200	129	212	

Notes:

1. Cycle length based on Highway Capacity Manual (HCM), 6th Edition equilibrium cycle length.
2. Minimum storage length is 1.5 times the average number of vehicles per cycle; assume 1 vehicle length = 25 ft.
3. Recommended storage length is exclusive of taper length or deceleration length. To be verified upon design.

Table 5.10: Base Year 2035, Future Year 2030 Scenario 3 and Future Year 2035 Scenario 4 Level of Service Summary

Intersection	Base Year 2035									Future Year 2030 Scenario 3									Future Year 2035 Scenario 4								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Honoapiilani Highway & Napilihau Street																											
NB LT	18.8	0.75	B	23.5	0.85	C	21.9	0.79	C	18.8	0.76	B	28.9	0.88	C	24.1	0.82	C	18.8	0.76	B	29.3	0.88	C	24.6	0.83	C
NB TH	8.4	0.36	A	5.7	0.28	A	7.4	0.42	A	8.6	0.40	A	5.6	0.28	A	7.4	0.44	A	8.5	0.39	A	5.6	0.28	A	7.3	0.44	A
NB RT	6.9	0.08	A	4.7	0.05	A	5.4	0.03	A	7.0	0.10	A	4.6	0.05	A	5.2	0.03	A	7.0	0.10	A	4.6	0.05	A	5.1	0.03	A
EB LT/TH	15.0	0.26	B	24.5	0.32	C	20.6	0.31	C	15.6	0.26	B	27.8	0.32	C	23.2	0.32	C	15.6	0.26	B	28.0	0.32	C	23.6	0.32	C
EB RT	14.5	0.15	B	23.1	0.12	C	19.6	0.17	B	15.1	0.16	B	26.5	0.15	C	22.2	0.16	C	15.1	0.16	B	26.7	0.15	C	22.6	0.16	C
WB LT	17.4	0.30	B	27.5	0.32	C	22.7	0.21	C	18.2	0.32	B	31.4	0.36	C	25.7	0.25	C	18.2	0.32	B	31.7	0.36	C	26.1	0.25	C
WB TH/RT	14.7	0.22	B	23.1	0.14	C	20.3	0.29	C	15.3	0.21	B	26.3	0.13	C	22.9	0.29	C	15.3	0.21	B	26.6	0.13	C	23.2	0.29	C
SB LT	66.2	0.72	E	78.3	0.73	E	59.5	0.78	E	67.6	0.72	E	84.7	0.74	F	65.6	0.79	E	67.6	0.72	E	85.2	0.74	F	66.4	0.80	E
SB TH	14.2	0.48	B	18.8	0.67	B	15.5	0.62	B	15.8	0.52	B	21.6	0.71	C	17.6	0.66	B	15.8	0.52	B	21.7	0.71	C	17.8	0.67	B
SB RT	11.2	0.02	B	12.8	0.05	B	10.9	0.06	B	12.2	0.02	B	14.3	0.05	B	12.0	0.06	B	12.2	0.02	B	14.3	0.05	B	12.0	0.06	B
Overall	14.2	-	B	18.1	-	B	15.7	-	B	14.7	-	B	21.1	-	C	17.2	-	B	14.7	-	B	21.3	-	C	17.4	-	B
2: Honoapiilani Highway & Hoohui Road																											
NB LT	11.0	0.40	B	11.5	0.54	B	8.8	0.36	A	12.4	0.49	B	15.5	0.68	B	10.7	0.48	B	12.6	0.50	B	15.9	0.69	B	10.9	0.48	B
NB TH	10.7	0.64	B	9.5	0.69	A	8.9	0.61	A	11.9	0.72	B	10.1	0.71	B	9.3	0.66	A	11.8	0.71	B	10.3	0.71	B	9.4	0.67	A
NB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
EB LT/TH	19.6	0.18	B	23.2	0.34	C	18.4	0.24	B	20.8	0.18	C	26.8	0.35	C	21.4	0.25	C	21.1	0.18	C	27.2	0.35	C	21.7	0.25	C
EB RT	18.4	0.06	B	21.4	0.06	C	17.5	0.08	B	19.5	0.06	B	24.7	0.05	C	20.4	0.09	C	19.8	0.06	B	25.0	0.05	C	20.6	0.09	C
WB LT	22.5	0.30	C	25.7	0.22	C	19.9	0.15	B	24.2	0.34	C	30.1	0.29	C	23.5	0.21	C	24.5	0.34	C	30.6	0.29	C	23.8	0.21	C
WB TH/RT	18.4	0.07	B	21.4	0.07	C	17.4	0.07	B	19.5	0.07	B	24.8	0.07	C	20.2	0.07	C	19.8	0.07	B	25.1	0.07	C	20.5	0.07	C
SB LT	9.5	0.03	A	8.1	0.07	A	7.7	0.04	A	10.4	0.04	B	8.6	0.08	A	8.1	0.04	A	10.3	0.04	B	8.7	0.08	A	8.1	0.04	A
SB TH	15.8	0.81	B	14.0	0.82	B	12.7	0.77	B	16.8	0.83	B	16.9	0.86	B	14.0	0.82	B	16.9	0.83	B	17.3	0.86	B	14.1	0.82	B
SB RT	9.1	0.05	A	7.5	0.06	A	7.5	0.04	A	9.4	0.04	A	7.6	0.06	A	7.6	0.04	A	9.4	0.04	A	7.5	0.06	A	7.5	0.04	A
Overall	13.9	-	B	12.7	-	B	11.4	-	B	15.0	-	B	14.9	-	B	12.5	-	B	15.0	-	B	15.2	-	B	12.6	-	B
3: Honoapiilani Highway & Akahele Street																											
NB LT	46.8	0.77	D	51.4	0.83	D	41.2	0.76	D	57.6	0.76	E	95.7	0.90	F	56.3	0.77	E	57.7	0.76	E	109.3	0.94	F	57.6	0.77	E
NB TH	10.0	0.64	A	14.4	0.79	B	9.8	0.63	A	19.2	0.75	B	35.2	0.91	D	25.7	0.81	C	30.6	0.87	C	43.0	0.94	D	26.2	0.81	C
NB RT	5.8	0.01	A	5.2	0.01	A	5.8	0.01	A	11.0	0.07	B	0.0	0.00	A	15.6	0.22	B	20.0	0.22	B	15.6	0.20	B	15.6	0.22	B
EB LT	51.8	0.75	D	60.8	0.77	E	49.5	0.74	D	66.2	0.78	E	79.5	0.78	E	68.9	0.78	E	66.3	0.78	E	81.9	0.77	F	70.0	0.78	E
EB TH/RT	28.4	0.07	C	40.6	0.05	D	27.8	0.05	C	39.3	0.30	D	67.3	0.73	E	50.1	0.75	D	39.3	0.30	D	76.3	0.77	E	51.5	0.75	D
WB LT	74.6	0.53	E	75.7	0.59	E	56.3	0.56	E	49.7	0.81	D	91.7	0.85	F	52.8	0.84	D	54.1	0.87	D	74.4	0.86	E	54.9	0.84	D
WB TH	29.9	0.03	C	44.0	0.04	D	29.1	0.03	C	32.7	0.19	C	53.4	0.23	D	34.2	0.21	C	28.3	0.14	C	53.5	0.21	D	35.2	0.21	D
WB RT	29.8	0.01	C	43.8	0.01	D	29.0	0.01	C	31.6	0.03	C	51.5	0.03	D	33.1	0.06	C	27.9	0.09	C	52.0	0.06	D	34.0	0.06	C
SB LT	117.4	0.71	F	136.6	0.72	F	115.7	0.71	F	58.9	0.76	E	78.2	0.83	E	52.9	0.81	D	47.5	0.84	D	94.9	0.87	F	54.2	0.81	D
SB TH	16.4	0.87	B	31.5	0.93	C	16.1	0.86	B	27.9	0.90	C	44.5	0.95	D	31.5	0.91	C	27.2	0.87	C	46.4	0.95	D	32.9	0.92	C
SB RT	7.2	0.02	A	9.9	0.05	A	7.7	0.04	A	10.8	0.02	B	14.1	0.04	B	12.4	0.03	B	13.6	0.02	B	15.2	0.05	B	12.4	0.03	B
Overall	16.2	-	B	26.4	-	C	16.1	-	B	28.9	-	C	49.9	-	D	34.0	-	C	34.4	-	C	53.0	-	D	35.0	-	D
4: Honoapiilani Highway & Lower Honoapiilani Road																											
NB LT	25.3	0.85	C	40.3	0.95	D	24.0	0.88	C	29.9	0.86	C	52.4	0.95	D	32.3	0.90	C	29.2	0.86	C	50.4	0.95	D	33.0	0.91	C
NB TH/RT	4.5	0.34	A	4.3	0.38	A	2.3	0.27	A	4.2	0.36	A	4.7	0.45	A	2.9	0.36	A	4.4	0.37	A	4.9	0.45	A	2.9	0.36	A
EB LT/TH	28.2	0.21	C	50.1	0.42	D	30.4	0.31	C	33.4	0.26	C	60.7	0.56	E	39.4	0.43	D	32.8	0.28	C	60.6	0.57	E	40.3	0.44	D
EB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
WB LT/TH/RT	27.6	0.11	C	50.9	0.51	D	28.6	0.05	C	32.5	0.12	C	59.7	0.52	E	36.0	0.05	D	31.7	0.12	C	59.0	0.50	E	36.8	0.05	D
SB LT	54.5	0.74	D	96.9	0.73	F	0.0	0.00	A	61.1	0.75	E	108.4	0.74	F	0.0	0.00	A	57.2	0.79	E	108.6	0.74	F	0.0	0.00	A
SB TH	13.3	0.60	B	30.8	0.74	C	15.3	0.61	B	14.1	0.64	B	36.4	0.80	D	18.8	0.68	B	14.0	0.64	B	37.8	0.82	D	19.0	0.69	B
SB RT	9.1	0.01	A	20.7	0.01	C	10.9	0.03	B	9.0	0.01	A	22.6	0.01	C	12.4	0.05	B	9.0	0.01	A	22.9	0.01	C	12.5	0.05	B
Overall	12.5	-	B	24.6	-	C	13.1	-	B	13.3	-	B	28.8	-	C	15.7	-	B	13.4	-	B	29.1	-	C	15.9	-	B
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive																											
NB LT	35.9	0.80	D	48.7	0.83	D	39.4	0.78	D	39.7	0.81	D	51.2	0.83	D	44.9	0.79	D	39.3	0.81	D	51.7	0.83	D	45.7	0.79	D
NB TH/RT	3.9	0.47	A	7.6	0.64	A	4.8	0.44	A	4.0	0.49	A	9.1	0.70	A	5.5	0.53	A	4.1	0.50	A	9.3	0.71	A	5.5	0.53	A
EB LT/TH	34.7	0.18	C	41.5	0.24	D	34.3	0.27	C	38.6	0.22	D	43.6	0.26	D	39.2	0.32	D	38.1	0.22	D	44.1	0.26	D	39.9	0.32	D
EB RT	34.4	0.01	C	40.5	0.03	D	33.4	0.04	C	38.1	0.01	D	42.4	0.03	D	37.9	0.04	D	37.6	0.01	D	42.8	0.03	D	38.6	0.04	D
WB LT/TH/RT	35.0	0.12	C	42.8	0.09	D	33.7	0.12	C	38.6	0.12	D	45.1	0.09	D	38.6	0.13	D	38.1	0.12	D	45.6	0.09	D	39.4	0.13	D
SB LT	59.1	0.79	E	79.3	0.78	E	64.9	0.76	E	64.5	0.85	E	82.7	0.79	F	72.3	0.77	E	64.2	0.85	E	83.3	0.79	F	73.3	0.77	E
SB TH	8.0	0.65	A	14.5	0.78	B	9.2	0.67	A	8.6	0.69	A	16.4	0.83	B	10.7	0.73	B	8.5	0.69	A	17.0	0.84	B	11.0	0.74	B
SB RT	4.3	0.04	A	6.4	0.04	A	4.9	0.04	A	4.3	0.05	A	6.5	0.04	A	5.0	0.04	A	4.3	0.05	A	6.5	0.04	A	5.0	0.05	A
Overall	8.3	-	A	13.3	-	B	9.5	-	A	8.9	-	A	14.9	-	B	10.6	-	B	8.8	-	A	15.2	-	B	10.8	-	B

Table 5.10: Base Year 2035, Future Year 2030 Scenario 3 and Future Year 2035 Scenario 4 Level of Service Summary Cont'd

Intersection	Base Year 2035									Future Year 2030 Scenario 3									Future Year 2035 Scenario 4								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road																											
NB LT	74.2	0.84	E	77.8	0.86	E	42.3	0.78	D	74.1	0.84	E	77.4	0.86	E	44.5	0.79	D	74.1	0.84	E	77.4	0.86	E	44.8	0.79	D
NB TH	6.5	0.51	A	10.6	0.64	B	8.3	0.53	A	7.1	0.54	A	12.4	0.71	B	9.3	0.62	A	7.5	0.55	A	12.6	0.72	B	9.3	0.63	A
NB RT	3.8	0.04	A	5.3	0.04	A	5.3	0.03	A	3.9	0.04	A	5.6	0.04	A	5.2	0.03	A	4.2	0.04	A	5.6	0.04	A	5.2	0.03	A
EB LT/TH	68.7	0.38	E	67.2	0.37	E	33.9	0.24	C	68.5	0.40	E	67.0	0.40	E	36.9	0.31	D	68.3	0.42	E	67.0	0.40	E	37.2	0.31	D
EB RT	63.3	0.01	E	63.7	0.13	E	32.6	0.05	C	62.9	0.01	E	63.6	0.20	E	34.6	0.05	C	62.3	0.01	E	63.6	0.20	E	34.9	0.05	C
WB LT	75.0	0.39	E	78.4	0.54	E	37.5	0.23	D	75.0	0.39	E	79.1	0.55	E	41.2	0.26	D	75.1	0.39	E	79.1	0.55	E	41.6	0.27	D
WB TH/RT	64.1	0.10	E	62.6	0.03	E	32.4	0.03	C	63.6	0.09	E	61.7	0.03	E	34.5	0.03	C	63.0	0.09	E	61.7	0.03	E	34.8	0.03	C
SB LT	82.8	0.68	F	89.0	0.77	F	45.2	0.59	D	84.7	0.76	F	89.0	0.77	F	47.7	0.63	D	84.0	0.77	F	89.0	0.77	F	48.1	0.63	D
SB TH	10.8	0.57	B	21.0	0.81	C	14.7	0.77	B	12.0	0.63	B	24.5	0.86	C	16.9	0.83	B	12.2	0.62	B	25.4	0.88	C	17.4	0.84	B
SB RT	6.0	0.03	A	8.5	0.07	A	7.1	0.05	A	6.1	0.03	A	8.9	0.08	A	7.1	0.06	A	6.3	0.04	A	9.0	0.09	A	7.0	0.06	A
Overall	14.0	-	B	21.1	-	C	14.2	-	B	14.7	-	B	23.3	-	C	15.7	-	B	15.2	-	B	23.8	-	C	16.0	-	B
7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street																											
NB LT	48.2	0.79	D	118.3	0.91	F	68.9	0.84	E	55.0	0.81	D	133.3	0.94	F	80.0	0.85	E	53.0	0.81	D	134.4	0.93	F	82.7	0.86	F
NB TH/RT	15.8	0.67	B	21.2	0.66	C	16.1	0.55	B	16.1	0.67	B	22.8	0.70	C	17.6	0.60	B	17.0	0.69	B	22.7	0.70	C	17.8	0.61	B
EB LT/TH	53.1	0.50	D	120.4	0.82	F	67.2	0.62	E	60.4	0.55	E	146.0	0.95	F	81.2	0.73	F	58.1	0.56	E	150.5	0.95	F	84.6	0.74	F
EB RT	33.6	0.08	C	81.9	0.69	F	46.1	0.44	D	38.5	0.08	D	87.3	0.70	F	54.2	0.45	D	36.7	0.08	D	91.1	0.73	F	56.3	0.45	E
WB LT/TH/RT	53.6	0.19	D	122.8	0.27	F	80.5	0.41	F	61.1	0.20	E	127.2	0.27	F	93.4	0.45	F	59.0	0.22	E	135.7	0.40	F	96.5	0.45	F
SB LT	55.4	0.61	E	152.4	0.80	F	79.4	0.59	E	62.9	0.65	E	176.9	0.87	F	91.8	0.64	F	60.6	0.66	E	132.5	0.78	F	94.8	0.65	F
SB TH	24.2	0.77	C	54.9	0.93	D	32.4	0.82	C	25.8	0.79	C	57.5	0.95	E	36.3	0.84	D	25.8	0.79	C	56.2	0.94	E	37.4	0.85	D
SB RT	10.2	0.09	B	23.6	0.18	C	20.0	0.23	B	10.2	0.10	B	10.8	0.16	B	9.4	0.20	A	10.4	0.11	B	10.3	0.16	B	9.5	0.20	A
Overall	25.9	-	C	59.2	-	E	35.9	-	D	27.9	-	C	63.9	-	E	39.9	-	D	28.0	-	C	63.5	-	E	40.9	-	D
8: Honoapiilani Highway & Leialii Parkway																											
NB LT	74.9	0.44	E	68.7	0.49	E	71.5	0.44	E	74.7	0.44	E	73.2	0.50	E	70.8	0.44	E	74.7	0.44	E	73.1	0.50	E	70.6	0.44	E
NB TH/RT	9.7	0.75	A	2.9	0.84	A	3.5	0.69	A	9.9	0.76	A	3.2	0.88	A	4.2	0.75	A	9.9	0.76	A	3.4	0.89	A	4.3	0.76	A
EB LT/TH/RT	58.6	0.06	E	57.1	0.07	E	50.0	0.03	D	58.6	0.06	E	61.5	0.07	E	50.0	0.03	D	58.6	0.06	E	61.5	0.07	E	50.0	0.03	D
WB LT	62.0	0.37	E	62.5	0.54	E	58.1	0.63	E	62.0	0.37	E	67.4	0.56	E	58.1	0.63	E	62.0	0.37	E	67.4	0.56	E	58.1	0.63	E
WB TH/RT	58.6	0.01	E	56.7	0.05	E	50.4	0.05	D	58.6	0.01	E	61.1	0.05	E	50.4	0.05	D	58.6	0.01	E	61.1	0.05	E	50.4	0.05	D
SB LT	68.7	0.52	E	66.2	0.78	E	76.0	0.79	E	69.8	0.60	E	77.8	0.80	E	78.3	0.80	E	69.8	0.60	E	74.3	0.80	E	78.3	0.80	E
SB TH/RT	5.8	0.56	A	23.2	0.94	C	13.2	0.79	B	6.2	0.59	A	24.9	0.95	C	15.1	0.83	B	6.0	0.57	A	27.7	0.96	C	16.1	0.85	B
Overall	9.7	-	A	16.0	-	B	12.3	-	B	10.0	-	B	17.1	-	B	13.5	-	B	10.0	-	A	18.6	-	B	13.9	-	B
9: Honoapiilani Highway & Front Street/Flemming Road																											
NB LT	88.1	0.73	F	91.8	0.74	F	84.4	0.84	F	87.3	0.73	F	93.9	0.74	F	82.3	0.84	F	87.3	0.73	F	94.1	0.74	F	81.8	0.84	F
NB TH/RT	8.4	0.72	A	2.6	0.80	A	7.5	0.58	A	8.7	0.73	A	3.0	0.84	A	8.8	0.64	A	8.7	0.73	A	3.7	0.85	A	9.0	0.66	A
EB LT/TH/RT	52.7	0.48	D	59.5	0.72	E	57.8	0.66	E	53.1	0.50	D	66.1	0.76	E	57.6	0.68	E	53.0	0.50	D	66.1	0.76	E	57.6	0.68	E
WB LT/TH/RT	54.3	0.61	D	49.8	0.24	D	52.4	0.32	D	54.4	0.61	D	51.7	0.22	D	50.9	0.30	D	54.3	0.61	D	51.7	0.22	D	50.9	0.30	D
SB LT	86.7	0.80	F	75.6	0.74	E	83.1	0.82	F	85.9	0.80	F	79.8	0.74	E	80.7	0.82	F	86.2	0.80	F	78.1	0.74	E	79.7	0.82	E
SB TH	5.3	0.53	A	14.3	0.90	B	8.9	0.73	A	5.5	0.56	A	17.0	0.93	B	10.4	0.77	B	5.4	0.54	A	17.3	0.94	B	10.6	0.79	B
SB RT	3.2	0.12	A	5.5	0.24	A	4.3	0.18	A	3.2	0.13	A	6.3	0.26	A	4.8	0.20	A	3.3	0.14	A	6.3	0.26	A	4.8	0.20	A
Overall	10.2	-	B	11.4	-	B	11.4	-	B	10.3	-	B	13.3	-	B	12.6	-	B	10.4	-	B	13.7	-	B	12.8	-	B
10: Honoapiilani Highway & Kapunakea Street																											
NB LT	68.5	0.79	E	62.7	0.79	E	62.1	0.78	E	68.5	0.79	E	71.9	0.81	E	62.1	0.78	E	68.5	0.79	E	71.9	0.81	E	62.1	0.78	E
NB TH/RT	0.3	0.71	A	0.4	0.75	A	1.4	0.66	A	0.3	0.72	A	0.5	0.80	A	2.2	0.72	A	0.3	0.72	A	0.5	0.80	A	2.2	0.74	A
EB LT	59.4	0.61	E	75.1	0.80	E	58.5	0.71	E	61.5	0.65	E	79.7	0.81	E	58.2	0.73	E	62.4	0.68	E	85.0	0.84	F	58.2	0.73	E
EB TH/RT	49.9	0.11	D	49.8	0.18	D	44.3	0.09	D	49.9	0.11	D	52.3	0.18	D	42.7	0.08	D	49.9	0.12	D	53.2	0.19	D	42.7	0.08	D
WB LT	59.9	0.62	E	56.6	0.45	E	49.0	0.34	D	60.4	0.63	E	59.4	0.44	E	47.2	0.32	D	60.6	0.63	E	60.6	0.46	E	47.2	0.32	D
WB TH/RT	49.8	0.10	D	49.0	0.10	D	44.2	0.07	D	49.8	0.10	D	51.5	0.10	D	42.6	0.07	D	49.7	0.10	D	52.3	0.10	D	42.6	0.07	D
SB LT	100.1	0.83	F	69.9	0.80	E	81.4	0.84	F	99.2	0.83	F	71.6	0.78	E	80.2	0.84	F	99.8	0.83	F	71.4	0.78	E	79.4	0.84	E
SB TH/RT	10.9	0.60	B	8.0	0.95	A	4.9	0.86	A	11.3	0.63	B	7.2	0.97	A	12.6	0.92	B	11.0	0.61	B	6.8	0.97	A	14.0	0.94	B
Overall	11.0	-	B	10.8	-	B	8.9	-	A	11.3	-	B	11.2	-	B	13.2	-	B	11.3	-	B	11.2	-	B	14.0	-	B

Table 5.10: Base Year 2035, Future Year 2030 Scenario 3 and Future Year 2035 Scenario 4 Level of Service Summary Cont'd

Intersection	Base Year 2035									Future Year 2030 Scenario 3									Future Year 2035 Scenario 4								
	AM			PM			WE			AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
11: Honoapiilani Highway & Keawe Street																											
NB LT	79.7	0.79	E	70.1	0.77	E	67.1	0.77	E	79.7	0.79	E	75.1	0.78	E	67.0	0.77	E	79.7	0.79	E	75.1	0.78	E	67.0	0.77	E
NB TH	33.6	0.81	C	74.1	1.04	F*	50.2	0.94	D	38.5	0.86	D	123.2	1.16	F*	48.8	0.95	D	34.4	0.82	C	110.4	1.13	F*	56.3	0.98	E
NB RT	17.3	0.13	B	21.9	0.22	C	21.3	0.20	C	18.6	0.12	B	26.6	0.24	C	19.6	0.20	B	17.6	0.12	B	25.5	0.23	C	20.2	0.20	C
EB LT/TH	61.3	0.48	E	56.3	0.50	E	51.7	0.36	D	61.3	0.48	E	61.2	0.53	E	51.7	0.36	D	61.3	0.48	E	61.2	0.53	E	51.7	0.36	D
EB RT	56.6	0.02	E	51.2	0.04	D	48.6	0.05	D	56.7	0.04	E	55.5	0.05	E	48.5	0.04	D	56.7	0.04	E	55.5	0.05	E	48.5	0.04	D
WB LT	50.6	0.49	D	64.4	0.79	E	44.5	0.61	D	49.8	0.47	D	51.2	0.65	D	56.3	0.72	E	49.8	0.47	D	53.3	0.68	D	52.6	0.69	D
WB TH	45.7	0.18	D	41.6	0.21	D	36.8	0.19	D	45.1	0.18	D	41.3	0.18	D	40.0	0.22	D	45.1	0.18	D	42.0	0.19	D	39.2	0.21	D
WB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
SB LT	61.3	0.94	E	43.9	0.95	D	61.7	0.93	E	51.1	0.92	D	43.5	0.95	D	56.3	0.95	E	51.2	0.91	D	44.6	0.95	D	55.2	0.95	E
SB TH/RT	1.1	0.51	A	0.5	0.66	A	18.2	0.65	B	1.2	0.54	A	0.4	0.70	A	6.1	0.64	A	1.2	0.53	A	0.4	0.70	A	6.6	0.66	A
Overall	27.2	-	C	34.5	-	C	37.2	-	D	26.6	-	C	46.3	-	D	31.9	-	C	25.2	-	C	43.3	-	D	33.4	-	C
12: RIRO Access & Honoapiilani Highway																											
WB RT										15.8	0.06	C	21.0	0.07	C	16.2	0.06	C	16.0	0.06	C	21.5	0.07	C	16.5	0.07	C
Overall										0.2	-	-	0.1	-	-	0.2	-	-	0.2	-	-	0.2	-	-	0.2	-	-
13: Honoapiilani Highway & Road J																											
WB LT										37.2	0.35	E	64.3	0.49	F	64.8	0.62	F	35.6	0.32	E	64.3	0.49	F	68.5	0.64	F
WB RT										17.1	0.10	C	28.3	0.17	D	20.3	0.19	C	17.0	0.08	C	28.6	0.18	D	20.8	0.19	C
SB LT										10.1	0.02	B	13.2	0.09	B	11.3	0.09	B	10.1	0.02	B	13.1	0.08	B	11.4	0.09	B
Overall										1.3	-	-	1.8	-	-	3.0	-	-	1.1	-	-	1.8	-	-	3.1	-	-
14: Road A & Akahele Street																											
NB LT/TH/RT										12.8	0.16	B	17.8	0.38	C	25.1	0.55	D	34.0	0.76	D	24.1	0.57	C	25.1	0.55	D
EB LT										7.6	0.01	A	7.5	0.03	A	7.6	0.04	A	7.5	0.01	A	7.5	0.03	A	7.6	0.04	A
WB LT										0.0	0.00	A	7.9	0.00	A	0.0	0.00	A	8.2	0.01	A	8.1	0.01	A	0.0	0.00	A
SB LT/TH/RT										9.6	0.08	A	9.7	0.05	A	9.3	0.06	A	10.3	0.10	B	10.4	0.07	B	9.3	0.06	A
Overall										3.8	-	-	5.5	-	-	7.2	-	-	12.2	-	-	8.1	-	-	7.2	-	-
15: Road C & Akahele Street																											
NB LT/TH/RT										10.2	0.12	B	11.0	0.09	B	11.4	0.11	B	10.3	0.13	B	11.1	0.1	B	11.4	0.11	B
EB LT										7.3	0.02	A	7.3	0.04	A	7.4	0.04	A	7.3	0.02	A	7.4	0.04	A	7.4	0.04	A
WB LT										0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
SB LT/TH/RT										8.5	0.05	A	8.8	0.06	A	8.6	0.06	A	8.6	0.06	A	8.9	0.06	A	8.6	0.06	A
Overall										6.9	-	-	5.4	-	-	5.5	-	-	7.0	-	-	5.5	-	-	5.5	-	-
16: Road G & Road J																											
NB LT/TH/RT										9.5	0.01	A	10.1	0.03	B	10.8	0.07	B	9.4	0.01	A	10.1	0.03	B	10.8	0.07	B
EB LT/TH/RT										7.4	0.01	A	7.4	0.02	A	7.4	0.03	A	7.4	0.01	A	7.4	0.02	A	7.4	0.03	A
WB LT/TH/RT										0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
SB LT/TH/RT										8.7	0.01	A	9.2	0.05	A	8.7	0.03	A	8.9	0.02	A	9.3	0.06	A	8.7	0.03	A
Overall										1.9	-	-	3.5	-	-	3.7	-	-	2.3	-	-	3.7	-	-	3.7	-	-
17: Road F & Road J																											
NB LT/RT										8.9	0.04	A	9.1	0.03	A	9.1	0.04	A	9.0	0.05	A	9.1	0.03	A	9.1	0.04	A
WB LT/TH										0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
Overall										3.5	-	-	1.7	-	-	2.1	-	-	3.6	-	-	1.7	-	-	2.1	-	-

* Denotes overcapacity condition, v/c ≥ 1.

6. CONCLUSIONS

The Project is located upon approximately 310 acres of undeveloped land in Lahaina, bounded by Honoapiilani Highway to the west and the Kapalua Airport to the east. The Project proposes to provide 100 single-family (SF) residential units, 800 multi-family (MF) residential units, an elementary school, a 10-acre park and three (3) retail centers, totaling 70,000 square feet. In addition, a new roadway will be constructed just east and parallel to Honoapiilani Highway that will provide vehicular, bike and pedestrian access to link the Project's development north and south of Mahinahina Gulch. The Project will be constructed in seven (7) phases, but for purposes of this TIAR, will be analyzed as four (4) scenarios.

<u>Scenario 1</u> – Develop Phase 1 with a build-out of 2022 that includes the following:

- 240 MF residential units north of Akahele Street, with direct access provided by a new Project roadway, Road A, intersecting Akahele Street, and a new right-in, right-out (RIRO) access via Honoapiilani Highway.

<u>Scenario 2</u> - Develop Phases 2A and 2B with a build-out of 2025 that include the following:

- 100 MF residential units (Phase 2A) south of Akahele Street with direct access provided by a new Project roadway, Road C, intersecting Akahele Street to the east of Road A.
- 250 MF residential units (Phase 2B) south of Akahele Street with direct access provided by Road A and Road C. 70 of the units will be located in live/work buildings.

<u>Scenario 3</u> – Develop Phases 3-5 with a build-out of 2030 that include the following:

- 210 MF residential units (Phase 3) south of Mahinahina Gulch, with access provided by a new Project roadway, Road J, intersecting Honoapiilani Highway south of Mahinahina Gulch.
- 10-acre park (Phase 3) with two (2) practice fields south of Mahinahina Gulch, with access provided by Road J.
- North Central Neighborhood Retail (Phase 4) consisting of approximately 6,000 square feet of commercial space located north of Akahele Street near the Kapalua Airport, with access provided by Road C.
- South Core Retail (Phase 4) consisting of approximately 55,000 square feet of commercial space located on the southeast corner of the Honoapiilani Highway/Akahele Street intersection, with access provided by Road A.
- South Central Neighborhood Retail (Phase 4) consisting of approximately 9,000 square feet of commercial space located on the northeast corner of the proposed Honoapiilani Highway/Road J intersection, with access provided by Road J.
- 86 SF (Phase 5) residential units north of Akahele Street, with access provided by Road C.
- 14 SF residential units (Phase 5) south of Mahinahina Gulch, with access provided by Road J.

<u>Scenario 4</u> – A future elementary school, to be planned/developed by the Department of Education (DOE). Since the development of the school is not in the direct controller of the

Pulelehua development, the timeframe for this school has yet to be determined. For purposes of this TIAR, a forecast build-out of 2035 was assumed.

- 750-student elementary school, with access provided by Road A.

6.1 Existing Conditions

In the vicinity of the Project, Honoapiilani Highway services the area as the main thoroughfare that connects the West Maui region. Honoapiilani Highway generally operates as a two (2) lane highway from Napilihau Street to Lower Honoapiilani Road and continues south as a four (4) lane highway from Lower Honoapiilani Road to beyond Keawe Street. In the vicinity of the Project, the intersections along the highway operate with either fixed coordinated signal timing plans or uncoordinated plans with lengthy through volume green times. As a result, numerous mainline left-turn movements and minor street approaches at various study intersections operate at LOS E/F conditions due to lengthy delays from the signal timing plans that favor the through movements along Honoapiilani Highway. Numerous movements also operate with low left-turning volumes (< 25 vehicles), which contribute to the LOS E/F conditions.

However, with the exception of the southbound left-turn movement at the Honoapiilani Highway/Keawe Street intersection, all vehicular movements at each study intersection operate adequately with under-capacity conditions during all peak hours of traffic.

Although the Lahaina Bypass Road (LBR) Phase 1B-2 along with improvements at the Honoapiilani Highway/Keawe Street intersection were completed in 2018, traffic count data was collected prior to completion, and the improvements were not included in the existing conditions scenario.

6.2 Base Year 2022

It is anticipated that by Base Year 2022, traffic will have increased over existing conditions due to various anticipated new developments in the Lahaina region and a 0.5% ambient growth rate, adjusted and applied from HDOT's MRTDM. By Base Year 2022 without the Project, traffic at the study intersections along Honoapiilani Highway is estimated to increase overall by approximately 10-20% on various parts of the corridor during the AM, PM and WE peak hours of traffic.

By Base Year 2022, it is assumed that various planned roadway improvements will be implemented even without the Project and include the LBR Phase 1B-2, improvements at the Honoapiilani Highway/Keawe Street/Lahaina Cannery Mall intersection to support the LBR extension, and various widening/restriping improvements at the Honoapiilani Highway/Napilihau Street intersection.

With the anticipated growth in traffic and planned roadway improvements, all study intersections are forecast to operate similar to existing conditions. Overall intersection delays generally increased by only 1-5 seconds at most study intersections. The majority of intersection movements currently operating at LOS E/F conditions will continue to operate similarly in Base Year 2022 and at under-capacity conditions, with the exception of the eastbound shared left-turn/through movement at Honoapiilani Highway/Kaanapali Parkway intersection during the PM peak hour of traffic, which is forecast to operate at LOS F and overcapacity conditions.

6.3 Base Year 2022 With Mitigation

The following mitigations were proposed for Base Year 2022.

[7] Honoapiilani Highway/Kaanapali Parkway/Halelo Street

- Modify the eastbound approach to incorporate a dedicated left-turn lane, a shared left-turn/through lane and two (2) dedicated right-turn lanes.

With the recommended mitigation, the intersection is anticipated to improve and operate adequately at overall LOS D or better during all peak hours of traffic. Similar to existing conditions, numerous minor street approaches and major street left-turn movements will continue operating at LOS E/F due to the long through movement green time and cycle length.

[8-11] Honoapiilani Highway from Leialii Parkway to Keawe Street

With the modifications to the Honoapiilani Highway/Keawe Street intersection with LBR Phase 1B-2, it was assumed that some of the signal timing plans for intersections along the coordinated corridor from Leialii Parkway to Keawe Street would be reoptimized to make signals run more efficient and improve throughput progression.

6.4 Base Year 2025

By Base Year 2025 without the Project, traffic at the study intersections along Honoapiilani Highway is estimated to increase by approximately 1% for the majority of sections along the corridor over Base Year 2022 during all peak hours of traffic due to a 0.5% ambient growth rate adjusted and applied from HDOT’s MRTDM. Intersection movements are expected to continue operating similar to Base Year 2022 with overall intersection delays expected to increase by 1-5 seconds.

6.5 Base Year 2030

It is anticipated that by Base Year 2030, traffic will have increased over Base Year 2025 due to various new developments in the region and a 0.5% ambient growth rate, adjusted and applied from HDOT’s MRTDM. By Base Year 2030 without the Project, traffic at the study intersections along Honoapiilani Highway is estimated to generally increase by an additional 5-15% for most parts along the corridor during the AM, PM and WE peak hours of traffic over Base Year 2025 conditions.

With the anticipated growth in traffic, the majority of study intersections are forecast to operate similar to existing conditions. Overall intersection delays generally increased by only 1-5 seconds at most study intersections. Select movements at Honoapiilani Highway/Akahele Street and Honoapiilani Highway/Kaanapali Parkway/Halelo Street are expected to experience significant increases in delay. However, no mitigation is proposed for either intersection as all major through movements will continue to operate adequately.

The Honoapiilani Highway/Kapunakea Street and Honoapiilani Highway/Keawe Street intersections are expected to experience overcapacity conditions along various major through movements due to the projected increase in traffic. It should be noted that the LBR Phase 1C and Phase 1D extending the bypass to Kaanapali and Kapalua, respectively, are expected to help alleviate congestion along Honoapiilani Highway. However, as funding for construction of Phase 1C is currently under discussion, extension of the LBR was not assumed to be completed by Base Year 2030. Restriping is proposed at the Honoapiilani Highway/Kapunakea Street intersection to help with delays in lieu of the extension.

6.6 Base Year 2030 With Mitigation

The following mitigation was proposed for Base Year 2030.

[10] Honoapiilani Highway/Kapunakea Street

- Restripe the eastbound approach to provide an exclusive left-turn lane and a shared through/right-turn lane.

Restriping the eastbound approach will provide lane configuration consistent with the westbound approach. With the restriping, the intersection is anticipated to operate with all movements under capacity during all peak hours of traffic. As in Base Year 2025, various left-turn movements are expected to operate at LOS E/F.

6.7 Base Year 2035

By Base Year 2035 without the Project, traffic at the study intersections along Honoapiilani Highway is estimated to increase by approximately 2% along the corridor over Base Year 2030 during all peak hours of traffic due to a 0.5% ambient growth rate adjusted and applied from HDOT's MRTDM. Intersection movements are expected to continue operating similar to Base Year 2030 with overall intersection delays expected to increase by 1-5 seconds.

As noted for Base Year 2030, the Honoapiilani Highway/Keawe Street intersection is anticipated to operate at overcapacity conditions for the northbound approach of the highway during the PM peak hour of traffic. Although no mitigation is proposed at this time, the LBR Phase 1C extension to Kaanapali is expected to alleviate long delays at the Keawe Street intersection once constructed.

6.8 Future Year 2022 Scenario 1

By completion of Scenario 1 in Future Year 2022, the Project is projected to generate a total of 75(102)[120] new external trips during the AM(PM)[WE] peak hours of traffic. Trips generated by the Project are expected to result in growth along major roadways in the study area. All generated traffic will access the site via Honoapiilani Highway at Akahele Street and a new right-in, right-out (RIRO) access.

Due to the relatively minimal traffic increases due to Scenario 1, regional traffic at the study intersections (those not providing direct access to the Project) along Honoapiilani Highway is estimated to increase overall by less than 5%, while local traffic at the study intersections (those providing direct access to the Project) along Honoapiilani Highway is estimated to increase overall by less than 10% from Base Year 2022 without the Project scenario, during the AM, PM and WE peak hours of traffic.

All study intersections are forecast to operate similar to Base Year 2022 because of the minimal traffic generated by Scenario 1. Based on the AASHTO Green Book, all existing left-turn storage lane lengths at the Honoapiilani Highway/Akahele Street intersection are adequate for the additional traffic generated by Scenario 1.

The new RIRO access along Honoapiilani Highway was analyzed as a stop-controlled intersection with stop control on the westbound right-turn movement out of the Project. The westbound right-turn movement is expected to operate adequately with LOS C or better during all peak hours. It is recommended that a northbound right-turn deceleration lane be provided for entry into the Project at the RIRO.

A new Road A is proposed to intersect Akahele Street to provide internal Project access. The approach of Road A north of Akahele Street is proposed for construction with Scenario 1. Due to the low through volumes currently using Akahele Street, lengthy gaps in traffic are currently available. Because volumes at the new intersection are anticipated to be low with a maximum of 150 vehicles in a given peak hour, the intersection is expected to operate adequately.

6.9 Future Year 2025 Scenario 2

By completion of Scenario 2 in Future Year 2025, the Project is projected to generate a total of 116(139)[175] new external trips during the AM(PM)[WE] peak hours of traffic. Trips generated by the Project are expected to result in growth along major roadways in the study area. Traffic will access the site via Honoapiilani Highway at its intersections with Akahele Street and the RIRO access.

By Future Year 2025 with the cumulative increases of Project Scenarios 1 and 2, regional traffic at the study intersections (those not providing direct access to the Project) along Honoapiilani Highway is estimated to increase overall by approximately 5-10%, while local traffic at the study intersections (those providing direct access to the Project) along Honoapiilani Highway is estimated to increase overall by approximately 10-20% from Base Year 2025 without the Project scenario, during the AM, PM and WE peak hours of traffic.

All study intersections are forecast to operate similar to Future Year 2022 Scenario 1 with the exception of the Honoapiilani Highway/Akahele Street intersection. Since this intersection is the primary access from Honoapiilani Highway into the Project's Scenario 2 site, turning movements into and out of Akahele Street will increase. As a result, the intersection will worsen, but operate adequately from an overall LOS B(C)[B] during the Future Year 2022 Scenario 1 condition to an overall LOS C(C)[C] for the Future Year 2025 Scenario 2. Various left-turn movements will operate at LOS E/F conditions during all peak hours due to the long cycle length and generally low turning movement volumes at the intersection. However, all movements will continue to operate under capacity. Based on the AASHTO Green Book, all existing left-turn storage lane lengths at the Honoapiilani Highway/Akahele Street intersection are adequate for the additional traffic generated by Scenario 2.

The southern approach of Road A at Akahele Street is proposed for construction with Scenario 2. Although lengthy gaps in through traffic are expected along Akahele Street to help prevent long queues for opposing left-turn movements, exclusive left-turn storage lanes should be considered along Akahele Street as traffic begins to increase as a result of the Project.

Road C is proposed to cross Akahele Street east of Road A. With Scenario 2 of the Project, a maximum of 185 vehicles are forecast to traverse the intersection in a given peak hour with under 25 through vehicles along Akahele Street in each direction. Although volumes are anticipated to be low, exclusive left-turn storage lanes should be considered to remove left-turns from the through lanes on Akahele Street.

6.10 Future Year 2030 Scenario 3

By completion of Scenario 3 in Future Year 2030, the Project is projected to generate an additional 321(475)[664] new external trips during the AM(PM)[WE] peak hours of traffic. Trips generated by the Project are expected to result in growth along major roadways in the study area. Traffic generated by Project Scenario 3 will access the site via Honoapiilani Highway at Akahele Street, the RIRO access and the proposed Road J south of Mahinahina Gulch.

By Future Year 2030 the cumulative increases of Project Scenarios 1, 2 and 3, regional traffic at the study intersections (those not providing direct access to the Project) along Honoapiilani Highway is estimated to increase overall by approximately 5-20%, while local traffic at the study intersections (those providing direct access to the Project) along Honoapiilani Highway is estimated to increase overall by approximately 10-50% from Base Year 2030 without the Project scenario, during the AM, PM and WE peak hours of traffic.

The study intersections are anticipated to operate with longer delays compared to Future Year 2025 Scenario 2 due to the additional trips generated by background developments and Scenario 3 of the Project. Various major through movements along Honoapiilani Highway at several study intersections are expected to operate at LOS E/F and at or near overcapacity conditions. As noted previously, the LBR Phase 1C is anticipated to improve operations along Honoapiilani Highway once funding is acquired and the extension is constructed.

The Honoapiilani Highway/Akahele Street intersection is expected to experience increases in delay as the Project is further developed. The majority of left-turn and minor street movements are anticipated to operate at LOS E/F with the projected growth. However, all movements will continue to operate under capacity. Based on the AASHTO Green Book, various storage lengths are recommended at the intersection as shown in Table 5.7. The Road A and Road C intersections with Akahele Street will continue to operate adequately at LOS D or better.

The new Honoapiilani Highway/Road J intersection was analyzed as an unsignalized intersection, which includes an exclusive westbound left-turn and westbound right-turn lane, an exclusive southbound left-turn lane and an exclusive northbound right-turn lane. A southbound median refuge lane along Honoapiilani Highway may be constructed to facilitate westbound vehicles making the left-turn movement from the Full Access onto Honoapiilani Highway. With the proposed configuration, the westbound left-turn out of the Project is expected to operate under capacity at LOS E/F during all peak hours of traffic. Although lengthy delays are anticipated, based on the MUTCD Four-Hour Vehicular Volume traffic signal warrant, a traffic signal is not forecast to be warranted based on weekday forecast volumes. However, the intersection should be monitored to determine if or when a traffic signal is warranted.

6.11 Future Year 2035 Scenario 4

A future elementary school will be planned/developed by the Department of Education (DOE) on the Project site. Since the development of the school is not in the direct controller of the Pulelehua development, the timeframe for this school has yet to be determined. For the purposes of this TIAR, a forecast build-out of 2035 with inclusion of the elementary school as part of the Project was assumed as Scenario 4.

By completion of Scenario 4 in Future Year 2035, the Project is projected to generate an additional 471(115)[0] new external trips during the AM(PM)[WE] peak hours of traffic. Elementary school students in Lahaina are currently serviced primarily by Princess Nahienaena

Elementary School and King Kamehameha III Elementary School, further south of Keawe Street. It's anticipated that upon opening of the new Elementary School in the Project site, many students will transfer to this site from the Kaanapali, Honokowai, Kahana, Napili and Kapalua regions. Trips generated by the new elementary school were rerouted from existing traffic along Honoapiilani Highway to the new site. As a result, the majority of traffic increases were turning movement traffic turning into and out of Akahele Street on the east leg of its intersection with Honoapiilani Highway. Traffic reductions to various through movements along the highway were a result of the reroute.

With the additional trips generated by Scenario 4 and background traffic growth, several study intersections are forecast to operate with increased delay from Future Year 2030 with Scenarios 1, 2 and 3. All intersection movements forecast to operate at LOS E/F for Future Year 2030 Scenario 3 conditions will continue to operate at LOS E/F conditions during Future Year 2035 Scenario 4. Based on the AASHTO Green Book, various storage lengths are recommended at the Honoapiilani Highway/Akahele Street intersection as shown in Table 5.9.

As noted previously, some deficiencies in capacity and delay are forecast along northbound Honoapiilani Highway in the vicinity of the current northern terminus of the LBR at Keawe Street. Upon completion of the LBR Phase 1C, which will extend the bypass road to Kaanapali, the majority of capacity and delay issues are anticipated to be resolved as a portion of vehicles will continue further north on the LBR rather than exiting to Honoapiilani Highway at Keawe Street. Because allocation of State funds for Phase 1C of the LBR is currently under discussion, the bypass extension was not assumed to be completed by Future Year 2035.

7. RECOMMENDATIONS

Full Base Year and Future Year 2022, 2025, 2030 and 2035 roadway improvements are listed in Appendix D and discussed in more detail below.

7.1 Planned Roadway Improvements

The following roadway improvements are anticipated to be completed by other entities by Year 2022.

Honoapiilani Highway/Napilihau Street

- An exclusive right-turn lane on the northbound Honoapiilani Highway approach and exclusive left-turn lane and shared through/right-turn lane on the westbound Napilihau Street approach will be constructed as part of West Maui Village roadway improvements.

7.2 Base Year 2022 Mitigation

The following mitigations are proposed for Base Year 2022 by other entities.

[7] Honoapiilani Highway/Kaanapali Parkway/Halelo Street

- Modify the eastbound approach to incorporate a dedicated left-turn lane, a shared left-turn/through lane and two (2) dedicated right-turn lanes.

7.3 Base Year 2030 Mitigation

The following mitigations are proposed for Base Year 2030 by other entities.

[10] Honoapiilani Highway/Kapunakea Street

- Restripe the eastbound approach to provide an exclusive left-turn lane and a shared through/right-turn lane.

7.4 Future Year 2022 Scenario 1 Mitigation

The following mitigations are proposed for Future Year 2022 Scenario 1.

[3] Honoapiilani Highway/Akahele Street

- Optimize existing signal timing to accommodate turning movement increases

[12] Honoapiilani Highway/Project RIRO

- Provide a new RIRO access for direct entry/exit to the Project via Honoapiilani Highway. Storage lane lengths shown below are exclusive of deceleration/taper length and will need to be verified upon design. Based on the AASHTO Green Book, 425 feet accommodates full deceleration length with a design speed of 50 mph.
    - Northbound right-turn lane → Provide at least 100 feet of storage space.

7.5 Future Year 2025 Scenario 2 Mitigation

[3] Honoapiilani Highway/Akahele Street

- Optimize existing signal timing to accommodate turning movement increases

[14-15] Akahele Street/Road A and Road C

- Consider providing exclusive left-turn storage lanes on Akahele Street to remove left-turns from the through lanes along Akahele Street. A minimum 100 feet of storage for the eastbound left-turn and 50 feet of storage for the westbound left-turn lanes should be provided, exclusive of taper and deceleration length

7.6 Future Year 2030 Scenario 3 Mitigation

[3] Honoapiilani Highway/Akahele Street

- Optimize existing signal timing to accommodate turning movement increases
- Lengthen existing left-turn storage lane lengths to provide the following storage space. Note, storage lane lengths shown below are exclusive of taper length or deceleration length and will need to be verified upon design:
  - Northbound left-turn lane → Lengthen left-turn lane to provide at least 250 feet of storage space.
  - Westbound left-turn lane → Lengthen left-turn lane to provide at least 200 feet of storage space.

[13] Honoapiilani Highway/Road J

- Provide a new unsignalized stop-controlled intersection south of the existing Honoapiilani Highway/Akahele Street intersection, with the westbound approach as the stopped approach. Monitor the intersection to determine if or when a signal will be warranted based on actual traffic volumes:
  - Northbound Approach → Provide one (1) through lane and a new right-turn deceleration lane with at least 100 feet of storage space. Additional taper and/or deceleration length to be provided based upon design.
  - Southbound Approach → Provide one (1) through lane and a new right-turn deceleration lane with at least 100 feet of storage space. Additional taper and/or deceleration length to be provided based upon design.
    - AASHTO Green Book recommends 425 feet for full deceleration length with a design speed of 50 mph for both northbound and southbound approaches.
    - A median refuge lane may be constructed to facilitate westbound left-turn traffic exiting Road J going onto Honoapiilani Highway.
  - Westbound Approach → Provide a new left-turn storage lane and a new 100 feet right-turn storage lane.

7.7 Future Year 2035 Scenario 4 Mitigation

[3] Honoapiilani Highway/Akahele Street

- Optimize existing signal timing to accommodate turning movement increases
- Lengthen existing left-turn storage lane lengths to provide the following storage space. Note, storage lane lengths shown below are exclusive of taper length or deceleration length and will need to be verified upon design:
    - Northbound left-turn lane → Lengthen left-turn lane to provide at least 275 feet of storage space.
    - Southbound left-turn lane → Lengthen left-turn lane to provide at least 250 feet of storage space.
    - Westbound left-turn lane → Lengthen left-turn lane to provide at least 250 feet of storage space.

8. REFERENCES

1. American Association of State Highway and Transportation Officials, A Policy on Geometric Design of Highways and Streets, 2011.
2. Federal Highway Administration, Manual on Uniform Traffic Control Devices, 2009.
3. Institute of Transportation Engineers, Trip Generation, 10th Edition, 2017.
4. Transportation Research Board, Highway Capacity Manual, 6th Edition, 2016.

APPENDICES

APPENDIX A

TRAFFIC COUNT DATA

AUSTIN TSUTSUMI & ASSOCIATES

501 Sumner Street, Suite 521
Honolulu, HI 96817-5031
Phone: (808) 533-3646   Fax: (808) 526-1267

File Name : AM_Honoapiilani Hwy - Napilihau St
Site Code : 00000000
Start Date : 12/1/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				NAPILIHAU ST Westbound				HONOAPIILANI HWY Northbound				NAPILIHAU ST Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
06:15 AM	0	16	6	0	1	0	0	0	19	24	2	0	10	0	30	0	108
06:30 AM	0	24	5	2	1	1	0	0	28	23	4	0	12	2	71	0	173
06:45 AM	0	28	4	0	5	2	2	0	41	49	4	0	8	4	67	0	214
Total	0	68	15	2	7	3	2	0	88	96	10	0	30	6	168	0	495
07:00 AM	1	19	2	1	7	2	1	0	43	32	5	0	7	0	82	0	202
07:15 AM	0	37	6	0	3	3	0	0	61	50	8	0	16	5	87	0	276
07:30 AM	0	12	2	1	1	2	1	0	18	31	6	0	7	6	47	0	134
07:45 AM	2	27	6	1	20	14	4	0	60	61	46	0	11	20	76	0	348
Total	3	95	16	3	31	21	6	0	182	174	65	0	41	31	292	0	960
08:00 AM	3	41	16	1	28	9	5	0	63	62	24	0	14	6	61	0	333
Grand Total	6	204	47	6	66	33	13	0	333	332	99	0	85	43	521	0	1788
Apprch %	2.3	77.6	17.9	2.3	58.9	29.5	11.6	0	43.6	43.5	13	0	13.1	6.6	80.3	0	
Total %	0.3	11.4	2.6	0.3	3.7	1.8	0.7	0	18.6	18.6	5.5	0	4.8	2.4	29.1	0	

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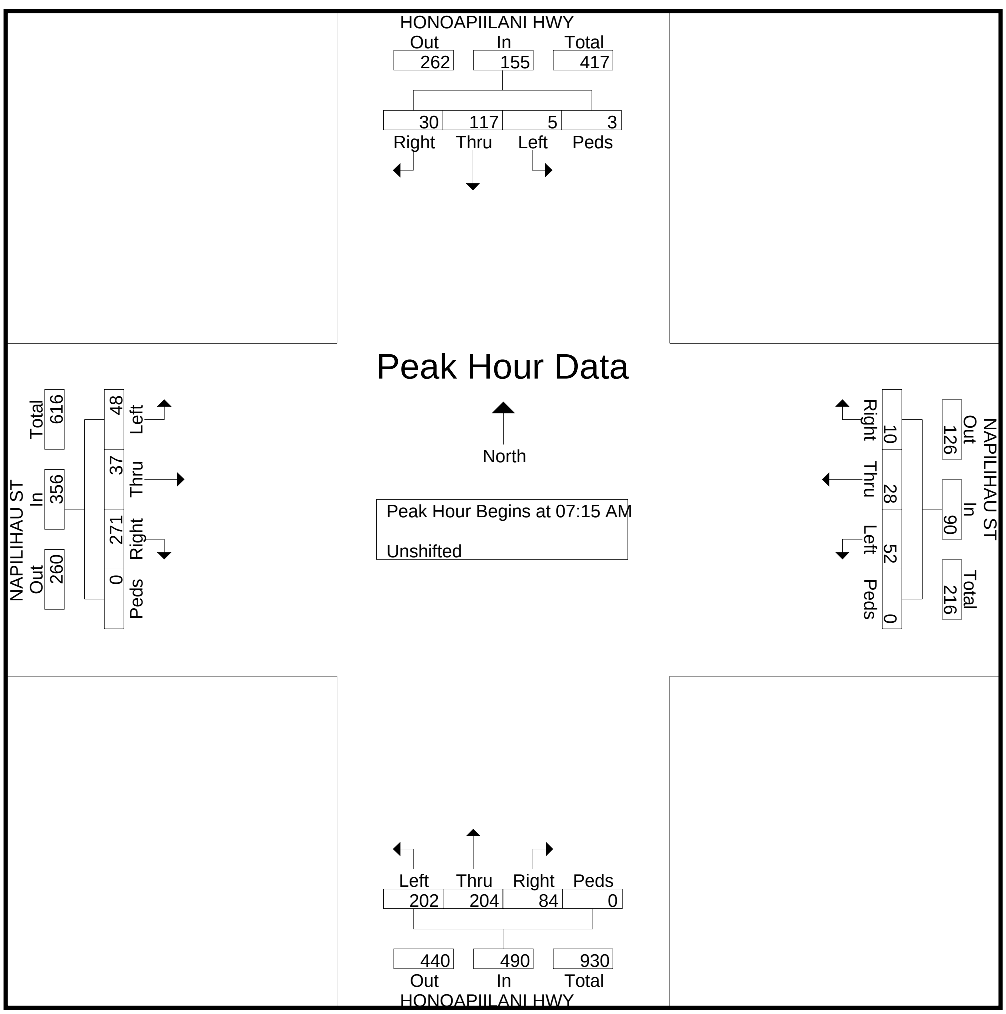
File Name : AM_Honoapiilani Hwy - Napilihau St
Site Code : 00000000
Start Date : 12/1/2016
Page No : 2

	HONOAPIILANI HWY Southbound					NAPILIHAU ST Westbound					HONOAPIILANI HWY Northbound					NAPILIHAU ST Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	37	6	0	43	3	3	0	0	6	61	50	8	0	119	**16**	5	**87**	0	**108**	276
07:30 AM	0	12	2	**1**	15	1	2	1	0	4	18	31	6	0	55	7	6	47	0	60	134
07:45 AM	2	27	6	1	36	20	**14**	4	0	38	60	61	**46**	0	**167**	11	**20**	76	0	107	**348**
08:00 AM	**3**	**41**	**16**	1	**61**	**28**	9	**5**	0	**42**	**63**	**62**	24	0	149	14	6	61	0	81	333
Total Volume	5	117	30	3	155	52	28	10	0	90	202	204	84	0	490	48	37	271	0	356	1091
% App. Total	3.2	75.5	19.4	1.9		57.8	31.1	11.1	0		41.2	41.6	17.1	0		13.5	10.4	76.1	0		
PHF	.417	.713	.469	.750	.635	.464	.500	.500	.000	.536	.802	.823	.457	.000	.734	.750	.463	.779	.000	.824	.784



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File Name : AM_Honoapiilani Hwy - Hoohui Rd
Site Code : 00000000
Start Date : 12/1/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				HOOHUI RD Westbound				HONOAPIILANI HWY Northbound				HOOHUI RD Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
06:15 AM	0	43	8	1	5	0	0	1	6	43	1	0	8	0	23	0	139
06:30 AM	0	80	8	0	12	3	3	0	7	47	1	0	8	2	32	0	203
06:45 AM	0	96	10	1	12	2	5	0	14	74	3	0	10	0	35	0	262
Total	0	219	26	2	29	5	8	1	27	164	5	0	26	2	90	0	604
07:00 AM	1	107	10	1	22	5	2	0	15	62	5	0	10	0	48	0	288
07:15 AM	1	113	19	2	36	6	2	1	23	89	1	1	11	0	36	0	341
07:30 AM	1	89	19	5	18	3	4	3	24	110	3	0	15	1	54	0	349
07:45 AM	6	111	10	2	16	6	3	2	37	117	5	0	19	2	41	0	377
Total	9	420	58	10	92	20	11	6	99	378	14	1	55	3	179	0	1355
08:00 AM	1	119	13	1	14	3	4	0	39	137	4	0	13	0	32	0	380
Grand Total	10	758	97	13	135	28	23	7	165	679	23	1	94	5	301	0	2339
Apprch %	1.1	86.3	11	1.5	69.9	14.5	11.9	3.6	19	78.2	2.6	0.1	23.5	1.2	75.2	0	
Total %	0.4	32.4	4.1	0.6	5.8	1.2	1	0.3	7.1	29	1	0	4	0.2	12.9	0	

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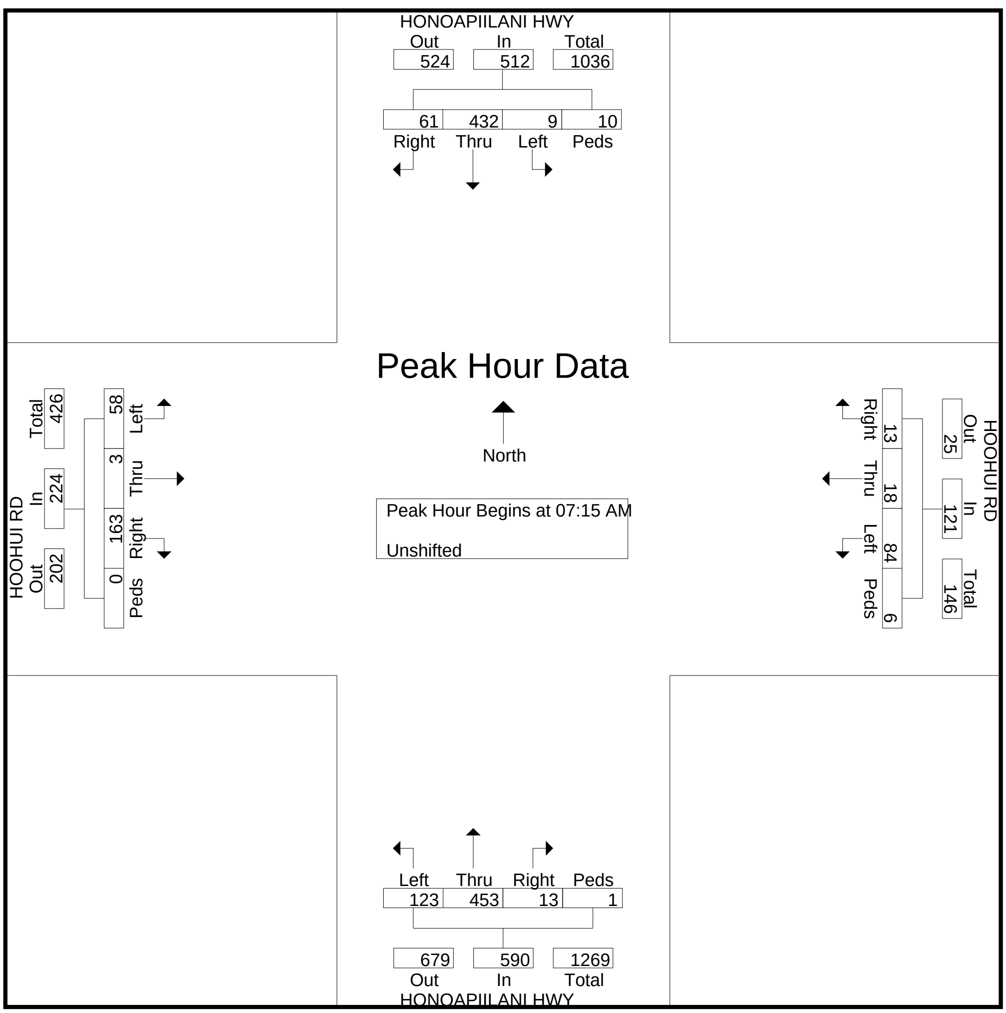
Site Code : 00000000
Start Date : 12/1/2016
Page No : 2

	HONOAPIILANI HWY Southbound					HOOHUI RD Westbound					HONOAPIILANI HWY Northbound					HOOHUI RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	1	113	**19**	2	**135**	**36**	**6**	2	1	**45**	23	89	1	**1**	114	11	0	36	0	47	341
07:30 AM	1	89	19	**5**	114	18	3	**4**	**3**	28	24	110	3	0	137	15	1	**54**	0	**70**	349
07:45 AM	**6**	111	10	2	129	16	6	3	2	27	37	117	**5**	0	159	**19**	**2**	41	0	62	377
08:00 AM	1	**119**	13	1	134	14	3	4	0	21	**39**	**137**	4	0	**180**	13	0	32	0	45	**380**
Total Volume	9	432	61	10	512	84	18	13	6	121	123	453	13	1	590	58	3	163	0	224	1447
% App. Total	1.8	84.4	11.9	2		69.4	14.9	10.7	5		20.8	76.8	2.2	0.2		25.9	1.3	72.8	0		
PHF	.375	.908	.803	.500	.948	.583	.750	.813	.500	.672	.788	.827	.650	.250	.819	.763	.375	.755	.000	.800	.952



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File Name : AM_Honoapiilani Hwy - Akahele St
Site Code : 00000000
Start Date : 12/7/2016
Page No : 1

Groups Printed- Unshifted - Bank 1

	HONOAPIILANI HWY Southbound				AKAHELE ST Westbound				HONOAPIILANI HWY Northbound				AKAHELE ST Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:15 AM	1	70	4	0	1	0	0	0	3	54	1	1	10	0	8	1	154
06:30 AM	3	102	3	0	1	0	1	0	5	72	2	0	13	1	17	0	220
06:45 AM	1	163	11	0	1	1	0	0	6	87	1	0	13	2	18	2	306
Total	5	335	18	0	3	1	1	0	14	213	4	1	36	3	43	3	680
07:00 AM	3	166	9	0	1	1	1	0	5	80	4	1	13	0	37	0	321
07:15 AM	1	185	4	2	2	0	2	0	10	104	3	0	5	0	46	3	367
07:30 AM	3	162	7	0	1	0	1	0	12	113	1	1	10	0	30	1	342
07:45 AM	0	136	10	2	1	1	1	0	19	134	4	2	12	1	23	1	347
Total	7	649	30	4	5	2	5	0	46	431	12	4	40	1	136	5	1377
08:00 AM	1	129	7	0	1	0	0	0	11	176	3	0	12	0	14	2	356
08:15 AM	1	114	6	0	2	2	0	0	10	121	3	1	8	1	19	3	291
Grand Total	14	1227	61	4	11	5	6	0	81	941	22	6	96	5	212	13	2704
Apprch %	1.1	94	4.7	0.3	50	22.7	27.3	0	7.7	89.6	2.1	0.6	29.4	1.5	65	4	
Total %	0.5	45.4	2.3	0.1	0.4	0.2	0.2	0	3	34.8	0.8	0.2	3.6	0.2	7.8	0.5	
Unshifted	14	1227	61	4	11	5	6	0	81	941	22	6	96	5	212	13	2704
% Unshifted	100	100	100	100	100	100	100	0	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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File Name : AM_Honoapiilani Hwy - Akahele St
Site Code : 00000000
Start Date : 12/7/2016
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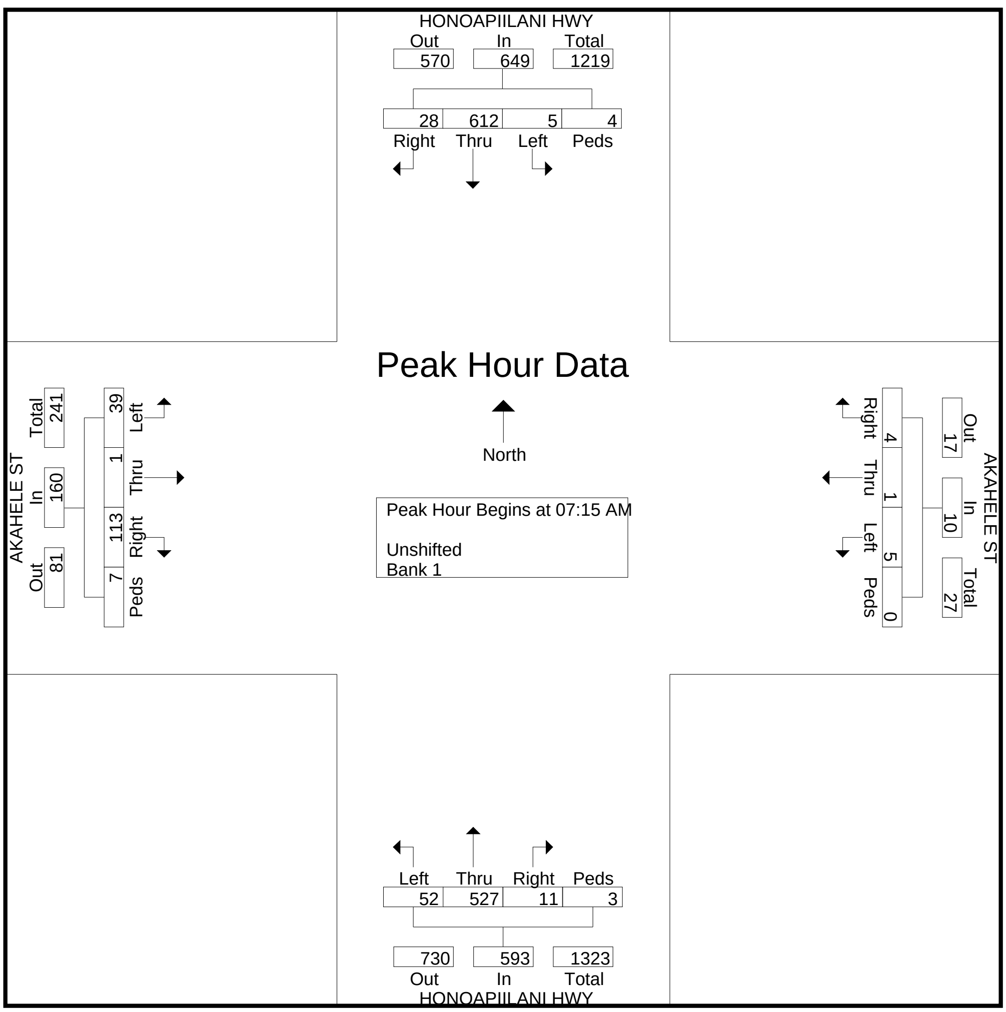
	HONOAPIILANI HWY Southbound					AKAHELE ST Westbound					HONOAPIILANI HWY Northbound					AKAHELE ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:15 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	1	**185**	4	**2**	**192**	**2**	0	**2**	0	**4**	10	104	3	0	117	5	0	**46**	**3**	**54**	**367**
07:30 AM	**3**	162	7	0	172	1	0	1	0	2	12	113	1	1	127	10	0	30	1	41	342
07:45 AM	0	136	**10**	2	148	1	**1**	1	0	3	**19**	134	**4**	**2**	159	**12**	**1**	23	1	37	347
08:00 AM	1	129	7	0	137	1	0	0	0	1	11	**176**	3	0	**190**	12	0	14	2	28	356
Total Volume	5	612	28	4	649	5	1	4	0	10	52	527	11	3	593	39	1	113	7	160	1412
% App. Total	0.8	94.3	4.3	0.6		50	10	40	0		8.8	88.9	1.9	0.5		24.4	0.6	70.6	4.4		
PHF	.417	.827	.700	.500	.845	.625	.250	.500	.000	.625	.684	.749	.688	.375	.780	.813	.250	.614	.583	.741	.962



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File Name : AM_Honoapiilani Hwy - Lower Honoapiilani Rd
Site Code : 00000000
Start Date : 12/7/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				LOWER HONOAPIILANI R Westbound				HONOAPIILANI HWY Northbound				LOWER HONOAPIILANI R Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
06:30 AM	6	97	3	0	14	0	0	0	46	85	33	0	6	0	57	0	347
06:45 AM	2	150	0	0	5	0	3	0	41	77	29	0	10	3	96	0	416
Total	8	247	3	0	19	0	3	0	87	162	62	0	16	3	153	0	763
07:00 AM	0	177	0	0	4	0	0	0	64	92	18	0	13	4	89	0	461
07:15 AM	3	199	0	0	1	0	0	0	59	105	12	0	8	2	116	0	505
07:30 AM	3	178	10	1	6	0	0	0	90	135	14	0	6	2	112	0	557
07:45 AM	1	145	0	1	2	1	0	0	73	181	5	0	11	2	94	0	516
Total	7	699	10	2	13	1	0	0	286	513	49	0	38	10	411	0	2039
08:00 AM	1	169	0	0	8	2	0	0	65	171	7	0	5	1	111	0	540
08:15 AM	1	117	0	0	4	2	2	0	81	123	7	0	10	0	105	0	452
Grand Total	17	1232	13	2	44	5	5	0	519	969	125	0	69	14	780	0	3794
Apprch %	1.3	97.5	1	0.2	81.5	9.3	9.3	0	32.2	60.1	7.7	0	8	1.6	90.4	0	
Total %	0.4	32.5	0.3	0.1	1.2	0.1	0.1	0	13.7	25.5	3.3	0	1.8	0.4	20.6	0	

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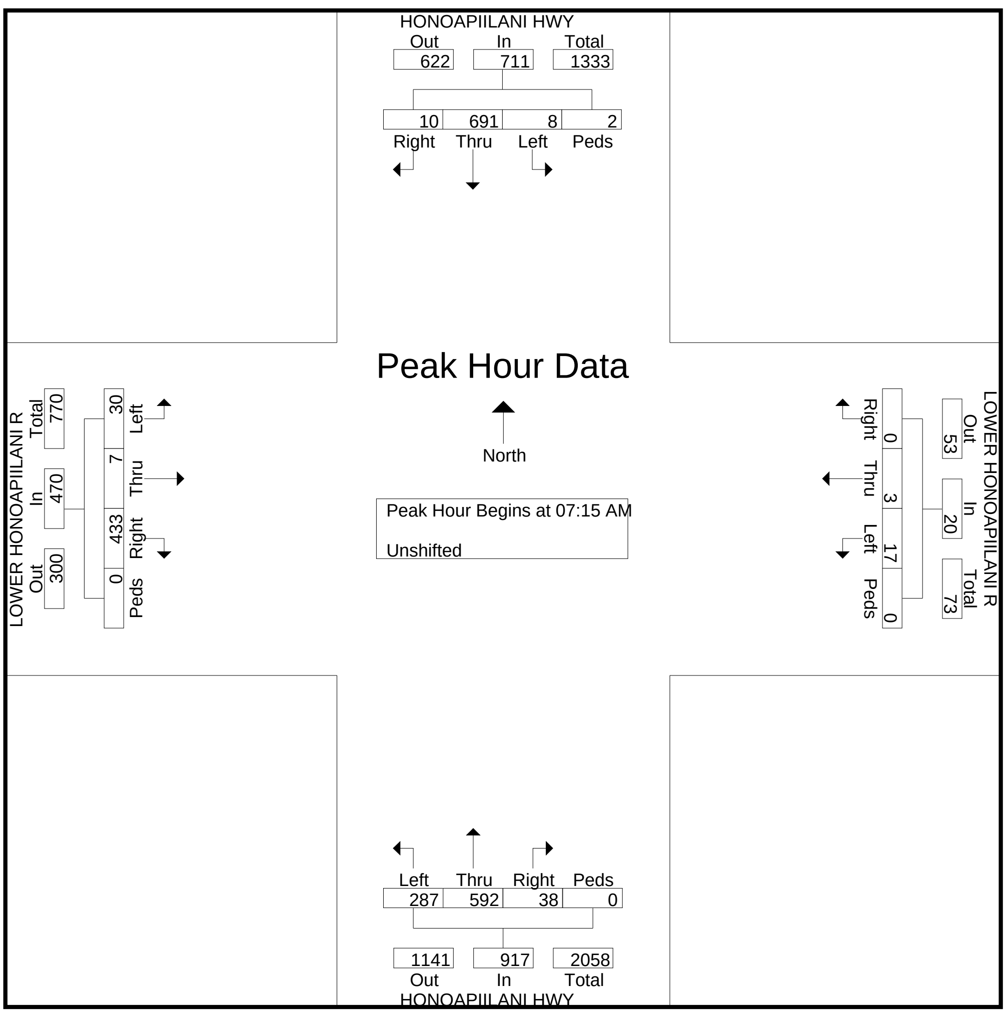
Site Code : 00000000
Start Date : 12/7/2016

	HONOAPIILANI HWY Southbound					LOWER HONOAPIILANI R Westbound					HONOAPIILANI HWY Northbound					LOWER HONOAPIILANI R Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**3**	**199**	0	0	**202**	1	0	0	0	1	59	105	12	0	176	8	**2**	**116**	0	**126**	505
07:30 AM	3	178	**10**	**1**	192	6	0	0	0	6	**90**	135	**14**	0	239	6	2	112	0	120	**557**
07:45 AM	1	145	0	1	147	2	1	0	0	3	73	**181**	5	0	**259**	**11**	2	94	0	107	516
08:00 AM	1	169	0	0	170	**8**	**2**	0	0	**10**	65	171	7	0	243	5	1	111	0	117	540
Total Volume	8	691	10	2	711	17	3	0	0	20	287	592	38	0	917	30	7	433	0	470	2118
% App. Total	1.1	97.2	1.4	0.3		85	15	0	0		31.3	64.6	4.1	0		6.4	1.5	92.1	0		
PHF	.667	.868	.250	.500	.880	.531	.375	.000	.000	.500	.797	.818	.679	.000	.885	.682	.875	.933	.000	.933	.951



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File Name : AM_Honoapiilani Hwy - Halawai Dr
Site Code : 00000000
Start Date : 12/7/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				HALAWAI DR Westbound				HONOAPIILANI HWY Northbound				HALAWAI DR Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
06:15 AM	0	130	11	0	0	0	0	0	14	123	3	1	12	0	2	0	296
06:30 AM	1	151	15	0	1	0	0	0	13	159	4	0	13	0	7	0	364
06:45 AM	1	243	12	0	0	0	1	0	16	138	3	0	9	0	6	0	429
Total	2	524	38	0	1	0	1	0	43	420	10	1	34	0	15	0	1089
07:00 AM	0	261	5	0	2	1	3	0	20	163	4	0	2	0	4	0	465
07:15 AM	1	330	11	0	2	1	1	0	16	190	2	0	6	0	6	0	566
07:30 AM	3	298	13	0	2	0	0	0	13	223	3	0	2	0	14	0	571
07:45 AM	4	248	4	0	4	0	3	0	19	289	6	0	5	0	6	0	588
Total	8	1137	33	0	10	2	7	0	68	865	15	0	15	0	30	0	2190
08:00 AM	6	253	10	0	0	0	2	0	16	272	5	0	3	0	7	0	574
Grand Total	16	1914	81	0	11	2	10	0	127	1557	30	1	52	0	52	0	3853
Apprch %	0.8	95.2	4	0	47.8	8.7	43.5	0	7.4	90.8	1.7	0.1	50	0	50	0	
Total %	0.4	49.7	2.1	0	0.3	0.1	0.3	0	3.3	40.4	0.8	0	1.3	0	1.3	0	

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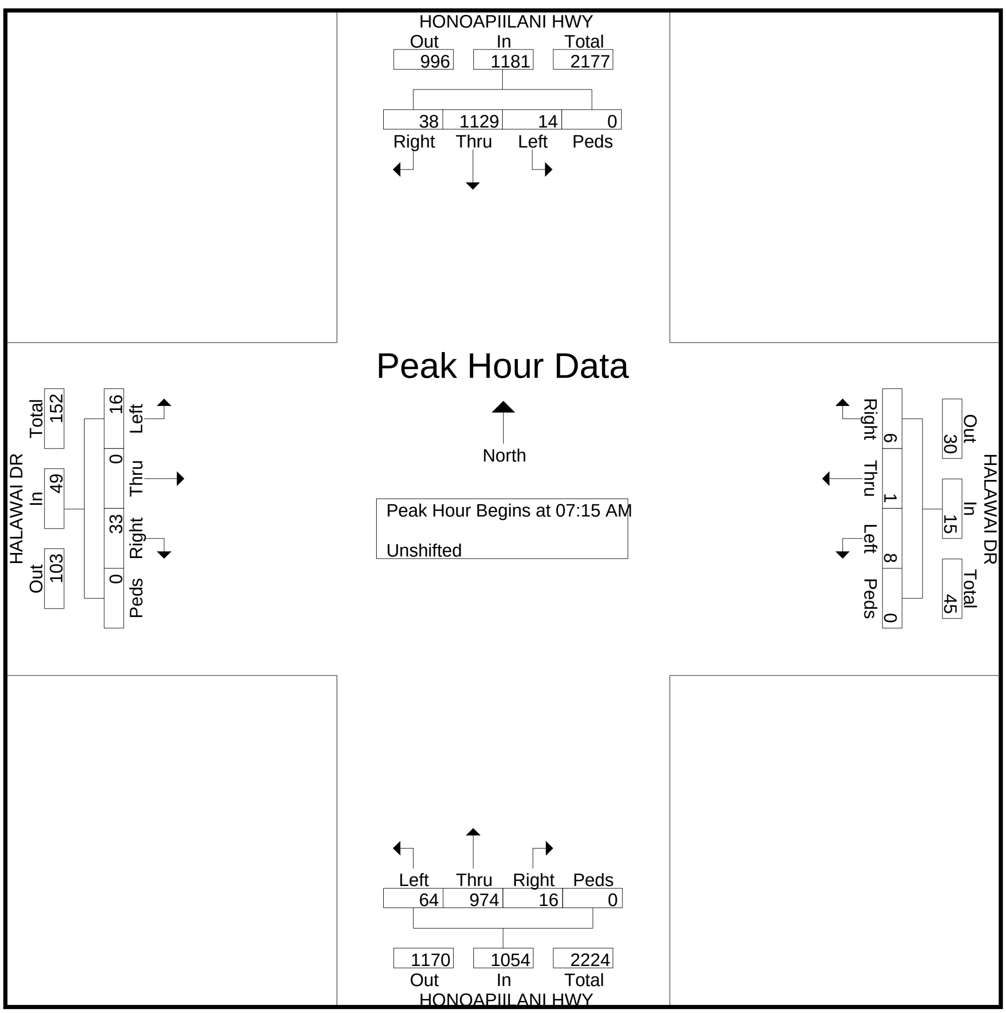
File Name : AM_Honoapiilani Hwy - Halawai Dr
Site Code : 00000000
Start Date : 12/7/2016

	HONOAPIILANI HWY Southbound					HALAWAI DR Westbound					HONOAPIILANI HWY Northbound					HALAWAI DR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	1	**330**	11	0	**342**	2	**1**	1	0	4	16	190	2	0	208	**6**	0	6	0	12	566
07:30 AM	3	298	**13**	0	314	2	0	0	0	2	13	223	3	0	239	2	0	**14**	0	**16**	571
07:45 AM	4	248	4	0	256	**4**	0	**3**	0	**7**	**19**	**289**	**6**	0	**314**	5	0	6	0	11	**588**
08:00 AM	**6**	253	10	0	269	0	0	2	0	2	16	272	5	0	293	3	0	7	0	10	574
Total Volume	14	1129	38	0	1181	8	1	6	0	15	64	974	16	0	1054	16	0	33	0	49	2299
% App. Total	1.2	95.6	3.2	0		53.3	6.7	40	0		6.1	92.4	1.5	0		32.7	0	67.3	0		
PHF	.583	.855	.731	.000	.863	.500	.250	.500	.000	.536	.842	.843	.667	.000	.839	.667	.000	.589	.000	.766	.977



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File Name : AM_Honoapiilani Hwy - Puukolii Rd
Site Code : 00000000
Start Date : 12/7/2016
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Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				PUUKOLII RD Westbound				HONOAPIILANI HWY Northbound				PUUKOLII RD Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
06:15 AM	1	118	5	2	1	0	3	0	12	140	3	0	3	0	12	0	300
06:30 AM	1	142	9	1	5	1	7	0	13	154	3	0	6	0	13	0	355
06:45 AM	1	228	12	3	6	0	4	0	19	140	8	0	4	0	8	0	433
Total	3	488	26	6	12	1	14	0	44	434	14	0	13	0	33	0	1088
07:00 AM	2	254	5	0	2	0	3	0	5	119	3	0	8	0	1	0	402
07:15 AM	6	305	6	0	10	0	3	0	22	209	12	0	6	0	7	0	586
07:30 AM	1	293	12	0	9	6	8	0	31	235	10	0	12	1	6	0	624
07:45 AM	7	239	12	1	12	5	21	0	19	258	17	0	16	1	7	0	615
Total	16	1091	35	1	33	11	35	0	77	821	42	0	42	2	21	0	2227
08:00 AM	10	223	7	0	8	2	9	0	30	263	15	0	11	2	10	0	590
Grand Total	29	1802	68	7	53	14	58	0	151	1518	71	0	66	4	64	0	3905
Apprch %	1.5	94.5	3.6	0.4	42.4	11.2	46.4	0	8.7	87.2	4.1	0	49.3	3	47.8	0	
Total %	0.7	46.1	1.7	0.2	1.4	0.4	1.5	0	3.9	38.9	1.8	0	1.7	0.1	1.6	0	

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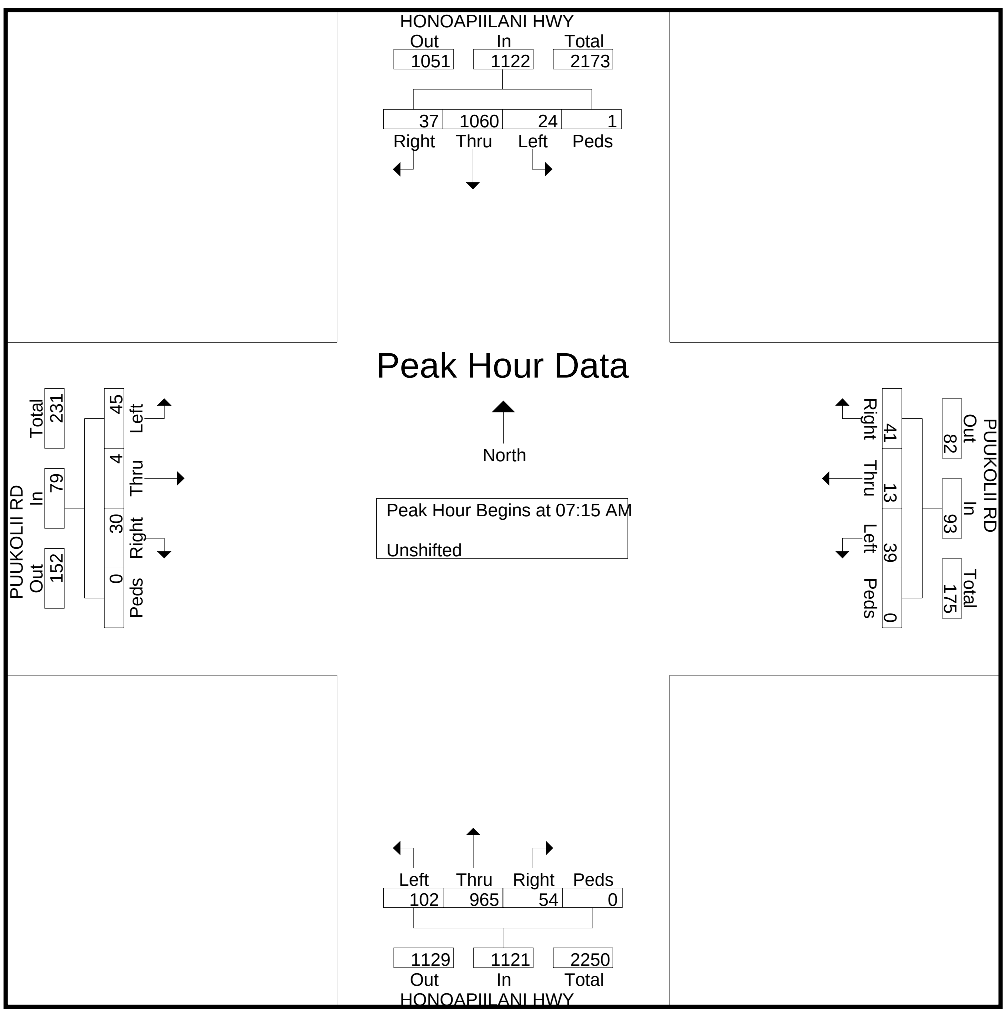
File Name : AM_Honoapiilani Hwy - Puukolii Rd
Site Code : 00000000
Start Date : 12/7/2016

	HONOAPIILANI HWY Southbound					PUUKOLII RD Westbound					HONOAPIILANI HWY Northbound					PUUKOLII RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	6	**305**	6	0	**317**	10	0	3	0	13	22	209	12	0	243	6	0	7	0	13	586
07:30 AM	1	293	**12**	0	306	9	**6**	8	0	23	**31**	235	10	0	276	12	1	6	0	19	**624**
07:45 AM	7	239	12	**1**	259	**12**	5	**21**	0	**38**	19	258	**17**	0	294	**16**	1	7	0	**24**	615
08:00 AM	**10**	223	7	0	240	8	2	9	0	19	30	**263**	15	0	**308**	11	**2**	**10**	0	23	590
Total Volume	24	1060	37	1	1122	39	13	41	0	93	102	965	54	0	1121	45	4	30	0	79	2415
% App. Total	2.1	94.5	3.3	0.1		41.9	14	44.1	0		9.1	86.1	4.8	0		57	5.1	38	0		
PHF	.600	.869	.771	.250	.885	.813	.542	.488	.000	.612	.823	.917	.794	.000	.910	.703	.500	.750	.000	.823	.968



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File Name : AM_Honoapiilani Hwy - Kaanapali Pkwy
Site Code : 00000000
Start Date : 12/7/2016
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	HONOAPIILANI HWY Southbound				KAANAPALI PKWY Westbound				HONOAPIILANI HWY Northbound				KAANAPALI PKWY Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
06:15 AM	5	114	9	0	0	1	0	0	50	142	4	0	13	0	22	0	360
06:30 AM	3	134	13	0	3	0	2	0	77	180	2	0	11	0	41	0	466
06:45 AM	9	183	26	2	4	8	1	0	81	186	2	0	17	1	42	0	562
Total	17	431	48	2	7	9	3	0	208	508	8	0	41	1	105	0	1388
07:00 AM	8	251	11	0	2	3	1	0	79	163	0	0	20	2	52	1	593
07:15 AM	17	264	20	0	2	3	1	0	93	218	3	0	18	1	51	0	691
07:30 AM	4	290	30	2	2	3	3	0	113	264	2	0	34	0	54	2	803
07:45 AM	9	232	21	1	3	2	3	0	120	319	5	0	28	0	49	2	794
Total	38	1037	82	3	9	11	8	0	405	964	10	0	100	3	206	5	2881
08:00 AM	10	210	16	2	3	2	1	0	84	270	4	0	35	5	60	2	704
Grand Total	65	1678	146	7	19	22	12	0	697	1742	22	0	176	9	371	7	4973
Apprch %	3.4	88.5	7.7	0.4	35.8	41.5	22.6	0	28.3	70.8	0.9	0	31.3	1.6	65.9	1.2	
Total %	1.3	33.7	2.9	0.1	0.4	0.4	0.2	0	14	35	0.4	0	3.5	0.2	7.5	0.1	

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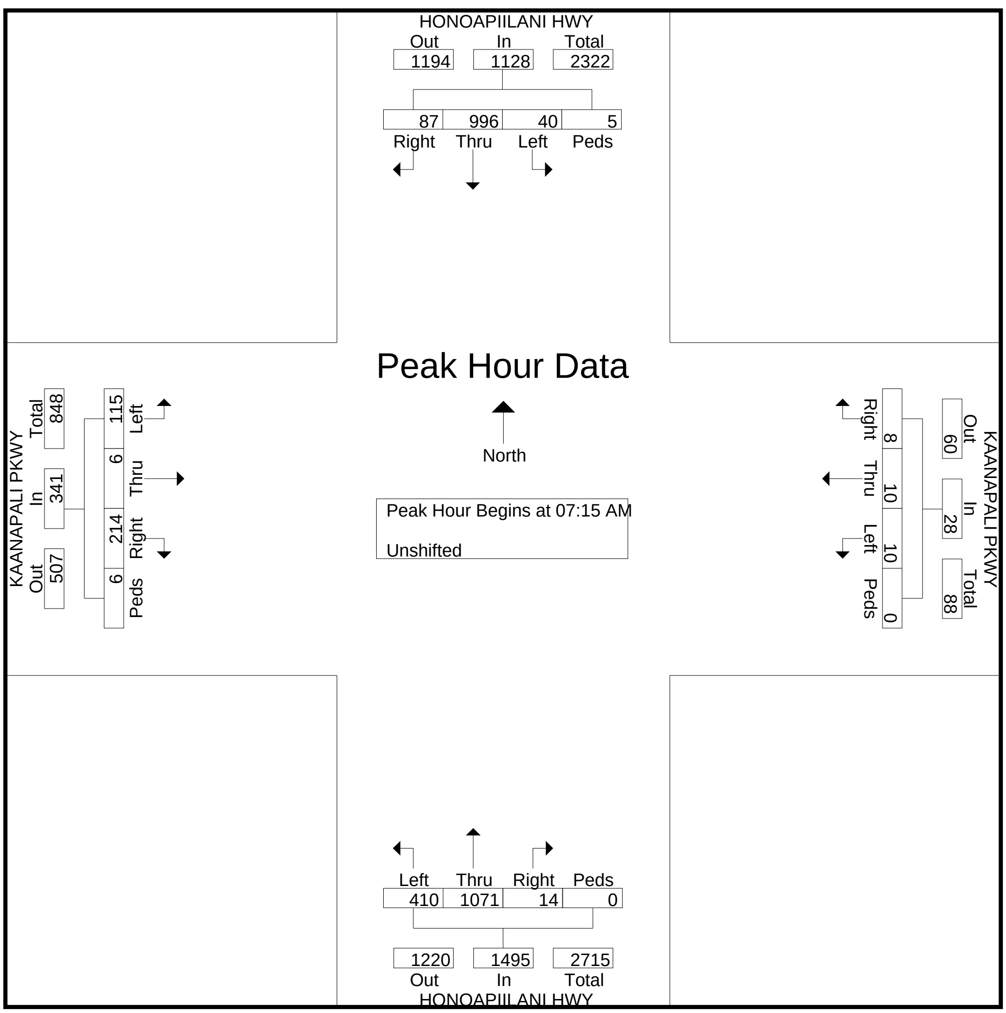
File Name : AM_Honoapiilani Hwy - Kaanapali Pkwy
Site Code : 00000000
Start Date : 12/7/2016
Page No : 2

	HONOAPIILANI HWY Southbound					KAANAPALI PKWY Westbound					HONOAPIILANI HWY Northbound					KAANAPALI PKWY Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**17**	264	20	0	301	2	**3**	1	0	6	93	218	3	0	314	18	1	51	0	70	691
07:30 AM	4	**290**	**30**	**2**	**326**	2	3	**3**	0	**8**	113	264	2	0	379	34	0	54	**2**	90	**803**
07:45 AM	9	232	21	1	263	**3**	2	3	0	8	**120**	**319**	**5**	0	**444**	28	0	49	2	79	794
08:00 AM	10	210	16	2	238	3	2	1	0	6	84	270	4	0	358	**35**	**5**	**60**	2	**102**	704
Total Volume	40	996	87	5	1128	10	10	8	0	28	410	1071	14	0	1495	115	6	214	6	341	2992
% App. Total	3.5	88.3	7.7	0.4		35.7	35.7	28.6	0		27.4	71.6	0.9	0		33.7	1.8	62.8	1.8		
PHF	.588	.859	.725	.625	.865	.833	.833	.667	.000	.875	.854	.839	.700	.000	.842	.821	.300	.892	.750	.836	.932



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File Name : AM_Honoapiilani Hwy - Leialii Pkwy
Site Code : 00000000
Start Date : 12/7/2016
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	HONOAPIILANI HWY Southbound				LEIALII PKWY Westbound				HONOAPIILANI HWY Northbound				LEIALII PKWY Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
06:15 AM	3	134	0	2	10	0	1	0	0	217	3	0	0	0	0	0	370
06:30 AM	2	173	1	2	9	0	9	1	0	254	7	0	0	0	0	0	458
06:45 AM	3	201	0	1	11	1	11	0	2	245	11	0	0	0	2	0	488
Total	8	508	1	5	30	1	21	1	2	716	21	0	0	0	2	0	1316
07:00 AM	6	320	0	0	16	0	5	2	1	264	14	0	0	0	0	2	630
07:15 AM	5	325	1	0	16	0	7	1	0	333	15	0	1	0	0	0	704
07:30 AM	4	342	1	1	9	0	9	1	0	442	22	0	0	0	2	2	835
07:45 AM	7	272	2	4	16	0	8	2	2	375	23	0	1	1	1	3	717
Total	22	1259	4	5	57	0	29	6	3	1414	74	0	2	1	3	7	2886
08:00 AM	9	251	0	2	15	0	15	0	1	335	26	0	0	0	1	1	656
08:15 AM	6	284	0	1	15	0	12	5	0	312	21	0	0	0	0	1	657
Grand Total	45	2302	5	13	117	1	77	12	6	2777	142	0	2	1	6	9	5515
Apprch %	1.9	97.3	0.2	0.5	56.5	0.5	37.2	5.8	0.2	94.9	4.9	0	11.1	5.6	33.3	50	
Total %	0.8	41.7	0.1	0.2	2.1	0	1.4	0.2	0.1	50.4	2.6	0	0	0	0.1	0.2	

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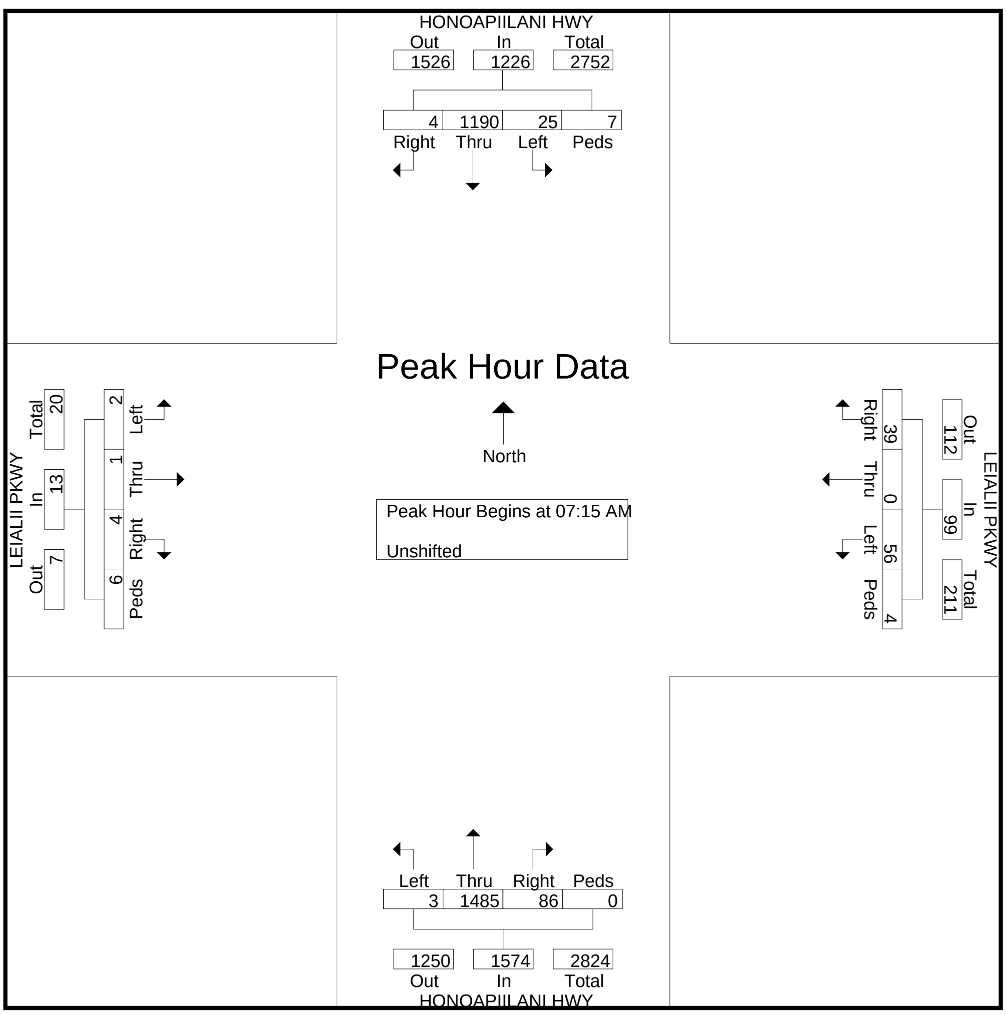
File Name : AM_Honoapiilani Hwy - Leialii Pkwy
Site Code : 00000000
Start Date : 12/7/2016
Page No : 2

	HONOAPIILANI HWY Southbound					LEIALII PKWY Westbound					HONOAPIILANI HWY Northbound					LEIALII PKWY Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:15 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	5	325	1	0	331	**16**	0	7	1	24	0	333	15	0	348	**1**	0	0	0	1	704
07:30 AM	4	**342**	1	1	**348**	9	0	9	1	19	0	**442**	22	0	**464**	0	0	**2**	2	4	**835**
07:45 AM	7	272	**2**	**4**	285	16	0	8	**2**	26	**2**	375	23	0	400	1	**1**	1	**3**	**6**	717
08:00 AM	**9**	251	0	2	262	15	0	**15**	0	**30**	1	335	**26**	0	362	0	0	1	1	2	656
Total Volume	25	1190	4	7	1226	56	0	39	4	99	3	1485	86	0	1574	2	1	4	6	13	2912
% App. Total	2	97.1	0.3	0.6		56.6	0	39.4	4		0.2	94.3	5.5	0		15.4	7.7	30.8	46.2		
PHF	.694	.870	.500	.438	.881	.875	.000	.650	.500	.825	.375	.840	.827	.000	.848	.500	.250	.500	.500	.542	.872



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File Name : AM_Honoapiilani Hwy - Front St
Site Code : 00000000
Start Date : 12/7/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				FLEMING RD Westbound				HONOAPIILANI HWY Northbound				FRONT ST Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
06:15 AM	0	126	9	0	12	1	2	0	0	208	0	0	2	0	0	3	363
06:30 AM	0	155	12	0	13	2	0	0	1	213	3	0	7	1	0	0	407
06:45 AM	0	183	13	0	15	1	1	0	0	234	1	0	6	0	1	0	455
Total	0	464	34	0	40	4	3	0	1	655	4	0	15	1	1	3	1225
07:00 AM	0	240	31	0	44	4	3	0	0	238	3	0	5	0	0	0	568
07:15 AM	1	280	53	0	29	7	2	0	0	327	2	0	18	0	1	1	721
07:30 AM	1	298	58	0	35	2	7	0	1	422	3	0	20	1	1	0	849
07:45 AM	0	249	32	0	16	1	2	0	0	389	8	0	24	1	0	0	722
Total	2	1067	174	0	124	14	14	0	1	1376	16	0	67	2	2	1	2860
08:00 AM	4	232	24	0	21	5	2	0	1	333	3	0	19	2	1	1	648
Grand Total	6	1763	232	0	185	23	19	0	3	2364	23	0	101	5	4	5	4733
Apprch %	0.3	88.1	11.6	0	81.5	10.1	8.4	0	0.1	98.9	1	0	87.8	4.3	3.5	4.3	
Total %	0.1	37.2	4.9	0	3.9	0.5	0.4	0	0.1	49.9	0.5	0	2.1	0.1	0.1	0.1	

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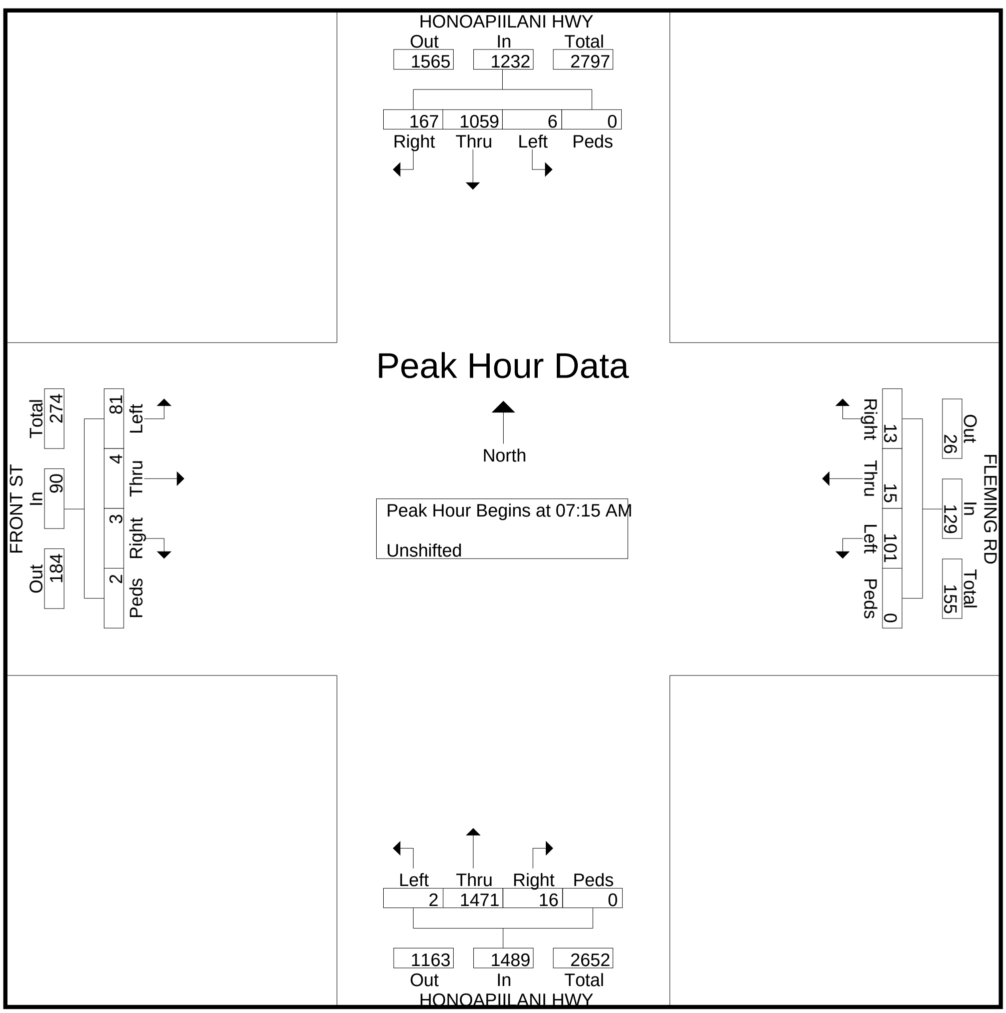
File Name : AM_Honoapiilani Hwy - Front St
Site Code : 00000000
Start Date : 12/7/2016

	HONOAPIILANI HWY Southbound					FLEMING RD Westbound					HONOAPIILANI HWY Northbound					FRONT ST Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	1	280	53	0	334	29	**7**	2	0	38	0	327	2	0	329	18	0	**1**	**1**	20	721
07:30 AM	1	**298**	**58**	0	**357**	**35**	2	**7**	0	**44**	**1**	**422**	3	0	**426**	20	1	1	0	22	**849**
07:45 AM	0	249	32	0	281	16	1	2	0	19	0	389	**8**	0	397	**24**	1	0	0	**25**	722
08:00 AM	**4**	232	24	0	260	21	5	2	0	28	1	333	3	0	337	19	**2**	1	1	23	648
Total Volume	6	1059	167	0	1232	101	15	13	0	129	2	1471	16	0	1489	81	4	3	2	90	2940
% App. Total	0.5	86	13.6	0		78.3	11.6	10.1	0		0.1	98.8	1.1	0		90	4.4	3.3	2.2		
PHF	.375	.888	.720	.000	.863	.721	.536	.464	.000	.733	.500	.871	.500	.000	.874	.844	.500	.750	.500	.900	.866



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File Name : AM_Honoapiilani Hwy-Kapunakea St
Site Code : 00000000
Start Date : 12/7/2016
Page No : 1

Groups Printed- Unshifted

	KAPUNAKEA ST Eastbound				KAPUNAKEA ST Westbound				HONOAPIILANI HWY Northbound				HONOAPIILANI HWY Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:15 AM	8	1	2	0	14	1	7	0	1	199	7	0	0	132	6	1	379
06:30 AM	14	1	4	0	16	3	4	0	3	243	11	0	0	172	9	2	482
06:45 AM	14	1	5	0	24	5	5	0	6	214	6	0	0	199	14	1	494
Total	36	3	11	0	54	9	16	0	10	656	24	0	0	503	29	4	1355
07:00 AM	17	3	9	0	28	7	5	1	5	245	4	0	4	304	13	4	649
07:15 AM	28	6	4	0	51	10	7	0	7	296	16	0	3	290	16	3	737
07:30 AM	21	7	6	0	33	5	14	0	3	386	15	0	2	336	17	4	849
07:45 AM	24	9	6	0	30	5	5	0	5	375	26	0	0	240	16	2	743
Total	90	25	25	0	142	27	31	1	20	1302	61	0	9	1170	62	13	2978
08:00 AM	22	5	3	0	27	3	3	1	8	296	14	0	2	237	13	0	634
Grand Total	148	33	39	0	223	39	50	2	38	2254	99	0	11	1910	104	17	4967
Apprch %	67.3	15	17.7	0	71	12.4	15.9	0.6	1.6	94.3	4.1	0	0.5	93.5	5.1	0.8	
Total %	3	0.7	0.8	0	4.5	0.8	1	0	0.8	45.4	2	0	0.2	38.5	2.1	0.3	

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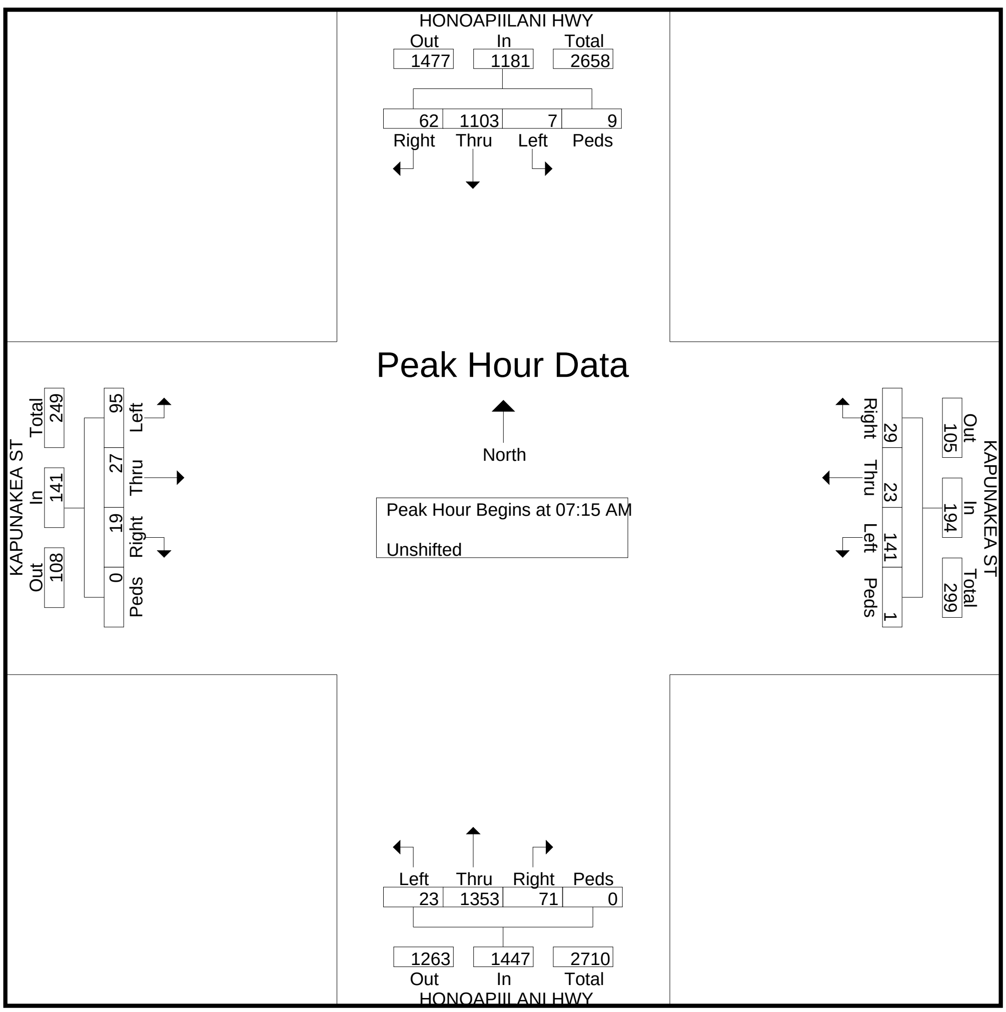
File Name : AM_Honoapiilani Hwy-Kapunakea St
Site Code : 00000000
Start Date : 12/7/2016

	KAPUNAKEA ST Eastbound					KAPUNAKEA ST Westbound					HONOAPIILANI HWY Northbound					HONOAPIILANI HWY Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**28**	6	4	0	38	**51**	**10**	7	0	**68**	7	296	16	0	319	**3**	290	16	3	312	737
07:30 AM	21	7	**6**	0	34	33	5	**14**	0	52	3	**386**	15	0	404	2	**336**	**17**	**4**	**359**	**849**
07:45 AM	24	**9**	6	0	**39**	30	5	5	0	40	5	375	**26**	0	**406**	0	240	16	2	258	743
08:00 AM	22	5	3	0	30	27	3	3	**1**	34	**8**	296	14	0	318	2	237	13	0	252	634
Total Volume	95	27	19	0	141	141	23	29	1	194	23	1353	71	0	1447	7	1103	62	9	1181	2963
% App. Total	67.4	19.1	13.5	0		72.7	11.9	14.9	0.5		1.6	93.5	4.9	0		0.6	93.4	5.2	0.8		
PHF	.848	.750	.792	.000	.904	.691	.575	.518	.250	.713	.719	.876	.683	.000	.891	.583	.821	.912	.563	.822	.872



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File Name : AM_Honoapiilani Hwy-Keawe St
Site Code : 00000000
Start Date : 12/7/2016
Page No : 1

Groups Printed- Unshifted

	KEAWE ST Eastbound				KEAWE ST Westbound				HONOAPIILANI HWY Northbound				HONOAPIILANI HWY Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:15 AM	0	2	1	0	17	2	47	1	6	149	19	0	24	115	1	2	386
06:30 AM	2	2	9	2	7	5	56	1	2	192	24	0	33	146	3	0	484
06:45 AM	2	10	6	0	13	5	53	0	5	169	25	0	52	170	3	0	513
Total	4	14	16	2	37	12	156	2	13	510	68	0	109	431	7	2	1383
07:00 AM	1	12	6	2	20	6	68	2	6	191	36	2	84	247	3	4	690
07:15 AM	4	43	9	0	27	11	114	0	5	190	36	3	88	229	9	0	768
07:30 AM	3	21	9	0	28	12	110	3	13	288	46	2	74	301	3	3	916
07:45 AM	5	17	14	2	32	23	130	0	6	255	53	2	58	210	3	3	813
Total	13	93	38	4	107	52	422	5	30	924	171	9	304	987	18	10	3187
08:00 AM	1	15	13	2	28	14	76	1	12	235	29	2	55	200	2	0	685
Grand Total	18	122	67	8	172	78	654	8	55	1669	268	11	468	1618	27	12	5255
Apprch %	8.4	56.7	31.2	3.7	18.9	8.6	71.7	0.9	2.7	83.3	13.4	0.5	22	76.1	1.3	0.6	
Total %	0.3	2.3	1.3	0.2	3.3	1.5	12.4	0.2	1	31.8	5.1	0.2	8.9	30.8	0.5	0.2	

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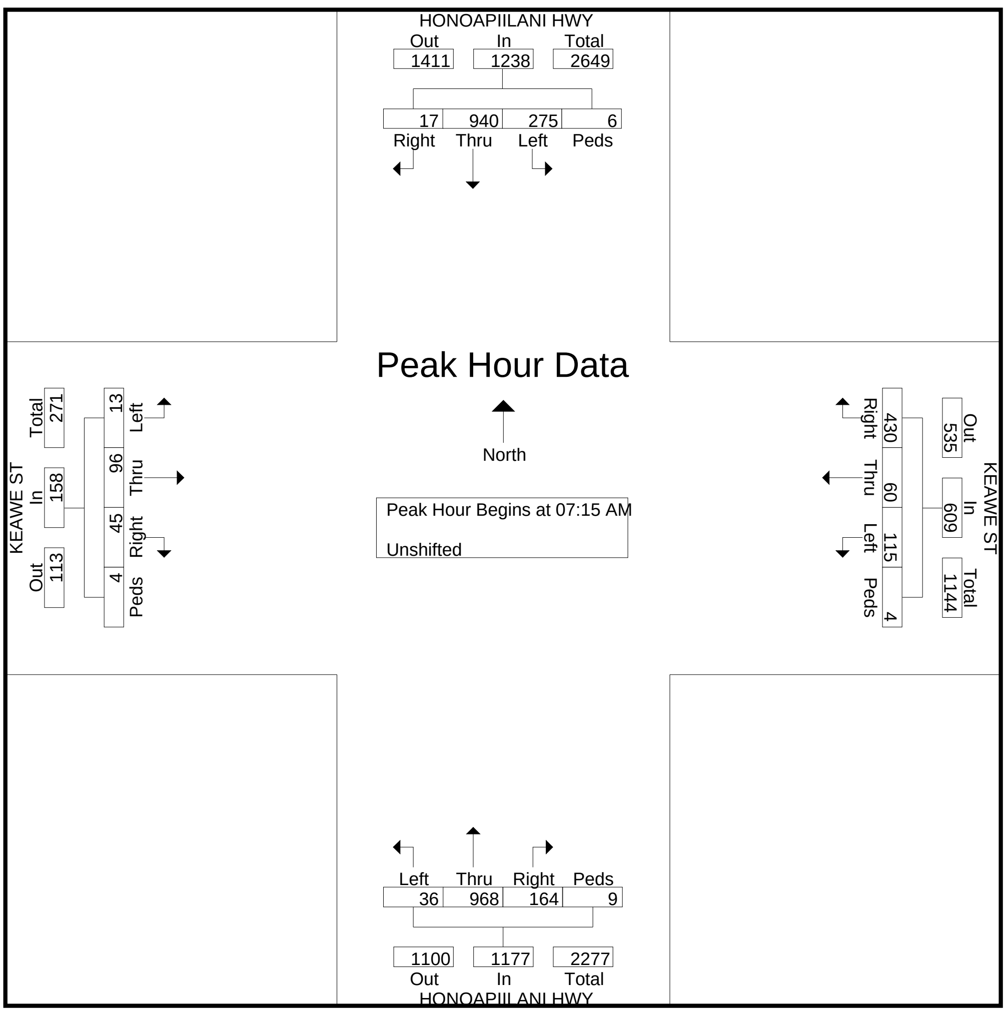
File Name : AM_Honoapiilani Hwy-Keawe St
Site Code : 00000000
Start Date : 12/7/2016

	KEAWE ST Eastbound					KEAWE ST Westbound					HONOAPIILANI HWY Northbound					HONOAPIILANI HWY Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	4	**43**	9	0	**56**	27	11	114	0	152	5	190	36	**3**	234	**88**	229	**9**	0	326	768
07:30 AM	3	21	9	0	33	28	12	110	**3**	153	**13**	**288**	46	2	**349**	74	**301**	3	**3**	**381**	**916**
07:45 AM	**5**	17	**14**	**2**	38	**32**	**23**	**130**	0	**185**	6	255	**53**	2	316	58	210	3	3	274	813
08:00 AM	1	15	13	2	31	28	14	76	1	119	12	235	29	2	278	55	200	2	0	257	685
Total Volume	13	96	45	4	158	115	60	430	4	609	36	968	164	9	1177	275	940	17	6	1238	3182
% App. Total	8.2	60.8	28.5	2.5		18.9	9.9	70.6	0.7		3.1	82.2	13.9	0.8		22.2	75.9	1.4	0.5		
PHF	.650	.558	.804	.500	.705	.898	.652	.827	.333	.823	.692	.840	.774	.750	.843	.781	.781	.472	.500	.812	.868



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File Name : PM_Honoapiilani Hwy - Napilihau St
Site Code : 00000000
Start Date : 11/30/2016

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				NAPILIHAU ST Westbound				HONOAPIILANI HWY Northbound				NAPILIHAU ST Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
03:00 PM	0	72	8	0	9	1	0	0	65	60	6	0	11	2	78	1	313
03:15 PM	1	59	14	0	8	1	0	0	75	43	3	0	6	0	54	0	264
03:30 PM	2	59	10	1	6	2	0	0	74	62	3	0	20	4	71	0	314
03:45 PM	0	56	15	0	10	5	2	0	69	48	6	0	16	3	85	0	315
Total	3	246	47	1	33	9	2	0	283	213	18	0	53	9	288	1	1206
04:00 PM	0	75	38	0	11	4	0	0	83	52	4	0	9	1	96	0	373
04:15 PM	2	68	6	0	7	3	0	0	102	58	9	0	13	2	81	0	351
04:30 PM	0	53	13	0	8	2	1	0	98	36	3	0	15	2	83	0	314
04:45 PM	5	48	24	0	10	5	4	0	108	53	5	0	18	2	83	1	366
Total	7	244	81	0	36	14	5	0	391	199	21	0	55	7	343	1	1404
Grand Total	10	490	128	1	69	23	7	0	674	412	39	0	108	16	631	2	2610
Apprch %	1.6	77.9	20.3	0.2	69.7	23.2	7.1	0	59.9	36.6	3.5	0	14.3	2.1	83.4	0.3	
Total %	0.4	18.8	4.9	0	2.6	0.9	0.3	0	25.8	15.8	1.5	0	4.1	0.6	24.2	0.1	

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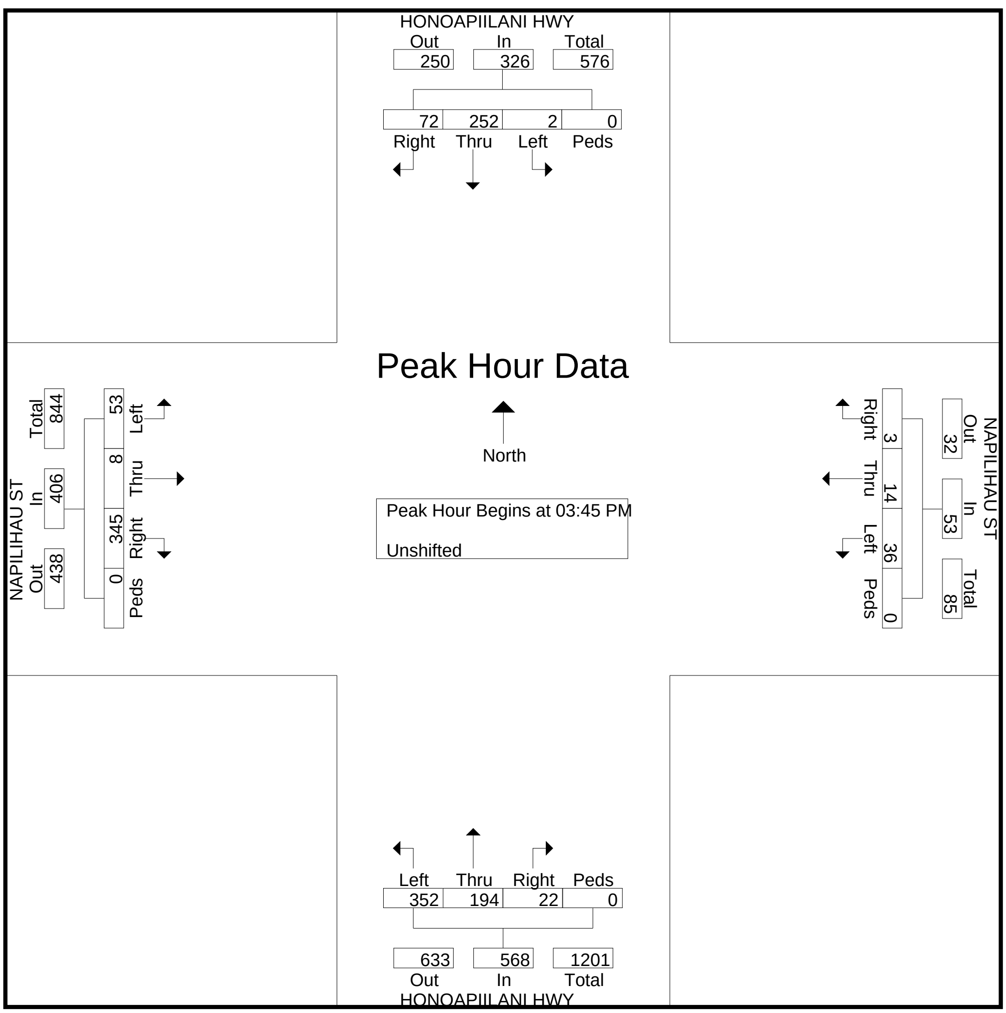
File Name : PM_Honoapiilani Hwy - Napilihau St
Site Code : 00000000
Start Date : 11/30/2016

	HONOAPIILANI HWY Southbound					NAPILIHAU ST Westbound					HONOAPIILANI HWY Northbound					NAPILIHAU ST Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	56	15	0	71	10	**5**	**2**	0	**17**	69	48	6	0	123	**16**	**3**	85	0	104	315
04:00 PM	0	**75**	**38**	0	**113**	**11**	4	0	0	15	83	52	4	0	139	9	1	**96**	0	**106**	**373**
04:15 PM	**2**	68	6	0	76	7	3	0	0	10	**102**	**58**	**9**	0	**169**	13	2	81	0	96	351
04:30 PM	0	53	13	0	66	8	2	1	0	11	98	36	3	0	137	15	2	83	0	100	314
Total Volume	2	252	72	0	326	36	14	3	0	53	352	194	22	0	568	53	8	345	0	406	1353
% App. Total	0.6	77.3	22.1	0		67.9	26.4	5.7	0		62	34.2	3.9	0		13.1	2	85	0		
PHF	.250	.840	.474	.000	.721	.818	.700	.375	.000	.779	.863	.836	.611	.000	.840	.828	.667	.898	.000	.958	.907



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File Name : PM_Honoapiilani Hwy - Hoohui Rd
Site Code : 00000000
Start Date : 11/30/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				HOOHUI RD Westbound				HONOAPIILANI HWY Northbound				HOOHUI RD Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:00 PM	3	94	15	0	9	3	1	0	32	86	7	0	7	2	26	0	285
03:15 PM	4	111	13	1	6	3	1	0	35	109	12	0	13	6	41	1	356
03:30 PM	2	125	18	1	9	2	2	1	41	122	15	0	16	5	38	0	397
03:45 PM	4	120	22	0	12	7	4	0	52	131	7	0	17	4	31	0	411
Total	13	450	68	2	36	15	8	1	160	448	41	0	53	17	136	1	1449
04:00 PM	6	143	20	0	5	1	0	0	46	112	10	0	14	4	37	0	398
04:15 PM	7	103	14	0	10	1	2	0	41	133	11	0	24	7	27	0	380
04:30 PM	4	130	19	0	14	5	1	4	40	117	12	0	13	3	40	0	402
04:45 PM	8	109	16	1	4	4	3	0	58	125	6	0	18	5	36	0	393
Total	25	485	69	1	33	11	6	4	185	487	39	0	69	19	140	0	1573
Grand Total	38	935	137	3	69	26	14	5	345	935	80	0	122	36	276	1	3022
Apprch %	3.4	84	12.3	0.3	60.5	22.8	12.3	4.4	25.4	68.8	5.9	0	28	8.3	63.4	0.2	
Total %	1.3	30.9	4.5	0.1	2.3	0.9	0.5	0.2	11.4	30.9	2.6	0	4	1.2	9.1	0	

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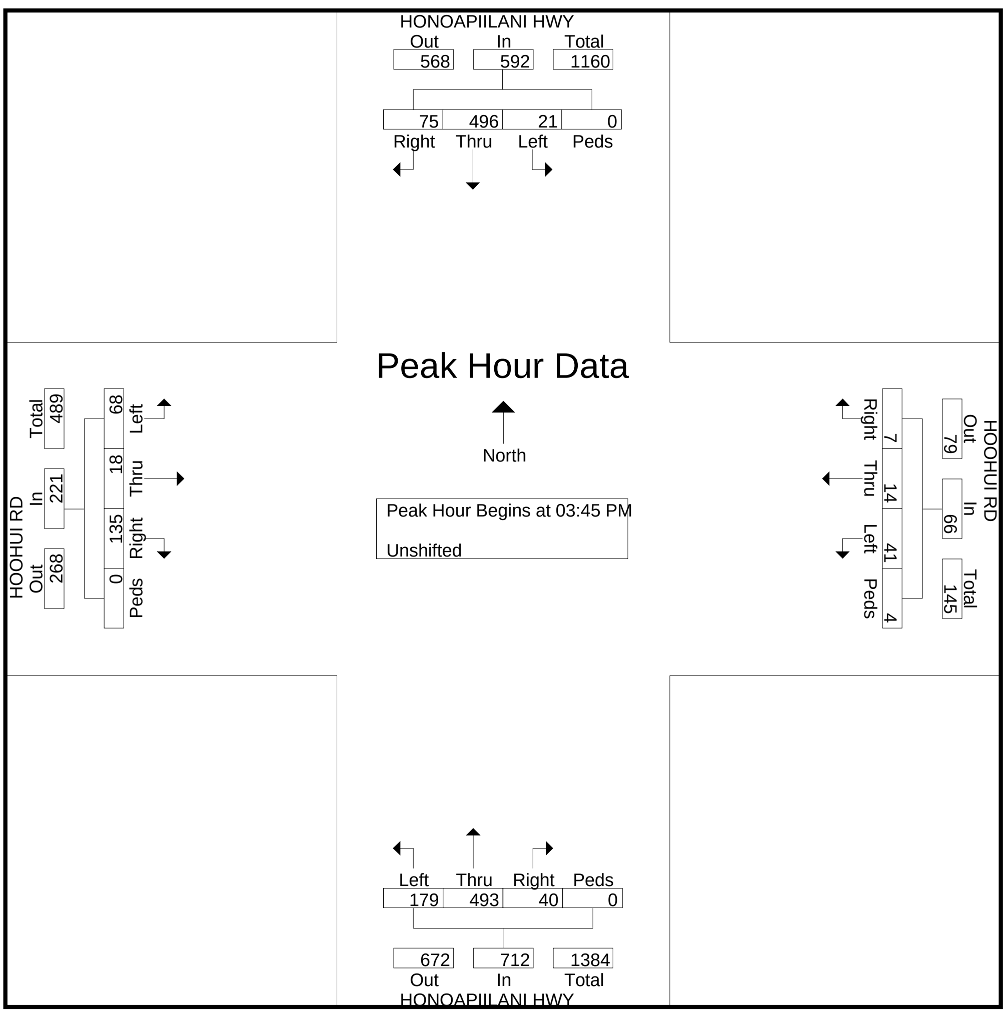
File Name : PM_Honoapiilani Hwy - Hoohui Rd
Site Code : 00000000
Start Date : 11/30/2016

	HONOAPIILANI HWY Southbound					HOOHUI RD Westbound					HONOAPIILANI HWY Northbound					HOOHUI RD Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	4	120	**22**	0	146	12	**7**	**4**	0	23	**52**	131	7	0	**190**	17	4	31	0	52	**411**
04:00 PM	6	**143**	20	0	**169**	5	1	0	0	6	46	112	10	0	168	14	4	37	0	55	398
04:15 PM	**7**	103	14	0	124	10	1	2	0	13	41	**133**	11	0	185	**24**	**7**	27	0	**58**	380
04:30 PM	4	130	19	0	153	**14**	5	1	**4**	**24**	40	117	**12**	0	169	13	3	**40**	0	56	402
Total Volume	21	496	75	0	592	41	14	7	4	66	179	493	40	0	712	68	18	135	0	221	1591
% App. Total	3.5	83.8	12.7	0		62.1	21.2	10.6	6.1		25.1	69.2	5.6	0		30.8	8.1	61.1	0		
PHF	.750	.867	.852	.000	.876	.732	.500	.438	.250	.688	.861	.927	.833	.000	.937	.708	.643	.844	.000	.953	.968



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File Name : PM_Honoapiilani Hwy - Akahele St
Site Code : 00000000
Start Date : 12/6/2016
Page No : 1

Groups Printed- Unshifted - Bank 1

	HONOAPIILANI HWY Southbound				AKAHELE ST Westbound				HONOAPIILANI HWY Northbound				AKAHELE ST Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:00 PM	1	199	22	0	2	4	1	0	33	170	2	0	7	2	15	0	458
03:15 PM	0	195	19	0	2	1	1	0	35	187	2	1	9	1	19	1	473
03:30 PM	1	189	19	0	7	0	2	0	35	153	3	1	24	0	21	0	455
03:45 PM	0	151	16	0	1	3	1	0	31	159	2	5	14	0	13	1	397
Total	2	734	76	0	12	8	5	0	134	669	9	7	54	3	68	2	1783
04:00 PM	1	163	25	0	2	0	3	0	52	168	2	0	6	0	19	0	441
04:15 PM	0	144	19	0	1	1	0	0	36	185	2	0	15	2	32	1	438
04:30 PM	0	179	10	1	5	1	2	0	32	191	1	2	18	1	24	0	467
04:45 PM	1	160	10	0	0	0	0	0	34	143	3	3	10	1	28	1	394
Total	2	646	64	1	8	2	5	0	154	687	8	5	49	4	103	2	1740
Grand Total	4	1380	140	1	20	10	10	0	288	1356	17	12	103	7	171	4	3523
Apprch %	0.3	90.5	9.2	0.1	50	25	25	0	17.2	81.1	1	0.7	36.1	2.5	60	1.4	
Total %	0.1	39.2	4	0	0.6	0.3	0.3	0	8.2	38.5	0.5	0.3	2.9	0.2	4.9	0.1	
Unshifted	4	1380	140	1	20	10	10	0	288	1356	17	12	103	7	171	4	3523
% Unshifted	100	100	100	100	100	100	100	0	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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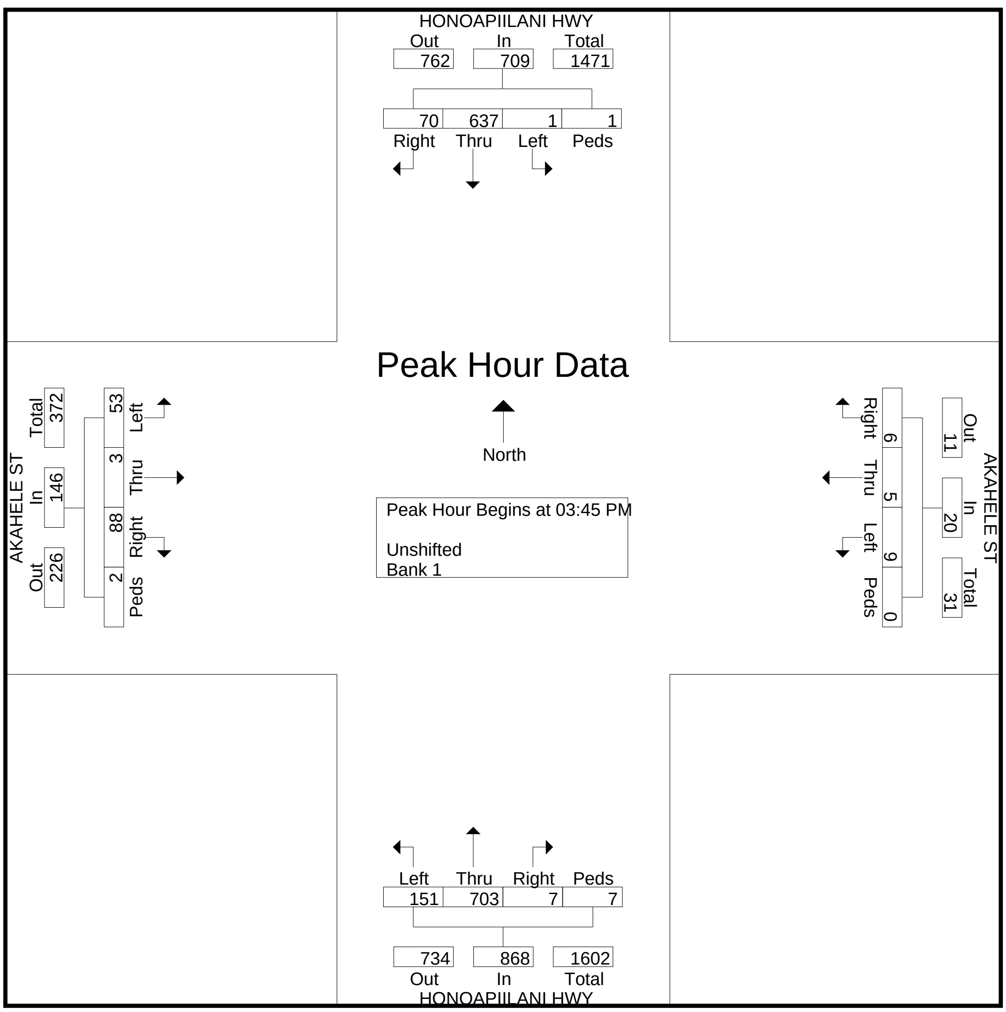
File Name : PM_Honoapiilani Hwy - Akahele St
Site Code : 00000000
Start Date : 12/6/2016
Page No : 2

	HONOAPIILANI HWY Southbound					AKAHELE ST Westbound					HONOAPIILANI HWY Northbound					AKAHELE ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	151	16	0	167	1	**3**	1	0	5	31	159	**2**	**5**	197	14	0	13	**1**	28	397
04:00 PM	**1**	163	**25**	0	189	2	0	**3**	0	5	**52**	168	2	0	222	6	0	19	0	25	441
04:15 PM	0	144	19	0	163	1	1	0	0	2	36	185	2	0	223	15	**2**	**32**	1	**50**	438
04:30 PM	0	**179**	10	**1**	**190**	**5**	1	2	0	**8**	32	**191**	1	2	**226**	**18**	1	24	0	43	**467**
Total Volume	1	637	70	1	709	9	5	6	0	20	151	703	7	7	868	53	3	88	2	146	1743
% App. Total	0.1	89.8	9.9	0.1		45	25	30	0		17.4	81	0.8	0.8		36.3	2.1	60.3	1.4		
PHF	.250	.890	.700	.250	.933	.450	.417	.500	.000	.625	.726	.920	.875	.350	.960	.736	.375	.688	.500	.730	.933



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File Name : PM_Honoapiilani Hwy - Lower Honoapiilani Rd
Site Code : 00000000
Start Date : 12/6/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				LOWER HONOAPIILANI R Westbound				HONOAPIILANI HWY Northbound				LOWER HONOAPIILANI R Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:00 PM	0	223	18	1	17	3	1	1	105	181	2	0	13	4	154	3	726
03:15 PM	1	62	0	0	29	1	1	0	130	187	7	0	12	1	137	0	568
03:30 PM	1	159	4	0	107	3	0	0	158	170	6	0	13	3	192	0	816
03:45 PM	0	157	0	0	36	1	2	0	166	187	0	0	5	2	88	0	644
Total	2	601	22	1	189	8	4	1	559	725	15	0	43	10	571	3	2754
04:00 PM	0	171	0	1	19	2	1	0	102	211	1	0	29	0	168	0	705
04:15 PM	1	187	0	0	12	6	1	2	152	181	3	0	14	0	127	0	686
04:30 PM	0	193	16	0	8	1	3	0	128	178	2	0	22	2	163	0	716
04:45 PM	0	122	17	0	8	2	4	0	135	172	3	0	14	0	137	3	617
Total	1	673	33	1	47	11	9	2	517	742	9	0	79	2	595	3	2724
Grand Total	3	1274	55	2	236	19	13	3	1076	1467	24	0	122	12	1166	6	5478
Apprch %	0.2	95.5	4.1	0.1	87.1	7	4.8	1.1	41.9	57.1	0.9	0	9.3	0.9	89.3	0.5	
Total %	0.1	23.3	1	0	4.3	0.3	0.2	0.1	19.6	26.8	0.4	0	2.2	0.2	21.3	0.1	

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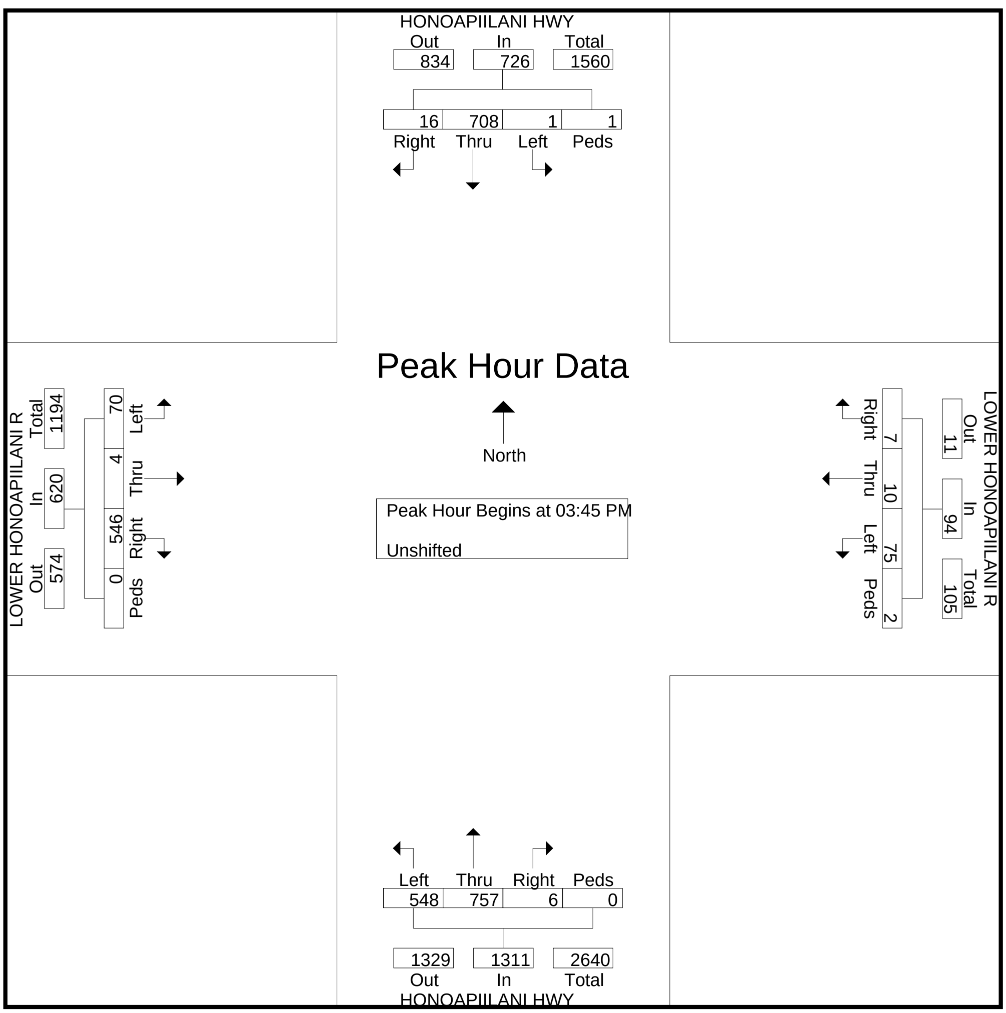
File Name : PM_Honoapiilani Hwy - Lower Honoapiilani Rd
Site Code : 00000000
Start Date : 12/6/2016

	HONOAPIILANI HWY Southbound					LOWER HONOAPIILANI R Westbound					HONOAPIILANI HWY Northbound					LOWER HONOAPIILANI R Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	157	0	0	157	**36**	1	2	0	**39**	**166**	187	0	0	**353**	5	**2**	88	0	95	644
04:00 PM	0	171	0	**1**	172	19	2	1	0	22	102	**211**	1	0	314	**29**	0	**168**	0	**197**	705
04:15 PM	**1**	187	0	0	188	12	**6**	1	**2**	21	152	181	**3**	0	336	14	0	127	0	141	686
04:30 PM	0	**193**	**16**	0	**209**	8	1	**3**	0	12	128	178	2	0	308	22	2	163	0	187	**716**
Total Volume	1	708	16	1	726	75	10	7	2	94	548	757	6	0	1311	70	4	546	0	620	2751
% App. Total	0.1	97.5	2.2	0.1		79.8	10.6	7.4	2.1		41.8	57.7	0.5	0		11.3	0.6	88.1	0		
PHF	.250	.917	.250	.250	.868	.521	.417	.583	.250	.603	.825	.897	.500	.000	.928	.603	.500	.813	.000	.787	.961



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File Name : PM_Honoapiilani Hwy - Halawai Dr
Site Code : 00000000
Start Date : 12/6/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				HALAWAI DR Westbound				HONOAPIILANI HWY Northbound				HALAWAI DR Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
03:00 PM	3	355	20	14	2	0	1	1	26	281	2	0	6	3	13	0	727
03:15 PM	2	322	25	23	5	1	2	0	15	319	1	0	18	2	13	0	748
03:30 PM	4	401	24	10	7	1	4	2	14	285	1	0	16	1	19	0	789
03:45 PM	1	315	7	5	5	0	1	3	17	319	0	0	4	1	16	0	694
Total	10	1393	76	52	19	2	8	6	72	1204	4	0	44	7	61	0	2958
04:00 PM	5	345	8	2	4	0	1	1	15	319	4	0	7	0	11	0	722
04:15 PM	2	317	12	4	1	0	1	1	16	324	4	0	6	0	9	0	697
04:30 PM	0	355	6	4	4	0	1	2	20	310	2	0	3	0	27	0	734
04:45 PM	4	303	7	10	5	0	3	0	10	285	4	0	7	0	21	0	659
Total	11	1320	33	20	14	0	6	4	61	1238	14	0	23	0	68	0	2812
Grand Total	21	2713	109	72	33	2	14	10	133	2442	18	0	67	7	129	0	5770
Apprch %	0.7	93.1	3.7	2.5	55.9	3.4	23.7	16.9	5.1	94.2	0.7	0	33	3.4	63.5	0	
Total %	0.4	47	1.9	1.2	0.6	0	0.2	0.2	2.3	42.3	0.3	0	1.2	0.1	2.2	0	

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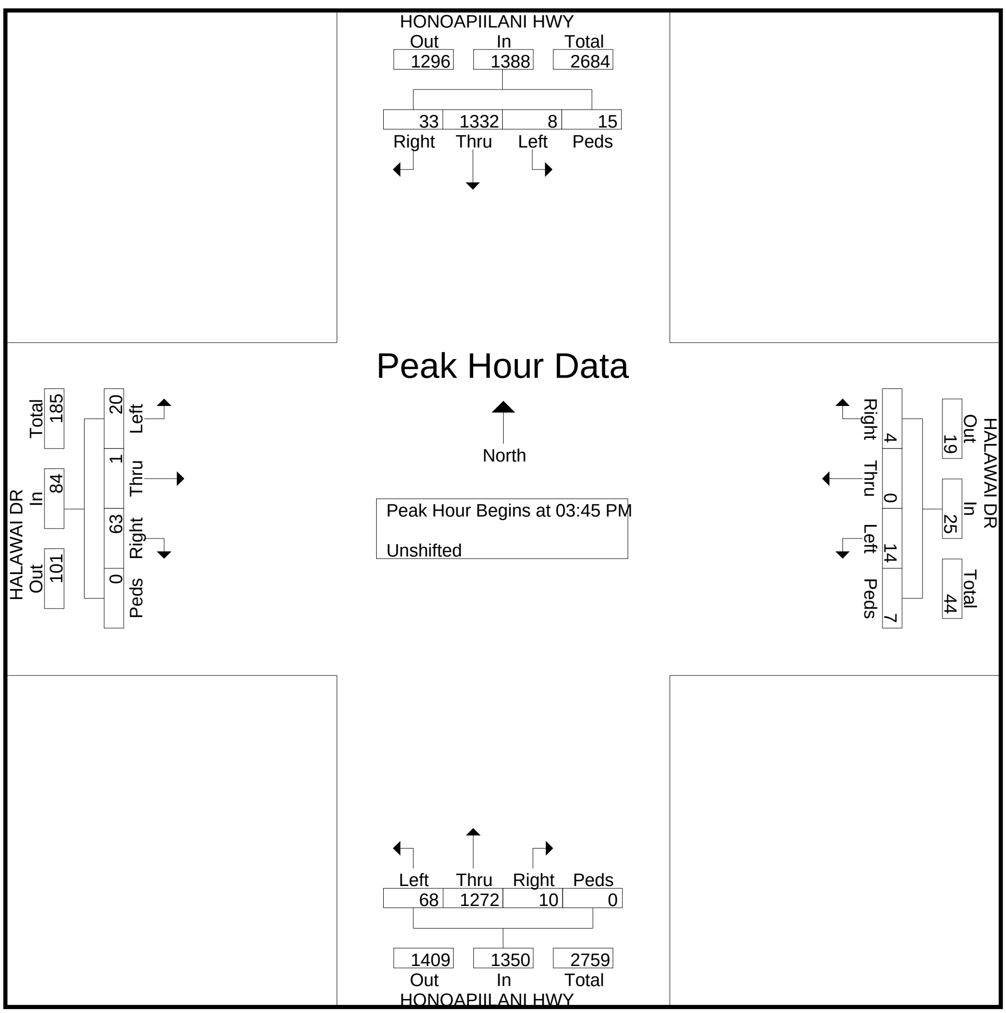
File Name : PM_Honoapiilani Hwy - Halawai Dr
Site Code : 00000000
Start Date : 12/6/2016

	HONOAPIILANI HWY Southbound					HALAWAI DR Westbound					HONOAPIILANI HWY Northbound					HALAWAI DR Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	1	315	7	**5**	328	**5**	0	**1**	**3**	**9**	17	319	0	0	336	4	**1**	16	0	21	694
04:00 PM	**5**	345	8	2	360	4	0	1	1	6	15	319	**4**	0	338	**7**	0	11	0	18	722
04:15 PM	2	317	**12**	4	335	1	0	1	1	3	16	**324**	4	0	**344**	6	0	9	0	15	697
04:30 PM	0	**355**	6	4	**365**	4	0	1	2	7	**20**	310	2	0	332	3	0	**27**	0	**30**	**734**
Total Volume	8	1332	33	15	1388	14	0	4	7	25	68	1272	10	0	1350	20	1	63	0	84	2847
% App. Total	0.6	96	2.4	1.1		56	0	16	28		5	94.2	0.7	0		23.8	1.2	75	0		
PHF	.400	.938	.688	.750	.951	.700	.000	1.00	.583	.694	.850	.981	.625	.000	.981	.714	.250	.583	.000	.700	.970



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File Name : PM_Honoapiilani Hwy - Puukolii Rd
Site Code : 00000000
Start Date : 12/6/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				PUUKOLII RD Westbound				HONOAPIILANI HWY Northbound				PUUKOLII RD Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
03:00 PM	9	340	11	0	7	2	6	0	25	285	16	0	18	2	40	0	761
03:15 PM	13	360	12	0	8	1	8	0	22	308	17	0	12	0	22	0	783
03:30 PM	9	412	16	0	16	0	5	0	24	275	18	0	22	0	26	0	823
03:45 PM	10	332	15	1	18	1	9	0	28	298	13	0	16	1	22	0	764
Total	41	1444	54	1	49	4	28	0	99	1166	64	0	68	3	110	0	3131
04:00 PM	8	312	23	3	17	2	12	1	23	301	14	0	14	1	50	0	781
04:15 PM	9	338	12	0	16	0	11	0	36	323	16	0	15	2	46	0	824
04:30 PM	2	343	33	2	12	1	8	0	34	286	12	0	19	1	46	0	799
04:45 PM	5	296	13	0	8	1	6	1	16	255	4	0	22	2	24	0	653
Total	24	1289	81	5	53	4	37	2	109	1165	46	0	70	6	166	0	3057
Grand Total	65	2733	135	6	102	8	65	2	208	2331	110	0	138	9	276	0	6188
Apprch %	2.2	93	4.6	0.2	57.6	4.5	36.7	1.1	7.9	88	4.2	0	32.6	2.1	65.2	0	
Total %	1.1	44.2	2.2	0.1	1.6	0.1	1.1	0	3.4	37.7	1.8	0	2.2	0.1	4.5	0	

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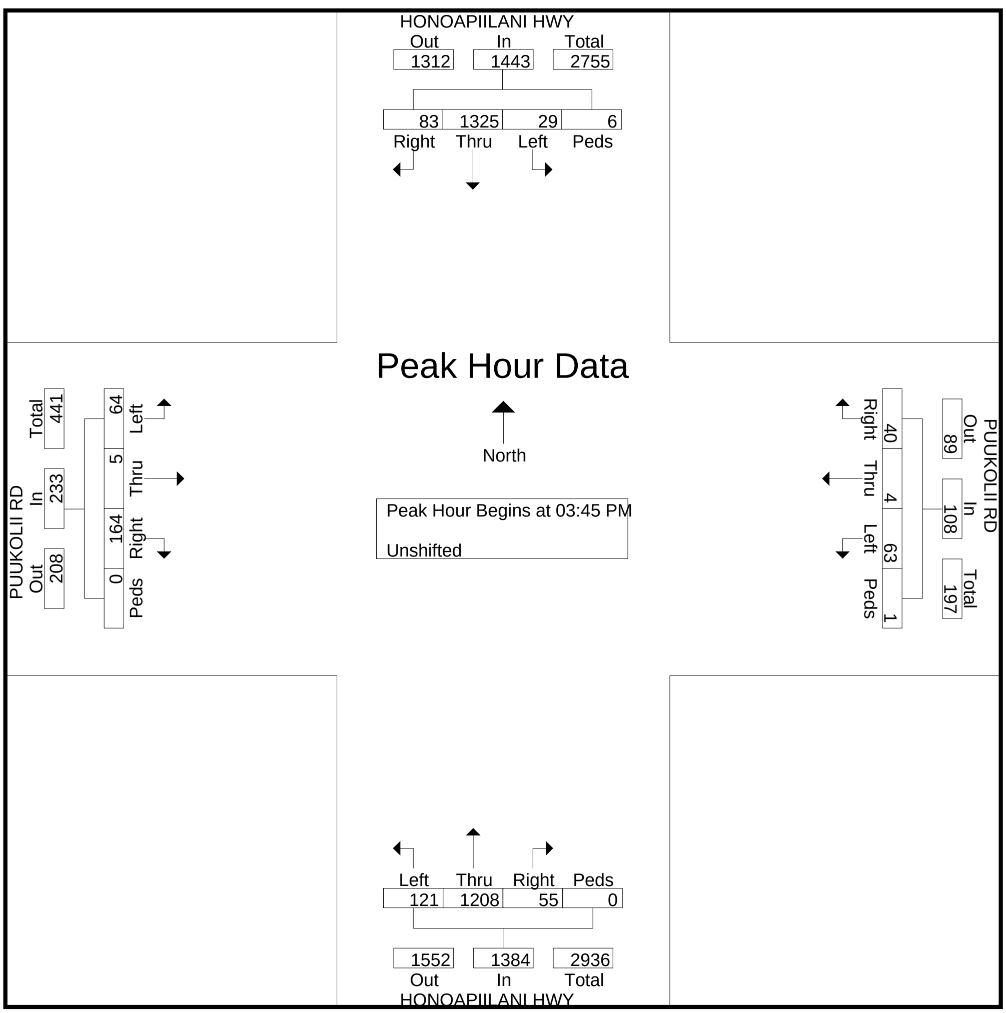
File Name : PM_Honoapiilani Hwy - Puukolii Rd
Site Code : 00000000
Start Date : 12/6/2016

	HONOAPIILANI HWY Southbound					PUUKOLII RD Westbound					HONOAPIILANI HWY Northbound					PUUKOLII RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	**10**	332	15	1	358	**18**	1	9	0	28	28	298	13	0	339	16	1	22	0	39	764
04:00 PM	8	312	23	**3**	346	17	**2**	**12**	**1**	**32**	23	301	14	0	338	14	1	**50**	0	65	781
04:15 PM	9	338	12	0	359	16	0	11	0	27	**36**	**323**	**16**	0	**375**	15	**2**	46	0	63	**824**
04:30 PM	2	**343**	**33**	2	**380**	12	1	8	0	21	34	286	12	0	332	**19**	1	46	0	**66**	799
Total Volume	29	1325	83	6	1443	63	4	40	1	108	121	1208	55	0	1384	64	5	164	0	233	3168
% App. Total	2	91.8	5.8	0.4		58.3	3.7	37	0.9		8.7	87.3	4	0		27.5	2.1	70.4	0		
PHF	.725	.966	.629	.500	.949	.875	.500	.833	.250	.844	.840	.935	.859	.000	.923	.842	.625	.820	.000	.883	.961



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File Name : PM_Honoapiilani Hwy - Kaanapali Pkwy
Site Code : 00000000
Start Date : 12/6/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				KAANAPALI PKWY Westbound				HONOAPIILANI HWY Northbound				KAANAPALI PKWY Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
03:00 PM	7	323	37	0	3	1	2	0	102	268	2	0	26	23	98	0	892
03:15 PM	6	321	15	0	4	0	2	1	137	351	2	0	68	1	121	0	1029
03:30 PM	7	363	32	0	5	2	1	0	95	264	3	0	51	0	115	0	938
03:45 PM	15	331	34	3	6	0	1	3	100	340	1	0	55	2	107	0	998
Total	35	1338	118	3	18	3	6	4	434	1223	8	0	200	26	441	0	3857
04:00 PM	15	364	32	0	1	0	1	0	101	302	2	0	71	0	185	0	1074
04:15 PM	12	345	34	1	4	0	1	1	86	316	1	0	72	0	169	0	1042
04:30 PM	6	376	20	0	2	0	1	0	87	282	2	0	67	0	136	0	979
04:45 PM	8	322	30	0	3	0	3	0	80	243	3	0	50	0	115	0	857
Total	41	1407	116	1	10	0	6	1	354	1143	8	0	260	0	605	0	3952
Grand Total	76	2745	234	4	28	3	12	5	788	2366	16	0	460	26	1046	0	7809
Apprch %	2.5	89.7	7.6	0.1	58.3	6.2	25	10.4	24.9	74.6	0.5	0	30	1.7	68.3	0	
Total %	1	35.2	3	0.1	0.4	0	0.2	0.1	10.1	30.3	0.2	0	5.9	0.3	13.4	0	

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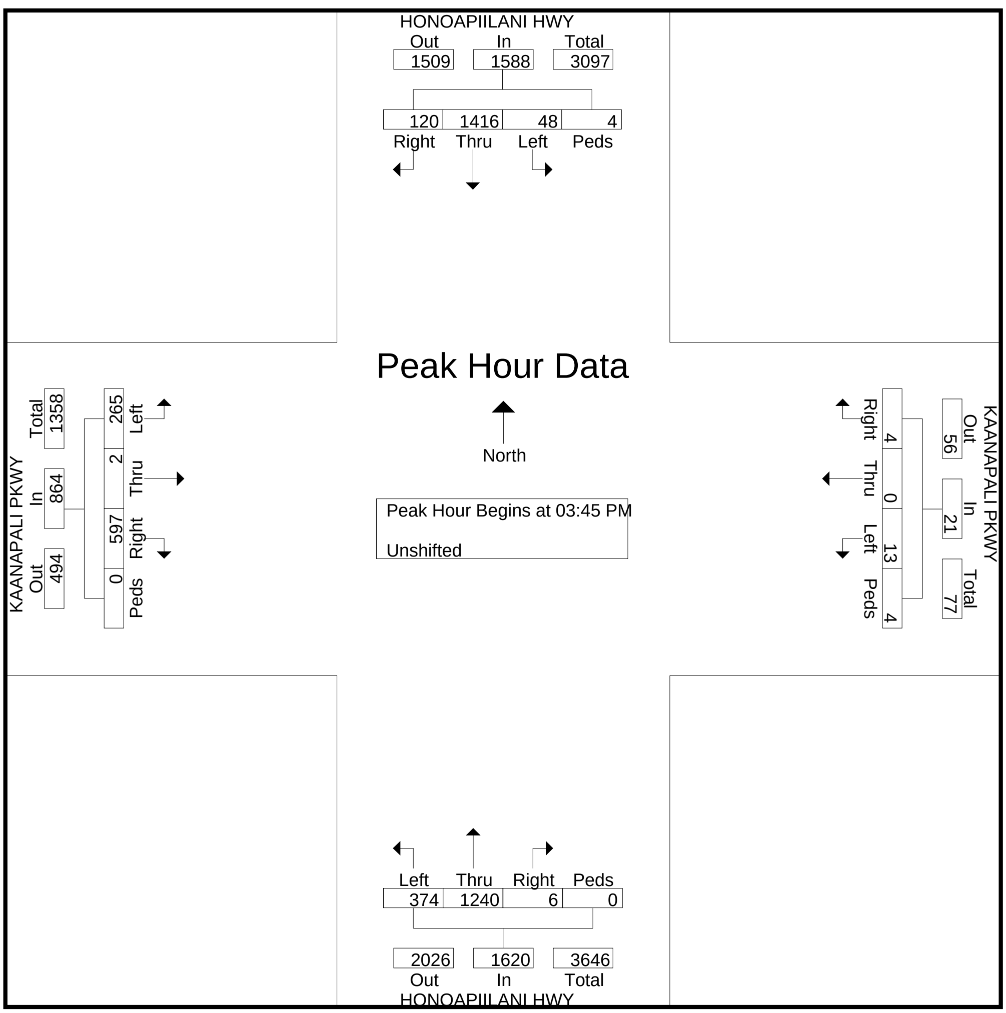
File Name : PM_Honoapiilani Hwy - Kaanapali Pkwy
Site Code : 00000000
Start Date : 12/6/2016
Page No : 2

	HONOAPIILANI HWY Southbound					KAANAPALI PKWY Westbound					HONOAPIILANI HWY Northbound					KAANAPALI PKWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	**15**	331	**34**	**3**	383	**6**	0	**1**	**3**	**10**	100	**340**	1	0	**441**	55	**2**	107	0	164	998
04:00 PM	15	364	32	0	**411**	1	0	1	0	2	**101**	302	**2**	0	405	71	0	**185**	0	**256**	**1074**
04:15 PM	12	345	34	1	392	4	0	1	1	6	86	316	1	0	403	**72**	0	169	0	241	1042
04:30 PM	6	**376**	20	0	402	2	0	1	0	3	87	282	2	0	371	67	0	136	0	203	979
Total Volume	48	1416	120	4	1588	13	0	4	4	21	374	1240	6	0	1620	265	2	597	0	864	4093
% App. Total	3	89.2	7.6	0.3		61.9	0	19	19		23.1	76.5	0.4	0		30.7	0.2	69.1	0		
PHF	.800	.941	.882	.333	.966	.542	.000	1.00	.333	.525	.926	.912	.750	.000	.918	.920	.250	.807	.000	.844	.953



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File Name : PM_Honoapiilani Hwy - Leialii Pkwy
Site Code : 00000000
Start Date : 12/6/2016

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				LEIALII PKWY Westbound				HONOAPIILANI HWY Northbound				LEIALII PKWY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:00 PM	23	429	2	1	19	0	13	1	2	401	27	0	1	0	1	0	920
03:15 PM	16	425	3	3	31	0	20	3	0	378	24	0	2	0	2	0	907
03:30 PM	22	483	0	1	29	0	13	1	0	387	23	0	0	0	0	0	959
03:45 PM	15	441	2	0	20	0	14	0	2	420	21	0	2	0	0	0	937
Total	76	1778	7	5	99	0	60	5	4	1586	95	0	5	0	3	0	3723
04:00 PM	23	490	1	0	20	0	18	0	2	414	22	0	3	0	1	0	994
04:15 PM	22	521	1	0	22	1	7	0	4	355	24	0	0	0	2	0	959
04:30 PM	17	501	0	0	23	1	14	0	1	374	21	0	2	0	1	0	955
04:45 PM	15	435	0	1	20	0	10	1	1	327	20	0	2	0	2	0	834
Total	77	1947	2	1	85	2	49	1	8	1470	87	0	7	0	6	0	3742
Grand Total	153	3725	9	6	184	2	109	6	12	3056	182	0	12	0	9	0	7465
Apprch %	3.9	95.7	0.2	0.2	61.1	0.7	36.2	2	0.4	94	5.6	0	57.1	0	42.9	0	
Total %	2	49.9	0.1	0.1	2.5	0	1.5	0.1	0.2	40.9	2.4	0	0.2	0	0.1	0	

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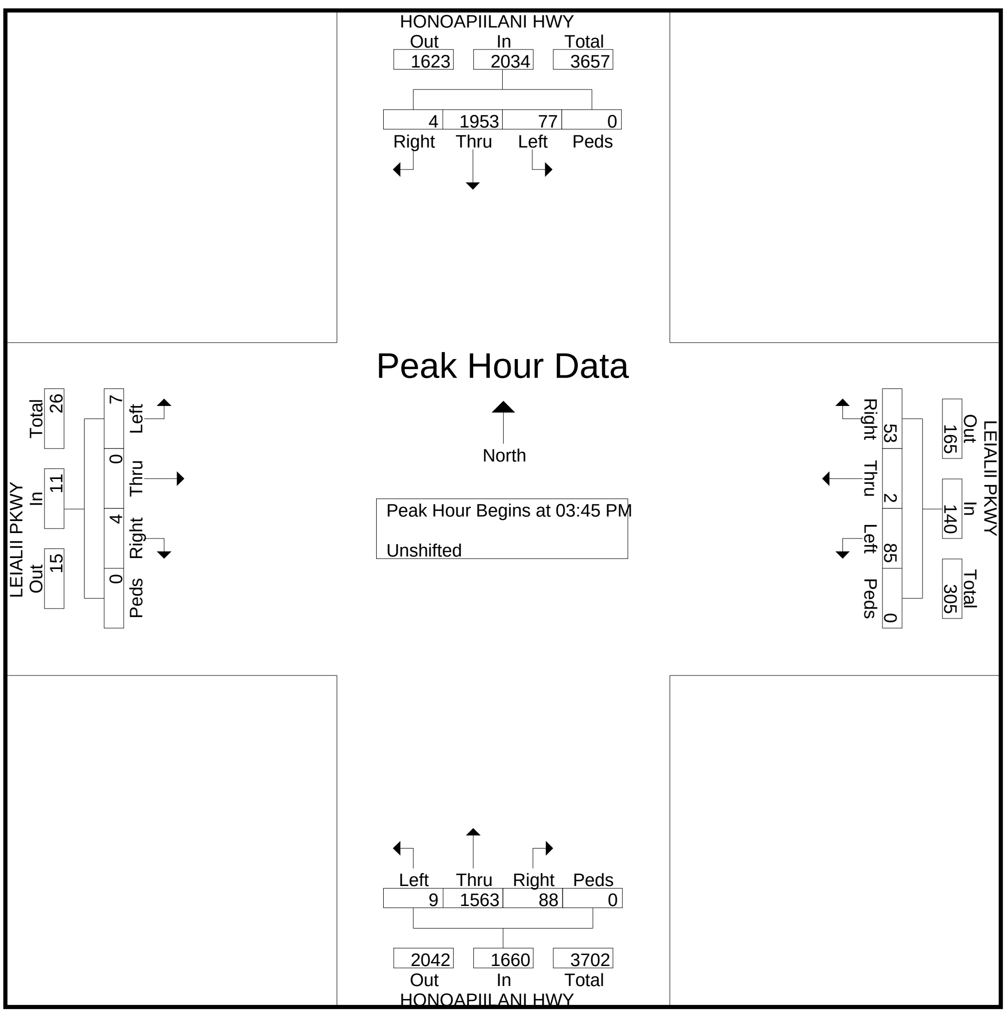
File Name : PM_Honoapiilani Hwy - Leialii Pkwy
Site Code : 00000000
Start Date : 12/6/2016

	HONOAPIILANI HWY Southbound					LEIALII PKWY Westbound					HONOAPIILANI HWY Northbound					LEIALII PKWY Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	15	441	**2**	0	458	20	0	14	0	34	2	**420**	21	0	**443**	2	0	0	0	2	937
04:00 PM	**23**	490	1	0	514	20	0	**18**	0	**38**	2	414	22	0	438	**3**	0	1	0	**4**	**994**
04:15 PM	22	**521**	1	0	**544**	22	**1**	7	0	30	**4**	355	**24**	0	383	0	0	**2**	0	2	959
04:30 PM	17	501	0	0	518	**23**	1	14	0	38	1	374	21	0	396	2	0	1	0	3	955
Total Volume	77	1953	4	0	2034	85	2	53	0	140	9	1563	88	0	1660	7	0	4	0	11	3845
% App. Total	3.8	96	0.2	0		60.7	1.4	37.9	0		0.5	94.2	5.3	0		63.6	0	36.4	0		
PHF	.837	.937	.500	.000	.935	.924	.500	.736	.000	.921	.563	.930	.917	.000	.937	.583	.000	.500	.000	.688	.967



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File Name : PM_Honoapiilani Hwy - Front St
Site Code : 00000000
Start Date : 12/6/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				FRONT ST Westbound				HONOAPIILANI HWY Northbound				FRONT ST Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:00 PM	0	340	58	0	27	2	1	0	0	381	7	0	51	1	0	0	868
03:15 PM	1	371	56	0	14	2	1	0	3	395	3	0	32	1	2	0	881
03:30 PM	2	412	51	0	18	3	1	0	1	394	2	0	47	2	1	0	934
03:45 PM	0	388	74	0	9	1	1	0	2	368	3	0	43	5	4	0	898
Total	3	1511	239	0	68	8	4	0	6	1538	15	0	173	9	7	0	3581
04:00 PM	1	391	62	0	7	1	0	0	0	428	5	0	37	1	3	0	936
04:15 PM	0	450	76	0	24	1	2	0	0	363	5	0	44	3	1	0	969
04:30 PM	1	417	81	0	19	2	4	1	3	345	7	0	36	2	0	0	918
04:45 PM	2	353	86	0	15	3	3	0	7	324	5	0	27	0	0	0	825
Total	4	1611	305	0	65	7	9	1	10	1460	22	0	144	6	4	0	3648
Grand Total	7	3122	544	0	133	15	13	1	16	2998	37	0	317	15	11	0	7229
Apprch %	0.2	85	14.8	0	82.1	9.3	8	0.6	0.5	98.3	1.2	0	92.4	4.4	3.2	0	
Total %	0.1	43.2	7.5	0	1.8	0.2	0.2	0	0.2	41.5	0.5	0	4.4	0.2	0.2	0	

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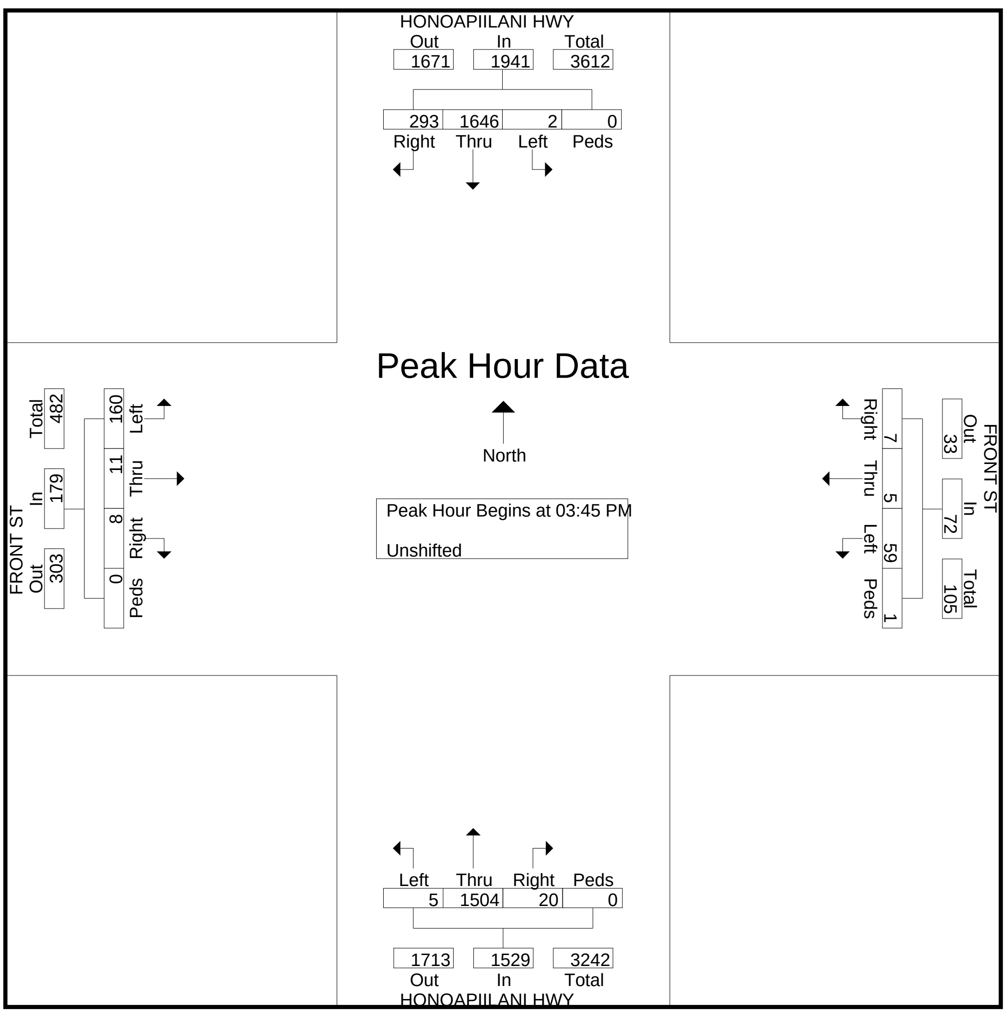
File Name : PM_Honoapiilani Hwy - Front St
Site Code : 00000000
Start Date : 12/6/2016
Page No : 2

	HONOAPIILANI HWY Southbound					FRONT ST Westbound					HONOAPIILANI HWY Northbound					FRONT ST Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	388	74	0	462	9	1	1	0	11	2	368	3	0	373	43	**5**	**4**	0	**52**	898
04:00 PM	**1**	391	62	0	454	7	1	0	0	8	0	**428**	5	0	**433**	37	1	3	0	41	936
04:15 PM	0	**450**	76	0	**526**	**24**	1	2	0	**27**	0	363	5	0	368	**44**	3	1	0	48	**969**
04:30 PM	1	417	**81**	0	499	19	**2**	**4**	**1**	26	**3**	345	**7**	0	355	36	2	0	0	38	918
Total Volume	2	1646	293	0	1941	59	5	7	1	72	5	1504	20	0	1529	160	11	8	0	179	3721
% App. Total	0.1	84.8	15.1	0		81.9	6.9	9.7	1.4		0.3	98.4	1.3	0		89.4	6.1	4.5	0		
PHF	.500	.914	.904	.000	.923	.615	.625	.438	.250	.667	.417	.879	.714	.000	.883	.909	.550	.500	.000	.861	.960



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File Name : PM_Honoapiilani Hwy-Kapunakea St
Site Code : 00000000
Start Date : 12/6/2016
Page No : 1

Groups Printed- Unshifted

	KAPUNAKEA ST Eastbound				KAPUNAKEA ST Westbound				HONOAPIILANI HWY Northbound				HONOAPIILANI HWY Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:00 PM	44	7	12	0	30	6	5	0	8	351	27	0	1	358	24	5	878
03:15 PM	35	9	13	1	21	4	3	0	10	334	25	0	6	404	18	2	885
03:30 PM	37	4	15	1	32	6	2	0	12	345	28	0	3	354	36	5	880
03:45 PM	28	8	9	1	21	8	6	0	16	361	28	0	3	405	29	0	923
Total	144	28	49	3	104	24	16	0	46	1391	108	0	13	1521	107	12	3566
04:00 PM	36	12	10	0	26	3	3	1	8	357	26	0	7	357	29	3	878
04:15 PM	36	8	11	1	17	5	2	1	13	313	16	0	9	398	39	8	877
04:30 PM	38	7	14	2	27	7	6	0	14	321	33	0	4	436	39	5	953
04:45 PM	31	4	11	0	25	8	1	0	13	312	21	0	4	361	34	0	825
Total	141	31	46	3	95	23	12	2	48	1303	96	0	24	1552	141	16	3533
Grand Total	285	59	95	6	199	47	28	2	94	2694	204	0	37	3073	248	28	7099
Apprch %	64	13.3	21.3	1.3	72.1	17	10.1	0.7	3.1	90	6.8	0	1.1	90.8	7.3	0.8	
Total %	4	0.8	1.3	0.1	2.8	0.7	0.4	0	1.3	37.9	2.9	0	0.5	43.3	3.5	0.4	

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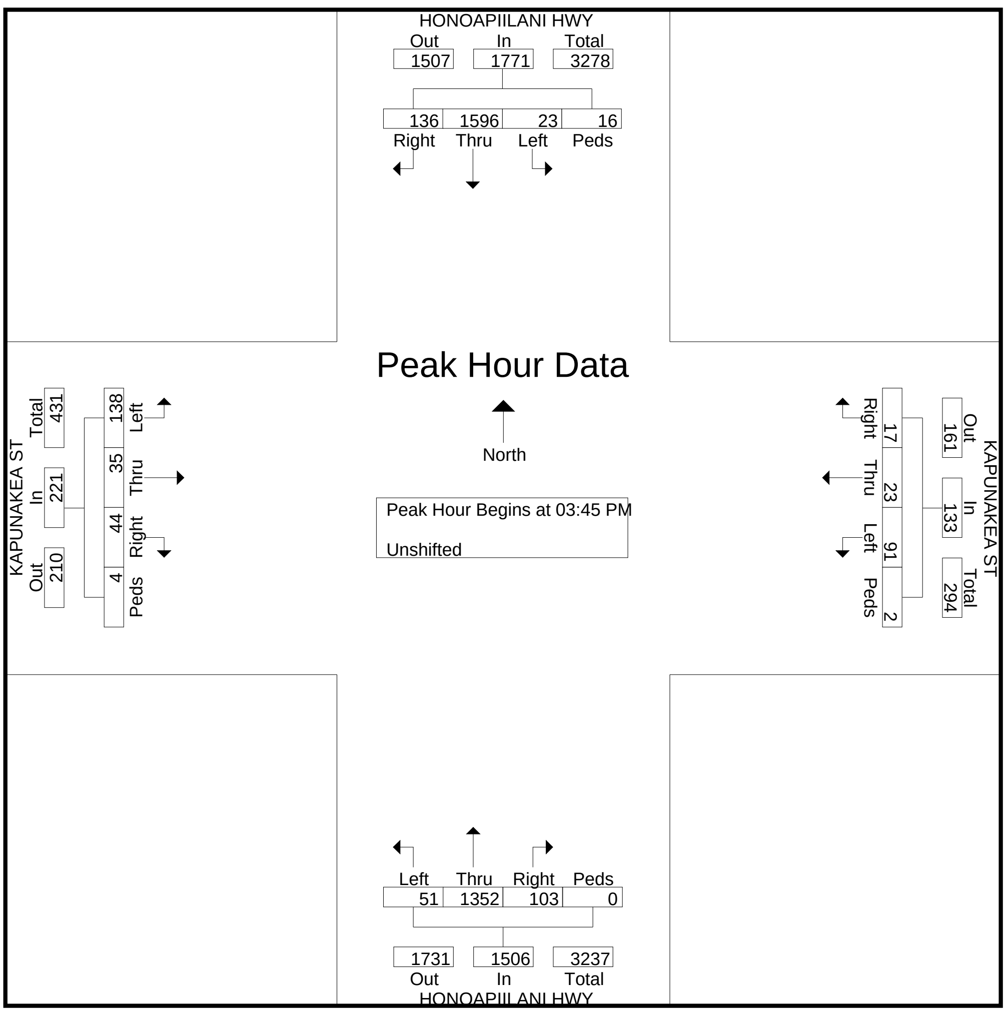
File Name : PM_Honoapiilani Hwy-Kapunakea St
Site Code : 00000000
Start Date : 12/6/2016

	KAPUNAKEA ST Eastbound					KAPUNAKEA ST Westbound					HONOAPIILANI HWY Northbound					HONOAPIILANI HWY Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	28	8	9	1	46	21	**8**	**6**	0	35	**16**	**361**	28	0	**405**	3	405	29	0	437	923
04:00 PM	36	**12**	10	0	58	26	3	3	**1**	33	8	357	26	0	391	7	357	29	3	396	878
04:15 PM	36	8	11	1	56	17	5	2	1	25	13	313	16	0	342	**9**	398	**39**	**8**	454	877
04:30 PM	**38**	7	**14**	**2**	**61**	**27**	7	6	0	**40**	14	321	**33**	0	368	4	**436**	39	5	**484**	**953**
Total Volume	138	35	44	4	221	91	23	17	2	133	51	1352	103	0	1506	23	1596	136	16	1771	3631
% App. Total	62.4	15.8	19.9	1.8		68.4	17.3	12.8	1.5		3.4	89.8	6.8	0		1.3	90.1	7.7	0.9		
PHF	.908	.729	.786	.500	.906	.843	.719	.708	.500	.831	.797	.936	.780	.000	.930	.639	.915	.872	.500	.915	.953



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File Name : PM_Honoapiilani Hwy-Keawe St
Site Code : 00000000
Start Date : 12/6/2016
Page No : 1

Groups Printed- Unshifted

	KEAWE ST Eastbound				KEAWE ST Westbound				HONOAPIILANI HWY Northbound				HONOAPIILANI HWY Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:00 PM	10	26	19	1	37	22	116	2	20	251	55	5	77	279	11	1	932
03:15 PM	21	34	21	1	41	17	108	4	22	222	48	3	94	285	15	4	940
03:30 PM	19	34	26	3	39	20	112	1	23	261	58	1	88	282	16	11	994
03:45 PM	9	39	13	1	49	18	90	1	19	301	60	1	107	329	10	1	1048
Total	59	133	79	6	166	77	426	8	84	1035	221	10	366	1175	52	17	3914
04:00 PM	17	47	27	3	41	19	122	0	22	263	61	2	94	271	17	2	1008
04:15 PM	14	42	15	5	33	23	102	3	17	244	80	6	85	309	11	8	997
04:30 PM	14	32	25	1	39	25	106	2	18	240	53	3	95	329	20	7	1009
04:45 PM	6	17	11	0	22	11	55	1	16	137	43	2	61	184	11	0	577
Total	51	138	78	9	135	78	385	6	73	884	237	13	335	1093	59	17	3591
Grand Total	110	271	157	15	301	155	811	14	157	1919	458	23	701	2268	111	34	7505
Apprch %	19.9	49	28.4	2.7	23.5	12.1	63.3	1.1	6.1	75	17.9	0.9	22.5	72.8	3.6	1.1	
Total %	1.5	3.6	2.1	0.2	4	2.1	10.8	0.2	2.1	25.6	6.1	0.3	9.3	30.2	1.5	0.5	

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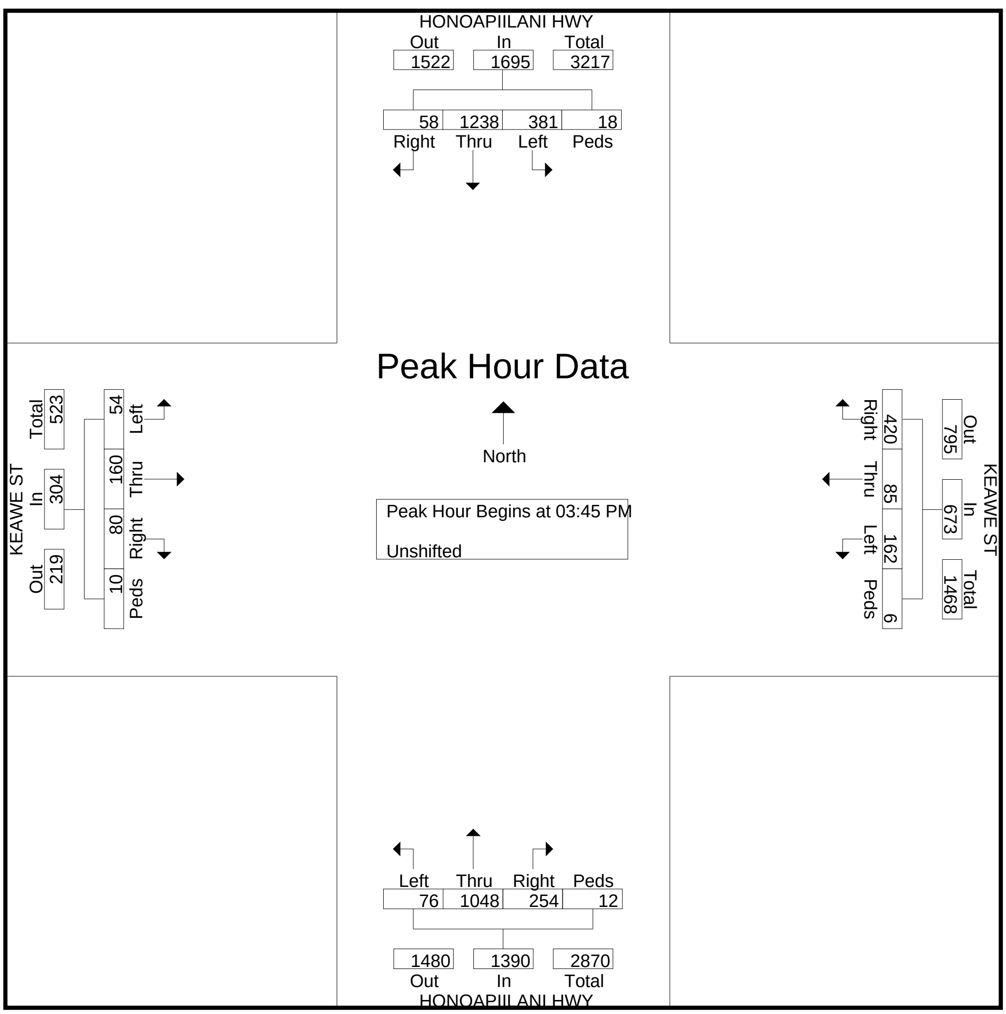
File Name : PM_Honoapiilani Hwy-Keawe St
Site Code : 00000000
Start Date : 12/6/2016

	KEAWE ST Eastbound					KEAWE ST Westbound					HONOAPIILANI HWY Northbound					HONOAPIILANI HWY Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	9	39	13	1	62	**49**	18	90	1	158	19	**301**	60	1	**381**	**107**	**329**	10	1	447	**1048**
04:00 PM	**17**	**47**	**27**	3	**94**	41	19	**122**	0	**182**	**22**	263	61	2	348	94	271	17	2	384	1008
04:15 PM	14	42	15	**5**	76	33	23	102	**3**	161	17	244	**80**	**6**	347	85	309	11	**8**	413	997
04:30 PM	14	32	25	1	72	39	**25**	106	2	172	18	240	53	3	314	95	329	**20**	7	**451**	1009
Total Volume	54	160	80	10	304	162	85	420	6	673	76	1048	254	12	1390	381	1238	58	18	1695	4062
% App. Total	17.8	52.6	26.3	3.3		24.1	12.6	62.4	0.9		5.5	75.4	18.3	0.9		22.5	73	3.4	1.1		
PHF	.794	.851	.741	.500	.809	.827	.850	.861	.500	.924	.864	.870	.794	.500	.912	.890	.941	.725	.563	.940	.969



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File Name : WE_Honoapiilani Hwy - Napilihau St
Site Code : 00000000
Start Date : 1/21/2017
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				NAPILIHAU ST Westbound				HONOAPIILANI HWY Northbound				NAPILIHAU ST Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
11:00 AM	5	67	13	4	10	10	1	0	60	79	14	0	18	4	88	1	374
11:15 AM	2	47	24	1	6	5	2	0	60	75	3	0	18	4	81	2	330
11:30 AM	3	55	13	1	6	9	2	0	52	79	10	0	14	9	78	0	331
11:45 AM	4	63	22	0	6	4	5	1	69	63	3	0	11	5	87	1	344
Total	14	232	72	6	28	28	10	1	241	296	30	0	61	22	334	4	1379
12:00 PM	2	60	22	2	8	6	1	1	78	72	2	0	7	5	73	0	339
12:15 PM	1	73	30	0	5	9	4	0	51	62	4	0	7	3	67	0	316
12:30 PM	0	58	19	0	4	2	1	0	59	62	4	0	13	3	71	0	296
12:45 PM	0	71	13	0	2	4	0	0	70	71	4	0	11	3	56	0	305
Total	3	262	84	2	19	21	6	1	258	267	14	0	38	14	267	0	1256
Grand Total	17	494	156	8	47	49	16	2	499	563	44	0	99	36	601	4	2635
Apprch %	2.5	73.2	23.1	1.2	41.2	43	14	1.8	45.1	50.9	4	0	13.4	4.9	81.2	0.5	
Total %	0.6	18.7	5.9	0.3	1.8	1.9	0.6	0.1	18.9	21.4	1.7	0	3.8	1.4	22.8	0.2	

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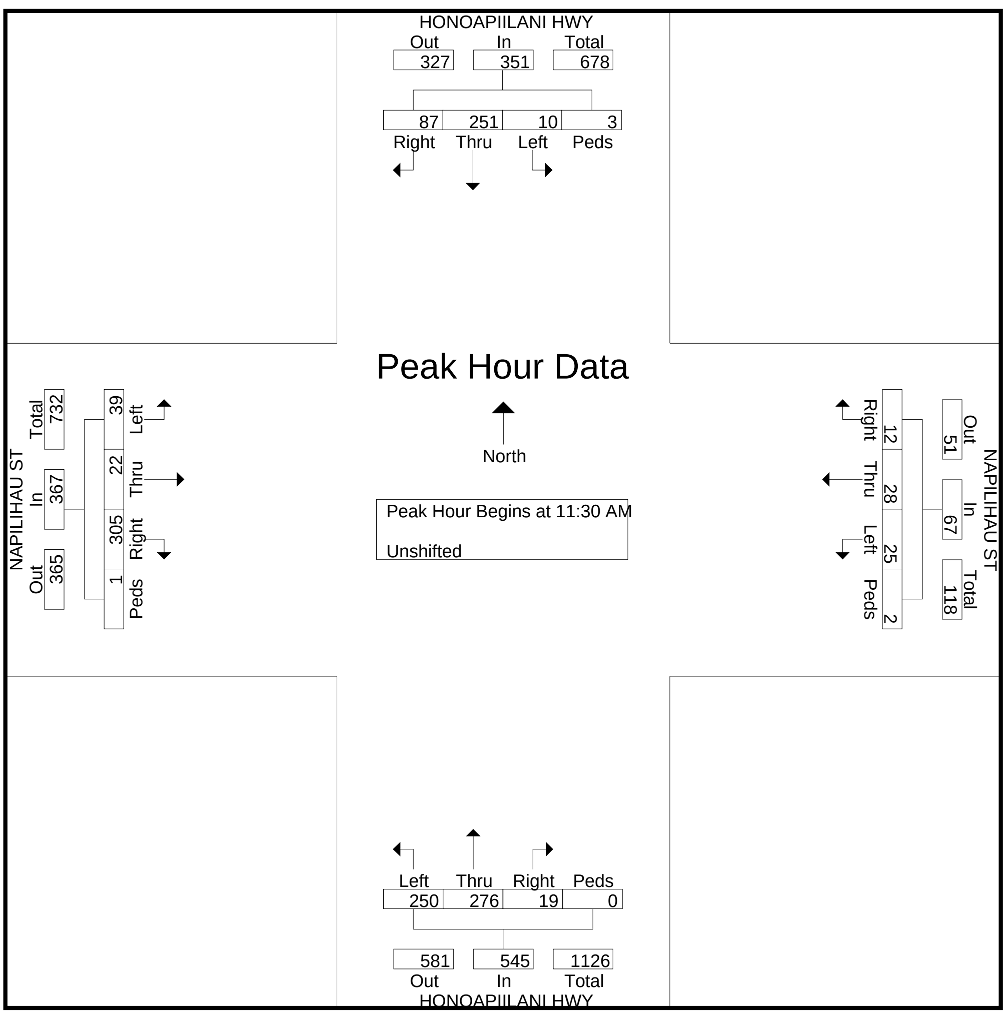
File Name : WE_Honoapiilani Hwy - Napilihau St
Site Code : 00000000
Start Date : 1/21/2017

	HONOAPIILANI HWY Southbound					NAPILIHAU ST Westbound					HONOAPIILANI HWY Northbound					NAPILIHAU ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:30 AM to 12:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:30 AM																					
11:30 AM	3	55	13	1	72	6	**9**	2	0	17	52	**79**	**10**	0	141	**14**	**9**	78	0	101	331
11:45 AM	**4**	63	22	0	89	6	4	**5**	**1**	16	69	63	3	0	135	11	5	**87**	**1**	**104**	**344**
12:00 PM	2	60	22	**2**	86	**8**	6	1	1	16	**78**	72	2	0	**152**	7	5	73	0	85	339
12:15 PM	1	**73**	**30**	0	**104**	5	9	4	0	**18**	51	62	4	0	117	7	3	67	0	77	316
Total Volume	10	251	87	3	351	25	28	12	2	67	250	276	19	0	545	39	22	305	1	367	1330
% App. Total	2.8	71.5	24.8	0.9		37.3	41.8	17.9	3		45.9	50.6	3.5	0		10.6	6	83.1	0.3		
PHF	.625	.860	.725	.375	.844	.781	.778	.600	.500	.931	.801	.873	.475	.000	.896	.696	.611	.876	.250	.882	.967



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File Name : WE_Honoapiilani Hwy - Hoohui Rd
Site Code : 00000000
Start Date : 12/10/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				HOOHUI RD Westbound				HONOAPIILANI HWY Northbound				HOOHUI RD Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
11:00 AM	2	93	13	0	9	5	2	0	18	77	6	0	8	6	35	0	274
11:15 AM	0	101	22	3	5	2	2	2	23	83	2	0	13	2	33	0	293
11:30 AM	3	111	12	3	14	4	0	2	24	80	4	0	10	1	52	0	320
11:45 AM	2	101	15	1	7	0	2	0	25	76	6	0	14	6	38	0	293
Total	7	406	62	7	35	11	6	4	90	316	18	0	45	15	158	0	1180
12:00 PM	4	103	14	0	5	7	3	0	41	108	6	0	12	5	45	0	353
12:15 PM	3	99	14	1	9	4	0	1	28	111	6	0	16	4	41	0	337
12:30 PM	3	95	20	1	7	1	2	0	25	112	6	0	15	1	33	0	321
12:45 PM	7	95	14	0	8	1	4	1	40	120	4	0	11	1	29	0	335
Total	17	392	62	2	29	13	9	2	134	451	22	0	54	11	148	0	1346
Grand Total	24	798	124	9	64	24	15	6	224	767	40	0	99	26	306	0	2526
Apprch %	2.5	83.6	13	0.9	58.7	22	13.8	5.5	21.7	74.4	3.9	0	23	6	71	0	
Total %	1	31.6	4.9	0.4	2.5	1	0.6	0.2	8.9	30.4	1.6	0	3.9	1	12.1	0	

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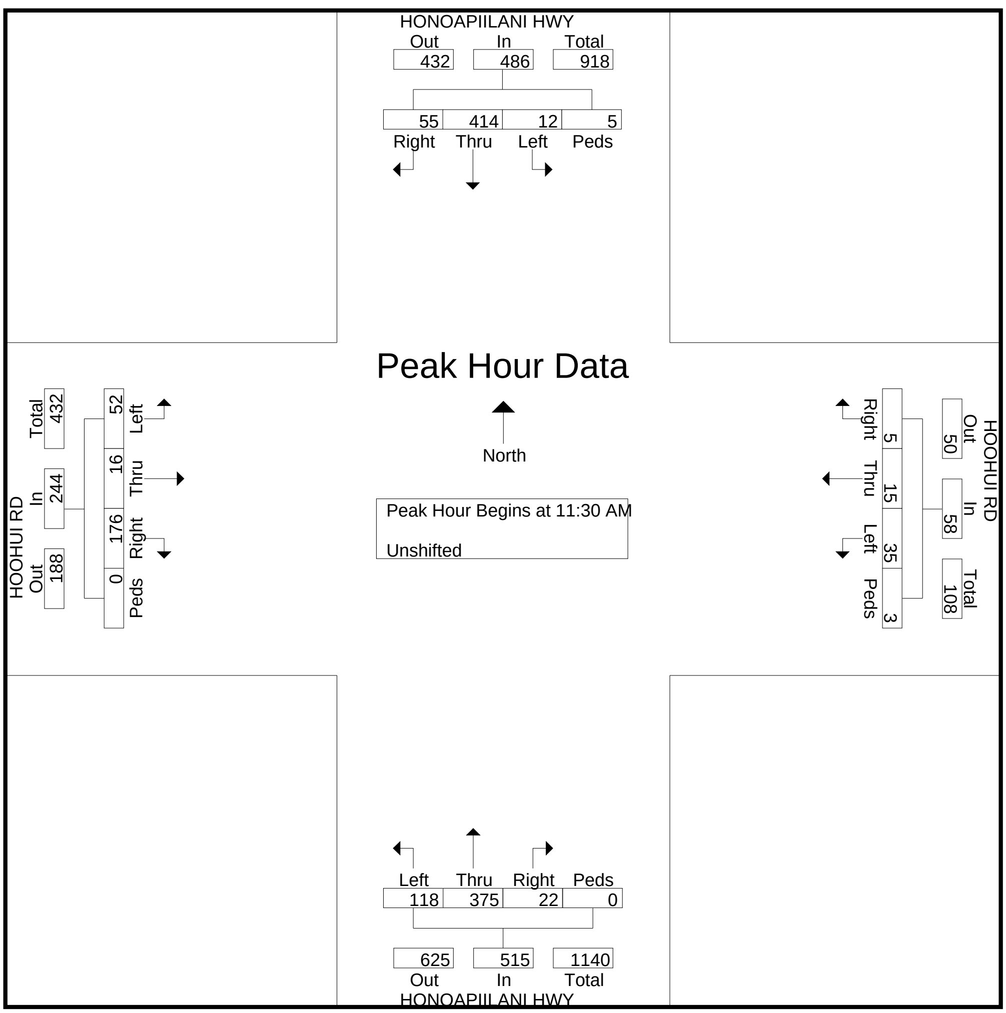
File Name : WE_Honoapiilani Hwy - Hoohui Rd
Site Code : 00000000
Start Date : 12/10/2016

	HONOAPIILANI HWY Southbound					HOOHUI RD Westbound					HONOAPIILANI HWY Northbound					HOOHUI RD Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 11:30 AM to 12:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:30 AM																					
11:30 AM	3	**111**	12	**3**	**129**	**14**	4	0	**2**	**20**	24	80	4	0	108	10	1	**52**	0	**63**	320
11:45 AM	2	101	**15**	1	119	7	0	2	0	9	25	76	**6**	0	107	14	**6**	38	0	58	293
12:00 PM	**4**	103	14	0	121	5	**7**	**3**	0	15	**41**	108	6	0	**155**	12	5	45	0	62	**353**
12:15 PM	3	99	14	1	117	9	4	0	1	14	28	**111**	6	0	145	**16**	4	41	0	61	337
Total Volume	12	414	55	5	486	35	15	5	3	58	118	375	22	0	515	52	16	176	0	244	1303
% App. Total	2.5	85.2	11.3	1		60.3	25.9	8.6	5.2		22.9	72.8	4.3	0		21.3	6.6	72.1	0		
PHF	.750	.932	.917	.417	.942	.625	.536	.417	.375	.725	.720	.845	.917	.000	.831	.813	.667	.846	.000	.968	.923



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File Name : WE_Honnoapiilani Hwy - Akahele St
Site Code : 00000000
Start Date : 12/10/2016
Page No : 1

Groups Printed- Unshifted - Bank 1

	HONOAPIILANI HWY Southbound				AKAHELE ST Westbound				HONOAPIILANI HWY Northbound				AKAHELE ST Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
11:00 AM	1	118	5	0	1	2	1	0	13	83	2	0	11	3	22	0	262
11:15 AM	1	115	15	0	4	3	0	0	12	108	2	3	5	1	18	0	287
11:30 AM	2	172	12	0	3	0	3	0	20	88	1	0	8	0	25	0	334
11:45 AM	1	130	14	0	3	0	1	0	15	95	4	3	11	2	14	0	293
Total	5	535	46	0	11	5	5	0	60	374	9	6	35	6	79	0	1176
12:00 PM	1	136	11	0	0	0	5	0	21	140	4	0	10	2	16	0	346
12:15 PM	0	143	8	0	4	2	1	0	14	139	2	0	8	1	19	1	342
12:30 PM	0	124	16	0	2	1	0	0	14	136	2	0	8	0	13	0	316
12:45 PM	2	120	10	0	1	1	5	0	16	152	1	0	8	1	14	0	331
Total	3	523	45	0	7	4	11	0	65	567	9	0	34	4	62	1	1335
Grand Total	8	1058	91	0	18	9	16	0	125	941	18	6	69	10	141	1	2511
Apprch %	0.7	91.4	7.9	0	41.9	20.9	37.2	0	11.5	86.3	1.7	0.6	31.2	4.5	63.8	0.5	
Total %	0.3	42.1	3.6	0	0.7	0.4	0.6	0	5	37.5	0.7	0.2	2.7	0.4	5.6	0	
Unshifted	8	1058	91	0	18	9	16	0	125	941	18	6	69	10	141	1	2511
% Unshifted	100	100	100	0	100	100	100	0	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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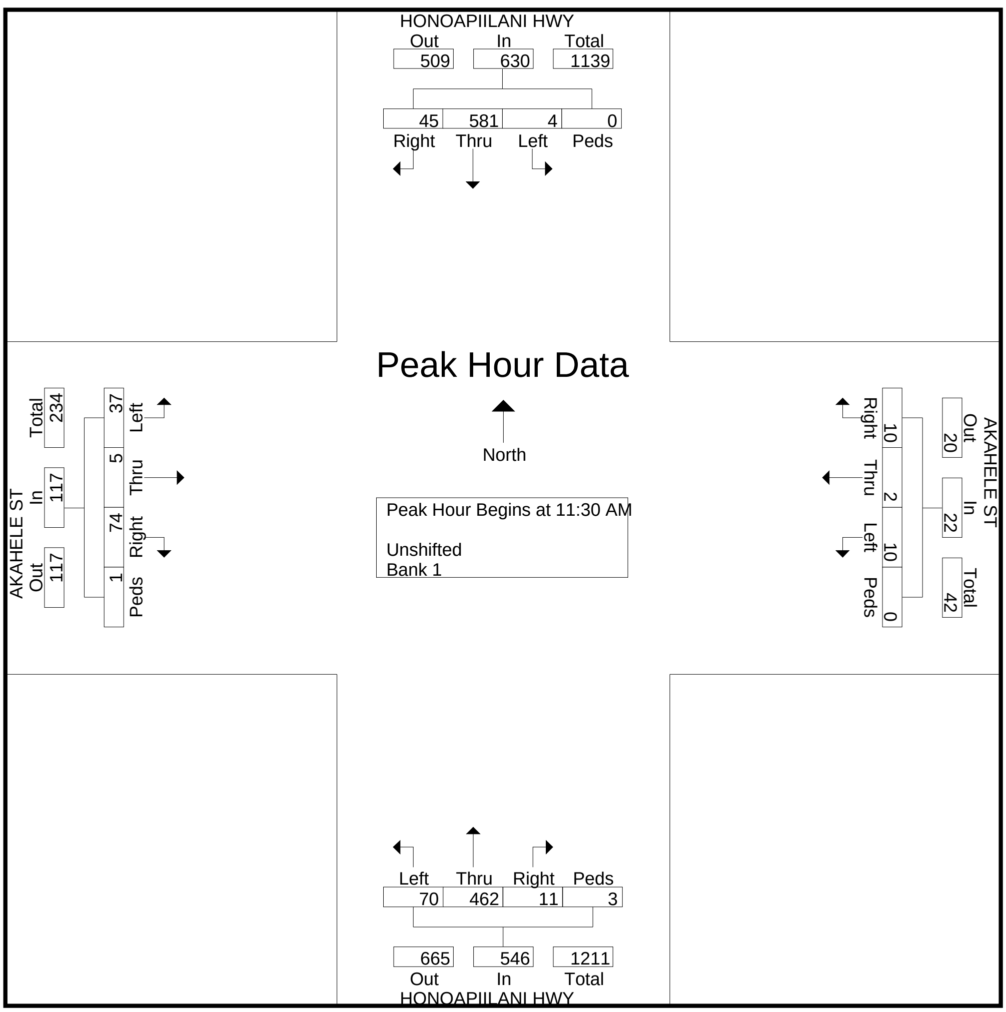
File Name : WE_Honnoapiilani Hwy - Akahele St
Site Code : 00000000
Start Date : 12/10/2016

	HONOAPIILANI HWY Southbound					AKAHELE ST Westbound					HONOAPIILANI HWY Northbound					AKAHELE ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:30 AM to 12:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:30 AM																					
11:30 AM	**2**	**172**	12	0	**186**	3	0	3	0	6	20	88	1	0	109	8	0	**25**	0	**33**	334
11:45 AM	1	130	**14**	0	145	3	0	1	0	4	15	95	**4**	**3**	117	**11**	**2**	14	0	27	293
12:00 PM	1	136	11	0	148	0	0	**5**	0	5	**21**	**140**	4	0	**165**	10	2	16	0	28	**346**
12:15 PM	0	143	8	0	151	**4**	**2**	1	0	**7**	14	139	2	0	155	8	1	19	**1**	29	342
Total Volume	4	581	45	0	630	10	2	10	0	22	70	462	11	3	546	37	5	74	1	117	1315
% App. Total	0.6	92.2	7.1	0		45.5	9.1	45.5	0		12.8	84.6	2	0.5		31.6	4.3	63.2	0.9		
PHF	.500	.844	.804	.000	.847	.625	.250	.500	.000	.786	.833	.825	.688	.250	.827	.841	.625	.740	.250	.886	.950



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File Name : WE_Honoapiilani Hwy - Lower Honoapiilani Rd
Site Code : 00000000
Start Date : 12/10/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				LOWER HONOAPIILANI Westbound				HONOAPIILANI HWY Northbound				LOWER HONOAPIILANI Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
11:00 AM	0	135	20	0	0	0	0	0	71	100	0	0	11	3	157	0	497
11:15 AM	0	118	11	0	0	0	0	0	76	112	3	0	14	24	133	0	491
11:30 AM	0	164	14	1	2	0	1	0	90	89	2	0	10	0	140	0	513
11:45 AM	0	134	11	0	2	0	0	0	83	107	2	0	14	0	128	3	484
Total	0	551	56	1	4	0	1	0	320	408	7	0	49	27	558	3	1985
12:00 PM	0	186	14	0	2	0	0	0	90	155	1	0	17	2	132	0	599
12:15 PM	0	148	8	0	3	0	0	0	93	150	0	0	7	7	136	0	552
12:30 PM	1	128	15	0	0	1	1	0	78	148	2	0	7	11	98	0	490
12:45 PM	0	123	22	0	0	2	0	0	84	149	0	0	10	2	88	0	480
Total	1	585	59	0	5	3	1	0	345	602	3	0	41	22	454	0	2121
Grand Total	1	1136	115	1	9	3	2	0	665	1010	10	0	90	49	1012	3	4106
Apprch %	0.1	90.7	9.2	0.1	64.3	21.4	14.3	0	39.5	59.9	0.6	0	7.8	4.2	87.7	0.3	
Total %	0	27.7	2.8	0	0.2	0.1	0	0	16.2	24.6	0.2	0	2.2	1.2	24.6	0.1	

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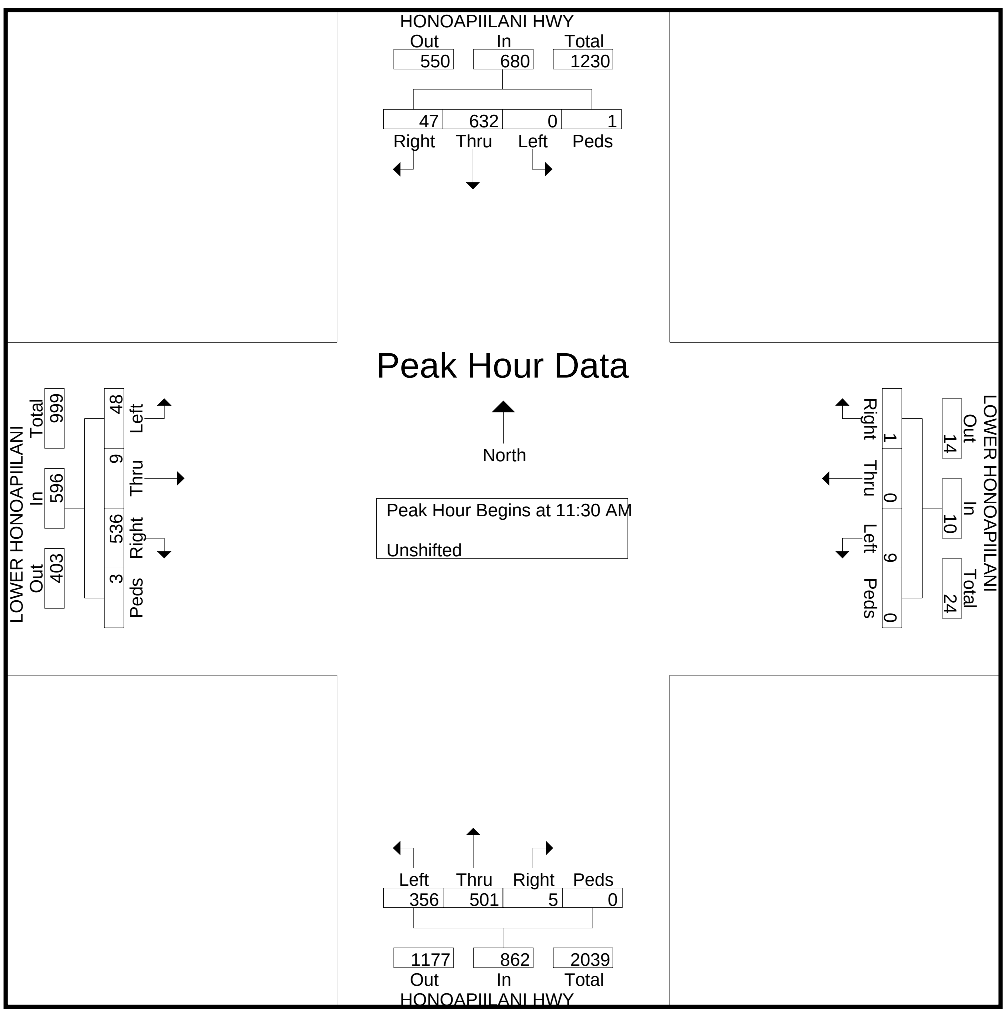
File Name : WE_Honoapiilani Hwy - Lower Honoapiilani Rd
Site Code : 00000000
Start Date : 12/10/2016
Page No : 2

	HONOAPIILANI HWY Southbound					LOWER HONOAPIILANI Westbound					HONOAPIILANI HWY Northbound					LOWER HONOAPIILANI Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:30 AM																					
11:30 AM	0	164	**14**	**1**	179	2	0	**1**	0	**3**	90	89	**2**	0	181	10	0	**140**	0	150	513
11:45 AM	0	134	11	0	145	2	0	0	0	2	83	107	2	0	192	14	0	128	**3**	145	484
12:00 PM	0	**186**	14	0	**200**	2	0	0	0	2	90	**155**	1	0	**246**	**17**	2	132	0	**151**	**599**
12:15 PM	0	148	8	0	156	**3**	0	0	0	3	**93**	150	0	0	243	7	**7**	136	0	150	552
Total Volume	0	632	47	1	680	9	0	1	0	10	356	501	5	0	862	48	9	536	3	596	2148
% App. Total	0	92.9	6.9	0.1		90	0	10	0		41.3	58.1	0.6	0		8.1	1.5	89.9	0.5		
PHF	.000	.849	.839	.250	.850	.750	.000	.250	.000	.833	.957	.808	.625	.000	.876	.706	.321	.957	.250	.987	.896



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File Name : WE_Honoapiilani Hwy - Halawai Dr
Site Code : 00000000
Start Date : 12/10/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				HALAWAI DR Westbound				HONOAPIILANI HWY Northbound				HALAWAI DR Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
11:00 AM	0	290	6	0	0	3	2	0	6	149	0	0	1	0	8	0	465
11:15 AM	0	288	4	0	1	0	0	0	3	188	1	0	2	0	10	0	497
11:30 AM	1	318	11	0	5	1	1	0	6	203	2	0	3	0	11	0	562
11:45 AM	4	266	8	2	3	1	5	0	17	191	6	0	7	2	13	0	525
Total	5	1162	29	2	9	5	8	0	32	731	9	0	13	2	42	0	2049
12:00 PM	2	259	8	4	4	0	2	0	11	219	5	0	7	0	21	3	545
12:15 PM	2	298	12	1	2	0	4	0	9	213	2	0	9	0	21	0	573
12:30 PM	2	236	4	0	6	0	4	0	10	226	6	0	4	2	12	2	514
Grand Total	11	1955	53	7	21	5	18	0	62	1389	22	0	33	4	96	5	3681
Apprch %	0.5	96.5	2.6	0.3	47.7	11.4	40.9	0	4.2	94.3	1.5	0	23.9	2.9	69.6	3.6	
Total %	0.3	53.1	1.4	0.2	0.6	0.1	0.5	0	1.7	37.7	0.6	0	0.9	0.1	2.6	0.1	

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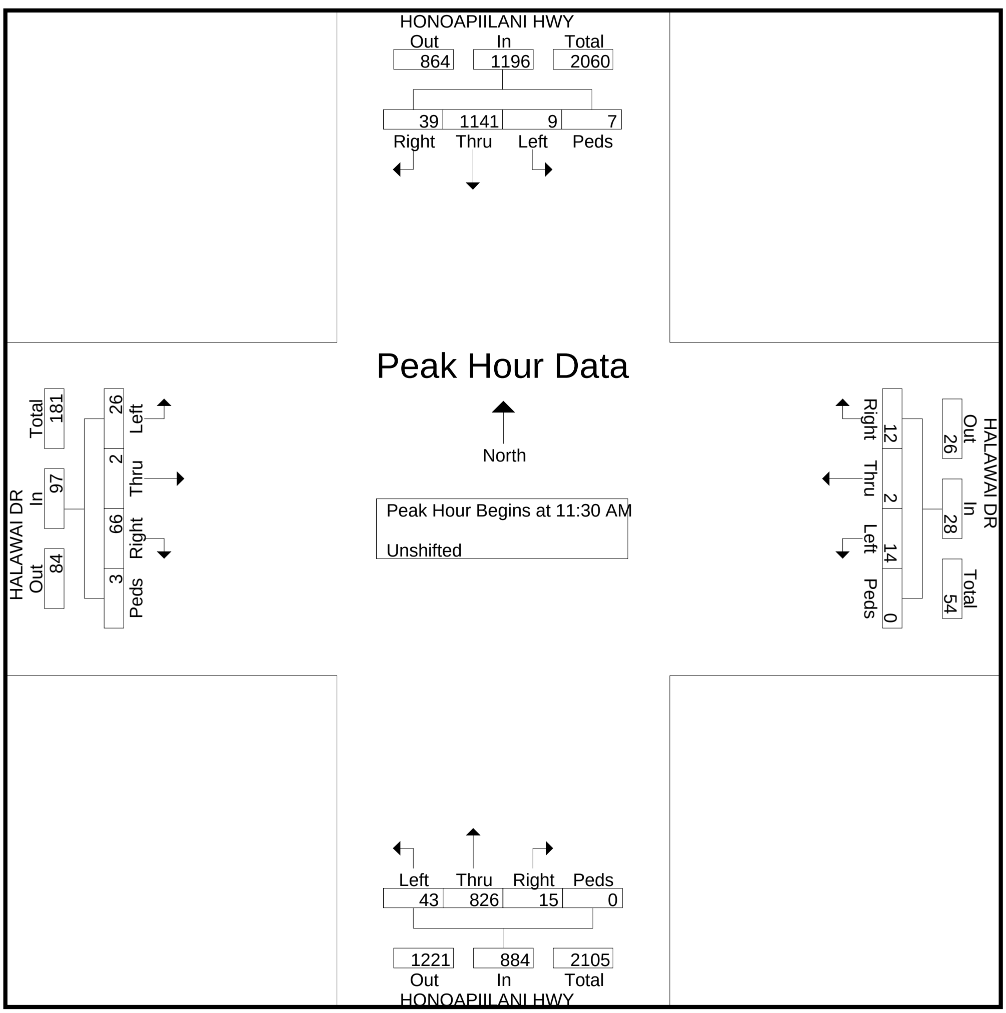
File Name : WE_Honoapiilani Hwy - Halawai Dr
Site Code : 00000000
Start Date : 12/10/2016

	HONOAPIILANI HWY Southbound					HALAWAI DR Westbound					HONOAPIILANI HWY Northbound					HALAWAI DR Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 11:00 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:30 AM																					
11:30 AM	1	**318**	11	0	**330**	**5**	**1**	1	0	7	6	203	2	0	211	3	0	11	0	14	562
11:45 AM	**4**	266	8	2	280	3	1	**5**	0	**9**	**17**	191	**6**	0	214	7	**2**	13	0	22	525
12:00 PM	2	259	8	**4**	273	4	0	2	0	6	11	**219**	5	0	**235**	7	0	**21**	**3**	**31**	545
12:15 PM	2	298	**12**	1	313	2	0	4	0	6	9	213	2	0	224	**9**	0	21	0	30	**573**
Total Volume	9	1141	39	7	1196	14	2	12	0	28	43	826	15	0	884	26	2	66	3	97	2205
% App. Total	0.8	95.4	3.3	0.6		50	7.1	42.9	0		4.9	93.4	1.7	0		26.8	2.1	68	3.1		
PHF	.563	.897	.813	.438	.906	.700	.500	.600	.000	.778	.632	.943	.625	.000	.940	.722	.250	.786	.250	.782	.962



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File Name : WE_Honoapiilani Hwy-Puukolii Rd
Site Code : 00000000
Start Date : 12/10/2016
Page No : 1

Groups Printed- Unshifted

	KAI ALA DR Eastbound				PUUKOLII RD Westbound				HONOAPIILANI HWY Northbound					HONOAPIILANI HWY Southbound					
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	U-Turn	Peds	Left	Thru	Right	U-Turn	Peds	Int. Total
11:00 AM	14	0	46	0	8	0	4	0	15	140	6	0	0	2	283	11	0	0	529
11:15 AM	10	1	47	0	10	0	11	0	21	165	11	2	0	6	257	14	1	0	556
11:30 AM	13	1	42	0	11	0	6	0	18	187	13	0	0	9	284	15	0	0	599
11:45 AM	13	1	38	0	14	1	10	0	28	173	9	0	0	5	272	18	0	0	582
Total	50	3	173	0	43	1	31	0	82	665	39	2	0	22	1096	58	1	0	2266
12:00 PM	7	0	42	0	10	1	4	0	25	216	9	0	0	7	262	14	0	0	597
12:15 PM	15	0	45	0	3	1	7	0	30	206	14	2	0	6	296	16	0	0	641
12:30 PM	9	0	41	0	9	0	6	0	36	230	12	0	0	6	251	11	0	0	611
12:45 PM	20	0	26	0	9	0	9	0	39	231	7	0	0	8	217	15	0	0	581
Total	51	0	154	0	31	2	26	0	130	883	42	2	0	27	1026	56	0	0	2430
Grand Total	101	3	327	0	74	3	57	0	212	1548	81	4	0	49	2122	114	1	0	4696
Apprch %	23.4	0.7	75.9	0	55.2	2.2	42.5	0	11.5	83.9	4.4	0.2	0	2.1	92.8	5	0	0	
Total %	2.2	0.1	7	0	1.6	0.1	1.2	0	4.5	33	1.7	0.1	0	1	45.2	2.4	0	0	

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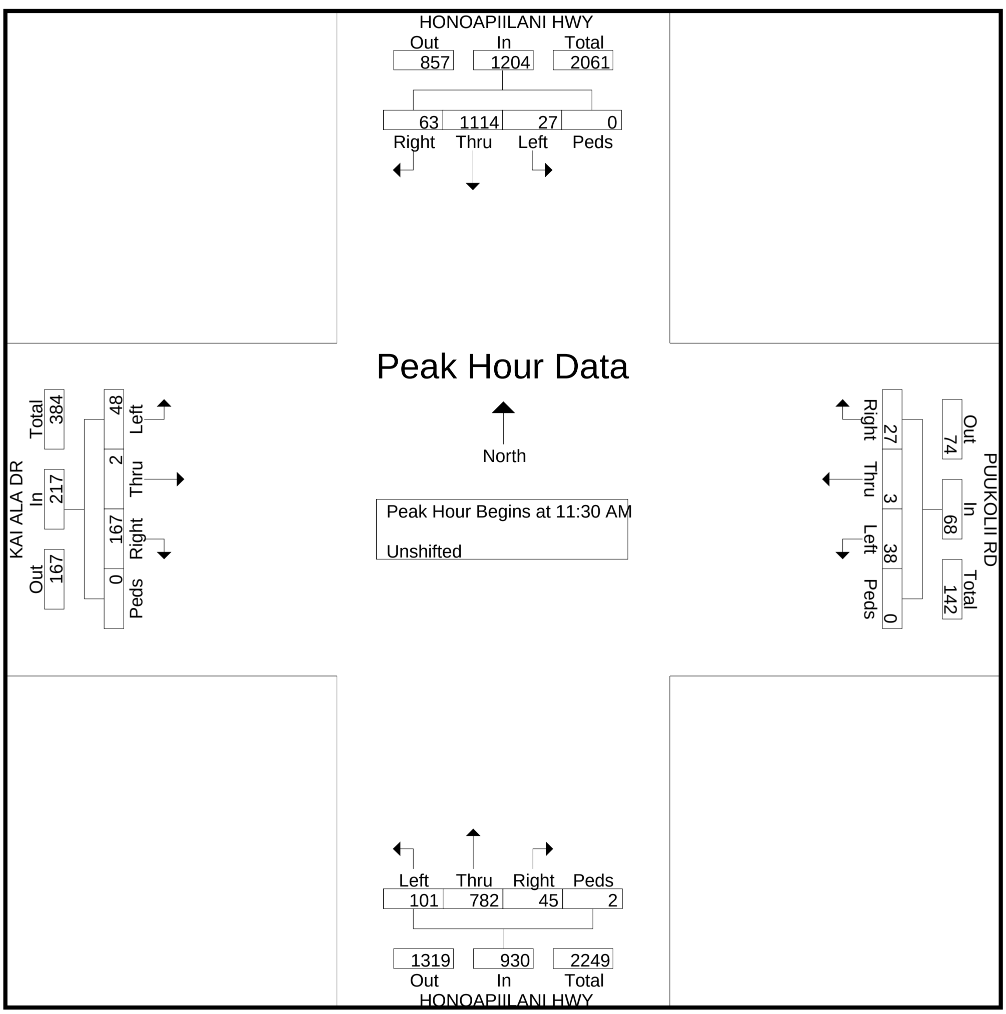
File Name : WE_Honoapiilani Hwy-Puukolii Rd
Site Code : 00000000
Start Date : 12/10/2016

	KAI ALA DR Eastbound					PUUKOLII RD Westbound					HONOAPIILANI HWY Northbound						HONOAPIILANI HWY Southbound						
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:30 AM to 12:15 PM - Peak 1 of 1																							
Peak Hour for Entire Intersection Begins at 11:30 AM																							
11:30 AM	13	**1**	42	0	56	11	0	6	0	17	18	187	13	0	0	218	**9**	284	15	0	0	308	599
11:45 AM	13	1	38	0	52	**14**	**1**	**10**	0	**25**	28	173	9	0	0	210	5	272	**18**	0	0	295	582
12:00 PM	7	0	42	0	49	10	1	4	0	15	25	**216**	9	0	0	250	7	262	14	0	0	283	597
12:15 PM	**15**	0	**45**	0	**60**	3	1	7	0	11	**30**	206	**14**	**2**	0	**252**	6	**296**	16	0	0	**318**	**641**
Total Volume	48	2	167	0	217	38	3	27	0	68	101	782	45	2	0	930	27	1114	63	0	0	1204	2419
% App. Total	22.1	0.9	77	0		55.9	4.4	39.7	0		10.9	84.1	4.8	0.2	0		2.2	92.5	5.2	0	0		
PHF	.800	.500	.928	.000	.904	.679	.750	.675	.000	.680	.842	.905	.804	.250	.000	.923	.750	.941	.875	.000	.000	.947	.943



AUSTIN TSUTSUMI & ASSOCIATES

501 Sumner Street, Suite 521
Honolulu, HI 96817-5031
Phone: (808) 533-3646   Fax: (808) 526-1267

File Name : WE_Honopiilani Hwy - Kaanapali Pkwy_Halelo St
Site Code : 00000000
Start Date : 1/21/2017

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				HALELO ST Westbound				HONOAPIILANI HWY Northbound				KAANAPALI PKWY Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
11:00 AM	10	382	55	0	0	0	1	0	70	191	7	0	58	0	101	0	875
11:15 AM	11	314	31	0	4	0	0	0	83	188	6	0	54	0	107	0	798
11:30 AM	5	342	40	0	3	1	1	0	57	247	3	0	48	0	108	1	856
11:45 AM	6	272	28	0	5	1	6	0	61	202	2	0	60	1	94	0	738
Total	32	1310	154	0	12	2	8	0	271	828	18	0	220	1	410	1	3267
12:00 PM	9	294	35	0	3	1	4	0	74	220	5	0	37	0	108	0	790
12:15 PM	5	233	33	0	1	0	4	0	88	239	2	0	59	0	122	0	786
12:30 PM	14	267	31	0	2	1	1	0	81	243	2	0	52	1	114	0	809
12:45 PM	6	211	28	0	3	3	2	0	84	289	5	0	46	0	86	0	763
Total	34	1005	127	0	9	5	11	0	327	991	14	0	194	1	430	0	3148
Grand Total	66	2315	281	0	21	7	19	0	598	1819	32	0	414	2	840	1	6415
Apprch %	2.5	87	10.6	0	44.7	14.9	40.4	0	24.4	74.3	1.3	0	32.9	0.2	66.8	0.1	
Total %	1	36.1	4.4	0	0.3	0.1	0.3	0	9.3	28.4	0.5	0	6.5	0	13.1	0	

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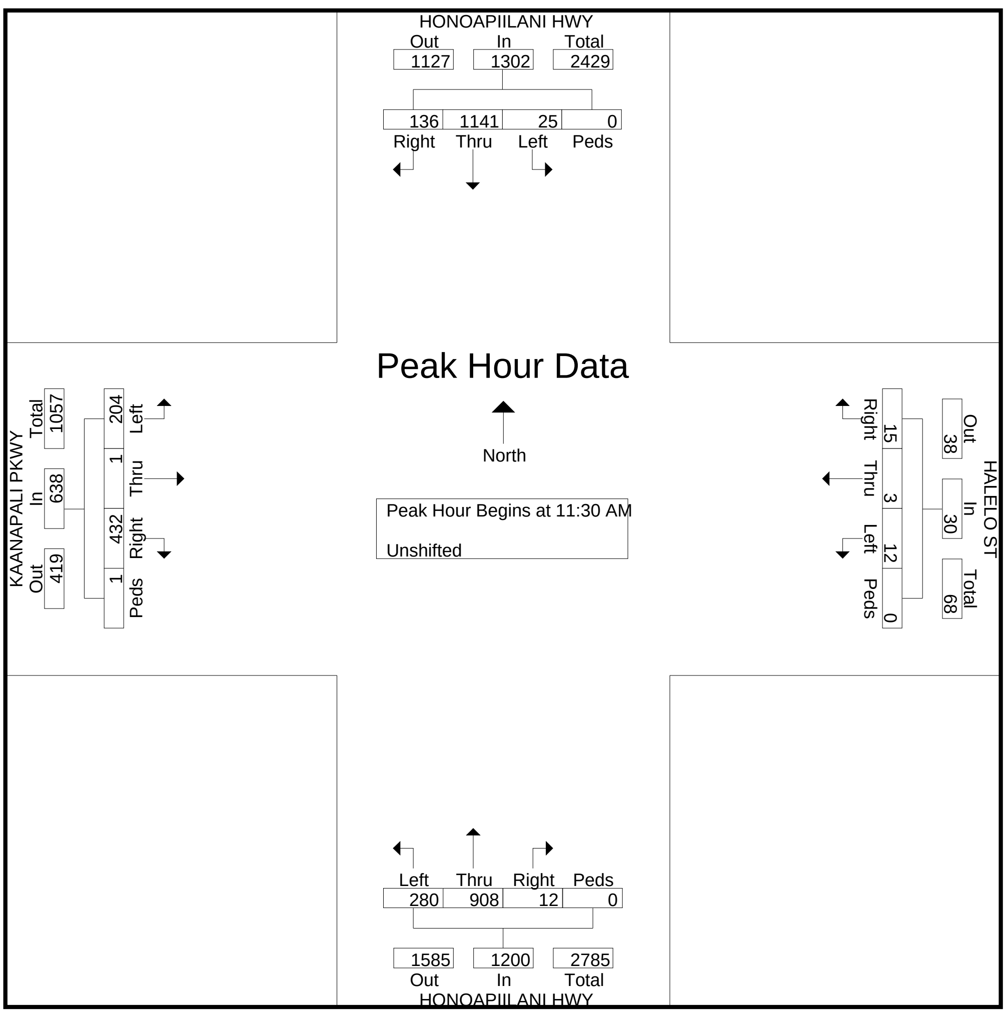
File Name : WE_Honopiilani Hwy - Kaanapali Pkwy_Halelo St
Site Code : 00000000
Start Date : 1/21/2017
Page No : 2

	HONOAPIILANI HWY Southbound					HALELO ST Westbound					HONOAPIILANI HWY Northbound					KAANAPALI PKWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:30 AM to 12:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:30 AM																					
11:30 AM	5	**342**	**40**	0	**387**	3	**1**	1	0	5	57	**247**	3	0	307	48	0	108	**1**	157	**856**
11:45 AM	6	272	28	0	306	**5**	1	**6**	0	**12**	61	202	2	0	265	**60**	**1**	94	0	155	738
12:00 PM	**9**	294	35	0	338	3	1	4	0	8	74	220	**5**	0	299	37	0	108	0	145	790
12:15 PM	5	233	33	0	271	1	0	4	0	5	**88**	239	2	0	**329**	59	0	**122**	0	**181**	786
Total Volume	25	1141	136	0	1302	12	3	15	0	30	280	908	12	0	1200	204	1	432	1	638	3170
% App. Total	1.9	87.6	10.4	0		40	10	50	0		23.3	75.7	1	0		32	0.2	67.7	0.2		
PHF	.694	.834	.850	.000	.841	.600	.750	.625	.000	.625	.795	.919	.600	.000	.912	.850	.250	.885	.250	.881	.926



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File Name : WE_Honoapiilani Hwy-Leialii Pkwy
Site Code : 00000000
Start Date : 12/10/2016
Page No : 1

Groups Printed- Unshifted

	LEIALII PKWY Eastbound				LEIALII PKWY Westbound				HONOAPIILANI HWY Northbound				HONOAPIILANI HWY Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
11:00 AM	0	1	1	0	23	1	4	0	1	187	12	0	19	378	4	0	631
11:15 AM	1	0	2	0	18	0	12	0	0	216	13	0	18	410	0	0	690
11:30 AM	0	0	2	0	47	1	16	0	0	228	25	0	21	371	0	0	711
11:45 AM	0	0	0	0	33	0	16	0	0	286	26	0	25	392	1	0	779
Total	1	1	5	0	121	2	48	0	1	917	76	0	83	1551	5	0	2811
12:00 PM	2	0	0	0	30	0	9	0	1	291	10	0	14	398	3	0	758
12:15 PM	0	0	1	0	20	0	10	0	1	278	22	0	18	397	2	0	749
12:30 PM	0	0	1	0	19	0	15	0	0	333	17	0	12	376	0	0	773
12:45 PM	2	0	0	0	21	0	18	0	0	324	24	0	14	296	0	1	700
Total	4	0	2	0	90	0	52	0	2	1226	73	0	58	1467	5	1	2980
Grand Total	5	1	7	0	211	2	100	0	3	2143	149	0	141	3018	10	1	5791
Apprch %	38.5	7.7	53.8	0	67.4	0.6	31.9	0	0.1	93.4	6.5	0	4.4	95.2	0.3	0	
Total %	0.1	0	0.1	0	3.6	0	1.7	0	0.1	37	2.6	0	2.4	52.1	0.2	0	

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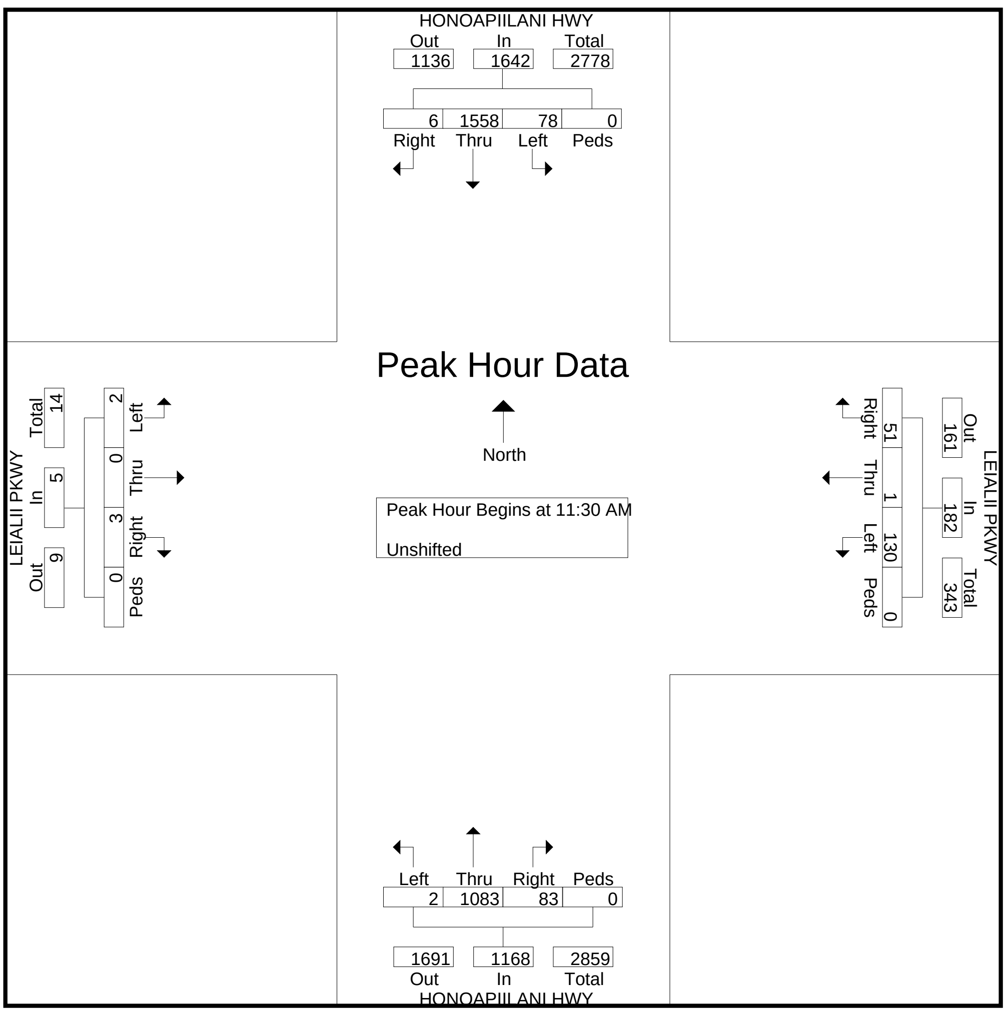
File Name : WE_Honoapiilani Hwy-Leialii Pkwy
Site Code : 00000000
Start Date : 12/10/2016
Page No : 2

	LEIALII PKWY Eastbound					LEIALII PKWY Westbound					HONOAPIILANI HWY Northbound					HONOAPIILANI HWY Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:30 AM to 12:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:30 AM																					
11:30 AM	0	0	**2**	0	**2**	**47**	**1**	**16**	0	**64**	0	228	25	0	253	21	371	0	0	392	711
11:45 AM	0	0	0	0	0	33	0	16	0	49	0	286	**26**	0	**312**	**25**	392	1	0	**418**	**779**
12:00 PM	**2**	0	0	0	2	30	0	9	0	39	**1**	**291**	10	0	302	14	**398**	**3**	0	415	758
12:15 PM	0	0	1	0	1	20	0	10	0	30	1	278	22	0	301	18	397	2	0	417	749
Total Volume	2	0	3	0	5	130	1	51	0	182	2	1083	83	0	1168	78	1558	6	0	1642	2997
% App. Total	40	0	60	0		71.4	0.5	28	0		0.2	92.7	7.1	0		4.8	94.9	0.4	0		
PHF	.250	.000	.375	.000	.625	.691	.250	.797	.000	.711	.500	.930	.798	.000	.936	.780	.979	.500	.000	.982	.962



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File Name : WE_Honoapiilani Hwy - Front St
Site Code : 00000000
Start Date : 12/10/2016
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				FRONT ST Westbound				HONOAPIILANI HWY Northbound				FRONT ST Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
11:00 AM	3	332	17	0	14	2	2	0	4	199	6	0	19	0	4	0	602
11:15 AM	1	349	42	0	15	0	1	0	2	242	3	0	22	0	3	0	680
11:30 AM	2	346	45	0	10	0	2	0	5	230	5	0	29	0	3	0	677
11:45 AM	1	339	52	0	17	0	4	0	3	272	4	0	24	2	3	0	721
Total	7	1366	156	0	56	2	9	0	14	943	18	0	94	2	13	0	2680
12:00 PM	2	337	67	0	19	2	2	0	1	268	4	0	27	1	4	1	735
12:15 PM	2	347	71	0	16	1	3	0	2	275	2	0	34	0	4	0	757
12:30 PM	1	338	58	0	17	4	3	0	1	325	6	0	31	4	4	0	792
12:45 PM	3	246	44	0	13	1	2	0	4	323	6	0	31	0	1	0	674
Total	8	1268	240	0	65	8	10	0	8	1191	18	0	123	5	13	1	2958
Grand Total	15	2634	396	0	121	10	19	0	22	2134	36	0	217	7	26	1	5638
Apprch %	0.5	86.5	13	0	80.7	6.7	12.7	0	1	97.4	1.6	0	86.5	2.8	10.4	0.4	
Total %	0.3	46.7	7	0	2.1	0.2	0.3	0	0.4	37.9	0.6	0	3.8	0.1	0.5	0	

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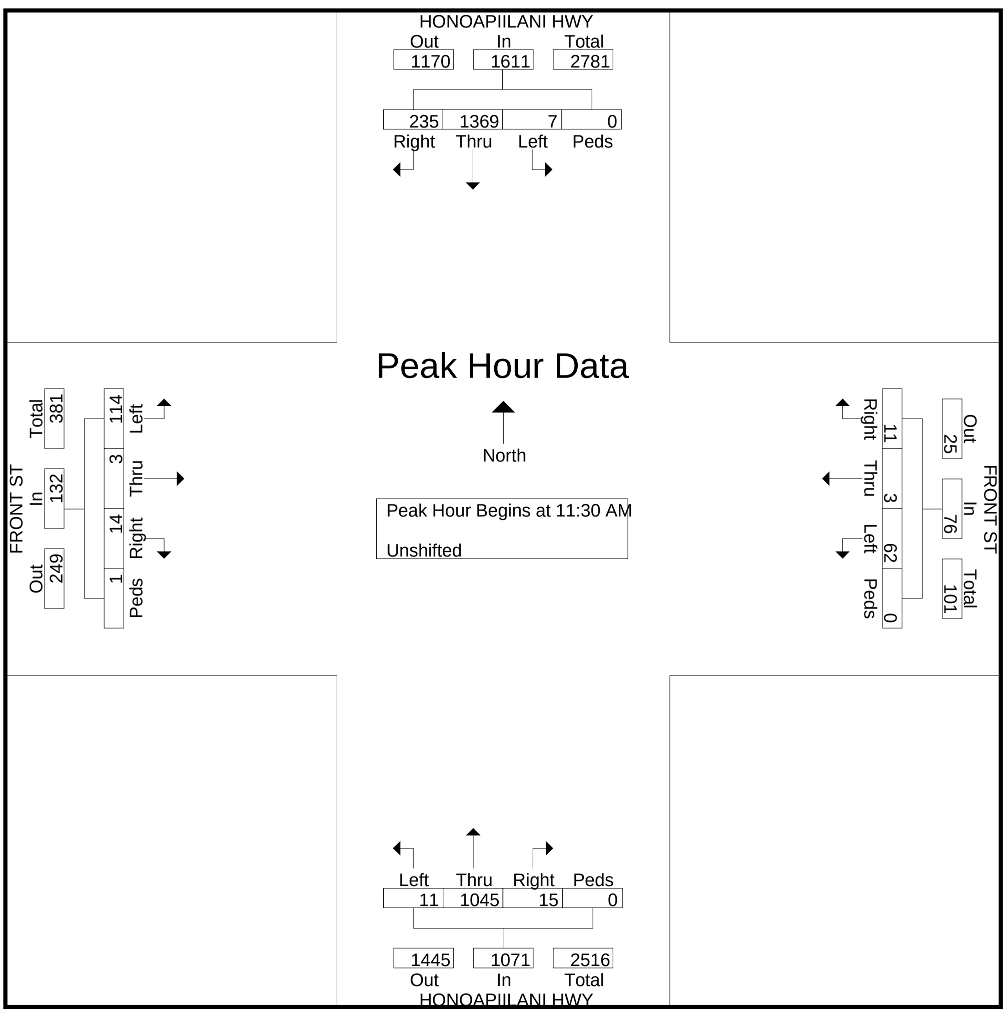
File Name : WE_Honoapiilani Hwy - Front St
Site Code : 00000000
Start Date : 12/10/2016

	HONOAPIILANI HWY Southbound					FRONT ST Westbound					HONOAPIILANI HWY Northbound					FRONT ST Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 11:30 AM to 12:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:30 AM																					
11:30 AM	**2**	346	45	0	393	10	0	2	0	12	**5**	230	**5**	0	240	29	0	3	0	32	677
11:45 AM	1	339	52	0	392	17	0	**4**	0	21	3	272	4	0	**279**	24	**2**	3	0	29	721
12:00 PM	2	337	67	0	406	**19**	**2**	2	0	**23**	1	268	4	0	273	27	1	**4**	**1**	33	735
12:15 PM	2	**347**	**71**	0	**420**	16	1	3	0	20	2	**275**	2	0	279	**34**	0	4	0	**38**	**757**
Total Volume	7	1369	235	0	1611	62	3	11	0	76	11	1045	15	0	1071	114	3	14	1	132	2890
% App. Total	0.4	85	14.6	0		81.6	3.9	14.5	0		1	97.6	1.4	0		86.4	2.3	10.6	0.8		
PHF	.875	.986	.827	.000	.959	.816	.375	.688	.000	.826	.550	.950	.750	.000	.960	.838	.375	.875	.250	.868	.954



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File Name : WE_Honoapiilani Hwy - Kapunakea St
Site Code : 00000000
Start Date : 1/21/2017
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				KAPUNAKEA ST Westbound				KAPUNAKEA ST Northbound				KAPUNAKEA ST Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
11:00 AM	3	347	19	0	23	6	1	1	11	256	13	0	36	7	12	0	735
11:15 AM	2	425	36	0	32	0	1	1	15	272	12	0	33	8	5	0	842
11:30 AM	4	413	35	1	18	5	4	0	14	289	12	2	32	3	14	0	846
11:45 AM	7	338	28	0	21	5	1	2	11	255	7	1	37	5	7	0	725
Total	16	1523	118	1	94	16	7	4	51	1072	44	3	138	23	38	0	3148
12:00 PM	1	304	24	1	22	5	1	6	21	265	15	0	31	4	15	2	717
12:15 PM	2	334	31	0	22	4	9	0	12	313	25	0	39	5	12	0	808
12:30 PM	4	283	19	0	21	2	4	3	16	308	26	0	46	3	12	0	747
12:45 PM	1	275	24	3	18	7	2	4	16	314	17	0	30	3	13	0	727
Total	8	1196	98	4	83	18	16	13	65	1200	83	0	146	15	52	2	2999
Grand Total	24	2719	216	5	177	34	23	17	116	2272	127	3	284	38	90	2	6147
Apprch %	0.8	91.7	7.3	0.2	70.5	13.5	9.2	6.8	4.6	90.2	5	0.1	68.6	9.2	21.7	0.5	
Total %	0.4	44.2	3.5	0.1	2.9	0.6	0.4	0.3	1.9	37	2.1	0	4.6	0.6	1.5	0	

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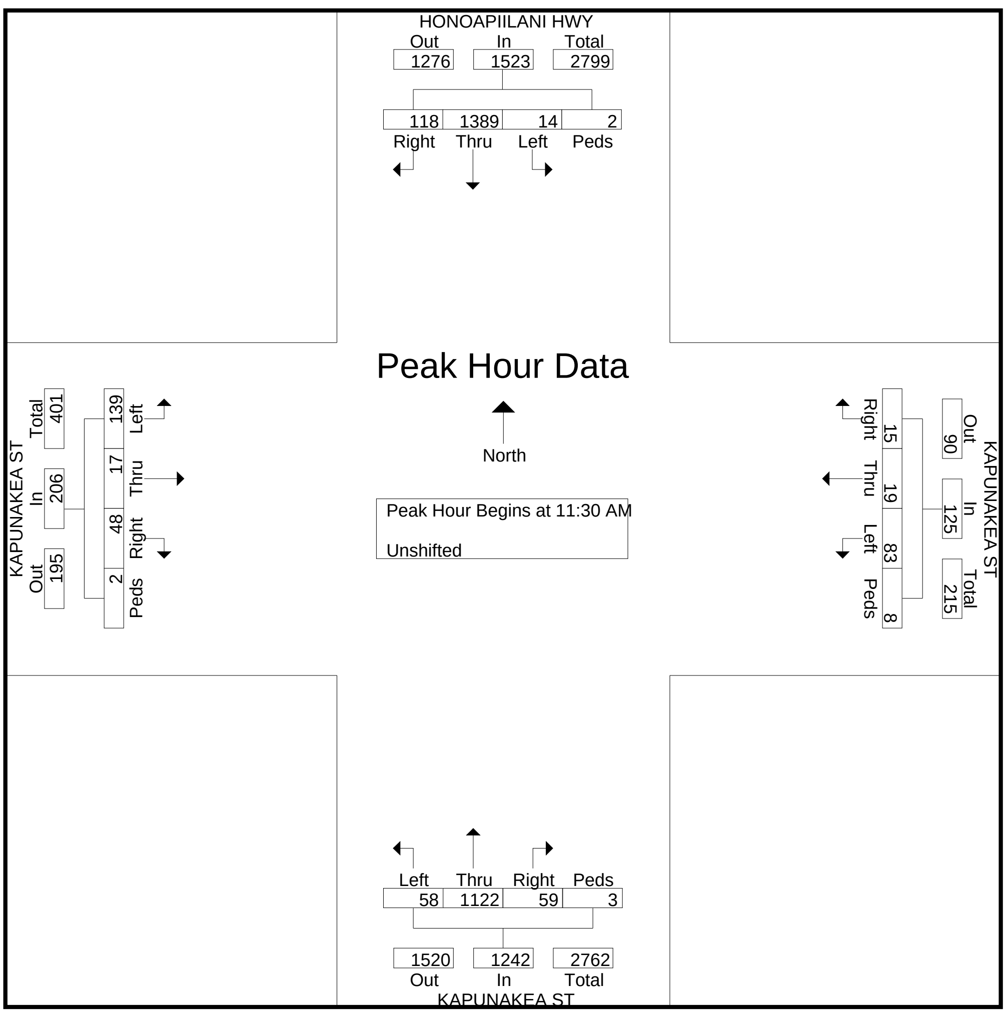
File Name : WE_Honoapiilani Hwy - Kapunakea St
Site Code : 00000000
Start Date : 1/21/2017

	HONOAPIILANI HWY Southbound					KAPUNAKEA ST Westbound					KAPUNAKEA ST Northbound					KAPUNAKEA ST Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Int. Total**
Peak Hour Analysis From 11:30 AM to 12:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:30 AM																					
11:30 AM	4	**413**	**35**	**1**	**453**	18	**5**	4	0	27	14	289	12	**2**	317	32	3	14	0	49	**846**
11:45 AM	**7**	338	28	0	373	21	5	1	2	29	11	255	7	1	274	37	**5**	7	0	49	725
12:00 PM	1	304	24	1	330	**22**	5	1	**6**	34	**21**	265	15	0	301	31	4	**15**	**2**	52	717
12:15 PM	2	334	31	0	367	22	4	**9**	0	**35**	12	**313**	**25**	0	**350**	**39**	5	12	0	**56**	808
Total Volume	14	1389	118	2	1523	83	19	15	8	125	58	1122	59	3	1242	139	17	48	2	206	3096
% App. Total	0.9	91.2	7.7	0.1		66.4	15.2	12	6.4		4.7	90.3	4.8	0.2		67.5	8.3	23.3	1		
PHF	.500	.841	.843	.500	.841	.943	.950	.417	.333	.893	.690	.896	.590	.375	.887	.891	.850	.800	.250	.920	.915



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File Name : WE_Honoapiilani Hwy - Keawe St
Site Code : 00000000
Start Date : 1/21/2017
Page No : 1

Groups Printed- Unshifted

	HONOAPIILANI HWY Southbound				KEAWE ST Westbound				HONOAPIILANI HWY Northbound				KEAWE ST Eastbound				
Start Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Int. Total**
11:00 AM	76	248	25	5	44	21	93	1	12	182	50	1	8	24	27	0	817
11:15 AM	88	275	26	8	39	15	74	3	25	200	48	1	9	27	14	0	852
11:30 AM	92	270	28	3	39	16	91	5	32	186	47	2	17	31	30	0	889
11:45 AM	93	230	27	12	38	29	87	5	28	183	76	4	13	35	29	0	889
Total	349	1023	106	28	160	81	345	14	97	751	221	8	47	117	100	0	3447
12:00 PM	81	216	20	4	59	25	93	0	20	206	69	2	7	22	35	1	860
12:15 PM	80	236	14	8	55	23	110	1	28	204	64	4	14	24	30	1	896
12:30 PM	80	215	11	7	34	29	104	4	27	249	62	1	12	32	24	0	891
12:45 PM	64	203	14	3	55	25	102	0	19	212	65	1	11	18	17	2	811
Total	305	870	59	22	203	102	409	5	94	871	260	8	44	96	106	4	3458
Grand Total	654	1893	165	50	363	183	754	19	191	1622	481	16	91	213	206	4	6905
Apprch %	23.7	68.5	6	1.8	27.5	13.9	57.2	1.4	8.3	70.2	20.8	0.7	17.7	41.4	40.1	0.8	
Total %	9.5	27.4	2.4	0.7	5.3	2.7	10.9	0.3	2.8	23.5	7	0.2	1.3	3.1	3	0.1	

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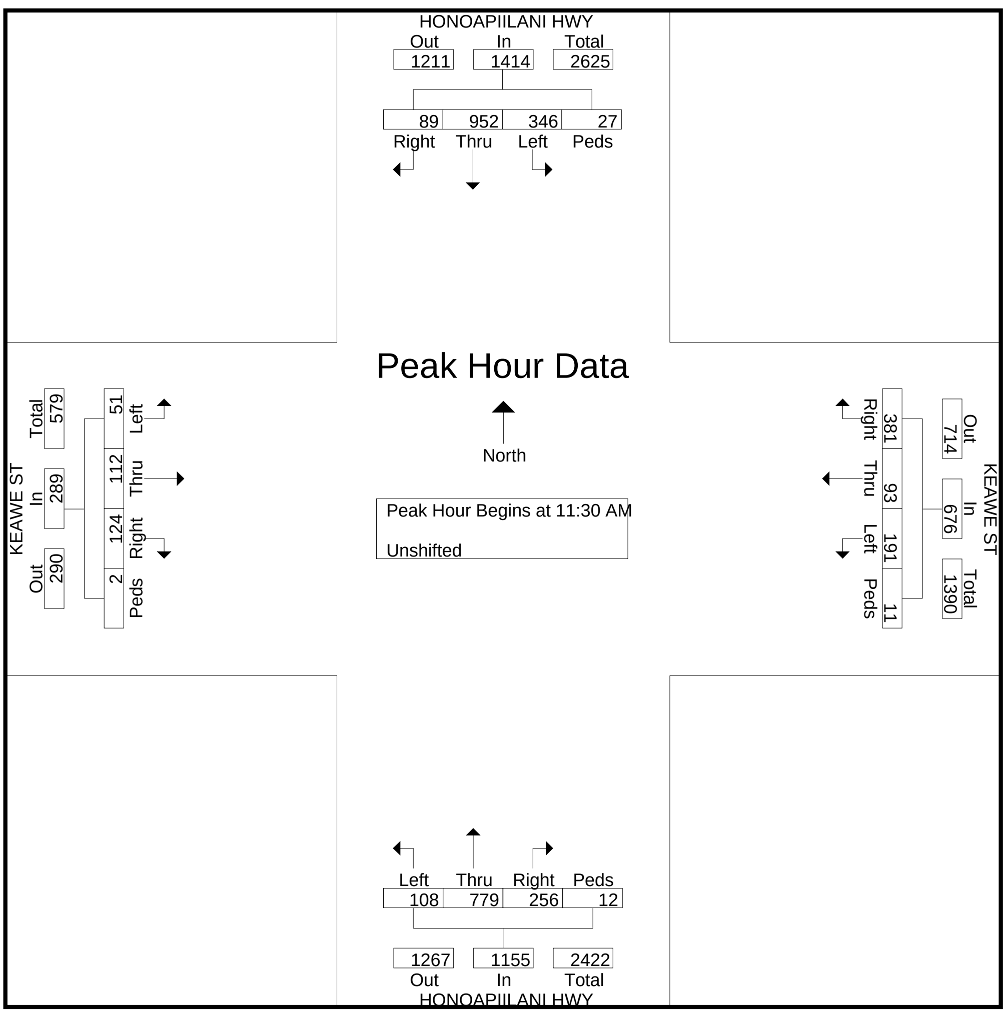
File Name : WE_Honoapiilani Hwy - Keawe St
Site Code : 00000000
Start Date : 1/21/2017
Page No : 2

	HONOAPIILANI HWY Southbound					KEAWE ST Westbound					HONOAPIILANI HWY Northbound					KEAWE ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:30 AM to 12:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:30 AM																					
11:30 AM	92	**270**	**28**	3	**393**	39	16	91	**5**	151	**32**	186	47	2	267	**17**	31	30	0	**78**	889
11:45 AM	**93**	230	27	**12**	362	38	**29**	87	5	159	28	183	**76**	**4**	291	13	**35**	29	0	77	889
12:00 PM	81	216	20	4	321	**59**	25	93	0	177	20	**206**	69	2	297	7	22	**35**	**1**	65	860
12:15 PM	80	236	14	8	338	55	23	**110**	1	**189**	28	204	64	4	**300**	14	24	30	1	69	**896**
Total Volume	346	952	89	27	1414	191	93	381	11	676	108	779	256	12	1155	51	112	124	2	289	3534
% App. Total	24.5	67.3	6.3	1.9		28.3	13.8	56.4	1.6		9.4	67.4	22.2	1		17.6	38.8	42.9	0.7		
PHF	.930	.881	.795	.563	.899	.809	.802	.866	.550	.894	.844	.945	.842	.750	.963	.750	.800	.886	.500	.926	.986



APPENDIX B

LEVEL OF SERVICE CRITERIA

APPENDIX B – LEVEL OF SERVICE (LOS) CRITERIA

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

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

Level-of Service Criteria for Signalized Intersections

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

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

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

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

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

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

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

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Existing AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	37	271	52	28	10	202	204	84	5	117	30
Future Volume (veh/h)	48	37	271	52	28	10	202	204	84	5	117	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	52	40	37	57	30	8	220	222	77	5	127	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	257	136	226	240	87	16	298	569	197	7	495	420
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.17	0.43	0.43	0.00	0.26	0.26
Sat Flow, veh/h	750	944	1570	607	603	111	1781	1327	460	1781	1870	1585
Grp Volume(v), veh/h	92	0	37	95	0	0	220	0	299	5	127	8
Grp Sat Flow(s),veh/h/ln	1694	0	1570	1322	0	0	1781	0	1788	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.8	1.1	0.0	0.0	4.4	0.0	4.3	0.1	2.0	0.1
Cycle Q Clear(g_c), s	1.7	0.0	0.8	2.8	0.0	0.0	4.4	0.0	4.3	0.1	2.0	0.1
Prop In Lane	0.57		1.00	0.60		0.08	1.00		0.26	1.00		1.00
Lane Grp Cap(c), veh/h	393	0	226	343	0	0	298	0	766	7	495	420
V/C Ratio(X)	0.23	0.00	0.16	0.28	0.00	0.00	0.74	0.00	0.39	0.69	0.26	0.02
Avail Cap(c_a), veh/h	1152	0	998	1066	0	0	1415	0	3740	708	3171	2687
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.6	0.0	14.2	15.0	0.0	0.0	14.9	0.0	7.4	18.8	10.9	10.3
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.4	0.0	0.0	3.5	0.0	0.7	77.4	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.3	0.7	0.0	0.0	1.7	0.0	1.2	0.2	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.9	0.0	14.5	15.4	0.0	0.0	18.5	0.0	8.1	96.2	11.5	10.3
LnGrp LOS	B	A	B	B	A	A	B	A	A	F	B	B
Approach Vol, veh/h		129			95			519			140	
Approach Delay, s/veh		14.8			15.4			12.5			14.5	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.2	22.2		10.4	11.3	16.0		10.4				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.1	6.3		3.7	6.4	4.0		4.8				
Green Ext Time (p_c), s	0.0	4.1		0.5	0.6	1.6		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			13.5									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	3	163	84	18	13	123	453	13	9	432	61
Future Volume (veh/h)	58	3	163	84	18	13	123	453	13	9	432	61
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	63	3	22	91	20	2	134	492	0	10	470	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	404	16	304	365	328	33	446	811		386	649	545
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.09	0.43	0.00	0.01	0.35	0.35
Sat Flow, veh/h	1245	80	1545	1356	1668	167	1781	1870	1585	1781	1870	1571
Grp Volume(v), veh/h	66	0	22	91	0	22	134	492	0	10	470	25
Grp Sat Flow(s),veh/h/ln	1325	0	1545	1356	0	1835	1781	1870	1585	1781	1870	1571
Q Serve(g_s), s	1.7	0.0	0.5	2.7	0.0	0.4	1.9	8.9	0.0	0.2	9.7	0.5
Cycle Q Clear(g_c), s	2.1	0.0	0.5	4.8	0.0	0.4	1.9	8.9	0.0	0.2	9.7	0.5
Prop In Lane	0.95		1.00	1.00		0.09	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	420	0	304	365	0	361	446	811		386	649	545
V/C Ratio(X)	0.16	0.00	0.07	0.25	0.00	0.06	0.30	0.61		0.03	0.72	0.05
Avail Cap(c_a), veh/h	926	0	874	865	0	1038	883	2158		976	2158	1813
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.2	0.0	14.5	17.2	0.0	14.4	8.4	9.6	0.0	9.5	12.6	9.6
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.4	0.0	0.1	0.4	0.7	0.0	0.0	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.2	0.8	0.0	0.2	0.6	2.7	0.0	0.1	3.4	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.4	0.0	14.6	17.5	0.0	14.5	8.8	10.4	0.0	9.6	14.1	9.6
LnGrp LOS	B	A	B	B	A	B	A	B		A	B	A
Approach Vol, veh/h		88			113			626	A		505	
Approach Delay, s/veh		15.2			16.9			10.0			13.8	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.3	25.2		13.7	9.2	21.3		13.7				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0				
Max Q Clear Time (g_c+I1), s	2.2	10.9		4.1	3.9	11.7		6.8				
Green Ext Time (p_c), s	0.0	3.4		0.4	0.2	3.3		0.3				

Intersection Summary

HCM 6th Ctrl Delay			12.4
HCM 6th LOS			B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	1	113	5	1	4	52	527	11	5	612	28
Future Volume (veh/h)	39	1	113	5	1	4	52	527	11	5	612	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	1	13	5	1	1	57	573	7	5	665	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	62	14	182	10	176	148	72	901	763	7	833	700
Arrive On Green	0.04	0.12	0.12	0.01	0.09	0.09	0.04	0.48	0.48	0.00	0.45	0.45
Sat Flow, veh/h	1781	113	1474	1781	1870	1569	1781	1870	1585	1781	1870	1573
Grp Volume(v), veh/h	42	0	14	5	1	1	57	573	7	5	665	14
Grp Sat Flow(s),veh/h/ln	1781	0	1587	1781	1870	1569	1781	1870	1585	1781	1870	1573
Q Serve(g_s), s	1.2	0.0	0.4	0.1	0.0	0.0	1.6	11.9	0.1	0.1	15.9	0.3
Cycle Q Clear(g_c), s	1.2	0.0	0.4	0.1	0.0	0.0	1.6	11.9	0.1	0.1	15.9	0.3
Prop In Lane	1.00		0.93	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	62	0	197	10	176	148	72	901	763	7	833	700
V/C Ratio(X)	0.67	0.00	0.07	0.52	0.01	0.01	0.79	0.64	0.01	0.70	0.80	0.02
Avail Cap(c_a), veh/h	686	0	642	686	756	634	858	2341	1984	858	2341	1968
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.8	0.0	20.1	25.8	21.3	21.3	24.7	10.1	7.0	25.8	12.4	8.1
Incr Delay (d2), s/veh	11.9	0.0	0.2	38.0	0.0	0.0	17.2	0.8	0.0	79.3	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.1	0.2	0.0	0.0	1.0	3.8	0.0	0.2	5.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.7	0.0	20.3	63.8	21.3	21.3	41.9	10.8	7.0	105.2	14.2	8.1
LnGrp LOS	D	A	C	E	C	C	D	B	A	F	B	A
Approach Vol, veh/h		56			7			637			684	
Approach Delay, s/veh		32.6			51.7			13.5			14.8	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	30.0	5.3	11.4	7.1	28.1	6.8	9.9
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.1	13.9	2.1	2.4	3.6	17.9	3.2	2.0
Green Ext Time (p_c), s	0.0	4.2	0.0	0.0	0.1	5.2	0.1	0.0

Intersection Summary			
HCM 6th Ctrl Delay			15.1
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	7	433	17	3	0	287	592	38	8	691	10
Future Volume (veh/h)	30	7	433	17	3	0	287	592	38	8	691	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	8	0	18	3	0	312	643	40	9	751	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	219	23		224	24	0	389	2074	129	13	1418	632
Arrive On Green	0.09	0.07	0.00	0.09	0.07	0.00	0.22	0.61	0.61	0.01	0.40	0.40
Sat Flow, veh/h	1188	326	1585	1204	340	0	1781	3398	211	1781	3554	1585
Grp Volume(v), veh/h	41	0	0	21	0	0	312	336	347	9	751	3
Grp Sat Flow(s),veh/h/ln	1514	0	1585	1544	0	0	1781	1777	1832	1781	1777	1585
Q Serve(g_s), s	0.6	0.0	0.0	0.0	0.0	0.0	8.0	4.4	4.4	0.2	7.8	0.1
Cycle Q Clear(g_c), s	1.1	0.0	0.0	0.5	0.0	0.0	8.0	4.4	4.4	0.2	7.8	0.1
Prop In Lane	0.80		1.00	0.86		0.00	1.00		0.12	1.00		1.00
Lane Grp Cap(c), veh/h	274	0		280	0	0	389	1085	1119	13	1418	632
V/C Ratio(X)	0.15	0.00		0.07	0.00	0.00	0.80	0.31	0.31	0.72	0.53	0.00
Avail Cap(c_a), veh/h	782	0		931	0	0	2442	2731	2816	2442	5462	2436
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.9	0.0	0.0	20.6	0.0	0.0	17.8	4.5	4.5	23.9	11.0	8.7
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	1.5	0.3	0.3	24.2	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.2	0.0	0.0	2.9	1.0	1.0	0.2	2.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.1	0.0	0.0	20.7	0.0	0.0	19.3	4.8	4.8	48.1	11.7	8.7
LnGrp LOS	C	A		C	A	A	B	A	A	D	B	A
Approach Vol, veh/h		41	A		21			995			763	
Approach Delay, s/veh		21.1			20.7			9.4			12.1	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.5	25.2		8.4	4.3	35.4		8.4				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	66.0	74.0		25.0	66.0	74.0		20.0				
Max Q Clear Time (g_c+I1), s	10.0	9.8		2.5	2.2	6.4		3.1				
Green Ext Time (p_c), s	0.7	9.5		0.0	0.0	7.5		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			10.9
HCM 6th LOS			B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	0	33	8	1	6	64	974	16	14	1129	38
Future Volume (veh/h)	16	0	33	8	1	6	64	974	16	14	1129	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	17	0	1	9	1	2	70	1059	16	15	1227	26
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	0	54	156	3	7	88	2429	37	20	2272	1014
Arrive On Green	0.05	0.00	0.03	0.05	0.03	0.03	0.05	0.68	0.68	0.01	0.64	0.64
Sat Flow, veh/h	1530	0	1585	917	102	204	1781	3583	54	1781	3554	1585
Grp Volume(v), veh/h	17	0	1	12	0	0	70	525	550	15	1227	26
Grp Sat Flow(s),veh/h/ln	1530	0	1585	1223	0	0	1781	1777	1861	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	2.0	6.8	6.8	0.4	9.6	0.3
Cycle Q Clear(g_c), s	0.5	0.0	0.0	0.9	0.0	0.0	2.0	6.8	6.8	0.4	9.6	0.3
Prop In Lane	1.00		1.00	0.75		0.17	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	225	0	54	190	0	0	88	1204	1261	20	2272	1014
V/C Ratio(X)	0.08	0.00	0.02	0.06	0.00	0.00	0.79	0.44	0.44	0.75	0.54	0.03
Avail Cap(c_a), veh/h	820	0	721	810	0	0	740	3023	3166	388	5344	2383
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.3	0.0	23.6	23.9	0.0	0.0	23.8	3.7	3.7	24.9	5.0	3.3
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.1	0.0	0.0	5.9	0.5	0.5	18.3	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.1	0.0	0.0	0.9	1.2	1.3	0.3	2.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	0.0	23.6	23.9	0.0	0.0	29.6	4.3	4.2	43.2	5.4	3.4
LnGrp LOS	C	A	C	C	A	A	C	A	A	D	A	A
Approach Vol, veh/h		18			12			1145			1268	
Approach Delay, s/veh		23.4			23.9			5.8			5.9	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.5	37.3		6.7	4.6	39.3		6.7
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	4.0	11.6		2.9	2.4	8.8		2.5
Green Ext Time (p_c), s	0.0	20.7		0.0	0.0	15.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	6.0
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	4	30	39	13	41	102	965	54	24	1060	37
Future Volume (veh/h)	45	4	30	39	13	41	102	965	54	24	1060	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	49	4	1	42	14	2	111	1049	46	26	1152	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	149	10	138	110	140	20	132	2822	1258	39	2635	1175
Arrive On Green	0.09	0.09	0.09	0.09	0.09	0.09	0.07	0.79	0.79	0.02	0.74	0.74
Sat Flow, veh/h	1193	120	1580	1408	1600	229	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	53	0	1	42	0	16	111	1049	46	26	1152	29
Grp Sat Flow(s),veh/h/ln	1312	0	1580	1408	0	1828	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.3	0.0	0.1	4.6	0.0	1.2	9.5	13.4	1.0	2.2	19.2	0.7
Cycle Q Clear(g_c), s	6.6	0.0	0.1	11.1	0.0	1.2	9.5	13.4	1.0	2.2	19.2	0.7
Prop In Lane	0.92		1.00	1.00		0.13	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	160	0	138	110	0	160	132	2822	1258	39	2635	1175
V/C Ratio(X)	0.33	0.00	0.01	0.38	0.00	0.10	0.84	0.37	0.04	0.67	0.44	0.02
Avail Cap(c_a), veh/h	255	0	245	205	0	283	184	2822	1258	184	2635	1175
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.83	0.83	0.83	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.0	0.0	64.6	72.8	0.0	65.1	70.8	4.7	3.4	75.3	7.7	5.3
Incr Delay (d2), s/veh	1.2	0.0	0.0	2.2	0.0	0.3	13.5	0.3	0.0	7.3	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	0.0	1.7	0.0	0.6	4.8	4.4	0.3	1.1	7.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.2	0.0	64.6	75.0	0.0	65.4	84.3	5.0	3.4	82.5	8.2	5.3
LnGrp LOS	E	A	E	E	A	E	F	A	A	F	A	A
Approach Vol, veh/h		54			58			1206			1207	
Approach Delay, s/veh		69.1			72.3			12.2			9.7	
Approach LOS		E			E			B			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.5	120.9		18.6	7.4	129.1		18.6				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	16.0	100.0		24.0	16.0	100.0		24.0				
Max Q Clear Time (g_c+I1), s	11.5	21.2		13.1	4.2	15.4		8.6				
Green Ext Time (p_c), s	0.1	19.3		0.1	0.0	16.9		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			13.6									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	6	214	10	10	8	410	1071	14	40	996	87
Future Volume (veh/h)	115	6	214	10	10	8	410	1071	14	40	996	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	125	7	84	11	11	4	446	1164	15	43	1083	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	221	12	827	68	68	25	619	1888	24	138	1505	669
Arrive On Green	0.13	0.13	0.12	0.09	0.09	0.06	0.18	0.53	0.50	0.08	0.42	0.42
Sat Flow, veh/h	1691	95	2731	752	752	273	3456	3593	46	1781	3554	1578
Grp Volume(v), veh/h	132	0	84	26	0	0	446	576	603	43	1083	49
Grp Sat Flow(s),veh/h/ln	1786	0	1366	1777	0	0	1728	1777	1862	1781	1777	1578
Q Serve(g_s), s	6.3	0.0	2.0	1.2	0.0	0.0	11.0	20.6	20.6	2.1	22.9	1.7
Cycle Q Clear(g_c), s	6.3	0.0	2.0	1.2	0.0	0.0	11.0	20.6	20.6	2.1	22.9	1.7
Prop In Lane	0.95		1.00	0.42		0.15	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	233	0	827	160	0	0	619	934	979	138	1505	669
V/C Ratio(X)	0.57	0.00	0.10	0.16	0.00	0.00	0.72	0.62	0.62	0.31	0.72	0.07
Avail Cap(c_a), veh/h	1104	0	2158	687	0	0	1640	4099	4295	413	7335	3258
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.0	0.0	23.0	38.3	0.0	0.0	35.0	15.1	15.1	39.5	21.6	15.5
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.5	0.0	0.0	0.6	0.9	0.9	0.5	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	0.7	0.6	0.0	0.0	4.5	7.8	8.1	0.9	9.1	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.8	0.0	23.0	38.8	0.0	0.0	35.6	16.0	16.0	40.0	22.6	15.6
LnGrp LOS	D	A	C	D	A	A	D	B	B	D	C	B
Approach Vol, veh/h		216			26			1625			1175	
Approach Delay, s/veh		32.0			38.8			21.4			22.9	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.2	42.4		12.1	11.0	51.6		15.8
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	41.0	185.0		32.0	19.0	207.0		53.0
Max Q Clear Time (g_c+I1), s	13.0	24.9		3.2	4.1	22.6		8.3
Green Ext Time (p_c), s	1.2	11.5		0.1	0.0	11.0		0.6

Intersection Summary		
HCM 6th Ctrl Delay		22.9
HCM 6th LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	4	56	0	39	3	1485	86	25	1190	4
Future Volume (veh/h)	2	1	4	56	0	39	3	1485	86	25	1190	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2	1	1	61	0	1	3	1614	91	27	1293	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	94	46	34	172	0	134	7	2708	152	64	2993	9
Arrive On Green	0.09	0.09	0.08	0.09	0.00	0.08	0.00	0.79	0.78	0.04	0.82	0.82
Sat Flow, veh/h	637	535	391	1381	0	1543	1781	3420	192	1781	3634	11
Grp Volume(v), veh/h	4	0	0	61	0	1	3	834	871	27	632	665
Grp Sat Flow(s),veh/h/ln	1562	0	0	1381	0	1543	1781	1777	1835	1781	1777	1868
Q Serve(g_s), s	0.0	0.0	0.0	5.5	0.0	0.1	0.2	25.8	26.4	2.1	13.6	13.6
Cycle Q Clear(g_c), s	0.3	0.0	0.0	5.8	0.0	0.1	0.2	25.8	26.4	2.1	13.6	13.6
Prop In Lane	0.50		0.25	1.00		1.00	1.00		0.10	1.00		0.01
Lane Grp Cap(c), veh/h	174	0	0	172	0	134	7	1407	1453	64	1463	1539
V/C Ratio(X)	0.02	0.00	0.00	0.35	0.00	0.01	0.43	0.59	0.60	0.42	0.43	0.43
Avail Cap(c_a), veh/h	303	0	0	289	0	265	102	1407	1453	102	1463	1539
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.77	0.77	0.77	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.6	0.0	0.0	61.0	0.0	58.9	69.6	5.7	5.8	66.1	3.4	3.4
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.2	0.0	0.0	11.4	1.4	1.4	1.7	0.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	2.2	0.0	0.0	0.1	8.4	8.9	1.0	4.0	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	0.0	0.0	62.2	0.0	58.9	81.0	7.1	7.2	67.8	4.3	4.3
LnGrp LOS	E	A	A	E	A	E	F	A	A	E	A	A
Approach Vol, veh/h		4			62			1708			1324	
Approach Delay, s/veh		58.7			62.2			7.3			5.6	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	119.3		16.1	9.0	114.9		16.1				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	95.0		23.0	8.0	95.0		23.0				
Max Q Clear Time (g_c+I1), s	2.2	15.6		7.8	4.1	28.4		2.3				
Green Ext Time (p_c), s	0.0	21.4		0.1	0.0	35.6		0.0				

Intersection Summary			
HCM 6th Ctrl Delay			7.7
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	4	3	101	15	13	2	1471	16	6	1059	167
Future Volume (veh/h)	81	4	3	101	15	13	2	1471	16	6	1059	167
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	88	4	2	110	16	11	2	1599	17	7	1151	130
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	207	9	3	195	20	14	3	2838	30	9	2812	1253
Arrive On Green	0.11	0.11	0.10	0.11	0.11	0.10	0.00	0.79	0.78	0.01	0.79	0.79
Sat Flow, veh/h	1394	83	32	1313	191	131	1781	3602	38	1781	3554	1583
Grp Volume(v), veh/h	94	0	0	137	0	0	2	788	828	7	1151	130
Grp Sat Flow(s),veh/h/ln	1509	0	0	1635	0	0	1781	1777	1863	1781	1777	1583
Q Serve(g_s), s	0.0	0.0	0.0	2.5	0.0	0.0	0.1	20.3	20.4	0.5	12.0	2.2
Cycle Q Clear(g_c), s	6.9	0.0	0.0	9.4	0.0	0.0	0.1	20.3	20.4	0.5	12.0	2.2
Prop In Lane	0.94		0.02	0.80		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	220	0	0	229	0	0	3	1400	1468	9	2812	1253
V/C Ratio(X)	0.43	0.00	0.00	0.60	0.00	0.00	0.70	0.56	0.56	0.76	0.41	0.10
Avail Cap(c_a), veh/h	432	0	0	451	0	0	119	1400	1468	119	2812	1253
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.78	0.78	0.78	0.91	0.91	0.91
Uniform Delay (d), s/veh	50.9	0.0	0.0	51.9	0.0	0.0	59.9	4.9	4.9	59.6	3.9	2.8
Incr Delay (d2), s/veh	1.3	0.0	0.0	2.5	0.0	0.0	61.9	1.3	1.2	33.6	0.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	0.0	4.2	0.0	0.0	0.1	6.1	6.4	0.3	3.4	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.3	0.0	0.0	54.4	0.0	0.0	121.8	6.1	6.1	93.2	4.3	3.0
LnGrp LOS	D	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		94			137			1618			1288	
Approach Delay, s/veh		52.3			54.4			6.3			4.6	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.2	99.0		16.8	4.6	98.5		16.8
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.1	14.0		11.4	2.5	22.4		8.9
Green Ext Time (p_c), s	0.0	26.7		0.4	0.0	33.1		0.3

Intersection Summary			
HCM 6th Ctrl Delay			9.1
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	27	19	141	23	29	23	1353	71	7	1103	62
Future Volume (veh/h)	95	27	19	141	23	29	23	1353	71	7	1103	62
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	29	3	153	25	4	25	1471	75	8	1199	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	257	66	313	202	314	50	31	2438	124	10	2388	129
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.19	0.04	1.00	1.00	0.01	0.70	0.69
Sat Flow, veh/h	1058	330	1564	1363	1570	251	1781	3441	175	1781	3428	186
Grp Volume(v), veh/h	132	0	3	153	0	29	25	757	789	8	621	643
Grp Sat Flow(s),veh/h/ln	1388	0	1564	1363	0	1821	1781	1777	1839	1781	1777	1837
Q Serve(g_s), s	10.7	0.0	0.2	15.5	0.0	1.8	2.0	0.0	0.0	0.6	22.8	22.9
Cycle Q Clear(g_c), s	12.5	0.0	0.2	28.0	0.0	1.8	2.0	0.0	0.0	0.6	22.8	22.9
Prop In Lane	0.78		1.00	1.00		0.14	1.00		0.10	1.00		0.10
Lane Grp Cap(c), veh/h	323	0	313	202	0	364	31	1259	1303	10	1238	1280
V/C Ratio(X)	0.41	0.00	0.01	0.76	0.00	0.08	0.80	0.60	0.61	0.78	0.50	0.50
Avail Cap(c_a), veh/h	323	0	313	202	0	364	140	1259	1303	140	1238	1280
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.91	0.91	0.91
Uniform Delay (d), s/veh	50.3	0.0	44.9	62.4	0.0	45.6	67.3	0.0	0.0	69.5	9.9	9.9
Incr Delay (d2), s/veh	0.8	0.0	0.0	15.1	0.0	0.1	1.6	0.2	0.2	34.5	1.3	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	0.1	6.4	0.0	0.8	0.9	0.1	0.1	0.4	8.8	9.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.1	0.0	44.9	77.5	0.0	45.7	68.9	0.2	0.2	104.0	11.2	11.2
LnGrp LOS	D	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		135			182			1571			1272	
Approach Delay, s/veh		51.0			72.4			1.3			11.8	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	101.5		32.0	4.8	103.2		32.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	88.0		27.0	11.0	88.0		27.0				
Max Q Clear Time (g_c+I1), s	4.0	24.9		30.0	2.6	2.0		14.5				
Green Ext Time (p_c), s	0.0	19.6		0.0	0.0	32.0		0.3				

Intersection Summary			
HCM 6th Ctrl Delay			11.7
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	83	32	101	64	985	22	585	156	493	924	26
Future Volume (veh/h)	7	83	32	101	64	985	22	585	156	493	924	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	8	90	3	110	70	0	24	636	100	536	1004	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	35	177	155	248	379		30	1011	853	591	2455	66
Arrive On Green	0.10	0.10	0.10	0.07	0.20	0.00	0.02	0.54	0.54	0.34	1.00	1.00
Sat Flow, veh/h	75	1762	1542	1781	1870	1585	1781	1870	1579	3456	3535	95
Grp Volume(v), veh/h	98	0	3	110	70	0	24	636	100	536	505	526
Grp Sat Flow(s),veh/h/ln	1837	0	1542	1781	1870	1585	1781	1870	1579	1728	1777	1853
Q Serve(g_s), s	0.1	0.0	0.2	7.5	4.3	0.0	1.9	33.2	4.3	20.7	0.0	0.0
Cycle Q Clear(g_c), s	7.0	0.0	0.2	7.5	4.3	0.0	1.9	33.2	4.3	20.7	0.0	0.0
Prop In Lane	0.08		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	212	0	155	248	379		30	1011	853	591	1234	1287
V/C Ratio(X)	0.46	0.00	0.02	0.44	0.18		0.80	0.63	0.12	0.91	0.41	0.41
Avail Cap(c_a), veh/h	328	0	253	256	508		178	1011	853	839	1234	1287
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.83	0.83	0.83
Uniform Delay (d), s/veh	59.8	0.0	56.8	49.4	46.2	0.0	68.6	22.4	15.8	45.0	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	1.2	0.2	0.0	13.2	2.4	0.2	7.1	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	0.0	0.1	3.5	2.1	0.0	1.0	14.9	1.6	8.1	0.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.4	0.0	56.8	50.7	46.4	0.0	81.8	24.8	16.0	52.1	0.8	0.8
LnGrp LOS	E	A	E	D	D		F	C	B	D	A	A
Approach Vol, veh/h		101			180	A		760			1567	
Approach Delay, s/veh		61.2			49.0			25.4			18.3	
Approach LOS		E			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	6.4	101.2	14.4	18.0	27.9	79.7		32.4
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	14.0	75.0	10.0	22.0	34.0	55.0		37.0
Max Q Clear Time (g_c+I1), s	3.9	2.0	9.5	9.0	22.7	35.2		6.3
Green Ext Time (p_c), s	0.0	13.9	0.0	0.2	1.2	6.8		0.2

Intersection Summary	
HCM 6th Ctrl Delay	24.2
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Existing PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	8	345	36	14	3	352	194	22	2	252	72
Future Volume (veh/h)	53	8	345	36	14	3	352	194	22	2	252	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	58	9	23	39	15	1	383	211	21	2	274	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	296	35	179	222	64	3	478	876	87	4	480	407
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.27	0.52	0.52	0.00	0.26	0.26
Sat Flow, veh/h	1280	314	1585	736	570	24	1781	1674	167	1781	1870	1585
Grp Volume(v), veh/h	67	0	23	55	0	0	383	0	232	2	274	19
Grp Sat Flow(s),veh/h/ln	1594	0	1585	1331	0	0	1781	0	1840	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.6	0.5	0.0	0.0	8.9	0.0	3.0	0.0	5.6	0.4
Cycle Q Clear(g_c), s	1.5	0.0	0.6	2.1	0.0	0.0	8.9	0.0	3.0	0.0	5.6	0.4
Prop In Lane	0.87		1.00	0.71		0.02	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	332	0	179	289	0	0	478	0	963	4	480	407
V/C Ratio(X)	0.20	0.00	0.13	0.19	0.00	0.00	0.80	0.00	0.24	0.50	0.57	0.05
Avail Cap(c_a), veh/h	954	0	861	930	0	0	1210	0	3291	605	2709	2296
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.0	0.0	17.6	18.2	0.0	0.0	15.1	0.0	5.7	22.0	14.3	12.4
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.3	0.0	0.0	3.2	0.0	0.3	72.1	2.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.2	0.5	0.0	0.0	3.3	0.0	0.8	0.1	2.2	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.3	0.0	18.0	18.5	0.0	0.0	18.2	0.0	6.0	94.1	16.6	12.5
LnGrp LOS	B	A	B	B	A	A	B	A	A	F	B	B
Approach Vol, veh/h		90			55			615			295	
Approach Delay, s/veh		18.2			18.5			13.6			16.8	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.1	29.1		10.0	16.9	17.3		10.0				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.0	5.0		3.5	10.9	7.6		4.1				
Green Ext Time (p_c), s	0.0	3.0		0.3	1.1	3.7		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			15.2									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	18	135	41	14	7	179	493	40	21	496	75
Future Volume (veh/h)	68	18	135	41	14	7	179	493	40	21	496	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	74	20	12	45	15	1	195	536	0	23	539	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	285	50	193	259	212	14	482	902		438	739	623
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.10	0.48	0.00	0.02	0.40	0.40
Sat Flow, veh/h	1090	412	1585	1377	1734	116	1781	1870	1585	1781	1870	1577
Grp Volume(v), veh/h	94	0	12	45	0	16	195	536	0	23	539	32
Grp Sat Flow(s),veh/h/ln	1501	0	1585	1377	0	1850	1781	1870	1585	1781	1870	1577
Q Serve(g_s), s	2.1	0.0	0.3	1.3	0.0	0.3	2.5	8.8	0.0	0.3	10.3	0.5
Cycle Q Clear(g_c), s	2.4	0.0	0.3	3.8	0.0	0.3	2.5	8.8	0.0	0.3	10.3	0.5
Prop In Lane	0.79		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	336	0	193	259	0	226	482	902		438	739	623
V/C Ratio(X)	0.28	0.00	0.06	0.17	0.00	0.07	0.40	0.59		0.05	0.73	0.05
Avail Cap(c_a), veh/h	1029	0	938	906	0	1095	929	2258		1041	2258	1904
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.3	0.0	16.4	19.1	0.0	16.4	7.4	7.9	0.0	7.7	10.9	7.9
Incr Delay (d2), s/veh	0.5	0.0	0.1	0.3	0.0	0.1	0.5	0.6	0.0	0.0	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.1	0.4	0.0	0.1	0.6	2.4	0.0	0.1	3.3	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.8	0.0	16.5	19.4	0.0	16.6	8.0	8.6	0.0	7.8	12.3	7.9
LnGrp LOS	B	A	B	B	A	B	A	A		A	B	A
Approach Vol, veh/h		106			61			731	A		594	
Approach Delay, s/veh		17.6			18.7			8.4			11.8	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.7	26.4		10.2	9.4	22.7		10.2
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.3	10.8		4.4	4.5	12.3		5.8
Green Ext Time (p_c), s	0.0	3.8		0.5	0.4	3.9		0.1

Intersection Summary			
HCM 6th Ctrl Delay			10.9
HCM 6th LOS			B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	3	88	9	5	6	151	703	7	1	670	70
Future Volume (veh/h)	53	3	88	9	5	6	151	703	7	1	670	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	58	3	7	10	5	2	164	764	5	1	728	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	64	148	18	184	152	210	1076	912	3	857	725
Arrive On Green	0.04	0.13	0.13	0.01	0.10	0.10	0.12	0.58	0.58	0.00	0.46	0.46
Sat Flow, veh/h	1781	489	1142	1781	1870	1546	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	58	0	10	10	5	2	164	764	5	1	728	35
Grp Sat Flow(s),veh/h/ln	1781	0	1631	1781	1870	1546	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	2.3	0.0	0.4	0.4	0.2	0.1	6.3	20.7	0.1	0.0	24.4	0.9
Cycle Q Clear(g_c), s	2.3	0.0	0.4	0.4	0.2	0.1	6.3	20.7	0.1	0.0	24.4	0.9
Prop In Lane	1.00		0.70	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	75	0	212	18	184	152	210	1076	912	3	857	725
V/C Ratio(X)	0.78	0.00	0.05	0.56	0.03	0.01	0.78	0.71	0.01	0.40	0.85	0.05
Avail Cap(c_a), veh/h	505	0	485	505	557	460	631	1723	1460	631	1723	1457
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.5	0.0	26.9	34.8	28.8	28.7	30.2	10.7	6.4	35.2	17.0	10.6
Incr Delay (d2), s/veh	15.5	0.0	0.1	24.2	0.1	0.0	6.2	0.9	0.0	78.4	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.1	0.3	0.1	0.0	2.9	7.0	0.0	0.1	9.5	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.0	0.0	26.9	59.0	28.8	28.8	36.4	11.6	6.4	113.6	19.4	10.6
LnGrp LOS	D	A	C	E	C	C	D	B	A	F	B	B
Approach Vol, veh/h		68			17			933			764	
Approach Delay, s/veh		45.8			46.5			15.9			19.1	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.1	45.6	5.7	14.2	13.3	37.3	8.0	11.9				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0				
Max Q Clear Time (g_c+I1), s	2.0	22.7	2.4	2.4	8.3	26.4	4.3	2.2				
Green Ext Time (p_c), s	0.0	6.4	0.0	0.0	0.4	6.0	0.1	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			18.7									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	4	546	75	10	7	548	757	6	1	708	16
Future Volume (veh/h)	70	4	546	75	10	7	548	757	6	1	708	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	76	4	0	82	11	6	596	823	7	1	770	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	232	7		207	16	9	652	2550	22	2	1211	540
Arrive On Green	0.10	0.09	0.00	0.10	0.09	0.09	0.37	0.71	0.71	0.00	0.34	0.34
Sat Flow, veh/h	1529	81	1585	1322	177	97	1781	3611	31	1781	3554	1585
Grp Volume(v), veh/h	80	0	0	99	0	0	596	405	425	1	770	4
Grp Sat Flow(s),veh/h/ln	1610	0	1585	1596	0	0	1781	1777	1865	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.9	0.0	0.0	23.4	6.4	6.4	0.0	13.4	0.1
Cycle Q Clear(g_c), s	3.1	0.0	0.0	4.0	0.0	0.0	23.4	6.4	6.4	0.0	13.4	0.1
Prop In Lane	0.95		1.00	0.83		0.06	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	261	0		253	0	0	652	1255	1317	2	1211	540
V/C Ratio(X)	0.31	0.00		0.39	0.00	0.00	0.91	0.32	0.32	0.41	0.64	0.01
Avail Cap(c_a), veh/h	519	0		619	0	0	1720	1667	1750	1720	3335	1487
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.5	0.0	0.0	31.9	0.0	0.0	22.2	4.1	4.1	36.7	20.4	16.0
Incr Delay (d2), s/veh	0.7	0.0	0.0	1.0	0.0	0.0	2.2	0.3	0.3	36.8	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.0	1.7	0.0	0.0	9.2	1.6	1.7	0.0	5.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.1	0.0	0.0	32.9	0.0	0.0	24.4	4.4	4.4	73.5	21.6	16.0
LnGrp LOS	C	A		C	A	A	C	A	A	E	C	B
Approach Vol, veh/h		80	A		99			1426			775	
Approach Delay, s/veh		32.1			32.9			12.8			21.6	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	30.9	31.1		11.5	4.1	57.9		11.5
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0
Max Q Clear Time (g_c+I1), s	25.4	15.4		6.0	2.0	8.4		5.1
Green Ext Time (p_c), s	1.5	9.6		0.3	0.0	9.7		0.2

Intersection Summary	
HCM 6th Ctrl Delay	17.1
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1	63	14	0	4	68	1272	10	8	1332	33
Future Volume (veh/h)	20	1	63	14	0	4	68	1272	10	8	1332	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.96	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	1	2	15	0	1	74	1383	11	9	1448	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	248	9	166	225	3	9	95	2483	20	12	2276	1015
Arrive On Green	0.12	0.11	0.11	0.12	0.00	0.11	0.05	0.69	0.69	0.01	0.64	0.64
Sat Flow, veh/h	1360	81	1520	1165	26	79	1781	3613	29	1781	3554	1585
Grp Volume(v), veh/h	23	0	2	16	0	0	74	680	714	9	1448	23
Grp Sat Flow(s),veh/h/ln	1441	0	1520	1271	0	0	1781	1777	1865	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.1	0.6	0.0	0.0	2.9	13.8	13.8	0.4	17.6	0.4
Cycle Q Clear(g_c), s	0.8	0.0	0.1	1.4	0.0	0.0	2.9	13.8	13.8	0.4	17.6	0.4
Prop In Lane	0.96		1.00	0.94		0.06	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	277	0	166	255	0	0	95	1221	1282	12	2276	1015
V/C Ratio(X)	0.08	0.00	0.01	0.06	0.00	0.00	0.78	0.56	0.56	0.74	0.64	0.02
Avail Cap(c_a), veh/h	572	0	490	548	0	0	525	2143	2250	275	3788	1690
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.2	0.0	28.3	28.6	0.0	0.0	33.3	5.6	5.6	35.3	7.8	4.7
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.9	0.8	26.7	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.2	0.0	0.0	1.3	3.7	3.8	0.2	5.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.3	0.0	28.3	28.7	0.0	0.0	38.3	6.5	6.5	62.1	8.4	4.7
LnGrp LOS	C	A	C	C	A	A	D	A	A	E	A	A
Approach Vol, veh/h		25			16			1468			1480	
Approach Delay, s/veh		28.3			28.7			8.1			8.7	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.8	50.7		12.8	4.5	54.0		12.8
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	4.9	19.6		3.4	2.4	15.8		2.8
Green Ext Time (p_c), s	0.0	26.0		0.0	0.0	24.2		0.0

Intersection Summary		
HCM 6th Ctrl Delay		8.7
HCM 6th LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	5	164	63	4	40	121	1208	55	29	1332	83
Future Volume (veh/h)	64	5	164	63	4	40	121	1208	55	29	1332	83
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	70	5	3	68	4	1	132	1313	45	32	1448	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	197	13	186	139	172	43	153	2724	1214	42	2502	1116
Arrive On Green	0.13	0.12	0.12	0.12	0.12	0.12	0.09	0.77	0.77	0.02	0.70	0.70
Sat Flow, veh/h	1295	105	1561	1391	1439	360	1781	3554	1584	1781	3554	1585
Grp Volume(v), veh/h	75	0	3	68	0	5	132	1313	45	32	1448	65
Grp Sat Flow(s),veh/h/ln	1401	0	1561	1391	0	1799	1781	1777	1584	1781	1777	1585
Q Serve(g_s), s	7.9	0.0	0.3	7.9	0.0	0.4	12.1	22.6	1.1	2.9	33.6	2.1
Cycle Q Clear(g_c), s	8.3	0.0	0.3	16.2	0.0	0.4	12.1	22.6	1.1	2.9	33.6	2.1
Prop In Lane	0.93		1.00	1.00		0.20	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	218	0	186	139	0	214	153	2724	1214	42	2502	1116
V/C Ratio(X)	0.34	0.00	0.02	0.49	0.00	0.02	0.86	0.48	0.04	0.77	0.58	0.06
Avail Cap(c_a), veh/h	255	0	227	176	0	262	227	2724	1214	108	2502	1116
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.78	0.78	0.78	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.3	0.0	64.1	75.2	0.0	64.2	74.5	7.1	4.6	80.1	12.2	7.5
Incr Delay (d2), s/veh	0.9	0.0	0.0	2.6	0.0	0.0	11.3	0.5	0.0	10.6	1.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.1	2.9	0.0	0.2	6.0	8.1	0.4	1.5	13.1	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.3	0.0	64.2	77.8	0.0	64.2	85.8	7.6	4.7	90.7	13.2	7.6
LnGrp LOS	E	A	E	E	A	E	F	A	A	F	B	A
Approach Vol, veh/h		78			73			1490			1545	
Approach Delay, s/veh		68.1			76.9			14.4			14.6	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.2	122.2		24.7	7.8	132.5		24.7				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	21.0	105.0		24.0	10.0	116.0		24.0				
Max Q Clear Time (g_c+I1), s	14.1	35.6		18.2	4.9	24.6		10.3				
Green Ext Time (p_c), s	0.1	29.2		0.1	0.0	25.6		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			17.2									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	265	2	597	13	0	4	374	1240	6	48	1416	120
Future Volume (veh/h)	265	2	597	13	0	4	374	1240	6	48	1416	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	288	2	453	14	0	1	407	1348	7	52	1539	94
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	350	2	929	78	0	6	494	2222	12	92	1853	826
Arrive On Green	0.20	0.20	0.19	0.05	0.00	0.03	0.14	0.61	0.60	0.05	0.52	0.52
Sat Flow, veh/h	1770	12	2761	1644	0	117	3456	3625	19	1781	3554	1585
Grp Volume(v), veh/h	290	0	453	15	0	0	407	661	694	52	1539	94
Grp Sat Flow(s),veh/h/ln	1782	0	1380	1761	0	0	1728	1777	1867	1781	1777	1585
Q Serve(g_s), s	27.6	0.0	23.1	1.4	0.0	0.0	20.2	40.5	40.5	5.0	64.6	5.3
Cycle Q Clear(g_c), s	27.6	0.0	23.1	1.4	0.0	0.0	20.2	40.5	40.5	5.0	64.6	5.3
Prop In Lane	0.99		1.00	0.93		0.07	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	352	0	929	84	0	0	494	1089	1144	92	1853	826
V/C Ratio(X)	0.82	0.00	0.49	0.18	0.00	0.00	0.82	0.61	0.61	0.57	0.83	0.11
Avail Cap(c_a), veh/h	565	0	1258	349	0	0	841	2102	2209	212	3762	1678
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.9	0.0	46.7	80.9	0.0	0.0	73.5	21.1	21.1	81.9	35.7	21.5
Incr Delay (d2), s/veh	2.4	0.0	0.1	0.4	0.0	0.0	1.3	0.8	0.7	2.0	1.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.9	0.0	8.1	0.7	0.0	0.0	9.1	16.9	17.8	2.4	28.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.4	0.0	46.9	81.3	0.0	0.0	74.9	21.9	21.8	83.9	37.1	21.6
LnGrp LOS	E	A	D	F	A	A	E	C	C	F	D	C
Approach Vol, veh/h		743			15			1762			1685	
Approach Delay, s/veh		56.1			81.3			34.1			37.7	
Approach LOS		E			F			C			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	29.3	96.1		12.4	13.1	112.2		38.9
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	41.0	185.0		32.0	19.0	207.0		53.0
Max Q Clear Time (g_c+I1), s	22.2	66.6		3.4	7.0	42.5		29.6
Green Ext Time (p_c), s	1.0	23.5		0.0	0.0	14.4		2.3

Intersection Summary		
HCM 6th Ctrl Delay		39.6
HCM 6th LOS		D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	4	85	2	53	9	1563	88	77	1953	4
Future Volume (veh/h)	7	0	4	85	2	53	9	1563	88	77	1953	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	8	0	1	92	2	3	10	1699	94	84	2123	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	154	3	13	175	57	85	21	2620	144	110	2967	6
Arrive On Green	0.08	0.00	0.08	0.08	0.08	0.08	0.01	0.76	0.76	0.06	0.82	0.81
Sat Flow, veh/h	1229	36	158	1416	675	1013	1781	3425	188	1781	3639	7
Grp Volume(v), veh/h	9	0	0	92	0	5	10	876	917	84	1036	1091
Grp Sat Flow(s),veh/h/ln	1423	0	0	1416	0	1688	1781	1777	1836	1781	1777	1869
Q Serve(g_s), s	0.5	0.0	0.0	7.5	0.0	0.4	0.8	30.9	31.7	6.3	34.9	35.0
Cycle Q Clear(g_c), s	0.8	0.0	0.0	8.4	0.0	0.4	0.8	30.9	31.7	6.3	34.9	35.0
Prop In Lane	0.89		0.11	1.00		0.60	1.00		0.10	1.00		0.00
Lane Grp Cap(c), veh/h	170	0	0	175	0	142	21	1359	1405	110	1449	1524
V/C Ratio(X)	0.05	0.00	0.00	0.53	0.00	0.04	0.48	0.64	0.65	0.76	0.72	0.72
Avail Cap(c_a), veh/h	304	0	0	307	0	300	145	1359	1405	251	1449	1524
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.73	0.73	0.73	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.0	0.0	0.0	60.3	0.0	57.0	66.3	7.4	7.5	62.3	5.5	5.5
Incr Delay (d2), s/veh	0.1	0.0	0.0	2.4	0.0	0.1	4.7	1.7	1.7	4.0	3.1	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	3.2	0.0	0.2	0.4	10.5	11.2	3.0	10.8	11.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.2	0.0	0.0	62.8	0.0	57.1	71.0	9.1	9.2	66.4	8.6	8.4
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	A	A
Approach Vol, veh/h		9			97			1803			2211	
Approach Delay, s/veh		57.2			62.5			9.5			10.7	
Approach LOS		E			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.6	114.1		15.4	12.4	107.3		15.4
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	87.0		23.0	19.0	79.0		23.0
Max Q Clear Time (g_c+I1), s	2.8	37.0		10.4	8.3	33.7		2.8
Green Ext Time (p_c), s	0.0	40.9		0.2	0.1	30.7		0.0

Intersection Summary		
HCM 6th Ctrl Delay		11.5
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	11	8	59	5	7	5	1504	20	2	1646	293
Future Volume (veh/h)	160	11	8	59	5	7	5	1504	20	2	1646	293
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	12	7	64	5	5	5	1635	21	2	1789	242
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	254	14	8	261	20	17	7	2732	35	3	2694	1202
Arrive On Green	0.15	0.15	0.14	0.15	0.15	0.14	0.01	1.00	1.00	0.00	0.76	0.76
Sat Flow, veh/h	1360	94	55	1413	137	112	1781	3593	46	1781	3554	1585
Grp Volume(v), veh/h	193	0	0	74	0	0	5	808	848	2	1789	242
Grp Sat Flow(s),veh/h/ln	1509	0	0	1663	0	0	1781	1777	1862	1781	1777	1585
Q Serve(g_s), s	11.5	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.2	33.1	5.9
Cycle Q Clear(g_c), s	16.6	0.0	0.0	5.2	0.0	0.0	0.4	0.0	0.0	0.2	33.1	5.9
Prop In Lane	0.90		0.04	0.86		0.07	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	276	0	0	298	0	0	7	1351	1416	3	2694	1202
V/C Ratio(X)	0.70	0.00	0.00	0.25	0.00	0.00	0.74	0.60	0.60	0.70	0.66	0.20
Avail Cap(c_a), veh/h	380	0	0	402	0	0	106	1351	1416	106	2694	1202
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.73	0.73	0.73	0.60	0.60	0.60
Uniform Delay (d), s/veh	55.6	0.0	0.0	51.1	0.0	0.0	66.9	0.0	0.0	67.4	8.0	4.7
Incr Delay (d2), s/veh	3.4	0.0	0.0	0.4	0.0	0.0	34.1	1.4	1.4	51.1	0.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	0.0	0.0	2.3	0.0	0.0	0.2	0.5	0.5	0.1	11.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.0	0.0	0.0	51.5	0.0	0.0	101.1	1.4	1.4	118.5	8.7	4.9
LnGrp LOS	E	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		193			74			1661			2033	
Approach Delay, s/veh		59.0			51.5			1.7			8.4	
Approach LOS		E			D			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.5	106.3		24.1	4.2	106.6		24.1				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	84.0		29.0	8.0	84.0		29.0				
Max Q Clear Time (g_c+I1), s	2.4	35.1		7.2	2.2	2.0		18.6				
Green Ext Time (p_c), s	0.0	41.6		0.2	0.0	50.7		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			8.9									
HCM 6th LOS			A									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	138	35	44	91	23	17	51	1352	103	23	1596	136
Future Volume (veh/h)	138	35	44	91	23	17	51	1352	103	23	1596	136
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	150	38	5	99	25	2	55	1470	109	25	1735	144
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	280	59	333	165	366	29	70	2277	168	31	2184	179
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.08	1.00	1.00	0.02	0.66	0.65
Sat Flow, veh/h	1082	274	1550	1344	1706	136	1781	3355	248	1781	3325	273
Grp Volume(v), veh/h	188	0	5	99	0	27	55	775	804	25	917	962
Grp Sat Flow(s),veh/h/ln	1357	0	1550	1344	0	1842	1781	1777	1825	1781	1777	1820
Q Serve(g_s), s	16.2	0.0	0.3	9.8	0.0	1.6	4.1	0.0	0.0	1.9	49.4	52.0
Cycle Q Clear(g_c), s	17.8	0.0	0.3	27.6	0.0	1.6	4.1	0.0	0.0	1.9	49.4	52.0
Prop In Lane	0.80		1.00	1.00		0.07	1.00		0.14	1.00		0.15
Lane Grp Cap(c), veh/h	339	0	333	165	0	396	70	1206	1239	31	1167	1196
V/C Ratio(X)	0.55	0.00	0.02	0.60	0.00	0.07	0.78	0.64	0.65	0.80	0.79	0.80
Avail Cap(c_a), veh/h	339	0	333	165	0	396	106	1206	1239	106	1167	1196
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.67	0.67	0.67
Uniform Delay (d), s/veh	49.3	0.0	41.7	61.3	0.0	42.3	61.6	0.0	0.0	66.1	16.4	16.9
Incr Delay (d2), s/veh	2.0	0.0	0.0	6.0	0.0	0.1	1.0	0.2	0.2	11.0	3.7	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.0	0.1	3.7	0.0	0.7	1.8	0.1	0.1	1.0	19.7	21.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.3	0.0	41.8	67.2	0.0	42.3	62.6	0.2	0.2	77.1	20.1	20.9
LnGrp LOS	D	A	D	E	A	D	E	A	A	E	C	C
Approach Vol, veh/h		193			126			1634			1904	
Approach Delay, s/veh		51.0			61.9			2.3			21.2	
Approach LOS		D			E			A			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.3	92.7		33.0	6.4	95.6		33.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	85.0		28.0	8.0	85.0		28.0				
Max Q Clear Time (g_c+I1), s	6.1	54.0		29.6	3.9	2.0		19.8				
Green Ext Time (p_c), s	0.0	24.5		0.0	0.0	33.3		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			16.1
HCM 6th LOS			B

HCM 6th Signalized Intersection Summary
11: Honoapiilani Highway & Keawe Street

03/07/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	85	84	180	82	896	50	597	205	555	978	36
Future Volume (veh/h)	30	85	84	180	82	896	50	597	205	555	978	36
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.96	0.98		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	92	11	196	89	0	54	649	145	603	1063	37
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	78	179	199	292	466		70	884	744	654	2180	76
Arrive On Green	0.13	0.13	0.13	0.09	0.25	0.00	0.04	0.47	0.47	0.38	1.00	1.00
Sat Flow, veh/h	340	1366	1520	1781	1870	1585	1781	1870	1575	3456	3503	122
Grp Volume(v), veh/h	125	0	11	196	89	0	54	649	145	603	539	561
Grp Sat Flow(s),veh/h/ln	1706	0	1520	1781	1870	1585	1781	1870	1575	1728	1777	1848
Q Serve(g_s), s	5.1	0.0	0.9	12.0	5.1	0.0	4.1	37.8	7.2	22.5	0.0	0.0
Cycle Q Clear(g_c), s	9.0	0.0	0.9	12.0	5.1	0.0	4.1	37.8	7.2	22.5	0.0	0.0
Prop In Lane	0.26		1.00	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	257	0	199	292	466		70	884	744	654	1106	1150
V/C Ratio(X)	0.49	0.00	0.06	0.67	0.19		0.77	0.73	0.19	0.92	0.49	0.49
Avail Cap(c_a), veh/h	347	0	281	292	568		277	884	744	794	1106	1150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.88	0.88	0.88	0.56	0.56	0.56
Uniform Delay (d), s/veh	54.8	0.0	51.4	45.6	39.9	0.0	64.2	28.8	20.7	41.0	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.1	5.8	0.2	0.0	5.8	4.8	0.5	8.2	0.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	0.3	6.2	2.4	0.0	1.9	17.8	2.8	8.6	0.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.2	0.0	51.5	51.4	40.1	0.0	70.0	33.5	21.2	49.2	0.9	0.8
LnGrp LOS	E	A	D	D	D		E	C	C	D	A	A
Approach Vol, veh/h		136			285	A		848			1703	
Approach Delay, s/veh		55.8			47.9			33.8			18.0	
Approach LOS		E			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.3	88.0	16.0	21.7	29.6	67.8		37.7
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	60.0	11.0	24.0	31.0	50.0		40.0
Max Q Clear Time (g_c+I1), s	6.1	2.0	14.0	11.0	24.5	39.8		7.1
Green Ext Time (p_c), s	0.1	15.1	0.0	0.4	1.1	4.9		0.3

Intersection Summary	
HCM 6th Ctrl Delay	27.1
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Existing WE Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	22	305	25	28	12	250	276	19	10	251	87
Future Volume (veh/h)	39	22	305	25	28	12	250	276	19	10	251	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	24	30	27	30	6	272	300	19	11	273	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	244	101	195	190	123	19	360	814	52	15	513	434
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.20	0.47	0.47	0.01	0.27	0.27
Sat Flow, veh/h	780	816	1569	495	992	156	1781	1740	110	1781	1870	1582
Grp Volume(v), veh/h	66	0	30	63	0	0	272	0	319	11	273	29
Grp Sat Flow(s),veh/h/ln	1595	0	1569	1643	0	0	1781	0	1850	1781	1870	1582
Q Serve(g_s), s	0.1	0.0	0.7	0.0	0.0	0.0	5.8	0.0	4.4	0.2	5.0	0.5
Cycle Q Clear(g_c), s	1.3	0.0	0.7	1.2	0.0	0.0	5.8	0.0	4.4	0.2	5.0	0.5
Prop In Lane	0.64		1.00	0.43		0.10	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	345	0	195	332	0	0	360	0	866	15	513	434
V/C Ratio(X)	0.19	0.00	0.15	0.19	0.00	0.00	0.75	0.00	0.37	0.72	0.53	0.07
Avail Cap(c_a), veh/h	1061	0	940	1079	0	0	1333	0	3647	667	2987	2527
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	0.0	15.7	15.9	0.0	0.0	15.1	0.0	6.9	19.8	12.4	10.8
Incr Delay (d2), s/veh	0.3	0.0	0.4	0.3	0.0	0.0	3.2	0.0	0.6	46.7	1.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.2	0.5	0.0	0.0	2.2	0.0	1.2	0.3	1.8	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.2	0.0	16.0	16.2	0.0	0.0	18.3	0.0	7.4	66.5	14.2	10.9
LnGrp LOS	B	A	B	B	A	A	B	A	A	E	B	B
Approach Vol, veh/h		96			63			591			313	
Approach Delay, s/veh		16.1			16.2			12.4			15.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.3	24.8		10.0	13.1	17.0		10.0				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.2	6.4		3.3	7.8	7.0		3.2				
Green Ext Time (p_c), s	0.0	4.3		0.4	0.8	3.8		0.3				

Intersection Summary			
HCM 6th Ctrl Delay			13.9
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	16	176	35	15	5	118	375	22	12	414	55
Future Volume (veh/h)	52	16	176	35	15	5	118	375	22	12	414	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	17	21	38	16	1	128	408	0	13	450	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	323	75	239	341	267	17	458	779		454	655	553
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.08	0.42	0.00	0.01	0.35	0.35
Sat Flow, veh/h	1014	491	1560	1351	1740	109	1781	1870	1585	1781	1870	1578
Grp Volume(v), veh/h	74	0	21	38	0	17	128	408	0	13	450	22
Grp Sat Flow(s),veh/h/ln	1504	0	1560	1351	0	1849	1781	1870	1585	1781	1870	1578
Q Serve(g_s), s	1.0	0.0	0.4	1.0	0.0	0.3	1.7	6.2	0.0	0.2	7.8	0.3
Cycle Q Clear(g_c), s	1.5	0.0	0.4	2.5	0.0	0.3	1.7	6.2	0.0	0.2	7.8	0.3
Prop In Lane	0.77		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	398	0	239	341	0	283	458	779		454	655	553
V/C Ratio(X)	0.19	0.00	0.09	0.11	0.00	0.06	0.28	0.52		0.03	0.69	0.04
Avail Cap(c_a), veh/h	1135	0	1024	1022	0	1214	1024	2506		1138	2506	2114
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.3	0.0	13.8	15.4	0.0	13.8	7.7	8.3	0.0	8.0	10.6	8.1
Incr Delay (d2), s/veh	0.2	0.0	0.2	0.1	0.0	0.1	0.3	0.5	0.0	0.0	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.1	0.3	0.0	0.1	0.4	1.7	0.0	0.1	2.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.5	0.0	14.0	15.6	0.0	13.9	8.0	8.8	0.0	8.0	11.9	8.2
LnGrp LOS	B	A	B	B	A	B	A	A		A	B	A
Approach Vol, veh/h		95			55			536	A		485	
Approach Delay, s/veh		14.4			15.0			8.6			11.6	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	21.8		10.8	7.9	19.3		10.8
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	8.2		3.5	3.7	9.8		4.5
Green Ext Time (p_c), s	0.0	2.7		0.4	0.2	3.1		0.1

Intersection Summary		
HCM 6th Ctrl Delay		10.6
HCM 6th LOS		B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	5	74	10	2	10	70	462	11	4	581	45
Future Volume (veh/h)	37	5	74	10	2	10	70	462	11	4	581	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	40	5	5	11	2	1	76	502	7	4	632	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	94	94	20	163	138	99	898	761	6	801	678
Arrive On Green	0.03	0.11	0.11	0.01	0.09	0.09	0.06	0.48	0.48	0.00	0.43	0.43
Sat Flow, veh/h	1781	854	854	1781	1870	1585	1781	1870	1585	1781	1870	1583
Grp Volume(v), veh/h	40	0	10	11	2	1	76	502	7	4	632	23
Grp Sat Flow(s),veh/h/ln	1781	0	1709	1781	1870	1585	1781	1870	1585	1781	1870	1583
Q Serve(g_s), s	1.1	0.0	0.3	0.3	0.0	0.0	2.1	9.6	0.1	0.1	14.8	0.4
Cycle Q Clear(g_c), s	1.1	0.0	0.3	0.3	0.0	0.0	2.1	9.6	0.1	0.1	14.8	0.4
Prop In Lane	1.00		0.50	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	61	0	187	20	163	138	99	898	761	6	801	678
V/C Ratio(X)	0.66	0.00	0.05	0.55	0.01	0.01	0.77	0.56	0.01	0.69	0.79	0.03
Avail Cap(c_a), veh/h	705	0	710	705	777	658	881	2404	2038	881	2404	2035
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.1	0.0	20.2	24.9	21.1	21.1	23.6	9.3	6.9	25.2	12.5	8.4
Incr Delay (d2), s/veh	11.6	0.0	0.1	21.0	0.0	0.0	11.7	0.5	0.0	91.4	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.1	0.2	0.0	0.0	1.1	3.0	0.0	0.2	5.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.7	0.0	20.3	45.8	21.1	21.1	35.3	9.9	6.9	116.6	14.3	8.4
LnGrp LOS	D	A	C	D	C	C	D	A	A	F	B	A
Approach Vol, veh/h		50			14			585			659	
Approach Delay, s/veh		32.6			40.5			13.1			14.7	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	29.3	5.6	10.5	7.8	26.6	6.7	9.4
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.1	11.6	2.3	2.3	4.1	16.8	3.1	2.0
Green Ext Time (p_c), s	0.0	3.5	0.0	0.0	0.2	4.9	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	15.0
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	9	536	9	0	1	356	501	5	0	632	47
Future Volume (veh/h)	48	9	536	9	0	1	356	501	5	0	632	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	52	10	0	10	0	1	387	545	5	0	687	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	216	15		228	5	9	467	2565	24	4	1303	579
Arrive On Green	0.08	0.06	0.00	0.08	0.00	0.06	0.26	0.71	0.71	0.00	0.37	0.37
Sat Flow, veh/h	1250	240	1585	1367	80	145	1781	3608	33	1781	3554	1579
Grp Volume(v), veh/h	62	0	0	11	0	0	387	268	282	0	687	15
Grp Sat Flow(s),veh/h/ln	1491	0	1585	1592	0	0	1781	1777	1864	1781	1777	1579
Q Serve(g_s), s	1.6	0.0	0.0	0.0	0.0	0.0	10.0	2.5	2.5	0.0	7.4	0.3
Cycle Q Clear(g_c), s	1.9	0.0	0.0	0.3	0.0	0.0	10.0	2.5	2.5	0.0	7.4	0.3
Prop In Lane	0.84		1.00	0.91		0.09	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	262	0		275	0	0	467	1263	1325	4	1303	579
V/C Ratio(X)	0.24	0.00		0.04	0.00	0.00	0.83	0.21	0.21	0.00	0.53	0.03
Avail Cap(c_a), veh/h	768	0		910	0	0	2586	2507	2630	2586	5013	2227
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	21.9	0.0	0.0	21.1	0.0	0.0	17.0	2.4	2.4	0.0	12.2	9.9
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.1	0.0	0.0	1.5	0.2	0.2	0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.1	0.0	0.0	3.6	0.3	0.3	0.0	2.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.3	0.0	0.0	21.2	0.0	0.0	18.5	2.6	2.6	0.0	12.9	9.9
LnGrp LOS	C	A		C	A	A	B	A	A	A	B	A
Approach Vol, veh/h		62	A		11			937			702	
Approach Delay, s/veh		22.3			21.2			9.1			12.8	
Approach LOS		C			C			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.8	23.9		8.1	0.0	40.8		8.1				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0				
Max Q Clear Time (g_c+I1), s	12.0	9.4		2.3	0.0	4.5		3.9				
Green Ext Time (p_c), s	0.9	8.5		0.0	0.0	5.6		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			11.2									
HCM 6th LOS			B									

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	2	66	14	2	12	43	826	15	9	1141	39
Future Volume (veh/h)	26	2	66	14	2	12	43	826	15	9	1141	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	28	2	1	15	2	1	47	898	15	10	1240	26
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	241	12	131	208	22	6	57	2323	39	14	2221	988
Arrive On Green	0.10	0.08	0.08	0.10	0.08	0.08	0.03	0.65	0.65	0.01	0.62	0.62
Sat Flow, veh/h	1330	143	1549	1018	260	75	1781	3577	60	1781	3554	1581
Grp Volume(v), veh/h	30	0	1	18	0	0	47	446	467	10	1240	26
Grp Sat Flow(s),veh/h/ln	1473	0	1549	1353	0	0	1781	1777	1860	1781	1777	1581
Q Serve(g_s), s	0.0	0.0	0.0	0.1	0.0	0.0	1.4	6.4	6.4	0.3	10.9	0.3
Cycle Q Clear(g_c), s	0.8	0.0	0.0	0.9	0.0	0.0	1.4	6.4	6.4	0.3	10.9	0.3
Prop In Lane	0.93		1.00	0.83		0.06	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	280	0	131	261	0	0	57	1154	1208	14	2221	988
V/C Ratio(X)	0.11	0.00	0.01	0.07	0.00	0.00	0.82	0.39	0.39	0.73	0.56	0.03
Avail Cap(c_a), veh/h	760	0	657	749	0	0	690	2819	2950	361	4982	2217
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.7	0.0	22.7	22.6	0.0	0.0	26.1	4.4	4.4	26.8	5.9	3.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	10.1	0.5	0.4	23.3	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.2	0.0	0.0	0.7	1.4	1.5	0.2	2.6	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.7	0.0	22.7	22.7	0.0	0.0	36.2	4.9	4.9	50.1	6.3	3.9
LnGrp LOS	C	A	C	C	A	A	D	A	A	D	A	A
Approach Vol, veh/h		31			18			960			1276	
Approach Delay, s/veh		22.7			22.7			6.4			6.6	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.7	38.9		9.6	4.4	40.2		9.6
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	3.4	12.9		2.9	2.3	8.4		2.8
Green Ext Time (p_c), s	0.0	21.0		0.0	0.0	11.4		0.0

Intersection Summary		
HCM 6th Ctrl Delay		6.9
HCM 6th LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	2	167	38	3	27	101	782	45	27	1114	63
Future Volume (veh/h)	48	2	167	38	3	27	101	782	45	27	1114	63
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	52	2	17	41	3	3	110	850	28	29	1211	34
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	326	10	261	288	141	141	144	2070	923	55	1894	845
Arrive On Green	0.18	0.17	0.17	0.17	0.17	0.17	0.08	0.58	0.58	0.03	0.53	0.53
Sat Flow, veh/h	1344	63	1579	1389	856	856	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	54	0	17	41	0	6	110	850	28	29	1211	34
Grp Sat Flow(s),veh/h/ln	1407	0	1579	1389	0	1713	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	2.1	0.0	0.6	1.8	0.0	0.2	4.1	8.9	0.5	1.1	16.4	0.7
Cycle Q Clear(g_c), s	2.3	0.0	0.6	4.1	0.0	0.2	4.1	8.9	0.5	1.1	16.4	0.7
Prop In Lane	0.96		1.00	1.00		0.50	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	357	0	261	288	0	283	144	2070	923	55	1894	845
V/C Ratio(X)	0.15	0.00	0.07	0.14	0.00	0.02	0.77	0.41	0.03	0.52	0.64	0.04
Avail Cap(c_a), veh/h	625	0	559	551	0	606	552	3617	1613	315	3145	1403
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.2	0.0	23.9	26.4	0.0	23.7	30.5	7.8	6.0	32.4	11.2	7.6
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.2	0.0	0.0	3.2	0.3	0.0	2.8	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	0.6	0.0	0.1	1.8	2.7	0.1	0.5	5.4	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.4	0.0	24.0	26.6	0.0	23.7	33.7	8.0	6.0	35.2	12.0	7.6
LnGrp LOS	C	A	C	C	A	C	C	A	A	D	B	A
Approach Vol, veh/h		71			47			988			1274	
Approach Delay, s/veh		24.3			26.2			10.8			12.4	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.5	42.1		16.2	6.1	45.5		16.2
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	60.0		24.0	12.0	69.0		24.0
Max Q Clear Time (g_c+I1), s	6.1	18.4		6.1	3.1	10.9		4.3
Green Ext Time (p_c), s	0.2	17.8		0.1	0.0	11.5		0.2

Intersection Summary			
HCM 6th Ctrl Delay			12.4
HCM 6th LOS			B

7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street

03/07/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	204	1	432	12	3	15	280	908	12	25	1141	136
Future Volume (veh/h)	204	1	432	12	3	15	280	908	12	25	1141	136
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	222	1	255	13	3	4	304	987	13	27	1240	107
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	322	1	846	58	13	18	455	1930	25	125	1690	753
Arrive On Green	0.18	0.18	0.17	0.05	0.05	0.02	0.13	0.54	0.52	0.07	0.48	0.48
Sat Flow, veh/h	1774	8	2790	1138	263	350	3456	3591	47	1781	3554	1584
Grp Volume(v), veh/h	223	0	255	20	0	0	304	488	512	27	1240	107
Grp Sat Flow(s),veh/h/ln	1782	0	1395	1750	0	0	1728	1777	1862	1781	1777	1584
Q Serve(g_s), s	11.7	0.0	7.0	1.1	0.0	0.0	8.4	17.5	17.5	1.4	28.1	3.8
Cycle Q Clear(g_c), s	11.7	0.0	7.0	1.1	0.0	0.0	8.4	17.5	17.5	1.4	28.1	3.8
Prop In Lane	1.00		1.00	0.65		0.20	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	323	0	846	90	0	0	455	955	1001	125	1690	753
V/C Ratio(X)	0.69	0.00	0.30	0.22	0.00	0.00	0.67	0.51	0.51	0.22	0.73	0.14
Avail Cap(c_a), veh/h	998	0	1902	613	0	0	1486	3713	3890	374	6644	2962
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.3	0.0	26.7	45.8	0.0	0.0	41.3	14.8	14.8	43.9	21.1	14.7
Incr Delay (d2), s/veh	1.0	0.0	0.1	0.5	0.0	0.0	0.6	0.6	0.6	0.3	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.0	2.3	0.5	0.0	0.0	3.5	6.7	7.0	0.6	11.1	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.3	0.0	26.8	46.3	0.0	0.0	42.0	15.4	15.4	44.2	22.0	14.9
LnGrp LOS	D	A	C	D	A	A	D	B	B	D	C	B
Approach Vol, veh/h		478			20			1304			1374	
Approach Delay, s/veh		32.6			46.3			21.6			21.9	
Approach LOS		C			D			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.2	51.6		9.1	11.0	57.8		22.1				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	41.0	185.0		32.0	19.0	207.0		53.0				
Max Q Clear Time (g_c+I1), s	10.4	30.1		3.1	3.4	19.5		13.7				
Green Ext Time (p_c), s	0.8	15.5		0.0	0.0	8.3		1.4				
Intersection Summary												
HCM 6th Ctrl Delay			23.5									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	3	130	1	51	2	1083	83	78	1558	6
Future Volume (veh/h)	2	0	3	130	1	51	2	1083	83	78	1558	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2	0	1	141	1	4	2	1177	86	85	1693	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	157	9	60	228	40	159	5	2430	177	111	2844	12
Arrive On Green	0.12	0.00	0.11	0.12	0.12	0.11	0.00	0.96	0.95	0.06	0.78	0.78
Sat Flow, veh/h	915	74	495	1416	327	1308	1781	3358	245	1781	3630	15
Grp Volume(v), veh/h	3	0	0	141	0	5	2	622	641	85	828	872
Grp Sat Flow(s),veh/h/ln	1484	0	0	1416	0	1635	1781	1777	1826	1781	1777	1868
Q Serve(g_s), s	0.0	0.0	0.0	12.4	0.0	0.4	0.1	3.2	3.3	6.1	24.6	24.6
Cycle Q Clear(g_c), s	0.2	0.0	0.0	12.6	0.0	0.4	0.1	3.2	3.3	6.1	24.6	24.6
Prop In Lane	0.67		0.33	1.00		0.80	1.00		0.13	1.00		0.01
Lane Grp Cap(c), veh/h	226	0	0	228	0	199	5	1286	1321	111	1392	1463
V/C Ratio(X)	0.01	0.00	0.00	0.62	0.00	0.03	0.42	0.48	0.48	0.76	0.60	0.60
Avail Cap(c_a), veh/h	319	0	0	317	0	302	151	1286	1321	151	1392	1463
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	0.0	0.0	55.7	0.0	50.7	64.7	0.7	0.8	60.0	5.7	5.7
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.7	0.0	0.1	18.5	1.2	1.2	9.4	1.9	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	4.7	0.0	0.1	0.1	1.0	1.1	3.0	8.0	8.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.4	0.0	0.0	58.4	0.0	50.7	83.2	1.9	1.9	69.4	7.6	7.5
LnGrp LOS	D	A	A	E	A	D	F	A	A	E	A	A
Approach Vol, veh/h		3			146			1265			1785	
Approach Delay, s/veh		50.4			58.1			2.1			10.5	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.3	105.9		19.8	12.1	98.1		19.8
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	82.0		23.0	11.0	82.0		23.0
Max Q Clear Time (g_c+I1), s	2.1	26.6		14.6	8.1	5.3		2.2
Green Ext Time (p_c), s	0.0	31.9		0.3	0.0	20.4		0.0

Intersection Summary		
HCM 6th Ctrl Delay		9.4
HCM 6th LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	114	3	14	62	3	11	11	1045	15	7	1369	235
Future Volume (veh/h)	114	3	14	62	3	11	11	1045	15	7	1369	235
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	124	3	12	67	3	7	12	1136	15	8	1488	182
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	206	4	15	208	11	17	14	2837	37	10	2799	1248
Arrive On Green	0.11	0.11	0.10	0.11	0.11	0.10	0.01	0.53	0.52	0.01	0.79	0.79
Sat Flow, veh/h	1371	33	133	1391	97	149	1781	3591	47	1781	3554	1584
Grp Volume(v), veh/h	139	0	0	77	0	0	12	562	589	8	1488	182
Grp Sat Flow(s),veh/h/ln	1537	0	0	1636	0	0	1781	1777	1862	1781	1777	1584
Q Serve(g_s), s	5.7	0.0	0.0	0.0	0.0	0.0	0.9	24.6	24.6	0.6	19.9	3.6
Cycle Q Clear(g_c), s	11.2	0.0	0.0	5.5	0.0	0.0	0.9	24.6	24.6	0.6	19.9	3.6
Prop In Lane	0.89		0.09	0.87		0.09	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	225	0	0	235	0	0	14	1404	1471	10	2799	1248
V/C Ratio(X)	0.62	0.00	0.00	0.33	0.00	0.00	0.83	0.40	0.40	0.78	0.53	0.15
Avail Cap(c_a), veh/h	350	0	0	361	0	0	110	1404	1471	110	2799	1248
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.86	0.86	0.86	0.74	0.74	0.74
Uniform Delay (d), s/veh	56.0	0.0	0.0	53.7	0.0	0.0	64.6	12.2	12.2	64.5	5.0	3.3
Incr Delay (d2), s/veh	2.8	0.0	0.0	0.8	0.0	0.0	30.1	0.7	0.7	28.0	0.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	0.0	2.4	0.0	0.0	0.5	11.0	11.5	0.3	6.1	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.8	0.0	0.0	54.5	0.0	0.0	94.7	12.9	12.9	92.6	5.6	3.5
LnGrp LOS	E	A	A	D	A	A	F	B	B	F	A	A
Approach Vol, veh/h		139			77			1163			1678	
Approach Delay, s/veh		58.8			54.5			13.8			5.8	
Approach LOS		E			D			B			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.1	106.4		18.6	4.8	106.7		18.6
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	83.0		25.0	8.0	83.0		25.0
Max Q Clear Time (g_c+I1), s	2.9	21.9		7.5	2.6	26.6		13.2
Green Ext Time (p_c), s	0.0	40.9		0.2	0.0	22.8		0.3

Intersection Summary	
HCM 6th Ctrl Delay	12.5
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	17	48	83	19	15	58	1122	59	14	1389	118
Future Volume (veh/h)	139	17	48	83	19	15	58	1122	59	14	1389	118
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	151	18	6	90	21	2	63	1220	62	15	1510	124
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	301	30	324	176	345	33	80	2381	121	18	2186	178
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.20	0.09	1.00	1.00	0.01	0.87	0.86
Sat Flow, veh/h	1208	144	1578	1383	1681	160	1781	3440	175	1781	3326	271
Grp Volume(v), veh/h	169	0	6	90	0	23	63	630	652	15	802	832
Grp Sat Flow(s),veh/h/ln	1352	0	1578	1383	0	1841	1781	1777	1838	1781	1777	1821
Q Serve(g_s), s	14.1	0.0	0.4	8.3	0.0	1.3	4.5	0.0	0.0	1.1	18.5	19.2
Cycle Q Clear(g_c), s	15.4	0.0	0.4	23.7	0.0	1.3	4.5	0.0	0.0	1.1	18.5	19.2
Prop In Lane	0.89		1.00	1.00		0.09	1.00		0.10	1.00		0.15
Lane Grp Cap(c), veh/h	330	0	324	176	0	378	80	1230	1272	18	1168	1197
V/C Ratio(X)	0.51	0.00	0.02	0.51	0.00	0.06	0.79	0.51	0.51	0.85	0.69	0.70
Avail Cap(c_a), veh/h	333	0	328	179	0	382	110	1230	1272	110	1168	1197
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.47	0.47	0.47	0.81	0.81	0.81
Uniform Delay (d), s/veh	47.8	0.0	41.2	58.0	0.0	41.6	58.5	0.0	0.0	64.0	4.0	4.1
Incr Delay (d2), s/veh	1.3	0.0	0.0	2.4	0.0	0.1	7.8	0.7	0.7	26.2	2.7	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.0	0.2	3.0	0.0	0.6	2.1	0.2	0.2	0.6	4.1	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.0	0.0	41.2	60.3	0.0	41.7	66.4	0.7	0.7	90.3	6.7	6.8
LnGrp LOS	D	A	D	E	A	D	E	A	A	F	A	A
Approach Vol, veh/h		175			113			1345			1649	
Approach Delay, s/veh		48.8			56.5			3.8			7.5	
Approach LOS		D			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	89.4		30.7	5.3	94.0		30.7
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	82.0		26.0	8.0	82.0		26.0
Max Q Clear Time (g_c+I1), s	6.5	21.2		25.7	3.1	2.0		17.4
Green Ext Time (p_c), s	0.0	31.5		0.0	0.0	21.1		0.4

Intersection Summary			
HCM 6th Ctrl Delay			9.9
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	65	69	182	88	698	47	503	178	465	883	68
Future Volume (veh/h)	22	65	69	182	88	698	47	503	178	465	883	68
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.94	0.96		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	24	71	5	198	96	0	51	547	117	505	960	71
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	197	206	364	517		66	862	722	588	1992	147
Arrive On Green	0.14	0.14	0.14	0.11	0.28	0.00	0.04	0.46	0.46	0.06	0.20	0.19
Sat Flow, veh/h	290	1430	1492	1781	1870	1585	1781	1870	1566	3456	3354	248
Grp Volume(v), veh/h	95	0	5	198	96	0	51	547	117	505	509	522
Grp Sat Flow(s),veh/h/ln	1720	0	1492	1781	1870	1585	1781	1870	1566	1728	1777	1825
Q Serve(g_s), s	0.6	0.0	0.4	12.0	5.1	0.0	3.7	29.0	5.7	18.8	33.0	33.0
Cycle Q Clear(g_c), s	6.1	0.0	0.4	12.0	5.1	0.0	3.7	29.0	5.7	18.8	33.0	33.0
Prop In Lane	0.25		1.00	1.00		1.00	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	272	0	206	364	517		66	862	722	588	1055	1084
V/C Ratio(X)	0.35	0.00	0.02	0.54	0.19		0.77	0.63	0.16	0.86	0.48	0.48
Avail Cap(c_a), veh/h	375	0	298	364	633		329	862	722	957	1055	1084
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.71	0.71	0.71
Uniform Delay (d), s/veh	50.9	0.0	48.5	40.2	35.9	0.0	62.0	26.7	20.4	59.8	34.5	34.5
Incr Delay (d2), s/veh	0.8	0.0	0.0	1.7	0.2	0.0	5.5	2.8	0.4	1.7	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.1	5.5	2.4	0.0	1.8	13.3	2.1	8.9	16.1	16.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.6	0.0	48.5	41.9	36.0	0.0	67.5	29.5	20.8	61.5	35.6	35.6
LnGrp LOS	D	A	D	D	D		E	C	C	E	D	D
Approach Vol, veh/h		100			294	A		715			1536	
Approach Delay, s/veh		51.5			40.0			30.8			44.1	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	8.8	81.2	18.0	21.9	26.1	63.9		39.9
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	24.0	49.0	13.0	25.0	36.0	37.0		43.0
Max Q Clear Time (g_c+I1), s	15.7	35.0	14.0	8.1	20.8	31.0		7.1
Green Ext Time (p_c), s	0.1	7.5	0.0	0.3	1.3	2.7		0.3

Intersection Summary		
HCM 6th Ctrl Delay		40.3
HCM 6th LOS		D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2022 AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	45	295	90	50	20	220	230	100	10	135	30
Future Volume (veh/h)	50	45	295	90	50	20	220	230	100	10	135	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	49	42	98	54	11	239	250	51	11	147	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	239	165	258	328	247	50	321	792	671	15	472	400
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.18	0.42	0.42	0.01	0.25	0.25
Sat Flow, veh/h	615	1003	1571	1297	1505	307	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	103	0	42	98	0	65	239	250	51	11	147	8
Grp Sat Flow(s),veh/h/ln	1618	0	1571	1297	0	1812	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.5	0.0	0.9	2.9	0.0	1.2	5.0	3.5	0.8	0.2	2.5	0.2
Cycle Q Clear(g_c), s	2.0	0.0	0.9	4.9	0.0	1.2	5.0	3.5	0.8	0.2	2.5	0.2
Prop In Lane	0.52		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	404	0	258	328	0	297	321	792	671	15	472	400
V/C Ratio(X)	0.25	0.00	0.16	0.30	0.00	0.22	0.75	0.32	0.08	0.72	0.31	0.02
Avail Cap(c_a), veh/h	1083	0	951	900	0	1097	1348	3727	3158	674	3019	2558
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.7	0.0	14.2	16.9	0.0	14.4	15.4	7.6	6.8	19.6	12.0	11.1
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.5	0.0	0.4	3.4	0.5	0.1	46.6	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.3	0.8	0.0	0.5	1.9	1.0	0.2	0.3	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	0.0	14.5	17.4	0.0	14.7	18.8	8.1	6.9	66.2	12.8	11.2
LnGrp LOS	B	A	B	B	A	B	B	A	A	E	B	B
Approach Vol, veh/h		145			163			540			166	
Approach Delay, s/veh		14.9			16.3			12.7			16.3	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.3	22.8		11.5	12.1	16.0		11.5				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.2	5.5		4.0	7.0	4.5		6.9				
Green Ext Time (p_c), s	0.0	3.7		0.6	0.7	1.8		0.6				

Intersection Summary			
HCM 6th Ctrl Delay			14.2
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	180	90	20	15	135	515	15	10	515	65
Future Volume (veh/h)	60	5	180	90	20	15	135	515	15	10	515	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	20	98	22	2	147	560	0	11	560	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	382	24	308	348	336	31	411	880		367	727	611
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.09	0.47	0.00	0.01	0.39	0.39
Sat Flow, veh/h	1214	122	1545	1357	1685	153	1781	1870	1585	1781	1870	1573
Grp Volume(v), veh/h	70	0	20	98	0	24	147	560	0	11	560	28
Grp Sat Flow(s),veh/h/ln	1337	0	1545	1357	0	1838	1781	1870	1585	1781	1870	1573
Q Serve(g_s), s	1.9	0.0	0.5	3.3	0.0	0.5	2.2	11.3	0.0	0.2	13.0	0.6
Cycle Q Clear(g_c), s	2.5	0.0	0.5	5.8	0.0	0.5	2.2	11.3	0.0	0.2	13.0	0.6
Prop In Lane	0.93		1.00	1.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	406	0	308	348	0	367	411	880		367	727	611
V/C Ratio(X)	0.17	0.00	0.06	0.28	0.00	0.07	0.36	0.64		0.03	0.77	0.05
Avail Cap(c_a), veh/h	825	0	776	759	0	923	787	1917		888	1917	1612
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.0	0.0	16.1	19.4	0.0	16.2	9.2	10.0	0.0	9.6	13.3	9.5
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.4	0.0	0.1	0.5	0.8	0.0	0.0	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	1.0	0.0	0.2	0.7	3.5	0.0	0.1	4.6	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.2	0.0	16.2	19.8	0.0	16.2	9.7	10.7	0.0	9.7	15.0	9.5
LnGrp LOS	B	A	B	B	A	B	A	B		A	B	A
Approach Vol, veh/h		90			122			707	A		599	
Approach Delay, s/veh		17.0			19.1			10.5			14.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	29.4		14.9	9.5	25.3		14.9
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	13.3		4.5	4.2	15.0		7.8
Green Ext Time (p_c), s	0.0	4.0		0.4	0.3	4.1		0.3

Intersection Summary	
HCM 6th Ctrl Delay	13.2
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	5	125	5	5	5	60	600	15	5	715	30
Future Volume (veh/h)	40	5	125	5	5	5	60	600	15	5	715	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	5	11	5	5	1	65	652	9	5	777	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	60	63	139	9	176	148	84	1012	857	7	931	783
Arrive On Green	0.03	0.12	0.12	0.01	0.09	0.09	0.05	0.54	0.54	0.00	0.50	0.50
Sat Flow, veh/h	1781	516	1134	1781	1870	1566	1781	1870	1585	1781	1870	1574
Grp Volume(v), veh/h	43	0	16	5	5	1	65	652	9	5	777	17
Grp Sat Flow(s),veh/h/ln	1781	0	1650	1781	1870	1566	1781	1870	1585	1781	1870	1574
Q Serve(g_s), s	1.5	0.0	0.5	0.2	0.1	0.0	2.2	15.0	0.2	0.2	21.8	0.3
Cycle Q Clear(g_c), s	1.5	0.0	0.5	0.2	0.1	0.0	2.2	15.0	0.2	0.2	21.8	0.3
Prop In Lane	1.00		0.69	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	60	0	203	9	176	148	84	1012	857	7	931	783
V/C Ratio(X)	0.71	0.00	0.08	0.53	0.03	0.01	0.77	0.64	0.01	0.70	0.83	0.02
Avail Cap(c_a), veh/h	582	0	566	582	642	538	728	1987	1684	728	1987	1672
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.3	0.0	23.8	30.3	25.2	25.1	28.8	9.9	6.5	30.4	13.2	7.8
Incr Delay (d2), s/veh	14.3	0.0	0.2	38.7	0.1	0.0	13.7	0.7	0.0	80.6	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.2	0.2	0.1	0.0	1.2	4.9	0.0	0.2	7.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.6	0.0	23.9	69.0	25.2	25.1	42.5	10.6	6.5	111.0	15.3	7.8
LnGrp LOS	D	A	C	E	C	C	D	B	A	F	B	A
Approach Vol, veh/h		59			11			726			799	
Approach Delay, s/veh		38.3			45.1			13.4			15.7	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	38.1	5.3	12.5	7.9	35.4	7.1	10.8
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.2	17.0	2.2	2.5	4.2	23.8	3.5	2.1
Green Ext Time (p_c), s	0.0	5.1	0.0	0.0	0.1	6.6	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	15.7
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	10	480	20	5	0	315	675	45	10	805	10
Future Volume (veh/h)	35	10	480	20	5	0	315	675	45	10	805	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	11	0	22	5	0	342	734	48	11	875	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	196	31		200	31	0	411	2207	144	15	1526	681
Arrive On Green	0.09	0.07	0.00	0.09	0.07	0.00	0.23	0.65	0.65	0.01	0.43	0.43
Sat Flow, veh/h	1117	419	1585	1147	423	0	1781	3386	221	1781	3554	1585
Grp Volume(v), veh/h	49	0	0	27	0	0	342	385	397	11	875	3
Grp Sat Flow(s),veh/h/ln	1536	0	1585	1571	0	0	1781	1777	1831	1781	1777	1585
Q Serve(g_s), s	0.8	0.0	0.0	0.0	0.0	0.0	10.3	5.4	5.4	0.3	10.5	0.1
Cycle Q Clear(g_c), s	1.6	0.0	0.0	0.8	0.0	0.0	10.3	5.4	5.4	0.3	10.5	0.1
Prop In Lane	0.78		1.00	0.81		0.00	1.00		0.12	1.00		1.00
Lane Grp Cap(c), veh/h	254	0		259	0	0	411	1158	1193	15	1526	681
V/C Ratio(X)	0.19	0.00		0.10	0.00	0.00	0.83	0.33	0.33	0.73	0.57	0.00
Avail Cap(c_a), veh/h	671	0		801	0	0	2085	2332	2402	2085	4663	2080
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.5	0.0	0.0	24.2	0.0	0.0	20.6	4.4	4.4	27.9	12.2	9.2
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	1.7	0.4	0.3	22.3	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.3	0.0	0.0	4.0	1.3	1.3	0.2	3.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.9	0.0	0.0	24.3	0.0	0.0	22.3	4.7	4.7	50.2	12.9	9.2
LnGrp LOS	C	A		C	A	A	C	A	A	D	B	A
Approach Vol, veh/h		49	A		27			1124			889	
Approach Delay, s/veh		24.9			24.3			10.1			13.4	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.0	30.2		9.2	4.5	42.8		9.2				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	66.0	74.0		25.0	66.0	74.0		20.0				
Max Q Clear Time (g_c+I1), s	12.3	12.5		2.8	2.3	7.4		3.6				
Green Ext Time (p_c), s	0.8	11.7		0.0	0.0	9.0		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			12.0									
HCM 6th LOS			B									

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	70	10	5	10	135	1085	20	15	1275	65
Future Volume (veh/h)	30	0	70	10	5	10	135	1085	20	15	1275	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	0	1	11	5	1	147	1179	21	16	1386	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	180	0	73	122	19	3	186	2614	47	21	2269	1012
Arrive On Green	0.06	0.00	0.05	0.06	0.05	0.05	0.10	0.73	0.73	0.01	0.64	0.64
Sat Flow, veh/h	1558	0	1585	705	417	70	1781	3572	64	1781	3554	1585
Grp Volume(v), veh/h	33	0	1	17	0	0	147	586	614	16	1386	43
Grp Sat Flow(s),veh/h/ln	1558	0	1585	1191	0	0	1781	1777	1859	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	5.3	8.8	8.8	0.6	15.3	0.7
Cycle Q Clear(g_c), s	1.2	0.0	0.0	1.6	0.0	0.0	5.3	8.8	8.8	0.6	15.3	0.7
Prop In Lane	1.00		1.00	0.65		0.06	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	203	0	73	162	0	0	186	1300	1360	21	2269	1012
V/C Ratio(X)	0.16	0.00	0.01	0.10	0.00	0.00	0.79	0.45	0.45	0.78	0.61	0.04
Avail Cap(c_a), veh/h	627	0	549	623	0	0	563	2302	2408	295	4068	1814
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.3	0.0	30.2	30.8	0.0	0.0	29.0	3.6	3.6	32.7	7.1	4.5
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.1	0.0	0.0	2.8	0.5	0.5	20.4	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.3	0.0	0.0	2.3	1.8	1.9	0.4	4.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.4	0.0	30.3	30.9	0.0	0.0	31.8	4.1	4.1	53.1	7.7	4.5
LnGrp LOS	C	A	C	C	A	A	C	A	A	D	A	A
Approach Vol, veh/h		34			17			1347			1445	
Approach Delay, s/veh		30.4			30.9			7.1			8.1	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.9	47.4		8.0	4.8	53.6		8.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	7.3	17.3		3.6	2.6	10.8		3.2
Green Ext Time (p_c), s	0.1	25.1		0.0	0.0	18.3		0.0

Intersection Summary	
HCM 6th Ctrl Delay	8.0
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	35	40	15	45	110	1225	60	25	1225	45
Future Volume (veh/h)	55	5	35	40	15	45	110	1225	60	25	1225	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	1	43	16	1	120	1332	50	27	1332	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	12	152	111	168	10	142	2789	1244	39	2584	1153
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.08	0.78	0.78	0.02	0.73	0.73
Sat Flow, veh/h	1198	121	1580	1407	1742	109	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	65	0	1	43	0	17	120	1332	50	27	1332	35
Grp Sat Flow(s),veh/h/ln	1318	0	1580	1407	0	1850	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	6.6	0.0	0.1	4.7	0.0	1.3	10.3	20.0	1.1	2.3	25.4	1.0
Cycle Q Clear(g_c), s	7.8	0.0	0.1	12.5	0.0	1.3	10.3	20.0	1.1	2.3	25.4	1.0
Prop In Lane	0.92		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	172	0	152	111	0	178	142	2789	1244	39	2584	1153
V/C Ratio(X)	0.38	0.00	0.01	0.39	0.00	0.10	0.84	0.48	0.04	0.68	0.52	0.03
Avail Cap(c_a), veh/h	255	0	245	193	0	287	241	2789	1244	241	2584	1153
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.70	0.70	0.70	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.3	0.0	63.3	72.8	0.0	63.9	70.4	5.7	3.7	75.2	9.2	5.9
Incr Delay (d2), s/veh	1.4	0.0	0.0	2.2	0.0	0.2	3.7	0.4	0.0	7.5	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	0.0	1.8	0.0	0.6	4.8	6.7	0.3	1.2	9.5	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.7	0.0	63.3	75.0	0.0	64.1	74.1	6.2	3.8	82.8	10.0	5.9
LnGrp LOS	E	A	E	E	A	E	E	A	A	F	A	A
Approach Vol, veh/h		66			60			1502			1394	
Approach Delay, s/veh		68.6			71.9			11.5			11.3	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.4	118.7		19.9	7.4	127.6		19.9				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	21.0	95.0		24.0	21.0	95.0		24.0				
Max Q Clear Time (g_c+I1), s	12.3	27.4		14.5	4.3	22.0		9.8				
Green Ext Time (p_c), s	0.1	24.4		0.1	0.0	25.2		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			13.8									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	10	220	10	10	10	425	1310	15	80	1185	95
Future Volume (veh/h)	135	10	220	10	10	10	425	1310	15	80	1185	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	147	11	67	11	11	3	462	1424	16	87	1288	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	221	17	825	60	60	16	602	2038	23	148	1688	947
Arrive On Green	0.13	0.13	0.12	0.08	0.08	0.05	0.17	0.57	0.55	0.08	0.48	0.48
Sat Flow, veh/h	1663	124	2733	786	786	214	3456	3599	40	1781	3554	1579
Grp Volume(v), veh/h	158	0	67	25	0	0	462	703	737	87	1288	76
Grp Sat Flow(s),veh/h/ln	1787	0	1367	1786	0	0	1728	1777	1863	1781	1777	1579
Q Serve(g_s), s	9.5	0.0	2.0	1.5	0.0	0.0	14.4	32.1	32.2	5.3	33.8	2.3
Cycle Q Clear(g_c), s	9.5	0.0	2.0	1.5	0.0	0.0	14.4	32.1	32.2	5.3	33.8	2.3
Prop In Lane	0.93		1.00	0.44		0.12	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	237	0	825	137	0	0	602	1006	1055	148	1688	947
V/C Ratio(X)	0.67	0.00	0.08	0.18	0.00	0.00	0.77	0.70	0.70	0.59	0.76	0.08
Avail Cap(c_a), veh/h	537	0	1283	489	0	0	1770	3044	3192	236	4739	2302
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.7	0.0	28.6	49.1	0.0	0.0	44.6	17.6	17.6	50.1	24.5	9.6
Incr Delay (d2), s/veh	1.2	0.0	0.0	0.6	0.0	0.0	0.8	1.3	1.2	1.4	1.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	0.7	0.7	0.0	0.0	6.2	12.6	13.2	2.4	13.8	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.9	0.0	28.6	49.8	0.0	0.0	45.4	18.9	18.9	51.5	25.5	9.6
LnGrp LOS	D	A	C	D	A	A	D	B	B	D	C	A
Approach Vol, veh/h		225			25			1902			1451	
Approach Delay, s/veh		42.2			49.8			25.3			26.2	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	23.7	57.8		12.7	13.4	68.1		19.0
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	11.4	35.8		3.5	7.3	34.2		11.5
Green Ext Time (p_c), s	1.3	16.0		0.0	0.1	16.4		0.5

Intersection Summary	
HCM 6th Ctrl Delay	26.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	60	0	45	5	1745	90	30	1385	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1745	90	30	1385	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	1897	96	33	1505	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	177	0	138	11	2717	136	64	2974	10
Arrive On Green	0.09	0.09	0.08	0.09	0.00	0.08	0.01	0.79	0.78	0.04	0.82	0.81
Sat Flow, veh/h	586	899	148	1378	0	1545	1781	3443	173	1781	3633	12
Grp Volume(v), veh/h	11	0	0	65	0	1	5	971	1022	33	736	774
Grp Sat Flow(s),veh/h/ln	1633	0	0	1378	0	1545	1781	1777	1839	1781	1777	1868
Q Serve(g_s), s	0.0	0.0	0.0	5.3	0.0	0.1	0.4	35.6	37.0	2.5	18.0	18.0
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	35.6	37.0	2.5	18.0	18.0
Prop In Lane	0.45		0.09	1.00		1.00	1.00		0.09	1.00		0.01
Lane Grp Cap(c), veh/h	183	0	0	177	0	138	11	1402	1451	64	1455	1529
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.44	0.69	0.70	0.52	0.51	0.51
Avail Cap(c_a), veh/h	313	0	0	290	0	265	102	1402	1451	102	1455	1529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.64	0.64	0.64	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.4	0.0	0.0	60.7	0.0	58.5	69.3	6.9	7.0	66.3	3.9	3.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	6.4	1.8	1.9	2.4	1.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.3	0.0	0.0	0.2	11.6	12.6	1.2	5.5	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	75.7	8.7	8.9	68.7	5.2	5.1
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	A	A
Approach Vol, veh/h		11			66			1998			1543	
Approach Delay, s/veh		58.6			62.0			9.0			6.5	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	4.9	118.6	16.5	9.0	114.5	16.5
Change Period (Y+Rc), s	4.0	5.0	5.0	4.0	5.0	5.0
Max Green Setting (Gmax), s	8.0	95.0	23.0	8.0	95.0	23.0
Max Q Clear Time (g_c+I1), s	2.4	20.0	8.1	4.5	39.0	2.8
Green Ext Time (p_c), s	0.0	29.0	0.1	0.0	41.4	0.0

Intersection Summary

HCM 6th Ctrl Delay 9.0

HCM 6th LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	5	5	105	15	15	5	1725	20	10	1230	185
Future Volume (veh/h)	90	5	5	105	15	15	5	1725	20	10	1230	185
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	98	5	3	114	16	12	5	1875	21	11	1337	143
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	210	8	5	199	20	15	7	2817	31	14	2795	1245
Arrive On Green	0.11	0.11	0.10	0.11	0.11	0.10	0.00	0.78	0.77	0.01	0.79	0.79
Sat Flow, veh/h	1393	71	43	1317	185	139	1781	3600	40	1781	3554	1583
Grp Volume(v), veh/h	106	0	0	142	0	0	5	924	972	11	1337	143
Grp Sat Flow(s),veh/h/ln	1506	0	0	1641	0	0	1781	1777	1863	1781	1777	1583
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.3	28.3	28.5	0.7	15.5	2.5
Cycle Q Clear(g_c), s	7.9	0.0	0.0	9.7	0.0	0.0	0.3	28.3	28.5	0.7	15.5	2.5
Prop In Lane	0.92		0.03	0.80		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	223	0	0	234	0	0	7	1391	1458	14	2795	1245
V/C Ratio(X)	0.48	0.00	0.00	0.61	0.00	0.00	0.73	0.66	0.67	0.80	0.48	0.11
Avail Cap(c_a), veh/h	432	0	0	451	0	0	119	1391	1458	119	2795	1245
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.63	0.63	0.63	0.86	0.86	0.86
Uniform Delay (d), s/veh	51.1	0.0	0.0	51.8	0.0	0.0	59.7	5.9	5.9	59.4	4.4	3.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.5	0.0	0.0	29.2	1.6	1.5	28.3	0.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.0	4.3	0.0	0.0	0.2	8.6	9.0	0.4	4.5	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.7	0.0	0.0	54.3	0.0	0.0	88.9	7.5	7.5	87.8	4.9	3.2
LnGrp LOS	D	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		106			142			1901			1491	
Approach Delay, s/veh		52.7			54.3			7.7			5.3	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.4		17.2	4.9	97.9		17.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.3	17.5		11.7	2.7	30.5		9.9
Green Ext Time (p_c), s	0.0	31.3		0.5	0.0	32.7		0.3

Intersection Summary			
HCM 6th Ctrl Delay			9.9
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	30	20	145	25	35	25	1550	75	10	1270	70
Future Volume (veh/h)	145	30	20	145	25	35	25	1550	75	10	1270	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	158	33	4	158	27	5	27	1685	80	11	1380	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	336	60	403	225	394	73	34	2244	106	13	2189	117
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.25	0.04	1.00	1.00	0.01	0.64	0.63
Sat Flow, veh/h	1122	234	1568	1361	1532	284	1781	3455	163	1781	3431	184
Grp Volume(v), veh/h	191	0	4	158	0	32	27	862	903	11	713	741
Grp Sat Flow(s),veh/h/ln	1357	0	1568	1361	0	1816	1781	1777	1841	1781	1777	1837
Q Serve(g_s), s	16.3	0.0	0.3	16.1	0.0	1.9	2.1	0.0	0.0	0.9	34.0	34.3
Cycle Q Clear(g_c), s	18.2	0.0	0.3	34.2	0.0	1.9	2.1	0.0	0.0	0.9	34.0	34.3
Prop In Lane	0.83		1.00	1.00		0.16	1.00		0.09	1.00		0.10
Lane Grp Cap(c), veh/h	396	0	403	225	0	467	34	1154	1196	13	1134	1172
V/C Ratio(X)	0.48	0.00	0.01	0.70	0.00	0.07	0.79	0.75	0.75	0.83	0.63	0.63
Avail Cap(c_a), veh/h	396	0	403	225	0	467	140	1154	1196	140	1134	1172
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.86	0.86	0.86
Uniform Delay (d), s/veh	46.2	0.0	38.7	60.3	0.0	39.4	67.1	0.0	0.0	69.4	15.3	15.4
Incr Delay (d2), s/veh	0.9	0.0	0.0	9.5	0.0	0.1	1.4	0.4	0.4	31.9	2.3	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	0.0	0.1	6.2	0.0	0.9	1.0	0.1	0.1	0.5	13.8	14.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.1	0.0	38.7	69.8	0.0	39.4	68.5	0.4	0.4	101.3	17.6	17.6
LnGrp LOS	D	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		195			190			1792			1465	
Approach Delay, s/veh		46.9			64.7			1.4			18.3	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	93.3		40.0	5.0	95.0		40.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	80.0		35.0	11.0	80.0		35.0
Max Q Clear Time (g_c+I1), s	14.1	36.3		36.2	2.9	2.0		20.2
Green Ext Time (p_c), s	0.0	22.0		0.0	0.0	41.1		0.6

Intersection Summary	
HCM 6th Ctrl Delay	13.9
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	85	35	115	65	1085	25	655	165	540	1030	30
Future Volume (veh/h)	10	85	35	115	65	1085	25	655	165	540	1030	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	92	3	125	71	0	27	712	111	587	1120	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	39	176	158	255	392		34	981	828	623	2419	69
Arrive On Green	0.10	0.10	0.10	0.08	0.21	0.00	0.02	0.52	0.52	0.36	1.00	1.00
Sat Flow, veh/h	108	1715	1543	1781	1870	1585	1781	1870	1579	3456	3528	101
Grp Volume(v), veh/h	103	0	3	125	71	0	27	712	111	587	564	588
Grp Sat Flow(s),veh/h/ln	1823	0	1543	1781	1870	1585	1781	1870	1579	1728	1777	1852
Q Serve(g_s), s	1.1	0.0	0.2	8.5	4.4	0.0	2.1	40.9	5.0	23.0	0.0	0.0
Cycle Q Clear(g_c), s	7.4	0.0	0.2	8.5	4.4	0.0	2.1	40.9	5.0	23.0	0.0	0.0
Prop In Lane	0.11		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	215	0	158	255	392		34	981	828	623	1218	1270
V/C Ratio(X)	0.48	0.00	0.02	0.49	0.18		0.79	0.73	0.13	0.94	0.46	0.46
Avail Cap(c_a), veh/h	326	0	254	255	508		178	981	828	642	1218	1270
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.74	0.74	0.74
Uniform Delay (d), s/veh	59.7	0.0	56.5	49.1	45.5	0.0	68.4	25.6	17.0	44.0	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.0	1.5	0.2	0.0	11.3	3.7	0.3	17.5	0.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.1	3.9	2.1	0.0	1.1	18.7	1.9	9.8	0.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.3	0.0	56.6	50.6	45.7	0.0	79.7	29.3	17.3	61.5	0.9	0.9
LnGrp LOS	E	A	E	D	D		E	C	B	E	A	A
Approach Vol, veh/h		106			196	A		850			1739	
Approach Delay, s/veh		61.2			48.8			29.3			21.4	
Approach LOS		E			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	100.0	15.0	18.3	29.3	77.4		33.3
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	14.0	75.0	10.0	22.0	26.0	63.0		37.0
Max Q Clear Time (g_c+I1), s	4.1	2.0	10.5	9.4	25.0	42.9		6.4
Green Ext Time (p_c), s	0.0	16.9	0.0	0.2	0.2	7.9		0.2

Intersection Summary		
HCM 6th Ctrl Delay		27.0
HCM 6th LOS		C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2022 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	25	370	60	25	5	380	215	65	10	280	75
Future Volume (veh/h)	55	25	370	60	25	5	380	215	65	10	280	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	27	24	65	27	1	413	234	45	11	304	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	233	73	185	238	209	8	502	1016	861	15	505	428
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.28	0.54	0.54	0.01	0.27	0.27
Sat Flow, veh/h	917	626	1585	1354	1792	66	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	87	0	24	65	0	28	413	234	45	11	304	20
Grp Sat Flow(s),veh/h/ln	1543	0	1585	1354	0	1858	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.8	0.0	0.7	2.3	0.0	0.7	10.4	3.1	0.6	0.3	6.8	0.4
Cycle Q Clear(g_c), s	2.5	0.0	0.7	4.7	0.0	0.7	10.4	3.1	0.6	0.3	6.8	0.4
Prop In Lane	0.69		1.00	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	306	0	185	238	0	216	502	1016	861	15	505	428
V/C Ratio(X)	0.28	0.00	0.13	0.27	0.00	0.13	0.82	0.23	0.05	0.72	0.60	0.05
Avail Cap(c_a), veh/h	880	0	789	755	0	926	1109	3067	2599	555	2484	2105
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.8	0.0	19.1	22.1	0.0	19.1	16.2	5.8	5.2	23.8	15.3	13.0
Incr Delay (d2), s/veh	0.5	0.0	0.3	0.6	0.0	0.3	3.4	0.2	0.1	48.4	2.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.2	0.7	0.0	0.3	4.0	0.9	0.2	0.3	2.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.4	0.0	19.4	22.7	0.0	19.4	19.6	6.0	5.2	72.3	17.8	13.1
LnGrp LOS	C	A	B	C	A	B	B	A	A	E	B	B
Approach Vol, veh/h		111			93			692			335	
Approach Delay, s/veh		20.2			21.7			14.1			19.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	32.2		10.6	18.6	19.0		10.6				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.3	5.1		4.5	12.4	8.8		6.7				
Green Ext Time (p_c), s	0.0	3.4		0.5	1.2	4.2		0.2				

Intersection Summary			
HCM 6th Ctrl Delay			16.6
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	20	150	45	15	10	195	585	45	25	570	80
Future Volume (veh/h)	75	20	150	45	15	10	195	585	45	25	570	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	22	14	49	16	1	212	636	0	27	620	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	276	55	207	243	227	14	450	963		394	804	678
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.10	0.51	0.00	0.02	0.43	0.43
Sat Flow, veh/h	1081	422	1585	1372	1742	109	1781	1870	1585	1781	1870	1578
Grp Volume(v), veh/h	104	0	14	49	0	17	212	636	0	27	620	42
Grp Sat Flow(s),veh/h/ln	1503	0	1585	1372	0	1851	1781	1870	1585	1781	1870	1578
Q Serve(g_s), s	2.6	0.0	0.4	1.6	0.0	0.4	2.9	11.9	0.0	0.4	13.5	0.7
Cycle Q Clear(g_c), s	3.0	0.0	0.4	4.7	0.0	0.4	2.9	11.9	0.0	0.4	13.5	0.7
Prop In Lane	0.79		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	331	0	207	243	0	241	450	963		394	804	678
V/C Ratio(X)	0.31	0.00	0.07	0.20	0.00	0.07	0.47	0.66		0.07	0.77	0.06
Avail Cap(c_a), veh/h	913	0	832	784	0	971	826	2003		921	2003	1689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.3	0.0	18.2	21.5	0.0	18.2	8.4	8.5	0.0	8.0	11.6	8.0
Incr Delay (d2), s/veh	0.5	0.0	0.1	0.4	0.0	0.1	0.8	0.8	0.0	0.1	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.1	0.5	0.0	0.2	0.7	3.4	0.0	0.1	4.5	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.8	0.0	18.3	21.9	0.0	18.3	9.2	9.3	0.0	8.1	13.2	8.0
LnGrp LOS	B	A	B	C	A	B	A	A		A	B	A
Approach Vol, veh/h		118			66			848	A		689	
Approach Delay, s/veh		19.6			21.0			9.2			12.7	
Approach LOS		B			C			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	30.5		11.2	9.9	26.5		11.2				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0				
Max Q Clear Time (g_c+I1), s	2.4	13.9		5.0	4.9	15.5		6.7				
Green Ext Time (p_c), s	0.0	4.7		0.5	0.4	4.7		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			11.8									
HCM 6th LOS			B									

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	95	10	5	10	165	815	10	5	765	75
Future Volume (veh/h)	60	5	95	10	5	10	165	815	10	5	765	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	4	11	5	1	179	886	8	5	832	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	114	91	19	156	128	222	1170	992	7	945	799
Arrive On Green	0.05	0.12	0.12	0.01	0.08	0.08	0.12	0.63	0.63	0.00	0.51	0.51
Sat Flow, veh/h	1781	948	759	1781	1870	1539	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	65	0	9	11	5	1	179	886	8	5	832	44
Grp Sat Flow(s),veh/h/ln	1781	0	1707	1781	1870	1539	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	3.0	0.0	0.4	0.5	0.2	0.0	8.2	28.2	0.2	0.2	33.1	1.2
Cycle Q Clear(g_c), s	3.0	0.0	0.4	0.5	0.2	0.0	8.2	28.2	0.2	0.2	33.1	1.2
Prop In Lane	1.00		0.44	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	85	0	205	19	156	128	222	1170	992	7	945	799
V/C Ratio(X)	0.77	0.00	0.04	0.57	0.03	0.01	0.81	0.76	0.01	0.71	0.88	0.06
Avail Cap(c_a), veh/h	426	0	429	426	470	387	533	1455	1233	533	1455	1230
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.3	0.0	32.5	41.1	35.2	35.1	35.6	11.1	5.9	41.6	18.4	10.5
Incr Delay (d2), s/veh	13.3	0.0	0.1	24.1	0.1	0.0	6.8	1.8	0.0	83.8	4.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.2	0.4	0.1	0.0	3.8	10.0	0.0	0.3	13.7	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.6	0.0	32.6	65.2	35.3	35.2	42.4	13.0	5.9	125.3	22.7	10.6
LnGrp LOS	D	A	C	E	D	D	D	B	A	F	C	B
Approach Vol, veh/h		74			17			1073			881	
Approach Delay, s/veh		50.2			54.7			17.8			22.7	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	57.3	5.9	15.1	15.4	47.2	9.0	12.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	12.2	30.2	2.5	2.4	10.2	35.1	5.0	2.2
Green Ext Time (p_c), s	0.0	8.0	0.0	0.0	0.4	7.1	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	21.4
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	600	80	10	10	605	880	10	5	810	20
Future Volume (veh/h)	75	5	600	80	10	10	605	880	10	5	810	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	0	87	11	9	658	957	11	5	880	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	204	8		187	15	12	703	2687	31	7	1266	565
Arrive On Green	0.10	0.09	0.00	0.10	0.09	0.09	0.39	0.75	0.75	0.00	0.36	0.36
Sat Flow, veh/h	1468	90	1585	1324	167	137	1781	3598	41	1781	3554	1585
Grp Volume(v), veh/h	87	0	0	107	0	0	658	473	495	5	880	6
Grp Sat Flow(s),veh/h/ln	1558	0	1585	1628	0	0	1781	1777	1863	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	33.0	8.5	8.5	0.3	19.7	0.2
Cycle Q Clear(g_c), s	4.6	0.0	0.0	5.5	0.0	0.0	33.0	8.5	8.5	0.3	19.7	0.2
Prop In Lane	0.94		1.00	0.81		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	229	0		231	0	0	703	1327	1391	7	1266	565
V/C Ratio(X)	0.38	0.00		0.46	0.00	0.00	0.94	0.36	0.36	0.72	0.70	0.01
Avail Cap(c_a), veh/h	408	0		495	0	0	1361	1327	1391	1361	2638	1177
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.3	0.0	0.0	40.7	0.0	0.0	27.0	4.1	4.1	46.2	25.6	19.3
Incr Delay (d2), s/veh	1.0	0.0	0.0	1.4	0.0	0.0	2.8	0.3	0.3	40.1	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.0	2.4	0.0	0.0	13.6	2.3	2.4	0.2	8.2	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.4	0.0	0.0	42.1	0.0	0.0	29.8	4.4	4.4	86.4	27.1	19.4
LnGrp LOS	D	A		D	A	A	C	A	A	F	C	B
Approach Vol, veh/h		87	A		107			1626			891	
Approach Delay, s/veh		41.4			42.1			14.7			27.4	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	40.7	39.1		13.2	4.4	75.4		13.2
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0
Max Q Clear Time (g_c+I1), s	35.0	21.7		7.5	2.3	10.5		6.6
Green Ext Time (p_c), s	1.7	11.4		0.3	0.0	12.2		0.2

Intersection Summary	
HCM 6th Ctrl Delay	20.8
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	5	140	15	0	5	135	1435	10	10	1485	60
Future Volume (veh/h)	50	5	140	15	0	5	135	1435	10	10	1485	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	5	6	16	0	1	147	1560	11	11	1614	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	231	18	174	188	2	7	180	2622	18	14	2245	1001
Arrive On Green	0.13	0.11	0.11	0.13	0.00	0.11	0.10	0.72	0.72	0.01	0.63	0.63
Sat Flow, veh/h	1358	156	1523	973	19	62	1781	3617	25	1781	3554	1585
Grp Volume(v), veh/h	59	0	6	17	0	0	147	766	805	11	1614	39
Grp Sat Flow(s),veh/h/ln	1514	0	1523	1054	0	0	1781	1777	1866	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.3	0.9	0.0	0.0	7.4	19.1	19.1	0.6	28.1	0.9
Cycle Q Clear(g_c), s	2.8	0.0	0.3	3.7	0.0	0.0	7.4	19.1	19.1	0.6	28.1	0.9
Prop In Lane	0.92		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	265	0	174	208	0	0	180	1288	1352	14	2245	1001
V/C Ratio(X)	0.22	0.00	0.03	0.08	0.00	0.00	0.82	0.59	0.60	0.77	0.72	0.04
Avail Cap(c_a), veh/h	457	0	382	395	0	0	408	1668	1751	214	2948	1315
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.7	0.0	36.1	37.9	0.0	0.0	40.3	6.1	6.1	45.4	11.4	6.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.4	0.9	0.9	27.1	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.1	0.3	0.0	0.0	3.3	5.6	5.9	0.4	9.6	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.9	0.0	36.1	38.0	0.0	0.0	43.7	7.0	7.0	72.5	12.4	6.4
LnGrp LOS	D	A	D	D	A	A	D	A	A	E	B	A
Approach Vol, veh/h		65			17			1718			1664	
Approach Delay, s/veh		36.8			38.0			10.2			12.7	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.3	62.9		15.5	4.7	71.4		15.5
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	9.4	30.1		5.7	2.6	21.1		4.8
Green Ext Time (p_c), s	0.1	27.8		0.0	0.0	29.9		0.1

Intersection Summary	
HCM 6th Ctrl Delay	12.0
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	175	70	5	45	125	1425	60	35	1645	95
Future Volume (veh/h)	75	5	175	70	5	45	125	1425	60	35	1645	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	27	76	5	1	136	1549	49	38	1788	81
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	12	204	142	197	39	157	2668	1189	49	2452	1094
Arrive On Green	0.14	0.13	0.13	0.13	0.13	0.13	0.09	0.75	0.75	0.03	0.69	0.69
Sat Flow, veh/h	1303	90	1563	1363	1509	302	1781	3554	1584	1781	3554	1585
Grp Volume(v), veh/h	87	0	27	76	0	6	136	1549	49	38	1788	81
Grp Sat Flow(s),veh/h/ln	1393	0	1563	1363	0	1811	1781	1777	1584	1781	1777	1585
Q Serve(g_s), s	9.2	0.0	2.5	9.0	0.0	0.5	12.4	31.8	1.3	3.5	51.8	2.8
Cycle Q Clear(g_c), s	9.7	0.0	2.5	18.7	0.0	0.5	12.4	31.8	1.3	3.5	51.8	2.8
Prop In Lane	0.94		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	233	0	204	142	0	237	157	2668	1189	49	2452	1094
V/C Ratio(X)	0.37	0.00	0.13	0.54	0.00	0.03	0.86	0.58	0.04	0.77	0.73	0.07
Avail Cap(c_a), veh/h	254	0	227	162	0	263	281	2668	1189	108	2452	1094
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.3	0.0	63.4	75.2	0.0	62.5	74.2	9.1	5.3	79.7	16.0	8.4
Incr Delay (d2), s/veh	1.0	0.0	0.3	3.1	0.0	0.0	3.9	0.7	0.0	9.3	1.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	1.0	3.3	0.0	0.2	5.9	11.7	0.4	1.7	20.7	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.2	0.0	63.7	78.4	0.0	62.6	78.1	9.7	5.3	89.0	17.9	8.5
LnGrp LOS	E	A	E	E	A	E	E	A	A	F	B	A
Approach Vol, veh/h		114			82			1734			1907	
Approach Delay, s/veh		66.4			77.2			15.0			18.9	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.6	119.8		26.6	8.5	129.9		26.6
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	26.0	100.0		24.0	10.0	116.0		24.0
Max Q Clear Time (g_c+I1), s	14.4	53.8		20.7	5.5	33.8		11.7
Green Ext Time (p_c), s	0.2	32.3		0.1	0.0	34.6		0.3

Intersection Summary	
HCM 6th Ctrl Delay	19.8
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	290	5	615	15	0	5	385	1470	10	75	1690	135
Future Volume (veh/h)	290	5	615	15	0	5	385	1470	10	75	1690	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	315	5	469	16	0	1	418	1598	11	82	1837	109
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	275	4	813	69	0	4	490	2404	17	113	2084	929
Arrive On Green	0.16	0.16	0.15	0.04	0.00	0.03	0.14	0.66	0.66	0.06	0.59	0.59
Sat Flow, veh/h	1755	28	2753	1660	0	104	3456	3618	25	1781	3554	1585
Grp Volume(v), veh/h	320	0	469	17	0	0	418	784	825	82	1837	109
Grp Sat Flow(s),veh/h/ln	1783	0	1376	1763	0	0	1728	1777	1866	1781	1777	1585
Q Serve(g_s), s	34.0	0.0	31.5	2.0	0.0	0.0	25.7	57.6	57.8	9.8	96.2	6.6
Cycle Q Clear(g_c), s	34.0	0.0	31.5	2.0	0.0	0.0	25.7	57.6	57.8	9.8	96.2	6.6
Prop In Lane	0.98		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	279	0	813	74	0	0	490	1181	1240	113	2084	929
V/C Ratio(X)	1.15	0.00	0.58	0.23	0.00	0.00	0.85	0.66	0.67	0.72	0.88	0.12
Avail Cap(c_a), veh/h	279	0	813	252	0	0	922	1586	1666	123	2469	1101
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	91.7	0.0	65.4	100.8	0.0	0.0	91.1	21.9	21.9	99.9	38.5	20.0
Incr Delay (d2), s/veh	99.7	0.0	0.7	0.6	0.0	0.0	1.7	0.9	0.9	14.4	3.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	23.7	0.0	11.4	1.0	0.0	0.0	11.7	24.4	25.7	5.0	42.7	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	191.4	0.0	66.0	101.4	0.0	0.0	92.7	22.8	22.8	114.3	42.3	20.0
LnGrp LOS	F	A	E	F	A	A	F	C	C	F	D	C
Approach Vol, veh/h		789			17			2027			2028	
Approach Delay, s/veh		116.9			101.4			37.2			44.1	
Approach LOS		F			F			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	34.8	131.4		13.1	17.8	148.4		38.0
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	27.7	98.2		4.0	11.8	59.8		36.0
Green Ext Time (p_c), s	1.1	27.2		0.0	0.0	21.5		0.0

Intersection Summary	
HCM 6th Ctrl Delay	53.2
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	5	90	5	60	10	1805	90	85	2250	5
Future Volume (veh/h)	10	0	5	90	5	60	10	1805	90	85	2250	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	1962	96	92	2446	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	2	10	182	96	58	22	2610	127	118	2949	6
Arrive On Green	0.09	0.00	0.08	0.09	0.09	0.08	0.03	1.00	1.00	0.07	0.81	0.80
Sat Flow, veh/h	1240	26	115	1416	1095	657	1781	3450	167	1781	3638	7
Grp Volume(v), veh/h	12	0	0	98	0	8	11	1003	1055	92	1194	1257
Grp Sat Flow(s),veh/h/ln	1381	0	0	1416	0	1752	1781	1777	1840	1781	1777	1869
Q Serve(g_s), s	0.8	0.0	0.0	7.4	0.0	0.6	0.8	0.0	0.0	6.9	52.4	52.5
Cycle Q Clear(g_c), s	1.4	0.0	0.0	8.8	0.0	0.6	0.8	0.0	0.0	6.9	52.4	52.5
Prop In Lane	0.92		0.08	1.00		0.38	1.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	173	0	0	182	0	154	22	1345	1393	118	1440	1515
V/C Ratio(X)	0.07	0.00	0.00	0.54	0.00	0.05	0.49	0.75	0.76	0.78	0.83	0.83
Avail Cap(c_a), veh/h	300	0	0	309	0	311	145	1345	1393	251	1440	1515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.60	0.60	0.60	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.9	0.0	0.0	60.0	0.0	56.6	65.4	0.0	0.0	62.0	7.4	7.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.1	3.7	2.3	2.4	4.1	5.6	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	3.4	0.0	0.3	0.4	0.9	0.9	3.2	16.8	17.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.1	0.0	0.0	62.5	0.0	56.7	69.1	2.3	2.4	66.2	13.0	12.8
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	B	B
Approach Vol, veh/h		12			106			2069			2543	
Approach Delay, s/veh		57.1			62.0			2.7			14.8	
Approach LOS		E			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.7	113.4		15.9	13.0	106.2		15.9
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	87.0		23.0	19.0	79.0		23.0
Max Q Clear Time (g_c+I1), s	2.8	54.5		10.8	8.9	2.0		3.4
Green Ext Time (p_c), s	0.0	30.8		0.2	0.1	54.6		0.0

Intersection Summary			
HCM 6th Ctrl Delay			10.7
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	15	10	60	5	10	5	1730	20	5	1910	325
Future Volume (veh/h)	175	15	10	60	5	10	5	1730	20	5	1910	325
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	190	16	9	65	5	7	5	1880	21	5	2076	278
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	268	18	10	273	22	25	7	2675	30	7	2640	1178
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.01	1.00	1.00	0.00	0.74	0.74
Sat Flow, veh/h	1326	112	63	1363	133	150	1781	3600	40	1781	3554	1585
Grp Volume(v), veh/h	215	0	0	77	0	0	5	926	975	5	2076	278
Grp Sat Flow(s),veh/h/ln	1501	0	0	1645	0	0	1781	1777	1863	1781	1777	1585
Q Serve(g_s), s	13.3	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	48.8	7.4
Cycle Q Clear(g_c), s	18.7	0.0	0.0	5.4	0.0	0.0	0.4	0.0	0.0	0.4	48.8	7.4
Prop In Lane	0.88		0.04	0.84		0.09	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	297	0	0	320	0	0	7	1320	1384	7	2640	1178
V/C Ratio(X)	0.72	0.00	0.00	0.24	0.00	0.00	0.74	0.70	0.70	0.74	0.79	0.24
Avail Cap(c_a), veh/h	380	0	0	402	0	0	106	1320	1384	106	2640	1178
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.58	0.58	0.58	0.39	0.39	0.39
Uniform Delay (d), s/veh	54.6	0.0	0.0	49.4	0.0	0.0	66.9	0.0	0.0	67.2	10.7	5.4
Incr Delay (d2), s/veh	4.9	0.0	0.0	0.4	0.0	0.0	28.2	1.8	1.8	20.1	1.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	0.0	0.0	2.4	0.0	0.0	0.2	0.7	0.7	0.2	16.7	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.5	0.0	0.0	49.8	0.0	0.0	95.1	1.8	1.8	87.3	11.7	5.6
LnGrp LOS	E	A	A	D	A	A	F	A	A	F	B	A
Approach Vol, veh/h		215			77			1906			2359	
Approach Delay, s/veh		59.5			49.8			2.0			11.1	
Approach LOS		E			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	104.3		26.2	4.5	104.3		26.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	84.0		29.0	8.0	84.0		29.0
Max Q Clear Time (g_c+I1), s	2.4	50.8		7.4	2.4	2.0		20.7
Green Ext Time (p_c), s	0.0	31.5		0.2	0.0	62.7		0.5

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	35	45	95	25	20	55	1535	105	25	1845	150
Future Volume (veh/h)	180	35	45	95	25	20	55	1535	105	25	1845	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	196	38	8	103	27	4	60	1668	111	27	2005	159
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	315	51	368	148	376	56	76	2216	146	34	2107	165
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.23	0.09	1.00	1.00	0.04	1.00	1.00
Sat Flow, veh/h	1120	217	1553	1343	1587	235	1781	3383	223	1781	3338	261
Grp Volume(v), veh/h	234	0	8	103	0	31	60	870	909	27	1054	1110
Grp Sat Flow(s),veh/h/ln	1338	0	1553	1343	0	1822	1781	1777	1830	1781	1777	1822
Q Serve(g_s), s	20.7	0.0	0.5	9.5	0.0	1.8	4.5	0.0	0.0	2.0	0.0	0.0
Cycle Q Clear(g_c), s	22.5	0.0	0.5	32.0	0.0	1.8	4.5	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.84		1.00	1.00		0.13	1.00		0.12	1.00		0.14
Lane Grp Cap(c), veh/h	366	0	368	148	0	432	76	1164	1199	34	1122	1150
V/C Ratio(X)	0.64	0.00	0.02	0.70	0.00	0.07	0.79	0.75	0.76	0.80	0.94	0.96
Avail Cap(c_a), veh/h	366	0	368	148	0	432	106	1164	1199	106	1122	1150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.50	0.50	0.50
Uniform Delay (d), s/veh	48.7	0.0	39.5	63.2	0.0	40.0	61.1	0.0	0.0	64.7	0.0	0.0
Incr Delay (d2), s/veh	3.7	0.0	0.0	13.5	0.0	0.1	1.6	0.4	0.4	7.7	9.3	12.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	0.0	0.2	4.1	0.0	0.8	2.0	0.1	0.1	1.0	2.9	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.4	0.0	39.5	76.6	0.0	40.1	62.7	0.4	0.4	72.4	9.3	12.1
LnGrp LOS	D	A	D	E	A	D	E	A	A	E	A	B
Approach Vol, veh/h		242			134			1839			2191	
Approach Delay, s/veh		52.0			68.2			2.4			11.5	
Approach LOS		D			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	89.2		36.0	6.6	92.4		36.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	82.0		31.0	8.0	82.0		31.0				
Max Q Clear Time (g_c+I1), s	6.5	2.0		34.0	4.0	2.0		24.5				
Green Ext Time (p_c), s	0.0	60.9		0.0	0.0	42.4		0.5				

Intersection Summary			
HCM 6th Ctrl Delay			11.7
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	85	85	190	85	985	50	665	220	620	1135	40
Future Volume (veh/h)	35	85	85	190	85	985	50	665	220	620	1135	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.96	0.98		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	92	13	207	92	0	54	723	156	674	1234	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	172	202	290	471		70	848	714	712	2174	74
Arrive On Green	0.13	0.13	0.13	0.09	0.25	0.00	0.04	0.45	0.45	0.41	1.00	1.00
Sat Flow, veh/h	387	1295	1521	1781	1870	1585	1781	1870	1575	3456	3506	119
Grp Volume(v), veh/h	130	0	13	207	92	0	54	723	156	674	625	651
Grp Sat Flow(s),veh/h/ln	1682	0	1521	1781	1870	1585	1781	1870	1575	1728	1777	1848
Q Serve(g_s), s	6.1	0.0	1.0	12.0	5.2	0.0	4.1	46.5	8.1	25.4	0.0	0.0
Cycle Q Clear(g_c), s	9.6	0.0	1.0	12.0	5.2	0.0	4.1	46.5	8.1	25.4	0.0	0.0
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	258	0	202	290	471		70	848	714	712	1102	1146
V/C Ratio(X)	0.50	0.00	0.06	0.71	0.20		0.77	0.85	0.22	0.95	0.57	0.57
Avail Cap(c_a), veh/h	380	0	315	290	610		238	848	714	742	1102	1146
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.88	0.88	0.88	0.29	0.29	0.29
Uniform Delay (d), s/veh	54.7	0.0	51.2	46.3	39.8	0.0	64.3	32.9	22.4	39.0	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.1	8.0	0.2	0.0	5.8	9.4	0.6	8.1	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	0.4	1.6	2.5	0.0	1.9	22.7	3.1	9.5	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.2	0.0	51.3	54.3	40.0	0.0	70.1	42.3	23.0	47.1	0.6	0.6
LnGrp LOS	E	A	D	D	D		E	D	C	D	A	A
Approach Vol, veh/h		143			299	A		933			1950	
Approach Delay, s/veh		55.8			49.9			40.7			16.7	
Approach LOS		E			D			D			B	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	9.3	87.7	16.0	22.0	31.8	65.2		38.0				
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	18.0	60.0	11.0	27.0	29.0	49.0		43.0				
Max Q Clear Time (g_c+I1), s	16.1	2.0	14.0	11.6	27.4	48.5		7.2				
Green Ext Time (p_c), s	0.0	19.5	0.0	0.4	0.4	0.4		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		28.1
HCM 6th LOS		C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2022 WE Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	45	330	45	50	20	270	310	40	20	280	90
Future Volume (veh/h)	40	45	330	45	50	20	270	310	40	20	280	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	49	35	49	54	10	293	337	22	22	304	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	137	205	270	200	37	380	907	767	29	538	455
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.21	0.48	0.48	0.02	0.29	0.29
Sat Flow, veh/h	555	1051	1568	1303	1532	284	1781	1870	1582	1781	1870	1582
Grp Volume(v), veh/h	92	0	35	49	0	64	293	337	22	22	304	28
Grp Sat Flow(s),veh/h/ln	1605	0	1568	1303	0	1816	1781	1870	1582	1781	1870	1582
Q Serve(g_s), s	0.8	0.0	0.9	1.6	0.0	1.4	6.7	4.9	0.3	0.5	6.0	0.6
Cycle Q Clear(g_c), s	2.2	0.0	0.9	3.8	0.0	1.4	6.7	4.9	0.3	0.5	6.0	0.6
Prop In Lane	0.47		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	331	0	205	270	0	237	380	907	767	29	538	455
V/C Ratio(X)	0.28	0.00	0.17	0.18	0.00	0.27	0.77	0.37	0.03	0.77	0.57	0.06
Avail Cap(c_a), veh/h	994	0	867	820	0	1004	1231	3404	2878	615	2757	2333
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.3	0.0	16.8	19.1	0.0	17.0	16.1	7.0	5.8	21.3	13.2	11.2
Incr Delay (d2), s/veh	0.5	0.0	0.4	0.3	0.0	0.6	3.3	0.5	0.0	33.8	2.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.3	0.5	0.0	0.6	2.6	1.4	0.1	0.5	2.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.8	0.0	17.2	19.4	0.0	17.6	19.4	7.6	5.9	55.0	15.2	11.3
LnGrp LOS	B	A	B	B	A	B	B	A	A	E	B	B
Approach Vol, veh/h		127			113			652			354	
Approach Delay, s/veh		17.6			18.4			12.8			17.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	27.0		10.7	14.3	18.5		10.7				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.5	6.9		4.2	8.7	8.0		5.8				
Green Ext Time (p_c), s	0.0	4.8		0.5	0.8	4.2		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			15.1
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	20	195	40	15	5	135	445	25	15	485	60
Future Volume (veh/h)	55	20	195	40	15	5	135	445	25	15	485	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	22	23	43	16	1	147	484	0	16	527	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	292	85	233	311	260	16	444	856		437	723	610
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.08	0.46	0.00	0.01	0.39	0.39
Sat Flow, veh/h	958	566	1559	1343	1740	109	1781	1870	1585	1781	1870	1579
Grp Volume(v), veh/h	82	0	23	43	0	17	147	484	0	16	527	25
Grp Sat Flow(s),veh/h/ln	1524	0	1559	1343	0	1849	1781	1870	1585	1781	1870	1579
Q Serve(g_s), s	1.2	0.0	0.5	1.2	0.0	0.3	2.0	8.0	0.0	0.2	10.1	0.4
Cycle Q Clear(g_c), s	1.9	0.0	0.5	3.1	0.0	0.3	2.0	8.0	0.0	0.2	10.1	0.4
Prop In Lane	0.73		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	376	0	233	311	0	276	444	856		437	723	610
V/C Ratio(X)	0.22	0.00	0.10	0.14	0.00	0.06	0.33	0.57		0.04	0.73	0.04
Avail Cap(c_a), veh/h	1036	0	928	910	0	1101	932	2272		1052	2272	1918
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	0.0	15.4	17.4	0.0	15.3	7.9	8.3	0.0	8.0	11.0	8.0
Incr Delay (d2), s/veh	0.3	0.0	0.2	0.2	0.0	0.1	0.4	0.6	0.0	0.0	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	0.4	0.0	0.1	0.5	2.2	0.0	0.1	3.3	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.2	0.0	15.6	17.6	0.0	15.4	8.3	8.9	0.0	8.0	12.4	8.1
LnGrp LOS	B	A	B	B	A	B	A	A		A	B	A
Approach Vol, veh/h		105			60			631	A		568	
Approach Delay, s/veh		16.1			17.0			8.8			12.1	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	25.2		11.3	8.5	22.2		11.3
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	10.0		3.9	4.0	12.1		5.1
Green Ext Time (p_c), s	0.0	3.3		0.4	0.3	3.8		0.1

Intersection Summary	
HCM 6th Ctrl Delay	11.1
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	5	85	10	5	10	80	550	15	5	675	50
Future Volume (veh/h)	40	5	85	10	5	10	80	550	15	5	675	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	5	7	11	5	1	87	598	9	5	734	26
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	79	110	20	167	141	115	1002	849	7	889	752
Arrive On Green	0.03	0.11	0.11	0.01	0.09	0.09	0.06	0.54	0.54	0.00	0.48	0.48
Sat Flow, veh/h	1781	701	982	1781	1870	1585	1781	1870	1585	1781	1870	1583
Grp Volume(v), veh/h	43	0	12	11	5	1	87	598	9	5	734	26
Grp Sat Flow(s),veh/h/ln	1781	0	1683	1781	1870	1585	1781	1870	1585	1781	1870	1583
Q Serve(g_s), s	1.4	0.0	0.4	0.4	0.1	0.0	2.9	13.0	0.2	0.2	20.1	0.5
Cycle Q Clear(g_c), s	1.4	0.0	0.4	0.4	0.1	0.0	2.9	13.0	0.2	0.2	20.1	0.5
Prop In Lane	1.00		0.58	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	61	0	189	20	167	141	115	1002	849	7	889	752
V/C Ratio(X)	0.71	0.00	0.06	0.55	0.03	0.01	0.76	0.60	0.01	0.70	0.83	0.03
Avail Cap(c_a), veh/h	600	0	596	600	662	561	750	2048	1736	750	2048	1734
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	0.0	23.6	29.2	24.7	24.6	27.3	9.4	6.4	29.5	13.5	8.3
Incr Delay (d2), s/veh	13.8	0.0	0.1	21.8	0.1	0.0	9.7	0.6	0.0	80.4	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.1	0.3	0.1	0.0	1.4	4.2	0.0	0.2	7.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.2	0.0	23.7	51.0	24.8	24.7	37.0	10.0	6.4	109.9	15.5	8.3
LnGrp LOS	D	A	C	D	C	C	D	A	A	F	B	A
Approach Vol, veh/h		55			17			694			765	
Approach Delay, s/veh		38.2			41.7			13.3			15.9	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	36.8	5.7	11.7	8.8	33.2	7.0	10.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.2	15.0	2.4	2.4	4.9	22.1	3.4	2.1
Green Ext Time (p_c), s	0.0	4.5	0.0	0.0	0.2	6.1	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	15.8
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	10	595	10	0	5	410	595	5	0	730	50
Future Volume (veh/h)	50	10	595	10	0	5	410	595	5	0	730	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	11	0	11	0	1	446	647	5	0	793	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	191	16		206	4	8	516	2703	21	3	1382	614
Arrive On Green	0.08	0.06	0.00	0.08	0.00	0.06	0.29	0.75	0.75	0.00	0.39	0.39
Sat Flow, veh/h	1244	253	1585	1412	67	134	1781	3614	28	1781	3554	1579
Grp Volume(v), veh/h	65	0	0	12	0	0	446	318	334	0	793	17
Grp Sat Flow(s),veh/h/ln	1497	0	1585	1613	0	0	1781	1777	1865	1781	1777	1579
Q Serve(g_s), s	2.0	0.0	0.0	0.0	0.0	0.0	13.7	3.2	3.2	0.0	10.1	0.4
Cycle Q Clear(g_c), s	2.4	0.0	0.0	0.4	0.0	0.0	13.7	3.2	3.2	0.0	10.1	0.4
Prop In Lane	0.83		1.00	0.92		0.08	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	232	0		247	0	0	516	1329	1395	3	1382	614
V/C Ratio(X)	0.28	0.00		0.05	0.00	0.00	0.86	0.24	0.24	0.00	0.57	0.03
Avail Cap(c_a), veh/h	652	0		774	0	0	2192	2125	2231	2192	4251	1889
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	0.0	0.0	25.1	0.0	0.0	19.4	2.2	2.2	0.0	13.9	10.9
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.1	0.0	0.0	1.7	0.2	0.2	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	0.1	0.0	0.0	5.2	0.4	0.5	0.0	3.6	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.7	0.0	0.0	25.2	0.0	0.0	21.1	2.4	2.4	0.0	14.7	10.9
LnGrp LOS	C	A		C	A	A	C	A	A	A	B	B
Approach Vol, veh/h		65	A		12			1098			810	
Approach Delay, s/veh		26.7			25.2			10.0			14.6	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	30.7	28.4		8.5	0.0	49.1		8.5				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0				
Max Q Clear Time (g_c+I1), s	15.7	12.1		2.4	0.0	5.2		4.4				
Green Ext Time (p_c), s	1.0	10.3		0.0	0.0	7.0		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			12.5									
HCM 6th LOS			B									

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	145	15	5	15	105	950	20	10	1295	65
Future Volume (veh/h)	55	5	145	15	5	15	105	950	20	10	1295	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	6	16	5	1	114	1033	21	11	1408	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	224	14	143	155	37	5	146	2502	51	15	2234	994
Arrive On Green	0.11	0.09	0.09	0.11	0.09	0.09	0.08	0.70	0.70	0.01	0.63	0.63
Sat Flow, veh/h	1375	156	1549	728	402	54	1781	3562	72	1781	3554	1581
Grp Volume(v), veh/h	65	0	6	22	0	0	114	515	539	11	1408	42
Grp Sat Flow(s),veh/h/ln	1531	0	1549	1184	0	0	1781	1777	1857	1781	1777	1581
Q Serve(g_s), s	0.0	0.0	0.3	0.1	0.0	0.0	4.5	8.6	8.6	0.4	17.3	0.7
Cycle Q Clear(g_c), s	2.4	0.0	0.3	2.5	0.0	0.0	4.5	8.6	8.6	0.4	17.3	0.7
Prop In Lane	0.92		1.00	0.73		0.05	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	260	0	143	213	0	0	146	1248	1305	15	2234	994
V/C Ratio(X)	0.25	0.00	0.04	0.10	0.00	0.00	0.78	0.41	0.41	0.75	0.63	0.04
Avail Cap(c_a), veh/h	588	0	502	555	0	0	527	2151	2249	276	3802	1692
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.9	0.0	29.4	29.4	0.0	0.0	32.0	4.4	4.4	35.2	8.1	5.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.3	0.5	0.4	24.2	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.1	0.3	0.0	0.0	2.0	2.2	2.3	0.3	5.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.1	0.0	29.4	29.4	0.0	0.0	35.3	4.9	4.9	59.3	8.7	5.1
LnGrp LOS	C	A	C	C	A	A	D	A	A	E	A	A
Approach Vol, veh/h		71			22			1168			1461	
Approach Delay, s/veh		30.1			29.4			7.9			9.0	
Approach LOS		C			C			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	49.7		11.5	4.6	54.9		11.5				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	16.5	19.3		4.5	2.4	10.6		4.4				
Green Ext Time (p_c), s	0.1	25.3		0.0	0.0	14.4		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			9.2
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	180	45	5	35	110	1025	50	30	1375	75
Future Volume (veh/h)	60	5	180	45	5	35	110	1025	50	30	1375	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	12	49	5	2	120	1114	33	33	1495	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	277	18	233	232	187	75	154	2262	1009	57	2069	923
Arrive On Green	0.16	0.15	0.15	0.15	0.15	0.15	0.09	0.64	0.64	0.03	0.58	0.58
Sat Flow, veh/h	1299	122	1579	1391	1269	508	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	70	0	12	49	0	7	120	1114	33	33	1495	45
Grp Sat Flow(s),veh/h/ln	1421	0	1579	1391	0	1777	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.3	0.0	0.5	2.7	0.0	0.3	5.4	13.6	0.6	1.5	24.8	1.0
Cycle Q Clear(g_c), s	3.6	0.0	0.5	6.3	0.0	0.3	5.4	13.6	0.6	1.5	24.8	1.0
Prop In Lane	0.93		1.00	1.00		0.29	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	312	0	233	232	0	262	154	2262	1009	57	2069	923
V/C Ratio(X)	0.22	0.00	0.05	0.21	0.00	0.03	0.78	0.49	0.03	0.57	0.72	0.05
Avail Cap(c_a), veh/h	521	0	464	436	0	522	458	3004	1340	262	2612	1165
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.8	0.0	29.9	34.0	0.0	29.8	36.5	7.9	5.5	38.9	12.3	7.3
Incr Delay (d2), s/veh	0.4	0.0	0.1	0.4	0.0	0.0	3.2	0.4	0.0	3.3	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.2	0.9	0.0	0.1	2.4	4.3	0.2	0.7	8.6	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.2	0.0	30.0	34.5	0.0	29.8	39.7	8.2	5.5	42.3	13.5	7.4
LnGrp LOS	C	A	C	C	A	C	D	A	A	D	B	A
Approach Vol, veh/h		82			56			1267			1573	
Approach Delay, s/veh		31.0			33.9			11.1			13.9	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.1	53.5		17.0	6.6	58.0		17.0				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	21.0	60.0		24.0	12.0	69.0		24.0				
Max Q Clear Time (g_c+I1), s	17.4	26.8		8.3	3.5	15.6		5.6				
Green Ext Time (p_c), s	0.2	20.8		0.1	0.0	17.1		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			13.6									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	235	5	445	15	5	20	290	1150	15	55	1380	155
Future Volume (veh/h)	235	5	445	15	5	20	290	1150	15	55	1380	155
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	255	5	283	16	5	7	315	1250	16	60	1500	125
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	322	6	836	45	14	20	425	2134	27	110	1893	844
Arrive On Green	0.18	0.18	0.18	0.05	0.05	0.02	0.12	0.59	0.58	0.06	0.53	0.53
Sat Flow, veh/h	1749	34	2790	996	311	436	3456	3593	46	1781	3554	1584
Grp Volume(v), veh/h	260	0	283	28	0	0	315	618	648	60	1500	125
Grp Sat Flow(s),veh/h/ln	1783	0	1395	1742	0	0	1728	1777	1862	1781	1777	1584
Q Serve(g_s), s	19.4	0.0	11.0	2.2	0.0	0.0	12.2	30.1	30.2	4.5	47.5	5.6
Cycle Q Clear(g_c), s	19.4	0.0	11.0	2.2	0.0	0.0	12.2	30.1	30.2	4.5	47.5	5.6
Prop In Lane	0.98		1.00	0.57		0.25	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	328	0	836	79	0	0	425	1055	1106	110	1893	844
V/C Ratio(X)	0.79	0.00	0.34	0.35	0.00	0.00	0.74	0.59	0.59	0.55	0.79	0.15
Avail Cap(c_a), veh/h	436	0	1005	388	0	0	1441	2478	2597	192	3858	1720
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.2	0.0	38.0	64.8	0.0	0.0	58.9	17.6	17.6	63.4	26.3	16.5
Incr Delay (d2), s/veh	5.1	0.0	0.1	1.0	0.0	0.0	1.0	0.7	0.7	1.6	1.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.2	0.0	3.9	1.0	0.0	0.0	5.4	12.1	12.7	2.1	19.7	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.3	0.0	38.0	65.8	0.0	0.0	59.8	18.3	18.3	64.9	27.4	16.6
LnGrp LOS	E	A	D	E	A	A	E	B	B	E	C	B
Approach Vol, veh/h		543			28			1581			1685	
Approach Delay, s/veh		48.2			65.8			26.6			27.9	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	21.1	78.1		10.3	12.6	86.6		29.6				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0				
Max Q Clear Time (g_c+I1), s	14.2	49.5		4.2	6.5	32.2		21.4				
Green Ext Time (p_c), s	0.9	22.6		0.0	0.0	12.5		1.2				

Intersection Summary		
HCM 6th Ctrl Delay		30.5
HCM 6th LOS		C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	135	5	60	5	1330	90	90	1810	10
Future Volume (veh/h)	5	0	5	135	5	60	5	1330	90	90	1810	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1446	95	98	1967	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2414	158	124	2813	16
Arrive On Green	0.13	0.00	0.12	0.13	0.13	0.12	0.01	0.95	0.94	0.07	0.78	0.77
Sat Flow, veh/h	1144	37	236	1416	858	858	1781	3386	222	1781	3623	20
Grp Volume(v), veh/h	6	0	0	147	0	10	5	756	785	98	964	1014
Grp Sat Flow(s),veh/h/ln	1418	0	0	1416	0	1716	1781	1777	1830	1781	1777	1867
Q Serve(g_s), s	0.0	0.0	0.0	12.3	0.0	0.7	0.4	6.6	6.9	7.0	34.5	34.6
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	6.6	6.9	7.0	34.5	34.6
Prop In Lane	0.83		0.17	1.00		0.50	1.00		0.12	1.00		0.01
Lane Grp Cap(c), veh/h	228	0	0	234	0	215	11	1267	1305	124	1379	1449
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.60	0.60	0.79	0.70	0.70
Avail Cap(c_a), veh/h	313	0	0	319	0	317	151	1267	1305	151	1379	1449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.83	0.83	0.83	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	0.0	0.0	55.4	0.0	50.3	64.2	1.1	1.2	59.5	7.1	7.1
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.7	0.0	0.1	8.1	1.7	1.7	16.4	3.0	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	4.9	0.0	0.3	0.2	1.7	1.8	3.7	11.6	12.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.4	72.3	2.9	2.9	76.0	10.1	10.0
LnGrp LOS	D	A	A	E	A	D	E	A	A	E	B	A
Approach Vol, veh/h		6			157			1546			2076	
Approach Delay, s/veh		50.0			57.6			3.1			13.1	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.8	104.9		20.3	13.1	96.7		20.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	82.0		23.0	11.0	82.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	36.6		15.0	9.0	8.9		2.7
Green Ext Time (p_c), s	0.0	34.8		0.3	0.0	30.3		0.0

Intersection Summary		
HCM 6th Ctrl Delay		10.9
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	5	15	65	5	15	15	1275	15	10	1595	260
Future Volume (veh/h)	135	5	15	65	5	15	15	1275	15	10	1595	260
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	147	5	13	71	5	9	16	1386	15	11	1734	208
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	6	16	227	17	23	19	2770	30	13	2722	1213
Arrive On Green	0.13	0.13	0.12	0.13	0.13	0.12	0.01	0.52	0.51	0.01	0.77	0.77
Sat Flow, veh/h	1344	46	119	1341	132	175	1781	3601	39	1781	3554	1584
Grp Volume(v), veh/h	165	0	0	85	0	0	16	684	717	11	1734	208
Grp Sat Flow(s),veh/h/ln	1509	0	0	1648	0	0	1781	1777	1863	1781	1777	1584
Q Serve(g_s), s	7.7	0.0	0.0	0.0	0.0	0.0	1.2	32.7	32.7	0.8	29.0	4.6
Cycle Q Clear(g_c), s	13.7	0.0	0.0	5.9	0.0	0.0	1.2	32.7	32.7	0.8	29.0	4.6
Prop In Lane	0.89		0.08	0.84		0.11	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	250	0	0	267	0	0	19	1367	1433	13	2722	1213
V/C Ratio(X)	0.66	0.00	0.00	0.32	0.00	0.00	0.84	0.50	0.50	0.82	0.64	0.17
Avail Cap(c_a), veh/h	348	0	0	366	0	0	110	1367	1433	110	2722	1213
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.77	0.77	0.77	0.62	0.62	0.62
Uniform Delay (d), s/veh	54.8	0.0	0.0	51.7	0.0	0.0	64.4	15.2	15.2	64.4	7.0	4.1
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.7	0.0	0.0	23.1	1.0	1.0	23.1	0.7	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	0.0	2.6	0.0	0.0	0.7	14.6	15.3	0.4	9.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.8	0.0	0.0	52.4	0.0	0.0	87.5	16.2	16.2	87.5	7.7	4.3
LnGrp LOS	E	A	A	D	A	A	F	B	B	F	A	A
Approach Vol, veh/h		165			85			1417			1953	
Approach Delay, s/veh		57.8			52.4			17.0			7.8	
Approach LOS		E			D			B			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	103.6		21.0	5.0	104.0		21.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	83.0		25.0	8.0	83.0		25.0				
Max Q Clear Time (g_c+I1), s	3.2	31.0		7.9	2.8	34.7		15.7				
Green Ext Time (p_c), s	0.0	42.4		0.2	0.0	28.6		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			14.7
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	20	50	90	20	20	60	1305	60	15	1605	130
Future Volume (veh/h)	190	20	50	90	20	20	60	1305	60	15	1605	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	207	22	11	98	22	2	65	1418	63	16	1745	137
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	325	29	352	139	377	34	83	2335	104	19	2132	165
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.06	0.90	0.89	0.01	0.85	0.84
Sat Flow, veh/h	1222	130	1579	1373	1688	153	1781	3465	154	1781	3341	259
Grp Volume(v), veh/h	229	0	11	98	0	24	65	726	755	16	918	964
Grp Sat Flow(s),veh/h/ln	1352	0	1579	1373	0	1842	1781	1777	1842	1781	1777	1823
Q Serve(g_s), s	19.7	0.0	0.7	7.9	0.0	1.3	4.7	12.1	12.2	1.2	32.5	35.2
Cycle Q Clear(g_c), s	21.1	0.0	0.7	29.0	0.0	1.3	4.7	12.1	12.2	1.2	32.5	35.2
Prop In Lane	0.90		1.00	1.00		0.08	1.00		0.08	1.00		0.14
Lane Grp Cap(c), veh/h	354	0	352	139	0	411	83	1197	1241	19	1134	1163
V/C Ratio(X)	0.65	0.00	0.03	0.70	0.00	0.06	0.78	0.61	0.61	0.84	0.81	0.83
Avail Cap(c_a), veh/h	354	0	352	139	0	411	110	1197	1241	110	1134	1163
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.19	0.19	0.19	0.70	0.70	0.70
Uniform Delay (d), s/veh	48.0	0.0	39.5	61.6	0.0	39.8	60.3	2.8	2.9	64.0	6.0	6.3
Incr Delay (d2), s/veh	4.0	0.0	0.0	14.8	0.0	0.1	3.6	0.4	0.4	21.5	4.5	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	0.0	0.3	3.8	0.0	0.6	2.2	2.4	2.6	0.6	6.3	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.1	0.0	39.5	76.4	0.0	39.8	64.0	3.3	3.3	85.4	10.5	11.2
LnGrp LOS	D	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		240			122			1546			1898	
Approach Delay, s/veh		51.5			69.2			5.8			11.5	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	87.0		33.0	5.4	91.6		33.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	80.0		28.0	8.0	80.0		28.0
Max Q Clear Time (g_c+I1), s	6.7	37.2		31.0	3.2	14.2		23.1
Green Ext Time (p_c), s	0.0	31.5		0.0	0.0	26.9		0.4

Intersection Summary		
HCM 6th Ctrl Delay		13.6
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	65	70	195	90	790	50	570	190	520	1020	75
Future Volume (veh/h)	25	65	70	195	90	790	50	570	190	520	1020	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.94	0.96		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	27	71	10	212	98	0	54	620	121	565	1109	79
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	191	208	361	519		70	830	694	645	1988	142
Arrive On Green	0.14	0.14	0.14	0.11	0.28	0.00	0.04	0.44	0.44	0.13	0.40	0.39
Sat Flow, veh/h	327	1374	1493	1781	1870	1585	1781	1870	1565	3456	3364	240
Grp Volume(v), veh/h	98	0	10	212	98	0	54	620	121	565	585	603
Grp Sat Flow(s),veh/h/ln	1701	0	1493	1781	1870	1585	1781	1870	1565	1728	1777	1827
Q Serve(g_s), s	1.4	0.0	0.8	13.0	5.2	0.0	3.9	35.9	6.1	20.9	33.2	33.3
Cycle Q Clear(g_c), s	6.4	0.0	0.8	13.0	5.2	0.0	3.9	35.9	6.1	20.9	33.2	33.3
Prop In Lane	0.28		1.00	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	272	0	208	361	519		70	830	694	645	1050	1079
V/C Ratio(X)	0.36	0.00	0.05	0.59	0.19		0.77	0.75	0.17	0.88	0.56	0.56
Avail Cap(c_a), veh/h	372	0	299	361	633		329	830	694	957	1050	1079
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.51	0.51	0.51
Uniform Delay (d), s/veh	50.9	0.0	48.5	40.5	35.8	0.0	61.9	30.1	21.8	55.4	26.1	26.1
Incr Delay (d2), s/veh	0.8	0.0	0.1	2.5	0.2	0.0	5.2	4.9	0.4	2.4	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.3	6.0	2.4	0.0	1.9	16.9	2.3	9.6	15.1	15.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	0.0	48.6	43.0	36.0	0.0	67.0	35.0	22.2	57.8	27.2	27.2
LnGrp LOS	D	A	D	D	D		E	C	C	E	C	C
Approach Vol, veh/h		108			310	A		795			1753	
Approach Delay, s/veh		51.4			40.7			35.2			37.1	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.1	80.8	18.0	22.1	28.3	61.7		40.1
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	24.0	49.0	13.0	25.0	36.0	37.0		43.0
Max Q Clear Time (g_c+I1), s	15.9	35.3	15.0	8.4	22.9	37.9		7.2
Green Ext Time (p_c), s	0.1	8.5	0.0	0.3	1.4	0.0		0.4

Intersection Summary			
HCM 6th Ctrl Delay			37.5
HCM 6th LOS			D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2022 with Mitigation AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	45	295	90	50	20	220	230	100	10	135	30
Future Volume (veh/h)	50	45	295	90	50	20	220	230	100	10	135	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	49	42	98	54	11	239	250	51	11	147	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	239	165	258	328	247	50	321	792	671	15	472	400
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.18	0.42	0.42	0.01	0.25	0.25
Sat Flow, veh/h	615	1003	1571	1297	1505	307	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	103	0	42	98	0	65	239	250	51	11	147	8
Grp Sat Flow(s),veh/h/ln	1618	0	1571	1297	0	1812	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.5	0.0	0.9	2.9	0.0	1.2	5.0	3.5	0.8	0.2	2.5	0.2
Cycle Q Clear(g_c), s	2.0	0.0	0.9	4.9	0.0	1.2	5.0	3.5	0.8	0.2	2.5	0.2
Prop In Lane	0.52		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	404	0	258	328	0	297	321	792	671	15	472	400
V/C Ratio(X)	0.25	0.00	0.16	0.30	0.00	0.22	0.75	0.32	0.08	0.72	0.31	0.02
Avail Cap(c_a), veh/h	1083	0	951	900	0	1097	1348	3727	3158	674	3019	2558
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.7	0.0	14.2	16.9	0.0	14.4	15.4	7.6	6.8	19.6	12.0	11.1
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.5	0.0	0.4	3.4	0.5	0.1	46.6	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.3	0.8	0.0	0.5	1.9	1.0	0.2	0.3	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	0.0	14.5	17.4	0.0	14.7	18.8	8.1	6.9	66.2	12.8	11.2
LnGrp LOS	B	A	B	B	A	B	B	A	A	E	B	B
Approach Vol, veh/h		145			163			540			166	
Approach Delay, s/veh		14.9			16.3			12.7			16.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.3	22.8		11.5	12.1	16.0		11.5
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0
Max Q Clear Time (g_c+I1), s	2.2	5.5		4.0	7.0	4.5		6.9
Green Ext Time (p_c), s	0.0	3.7		0.6	0.7	1.8		0.6

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	180	90	20	15	135	515	15	10	515	65
Future Volume (veh/h)	60	5	180	90	20	15	135	515	15	10	515	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	20	98	22	2	147	560	0	11	560	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	382	24	308	348	336	31	411	880		367	727	611
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.09	0.47	0.00	0.01	0.39	0.39
Sat Flow, veh/h	1214	122	1545	1357	1685	153	1781	1870	1585	1781	1870	1573
Grp Volume(v), veh/h	70	0	20	98	0	24	147	560	0	11	560	28
Grp Sat Flow(s),veh/h/ln	1337	0	1545	1357	0	1838	1781	1870	1585	1781	1870	1573
Q Serve(g_s), s	1.9	0.0	0.5	3.3	0.0	0.5	2.2	11.3	0.0	0.2	13.0	0.6
Cycle Q Clear(g_c), s	2.5	0.0	0.5	5.8	0.0	0.5	2.2	11.3	0.0	0.2	13.0	0.6
Prop In Lane	0.93		1.00	1.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	406	0	308	348	0	367	411	880		367	727	611
V/C Ratio(X)	0.17	0.00	0.06	0.28	0.00	0.07	0.36	0.64		0.03	0.77	0.05
Avail Cap(c_a), veh/h	825	0	776	759	0	923	787	1917		888	1917	1612
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.0	0.0	16.1	19.4	0.0	16.2	9.2	10.0	0.0	9.6	13.3	9.5
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.4	0.0	0.1	0.5	0.8	0.0	0.0	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	1.0	0.0	0.2	0.7	3.5	0.0	0.1	4.6	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.2	0.0	16.2	19.8	0.0	16.2	9.7	10.7	0.0	9.7	15.0	9.5
LnGrp LOS	B	A	B	B	A	B	A	B		A	B	A
Approach Vol, veh/h		90			122			707	A		599	
Approach Delay, s/veh		17.0			19.1			10.5			14.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	29.4		14.9	9.5	25.3		14.9
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	13.3		4.5	4.2	15.0		7.8
Green Ext Time (p_c), s	0.0	4.0		0.4	0.3	4.1		0.3

Intersection Summary		
HCM 6th Ctrl Delay		13.2
HCM 6th LOS		B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	5	125	5	5	5	60	600	15	5	715	30
Future Volume (veh/h)	40	5	125	5	5	5	60	600	15	5	715	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	5	11	5	5	1	65	652	9	5	777	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	60	63	139	9	176	148	84	1012	857	7	931	783
Arrive On Green	0.03	0.12	0.12	0.01	0.09	0.09	0.05	0.54	0.54	0.00	0.50	0.50
Sat Flow, veh/h	1781	516	1134	1781	1870	1566	1781	1870	1585	1781	1870	1574
Grp Volume(v), veh/h	43	0	16	5	5	1	65	652	9	5	777	17
Grp Sat Flow(s),veh/h/ln	1781	0	1650	1781	1870	1566	1781	1870	1585	1781	1870	1574
Q Serve(g_s), s	1.5	0.0	0.5	0.2	0.1	0.0	2.2	15.0	0.2	0.2	21.8	0.3
Cycle Q Clear(g_c), s	1.5	0.0	0.5	0.2	0.1	0.0	2.2	15.0	0.2	0.2	21.8	0.3
Prop In Lane	1.00		0.69	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	60	0	203	9	176	148	84	1012	857	7	931	783
V/C Ratio(X)	0.71	0.00	0.08	0.53	0.03	0.01	0.77	0.64	0.01	0.70	0.83	0.02
Avail Cap(c_a), veh/h	582	0	566	582	642	538	728	1987	1684	728	1987	1672
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.3	0.0	23.8	30.3	25.2	25.1	28.8	9.9	6.5	30.4	13.2	7.8
Incr Delay (d2), s/veh	14.3	0.0	0.2	38.7	0.1	0.0	13.7	0.7	0.0	80.6	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.2	0.2	0.1	0.0	1.2	4.9	0.0	0.2	7.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.6	0.0	23.9	69.0	25.2	25.1	42.5	10.6	6.5	111.0	15.3	7.8
LnGrp LOS	D	A	C	E	C	C	D	B	A	F	B	A
Approach Vol, veh/h		59			11			726			799	
Approach Delay, s/veh		38.3			45.1			13.4			15.7	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	38.1	5.3	12.5	7.9	35.4	7.1	10.8
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.2	17.0	2.2	2.5	4.2	23.8	3.5	2.1
Green Ext Time (p_c), s	0.0	5.1	0.0	0.0	0.1	6.6	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	15.7
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	10	480	20	5	0	315	675	45	10	805	10
Future Volume (veh/h)	35	10	480	20	5	0	315	675	45	10	805	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	11	0	22	5	0	342	734	48	11	875	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	196	31		200	31	0	411	2207	144	15	1526	681
Arrive On Green	0.09	0.07	0.00	0.09	0.07	0.00	0.23	0.65	0.65	0.01	0.43	0.43
Sat Flow, veh/h	1117	419	1585	1147	423	0	1781	3386	221	1781	3554	1585
Grp Volume(v), veh/h	49	0	0	27	0	0	342	385	397	11	875	3
Grp Sat Flow(s),veh/h/ln	1536	0	1585	1571	0	0	1781	1777	1831	1781	1777	1585
Q Serve(g_s), s	0.8	0.0	0.0	0.0	0.0	0.0	10.3	5.4	5.4	0.3	10.5	0.1
Cycle Q Clear(g_c), s	1.6	0.0	0.0	0.8	0.0	0.0	10.3	5.4	5.4	0.3	10.5	0.1
Prop In Lane	0.78		1.00	0.81		0.00	1.00		0.12	1.00		1.00
Lane Grp Cap(c), veh/h	254	0		259	0	0	411	1158	1193	15	1526	681
V/C Ratio(X)	0.19	0.00		0.10	0.00	0.00	0.83	0.33	0.33	0.73	0.57	0.00
Avail Cap(c_a), veh/h	671	0		801	0	0	2085	2332	2402	2085	4663	2080
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.5	0.0	0.0	24.2	0.0	0.0	20.6	4.4	4.4	27.9	12.2	9.2
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	1.7	0.4	0.3	22.3	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.3	0.0	0.0	4.0	1.3	1.3	0.2	3.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.9	0.0	0.0	24.3	0.0	0.0	22.3	4.7	4.7	50.2	12.9	9.2
LnGrp LOS	C	A		C	A	A	C	A	A	D	B	A
Approach Vol, veh/h		49	A		27			1124			889	
Approach Delay, s/veh		24.9			24.3			10.1			13.4	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	17.0	30.2		9.2	4.5	42.8		9.2
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	66.0	74.0		25.0	66.0	74.0		20.0
Max Q Clear Time (g_c+I1), s	12.3	12.5		2.8	2.3	7.4		3.6
Green Ext Time (p_c), s	0.8	11.7		0.0	0.0	9.0		0.1

Intersection Summary	
HCM 6th Ctrl Delay	12.0
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	70	10	5	10	135	1085	20	15	1275	65
Future Volume (veh/h)	30	0	70	10	5	10	135	1085	20	15	1275	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	0	1	11	5	1	147	1179	21	16	1386	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	180	0	73	122	19	3	186	2614	47	21	2269	1012
Arrive On Green	0.06	0.00	0.05	0.06	0.05	0.05	0.10	0.73	0.73	0.01	0.64	0.64
Sat Flow, veh/h	1558	0	1585	705	417	70	1781	3572	64	1781	3554	1585
Grp Volume(v), veh/h	33	0	1	17	0	0	147	586	614	16	1386	43
Grp Sat Flow(s),veh/h/ln	1558	0	1585	1191	0	0	1781	1777	1859	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	5.3	8.8	8.8	0.6	15.3	0.7
Cycle Q Clear(g_c), s	1.2	0.0	0.0	1.6	0.0	0.0	5.3	8.8	8.8	0.6	15.3	0.7
Prop In Lane	1.00		1.00	0.65		0.06	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	203	0	73	162	0	0	186	1300	1360	21	2269	1012
V/C Ratio(X)	0.16	0.00	0.01	0.10	0.00	0.00	0.79	0.45	0.45	0.78	0.61	0.04
Avail Cap(c_a), veh/h	627	0	549	623	0	0	563	2302	2408	295	4068	1814
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.3	0.0	30.2	30.8	0.0	0.0	29.0	3.6	3.6	32.7	7.1	4.5
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.1	0.0	0.0	2.8	0.5	0.5	20.4	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.3	0.0	0.0	2.3	1.8	1.9	0.4	4.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.4	0.0	30.3	30.9	0.0	0.0	31.8	4.1	4.1	53.1	7.7	4.5
LnGrp LOS	C	A	C	C	A	A	C	A	A	D	A	A
Approach Vol, veh/h		34			17			1347			1445	
Approach Delay, s/veh		30.4			30.9			7.1			8.1	
Approach LOS		C			C			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.9	47.4		8.0	4.8	53.6		8.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	7.3	17.3		3.6	2.6	10.8		3.2				
Green Ext Time (p_c), s	0.1	25.1		0.0	0.0	18.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			8.0									
HCM 6th LOS			A									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	35	40	15	45	110	1225	60	25	1225	45
Future Volume (veh/h)	55	5	35	40	15	45	110	1225	60	25	1225	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	1	43	16	1	120	1332	50	27	1332	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	12	152	111	168	10	142	2789	1244	39	2584	1153
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.08	0.78	0.78	0.02	0.73	0.73
Sat Flow, veh/h	1198	121	1580	1407	1742	109	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	65	0	1	43	0	17	120	1332	50	27	1332	35
Grp Sat Flow(s),veh/h/ln	1318	0	1580	1407	0	1850	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	6.6	0.0	0.1	4.7	0.0	1.3	10.3	20.0	1.1	2.3	25.4	1.0
Cycle Q Clear(g_c), s	7.8	0.0	0.1	12.5	0.0	1.3	10.3	20.0	1.1	2.3	25.4	1.0
Prop In Lane	0.92		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	172	0	152	111	0	178	142	2789	1244	39	2584	1153
V/C Ratio(X)	0.38	0.00	0.01	0.39	0.00	0.10	0.84	0.48	0.04	0.68	0.52	0.03
Avail Cap(c_a), veh/h	255	0	245	193	0	287	241	2789	1244	241	2584	1153
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.3	0.0	63.3	72.8	0.0	63.9	70.4	5.7	3.7	75.2	9.2	5.9
Incr Delay (d2), s/veh	1.4	0.0	0.0	2.2	0.0	0.2	3.7	0.4	0.0	7.5	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	0.0	1.8	0.0	0.6	4.8	6.7	0.3	1.2	9.5	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.7	0.0	63.3	75.0	0.0	64.1	74.1	6.2	3.8	82.8	10.0	5.9
LnGrp LOS	E	A	E	E	A	E	E	A	A	F	A	A
Approach Vol, veh/h		66			60			1502			1394	
Approach Delay, s/veh		68.6			71.9			11.5			11.3	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.7		19.9	7.4	127.6		19.9
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	27.4		14.5	4.3	22.0		9.8
Green Ext Time (p_c), s	0.1	24.4		0.1	0.0	25.2		0.1

Intersection Summary			
HCM 6th Ctrl Delay			13.8
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	10	220	10	10	10	425	1310	15	80	1185	95
Future Volume (veh/h)	135	10	220	10	10	10	425	1310	15	80	1185	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	155	0	64	11	11	4	462	1424	16	87	1288	73
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	342	0	832	61	61	22	617	2084	23	154	1731	906
Arrive On Green	0.10	0.00	0.09	0.08	0.08	0.05	0.18	0.58	0.56	0.09	0.49	0.49
Sat Flow, veh/h	3563	0	3078	752	752	273	3456	3599	40	1781	3554	1579
Grp Volume(v), veh/h	155	0	64	26	0	0	462	703	737	87	1288	73
Grp Sat Flow(s),veh/h/ln	1781	0	1539	1776	0	0	1728	1777	1863	1781	1777	1579
Q Serve(g_s), s	4.2	0.0	1.6	1.4	0.0	0.0	12.9	28.1	28.2	4.8	29.8	2.1
Cycle Q Clear(g_c), s	4.2	0.0	1.6	1.4	0.0	0.0	12.9	28.1	28.2	4.8	29.8	2.1
Prop In Lane	1.00		1.00	0.42		0.15	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	342	0	832	145	0	0	617	1029	1079	154	1731	906
V/C Ratio(X)	0.45	0.00	0.08	0.18	0.00	0.00	0.75	0.68	0.68	0.56	0.74	0.08
Avail Cap(c_a), veh/h	1186	0	1560	539	0	0	1962	3374	3538	262	5253	2471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.6	0.0	28.2	43.9	0.0	0.0	39.8	15.0	15.0	44.8	21.1	9.8
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.6	0.0	0.0	0.7	1.2	1.1	1.2	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.6	0.6	0.0	0.0	5.4	10.6	11.2	2.1	11.8	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.0	0.0	28.2	44.5	0.0	0.0	40.5	16.1	16.1	46.0	22.0	9.8
LnGrp LOS	D	A	C	D	A	A	D	B	B	D	C	A
Approach Vol, veh/h		219			26			1902			1448	
Approach Delay, s/veh		39.4			44.5			22.0			22.8	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	22.2	53.7		12.4	12.9	63.1		13.8
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	14.9	31.8		3.4	6.8	30.2		6.2
Green Ext Time (p_c), s	1.3	16.0		0.1	0.1	16.4		0.6

Intersection Summary	
HCM 6th Ctrl Delay	23.6
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	60	0	45	5	1745	90	30	1385	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1745	90	30	1385	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	1897	96	33	1505	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	177	0	138	11	2717	136	64	2974	10
Arrive On Green	0.09	0.09	0.08	0.09	0.00	0.08	0.01	0.79	0.78	0.04	0.82	0.81
Sat Flow, veh/h	586	899	148	1378	0	1545	1781	3443	173	1781	3633	12
Grp Volume(v), veh/h	11	0	0	65	0	1	5	971	1022	33	736	774
Grp Sat Flow(s),veh/h/ln	1633	0	0	1378	0	1545	1781	1777	1839	1781	1777	1868
Q Serve(g_s), s	0.0	0.0	0.0	5.3	0.0	0.1	0.4	35.6	37.0	2.5	18.0	18.0
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	35.6	37.0	2.5	18.0	18.0
Prop In Lane	0.45		0.09	1.00		1.00	1.00		0.09	1.00		0.01
Lane Grp Cap(c), veh/h	183	0	0	177	0	138	11	1402	1451	64	1455	1529
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.44	0.69	0.70	0.52	0.51	0.51
Avail Cap(c_a), veh/h	313	0	0	290	0	265	102	1402	1451	102	1455	1529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.64	0.64	0.64	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.4	0.0	0.0	60.7	0.0	58.5	69.3	6.9	7.0	66.3	3.9	3.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	6.4	1.8	1.9	2.4	1.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.3	0.0	0.0	0.2	11.6	12.6	1.2	5.5	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	75.7	8.7	8.9	68.7	5.2	5.1
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	A	A
Approach Vol, veh/h		11			66			1998			1543	
Approach Delay, s/veh		58.6			62.0			9.0			6.5	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.9	118.6		16.5	9.0	114.5		16.5
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	95.0		23.0	8.0	95.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	20.0		8.1	4.5	39.0		2.8
Green Ext Time (p_c), s	0.0	29.0		0.1	0.0	41.4		0.0

Intersection Summary			
HCM 6th Ctrl Delay			9.0
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	5	5	105	15	15	5	1725	20	10	1230	185
Future Volume (veh/h)	90	5	5	105	15	15	5	1725	20	10	1230	185
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	98	5	3	114	16	12	5	1875	21	11	1337	143
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	210	8	5	199	20	15	7	2817	31	14	2795	1245
Arrive On Green	0.11	0.11	0.10	0.11	0.11	0.10	0.00	0.78	0.77	0.01	0.79	0.79
Sat Flow, veh/h	1393	71	43	1317	185	139	1781	3600	40	1781	3554	1583
Grp Volume(v), veh/h	106	0	0	142	0	0	5	924	972	11	1337	143
Grp Sat Flow(s),veh/h/ln	1506	0	0	1641	0	0	1781	1777	1863	1781	1777	1583
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.3	28.3	28.5	0.7	15.5	2.5
Cycle Q Clear(g_c), s	7.9	0.0	0.0	9.7	0.0	0.0	0.3	28.3	28.5	0.7	15.5	2.5
Prop In Lane	0.92		0.03	0.80		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	223	0	0	234	0	0	7	1391	1458	14	2795	1245
V/C Ratio(X)	0.48	0.00	0.00	0.61	0.00	0.00	0.73	0.66	0.67	0.80	0.48	0.11
Avail Cap(c_a), veh/h	432	0	0	451	0	0	119	1391	1458	119	2795	1245
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.63	0.63	0.63	0.86	0.86	0.86
Uniform Delay (d), s/veh	51.1	0.0	0.0	51.8	0.0	0.0	59.7	5.9	5.9	59.4	4.4	3.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.5	0.0	0.0	29.2	1.6	1.5	28.3	0.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.0	4.3	0.0	0.0	0.2	8.6	9.0	0.4	4.5	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.7	0.0	0.0	54.3	0.0	0.0	88.9	7.5	7.5	87.8	4.9	3.2
LnGrp LOS	D	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		106			142			1901			1491	
Approach Delay, s/veh		52.7			54.3			7.7			5.3	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.4		17.2	4.9	97.9		17.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.3	17.5		11.7	2.7	30.5		9.9
Green Ext Time (p_c), s	0.0	31.3		0.5	0.0	32.7		0.3

Intersection Summary	
HCM 6th Ctrl Delay	9.9
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	30	20	145	25	35	25	1550	75	10	1270	70
Future Volume (veh/h)	145	30	20	145	25	35	25	1550	75	10	1270	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	158	33	4	158	27	5	27	1685	80	11	1380	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	336	60	403	225	394	73	34	2244	106	13	2189	117
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.25	0.04	1.00	1.00	0.01	0.64	0.63
Sat Flow, veh/h	1122	234	1568	1361	1532	284	1781	3455	163	1781	3431	184
Grp Volume(v), veh/h	191	0	4	158	0	32	27	862	903	11	713	741
Grp Sat Flow(s),veh/h/ln	1357	0	1568	1361	0	1816	1781	1777	1841	1781	1777	1837
Q Serve(g_s), s	16.3	0.0	0.3	16.1	0.0	1.9	2.1	0.0	0.0	0.9	34.0	34.3
Cycle Q Clear(g_c), s	18.2	0.0	0.3	34.2	0.0	1.9	2.1	0.0	0.0	0.9	34.0	34.3
Prop In Lane	0.83		1.00	1.00		0.16	1.00		0.09	1.00		0.10
Lane Grp Cap(c), veh/h	396	0	403	225	0	467	34	1154	1196	13	1134	1172
V/C Ratio(X)	0.48	0.00	0.01	0.70	0.00	0.07	0.79	0.75	0.75	0.83	0.63	0.63
Avail Cap(c_a), veh/h	396	0	403	225	0	467	140	1154	1196	140	1134	1172
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.86	0.86	0.86
Uniform Delay (d), s/veh	46.2	0.0	38.7	60.3	0.0	39.4	67.1	0.0	0.0	69.4	15.3	15.4
Incr Delay (d2), s/veh	0.9	0.0	0.0	9.5	0.0	0.1	1.4	0.4	0.4	31.9	2.3	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	0.0	0.1	6.2	0.0	0.9	1.0	0.1	0.1	0.5	13.8	14.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.1	0.0	38.7	69.8	0.0	39.4	68.5	0.4	0.4	101.3	17.6	17.6
LnGrp LOS	D	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		195			190			1792			1465	
Approach Delay, s/veh		46.9			64.7			1.4			18.3	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	93.3		40.0	5.0	95.0		40.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	80.0		35.0	11.0	80.0		35.0
Max Q Clear Time (g_c+I1), s	4.1	36.3		36.2	2.9	2.0		20.2
Green Ext Time (p_c), s	0.0	22.0		0.0	0.0	41.1		0.6

Intersection Summary		
HCM 6th Ctrl Delay		13.9
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	85	35	115	65	1085	25	655	165	540	1030	30
Future Volume (veh/h)	10	85	35	115	65	1085	25	655	165	540	1030	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	92	3	125	71	0	27	712	111	587	1120	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	39	176	158	255	392		34	981	828	623	2419	69
Arrive On Green	0.10	0.10	0.10	0.08	0.21	0.00	0.02	0.52	0.52	0.36	1.00	1.00
Sat Flow, veh/h	108	1715	1543	1781	1870	1585	1781	1870	1579	3456	3528	101
Grp Volume(v), veh/h	103	0	3	125	71	0	27	712	111	587	564	588
Grp Sat Flow(s),veh/h/ln	1823	0	1543	1781	1870	1585	1781	1870	1579	1728	1777	1852
Q Serve(g_s), s	1.1	0.0	0.2	8.5	4.4	0.0	2.1	40.9	5.0	23.0	0.0	0.0
Cycle Q Clear(g_c), s	7.4	0.0	0.2	8.5	4.4	0.0	2.1	40.9	5.0	23.0	0.0	0.0
Prop In Lane	0.11		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	215	0	158	255	392		34	981	828	623	1218	1270
V/C Ratio(X)	0.48	0.00	0.02	0.49	0.18		0.79	0.73	0.13	0.94	0.46	0.46
Avail Cap(c_a), veh/h	326	0	254	255	508		178	981	828	642	1218	1270
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.74	0.74	0.74
Uniform Delay (d), s/veh	59.7	0.0	56.5	49.1	45.5	0.0	68.4	25.6	17.0	44.0	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.0	1.5	0.2	0.0	11.3	3.7	0.3	17.5	0.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.1	3.9	2.1	0.0	1.1	18.7	1.9	9.8	0.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.3	0.0	56.6	50.6	45.7	0.0	79.7	29.3	17.3	61.5	0.9	0.9
LnGrp LOS	E	A	E	D	D		E	C	B	E	A	A
Approach Vol, veh/h		106			196	A		850			1739	
Approach Delay, s/veh		61.2			48.8			29.3			21.4	
Approach LOS		E			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	100.0	15.0	18.3	29.3	77.4		33.3
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	14.0	75.0	10.0	22.0	26.0	63.0		37.0
Max Q Clear Time (g_c+I1), s	14.1	2.0	10.5	9.4	25.0	42.9		6.4
Green Ext Time (p_c), s	0.0	16.9	0.0	0.2	0.2	7.9		0.2

Intersection Summary	
HCM 6th Ctrl Delay	27.0
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2022 with Mitigation PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	25	370	60	25	5	380	215	65	10	280	75
Future Volume (veh/h)	55	25	370	60	25	5	380	215	65	10	280	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	27	24	65	27	1	413	234	45	11	304	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	233	73	185	238	209	8	502	1016	861	15	505	428
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.28	0.54	0.54	0.01	0.27	0.27
Sat Flow, veh/h	917	626	1585	1354	1792	66	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	87	0	24	65	0	28	413	234	45	11	304	20
Grp Sat Flow(s),veh/h/ln	1543	0	1585	1354	0	1858	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.8	0.0	0.7	2.3	0.0	0.7	10.4	3.1	0.6	0.3	6.8	0.4
Cycle Q Clear(g_c), s	2.5	0.0	0.7	4.7	0.0	0.7	10.4	3.1	0.6	0.3	6.8	0.4
Prop In Lane	0.69		1.00	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	306	0	185	238	0	216	502	1016	861	15	505	428
V/C Ratio(X)	0.28	0.00	0.13	0.27	0.00	0.13	0.82	0.23	0.05	0.72	0.60	0.05
Avail Cap(c_a), veh/h	880	0	789	755	0	926	1109	3067	2599	555	2484	2105
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.8	0.0	19.1	22.1	0.0	19.1	16.2	5.8	5.2	23.8	15.3	13.0
Incr Delay (d2), s/veh	0.5	0.0	0.3	0.6	0.0	0.3	3.4	0.2	0.1	48.4	2.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.2	0.7	0.0	0.3	4.0	0.9	0.2	0.3	2.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.4	0.0	19.4	22.7	0.0	19.4	19.6	6.0	5.2	72.3	17.8	13.1
LnGrp LOS	C	A	B	C	A	B	B	A	A	E	B	B
Approach Vol, veh/h		111			93			692			335	
Approach Delay, s/veh		20.2			21.7			14.1			19.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	32.2		10.6	18.6	19.0		10.6
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0
Max Q Clear Time (g_c+I1), s	2.3	5.1		4.5	12.4	8.8		6.7
Green Ext Time (p_c), s	0.0	3.4		0.5	1.2	4.2		0.2

Intersection Summary			
HCM 6th Ctrl Delay			16.6
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	20	150	45	15	10	195	585	45	25	570	80
Future Volume (veh/h)	75	20	150	45	15	10	195	585	45	25	570	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	22	14	49	16	1	212	636	0	27	620	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	276	55	207	243	227	14	450	963		394	804	678
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.10	0.51	0.00	0.02	0.43	0.43
Sat Flow, veh/h	1081	422	1585	1372	1742	109	1781	1870	1585	1781	1870	1578
Grp Volume(v), veh/h	104	0	14	49	0	17	212	636	0	27	620	42
Grp Sat Flow(s),veh/h/ln	1503	0	1585	1372	0	1851	1781	1870	1585	1781	1870	1578
Q Serve(g_s), s	2.6	0.0	0.4	1.6	0.0	0.4	2.9	11.9	0.0	0.4	13.5	0.7
Cycle Q Clear(g_c), s	3.0	0.0	0.4	4.7	0.0	0.4	2.9	11.9	0.0	0.4	13.5	0.7
Prop In Lane	0.79		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	331	0	207	243	0	241	450	963		394	804	678
V/C Ratio(X)	0.31	0.00	0.07	0.20	0.00	0.07	0.47	0.66		0.07	0.77	0.06
Avail Cap(c_a), veh/h	913	0	832	784	0	971	826	2003		921	2003	1689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.3	0.0	18.2	21.5	0.0	18.2	8.4	8.5	0.0	8.0	11.6	8.0
Incr Delay (d2), s/veh	0.5	0.0	0.1	0.4	0.0	0.1	0.8	0.8	0.0	0.1	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.1	0.5	0.0	0.2	0.7	3.4	0.0	0.1	4.5	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.8	0.0	18.3	21.9	0.0	18.3	9.2	9.3	0.0	8.1	13.2	8.0
LnGrp LOS	B	A	B	C	A	B	A	A		A	B	A
Approach Vol, veh/h		118			66			848	A		689	
Approach Delay, s/veh		19.6			21.0			9.2			12.7	
Approach LOS		B			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.9	30.5		11.2	9.9	26.5		11.2
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.4	13.9		5.0	4.9	15.5		6.7
Green Ext Time (p_c), s	0.0	4.7		0.5	0.4	4.7		0.1

Intersection Summary			
HCM 6th Ctrl Delay			11.8
HCM 6th LOS			B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	95	10	5	10	165	815	10	5	765	75
Future Volume (veh/h)	60	5	95	10	5	10	165	815	10	5	765	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	4	11	5	1	179	886	8	5	832	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	114	91	19	156	128	222	1170	992	7	945	799
Arrive On Green	0.05	0.12	0.12	0.01	0.08	0.08	0.12	0.63	0.63	0.00	0.51	0.51
Sat Flow, veh/h	1781	948	759	1781	1870	1539	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	65	0	9	11	5	1	179	886	8	5	832	44
Grp Sat Flow(s),veh/h/ln	1781	0	1707	1781	1870	1539	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	3.0	0.0	0.4	0.5	0.2	0.0	8.2	28.2	0.2	0.2	33.1	1.2
Cycle Q Clear(g_c), s	3.0	0.0	0.4	0.5	0.2	0.0	8.2	28.2	0.2	0.2	33.1	1.2
Prop In Lane	1.00		0.44	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	85	0	205	19	156	128	222	1170	992	7	945	799
V/C Ratio(X)	0.77	0.00	0.04	0.57	0.03	0.01	0.81	0.76	0.01	0.71	0.88	0.06
Avail Cap(c_a), veh/h	426	0	429	426	470	387	533	1455	1233	533	1455	1230
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.3	0.0	32.5	41.1	35.2	35.1	35.6	11.1	5.9	41.6	18.4	10.5
Incr Delay (d2), s/veh	13.3	0.0	0.1	24.1	0.1	0.0	6.8	1.8	0.0	83.8	4.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.2	0.4	0.1	0.0	3.8	10.0	0.0	0.3	13.7	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.6	0.0	32.6	65.2	35.3	35.2	42.4	13.0	5.9	125.3	22.7	10.6
LnGrp LOS	D	A	C	E	D	D	D	B	A	F	C	B
Approach Vol, veh/h		74			17			1073			881	
Approach Delay, s/veh		50.2			54.7			17.8			22.7	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	57.3	5.9	15.1	15.4	47.2	9.0	12.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.2	30.2	2.5	2.4	10.2	35.1	5.0	2.2
Green Ext Time (p_c), s	0.0	8.0	0.0	0.0	0.4	7.1	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	21.4
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	600	80	10	10	605	880	10	5	810	20
Future Volume (veh/h)	75	5	600	80	10	10	605	880	10	5	810	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	0	87	11	9	658	957	11	5	880	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	204	8		187	15	12	703	2687	31	7	1266	565
Arrive On Green	0.10	0.09	0.00	0.10	0.09	0.09	0.39	0.75	0.75	0.00	0.36	0.36
Sat Flow, veh/h	1468	90	1585	1324	167	137	1781	3598	41	1781	3554	1585
Grp Volume(v), veh/h	87	0	0	107	0	0	658	473	495	5	880	6
Grp Sat Flow(s),veh/h/ln	1558	0	1585	1628	0	0	1781	1777	1863	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	33.0	8.5	8.5	0.3	19.7	0.2
Cycle Q Clear(g_c), s	4.6	0.0	0.0	5.5	0.0	0.0	33.0	8.5	8.5	0.3	19.7	0.2
Prop In Lane	0.94		1.00	0.81		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	229	0		231	0	0	703	1327	1391	7	1266	565
V/C Ratio(X)	0.38	0.00		0.46	0.00	0.00	0.94	0.36	0.36	0.72	0.70	0.01
Avail Cap(c_a), veh/h	408	0		495	0	0	1361	1327	1391	1361	2638	1177
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.3	0.0	0.0	40.7	0.0	0.0	27.0	4.1	4.1	46.2	25.6	19.3
Incr Delay (d2), s/veh	1.0	0.0	0.0	1.4	0.0	0.0	2.8	0.3	0.3	40.1	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.0	2.4	0.0	0.0	13.6	2.3	2.4	0.2	8.2	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.4	0.0	0.0	42.1	0.0	0.0	29.8	4.4	4.4	86.4	27.1	19.4
LnGrp LOS	D	A		D	A	A	C	A	A	F	C	B
Approach Vol, veh/h		87	A		107			1626			891	
Approach Delay, s/veh		41.4			42.1			14.7			27.4	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	40.7	39.1		13.2	4.4	75.4		13.2				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0				
Max Q Clear Time (g_c+I1), s	35.0	21.7		7.5	2.3	10.5		6.6				
Green Ext Time (p_c), s	1.7	11.4		0.3	0.0	12.2		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	20.8
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	5	140	15	0	5	135	1435	10	10	1485	60
Future Volume (veh/h)	50	5	140	15	0	5	135	1435	10	10	1485	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	5	6	16	0	1	147	1560	11	11	1614	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	231	18	174	188	2	7	180	2622	18	14	2245	1001
Arrive On Green	0.13	0.11	0.11	0.13	0.00	0.11	0.10	0.72	0.72	0.01	0.63	0.63
Sat Flow, veh/h	1358	156	1523	973	19	62	1781	3617	25	1781	3554	1585
Grp Volume(v), veh/h	59	0	6	17	0	0	147	766	805	11	1614	39
Grp Sat Flow(s),veh/h/ln	1514	0	1523	1054	0	0	1781	1777	1866	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.3	0.9	0.0	0.0	7.4	19.1	19.1	0.6	28.1	0.9
Cycle Q Clear(g_c), s	2.8	0.0	0.3	3.7	0.0	0.0	7.4	19.1	19.1	0.6	28.1	0.9
Prop In Lane	0.92		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	265	0	174	208	0	0	180	1288	1352	14	2245	1001
V/C Ratio(X)	0.22	0.00	0.03	0.08	0.00	0.00	0.82	0.59	0.60	0.77	0.72	0.04
Avail Cap(c_a), veh/h	457	0	382	395	0	0	408	1668	1751	214	2948	1315
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.7	0.0	36.1	37.9	0.0	0.0	40.3	6.1	6.1	45.4	11.4	6.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.4	0.9	0.9	27.1	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.1	0.3	0.0	0.0	3.3	5.6	5.9	0.4	9.6	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.9	0.0	36.1	38.0	0.0	0.0	43.7	7.0	7.0	72.5	12.4	6.4
LnGrp LOS	D	A	D	D	A	A	D	A	A	E	B	A
Approach Vol, veh/h		65			17			1718			1664	
Approach Delay, s/veh		36.8			38.0			10.2			12.7	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.3	62.9		15.5	4.7	71.4		15.5				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	9.4	30.1		5.7	2.6	21.1		4.8				
Green Ext Time (p_c), s	0.1	27.8		0.0	0.0	29.9		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			12.0
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	175	70	5	45	125	1425	60	35	1645	95
Future Volume (veh/h)	75	5	175	70	5	45	125	1425	60	35	1645	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	27	76	5	1	136	1549	49	38	1788	81
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	12	204	142	197	39	157	2668	1189	49	2452	1094
Arrive On Green	0.14	0.13	0.13	0.13	0.13	0.13	0.09	0.75	0.75	0.03	0.69	0.69
Sat Flow, veh/h	1303	90	1563	1363	1509	302	1781	3554	1584	1781	3554	1585
Grp Volume(v), veh/h	87	0	27	76	0	6	136	1549	49	38	1788	81
Grp Sat Flow(s),veh/h/ln	1393	0	1563	1363	0	1811	1781	1777	1584	1781	1777	1585
Q Serve(g_s), s	9.2	0.0	2.5	9.0	0.0	0.5	12.4	31.8	1.3	3.5	51.8	2.8
Cycle Q Clear(g_c), s	9.7	0.0	2.5	18.7	0.0	0.5	12.4	31.8	1.3	3.5	51.8	2.8
Prop In Lane	0.94		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	233	0	204	142	0	237	157	2668	1189	49	2452	1094
V/C Ratio(X)	0.37	0.00	0.13	0.54	0.00	0.03	0.86	0.58	0.04	0.77	0.73	0.07
Avail Cap(c_a), veh/h	254	0	227	162	0	263	281	2668	1189	108	2452	1094
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.3	0.0	63.4	75.2	0.0	62.5	74.2	9.1	5.3	79.7	16.0	8.4
Incr Delay (d2), s/veh	1.0	0.0	0.3	3.1	0.0	0.0	3.9	0.7	0.0	9.3	1.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	1.0	3.3	0.0	0.2	5.9	11.7	0.4	1.7	20.7	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.2	0.0	63.7	78.4	0.0	62.6	78.1	9.7	5.3	89.0	17.9	8.5
LnGrp LOS	E	A	E	E	A	E	E	A	A	F	B	A
Approach Vol, veh/h		114			82			1734			1907	
Approach Delay, s/veh		66.4			77.2			15.0			18.9	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.6	119.8		26.6	8.5	129.9		26.6
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	26.0	100.0		24.0	10.0	116.0		24.0
Max Q Clear Time (g_c+I1), s	14.4	53.8		20.7	5.5	33.8		11.7
Green Ext Time (p_c), s	0.2	32.3		0.1	0.0	34.6		0.3

Intersection Summary			
HCM 6th Ctrl Delay			19.8
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	290	5	615	15	0	5	385	1470	10	75	1690	135
Future Volume (veh/h)	290	5	615	15	0	5	385	1470	10	75	1690	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	319	0	468	16	0	1	418	1598	11	82	1837	110
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	541	0	911	70	0	4	491	2413	17	114	2093	933
Arrive On Green	0.15	0.00	0.15	0.04	0.00	0.03	0.14	0.67	0.66	0.06	0.59	0.59
Sat Flow, veh/h	3563	0	3127	1660	0	104	3456	3618	25	1781	3554	1585
Grp Volume(v), veh/h	319	0	468	17	0	0	418	784	825	82	1837	110
Grp Sat Flow(s),veh/h/ln	1781	0	1564	1763	0	0	1728	1777	1866	1781	1777	1585
Q Serve(g_s), s	17.8	0.0	26.7	2.0	0.0	0.0	25.2	56.2	56.4	9.7	94.0	6.6
Cycle Q Clear(g_c), s	17.8	0.0	26.7	2.0	0.0	0.0	25.2	56.2	56.4	9.7	94.0	6.6
Prop In Lane	1.00		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	541	0	911	74	0	0	491	1185	1245	114	2093	933
V/C Ratio(X)	0.59	0.00	0.51	0.23	0.00	0.00	0.85	0.66	0.66	0.72	0.88	0.12
Avail Cap(c_a), veh/h	567	0	933	256	0	0	938	1613	1694	125	2511	1120
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	84.4	0.0	63.5	99.1	0.0	0.0	89.5	21.2	21.2	98.1	37.4	19.4
Incr Delay (d2), s/veh	0.9	0.0	0.2	0.6	0.0	0.0	1.6	0.9	0.9	13.5	3.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	0.0	10.9	0.9	0.0	0.0	11.5	23.7	24.9	4.9	41.5	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	85.3	0.0	63.6	99.6	0.0	0.0	91.1	22.1	22.1	111.6	41.0	19.5
LnGrp LOS	F	A	E	F	A	A	F	C	C	F	D	B
Approach Vol, veh/h		787			17			2027			2029	
Approach Delay, s/veh		72.4			99.6			36.3			42.7	
Approach LOS		E			F			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	34.4	129.8		13.0	17.7	146.5		36.5				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0				
Max Q Clear Time (g_c+I1), s	27.2	96.0		4.0	11.7	58.4		28.7				
Green Ext Time (p_c), s	1.1	27.8		0.0	0.0	21.5		0.7				

Intersection Summary		
HCM 6th Ctrl Delay		45.1
HCM 6th LOS		D

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	5	90	5	60	10	1805	90	85	2250	5
Future Volume (veh/h)	10	0	5	90	5	60	10	1805	90	85	2250	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	1962	96	92	2446	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	2	10	182	96	58	22	2610	127	118	2949	6
Arrive On Green	0.09	0.00	0.08	0.09	0.09	0.08	0.03	1.00	1.00	0.07	0.81	0.80
Sat Flow, veh/h	1240	26	115	1416	1095	657	1781	3450	167	1781	3638	7
Grp Volume(v), veh/h	12	0	0	98	0	8	11	1003	1055	92	1194	1257
Grp Sat Flow(s),veh/h/ln	1381	0	0	1416	0	1752	1781	1777	1840	1781	1777	1869
Q Serve(g_s), s	0.8	0.0	0.0	7.4	0.0	0.6	0.8	0.0	0.0	6.9	52.4	52.5
Cycle Q Clear(g_c), s	1.4	0.0	0.0	8.8	0.0	0.6	0.8	0.0	0.0	6.9	52.4	52.5
Prop In Lane	0.92		0.08	1.00		0.38	1.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	173	0	0	182	0	154	22	1345	1393	118	1440	1515
V/C Ratio(X)	0.07	0.00	0.00	0.54	0.00	0.05	0.49	0.75	0.76	0.78	0.83	0.83
Avail Cap(c_a), veh/h	300	0	0	309	0	311	145	1345	1393	251	1440	1515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.60	0.60	0.60	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.9	0.0	0.0	60.0	0.0	56.6	65.4	0.0	0.0	62.0	7.4	7.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.1	3.7	2.3	2.4	4.1	5.6	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	3.4	0.0	0.3	0.4	0.9	0.9	3.2	16.8	17.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.1	0.0	0.0	62.5	0.0	56.7	69.1	2.3	2.4	66.2	13.0	12.8
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	B	B
Approach Vol, veh/h		12			106			2069			2543	
Approach Delay, s/veh		57.1			62.0			2.7			14.8	
Approach LOS		E			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	113.4		15.9	13.0	106.2		15.9				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	87.0		23.0	19.0	79.0		23.0				
Max Q Clear Time (g_c+I1), s	2.8	54.5		10.8	8.9	2.0		3.4				
Green Ext Time (p_c), s	0.0	30.8		0.2	0.1	54.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			10.7									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	15	10	60	5	10	5	1730	20	5	1910	325
Future Volume (veh/h)	175	15	10	60	5	10	5	1730	20	5	1910	325
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	190	16	9	65	5	7	5	1880	21	5	2076	278
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	268	18	10	273	22	25	7	2675	30	7	2640	1178
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.01	1.00	1.00	0.00	0.74	0.74
Sat Flow, veh/h	1326	112	63	1363	133	150	1781	3600	40	1781	3554	1585
Grp Volume(v), veh/h	215	0	0	77	0	0	5	926	975	5	2076	278
Grp Sat Flow(s),veh/h/ln	1501	0	0	1645	0	0	1781	1777	1863	1781	1777	1585
Q Serve(g_s), s	13.3	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	48.8	7.4
Cycle Q Clear(g_c), s	18.7	0.0	0.0	5.4	0.0	0.0	0.4	0.0	0.0	0.4	48.8	7.4
Prop In Lane	0.88		0.04	0.84		0.09	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	297	0	0	320	0	0	7	1320	1384	7	2640	1178
V/C Ratio(X)	0.72	0.00	0.00	0.24	0.00	0.00	0.74	0.70	0.70	0.74	0.79	0.24
Avail Cap(c_a), veh/h	380	0	0	402	0	0	106	1320	1384	106	2640	1178
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.58	0.58	0.58	0.39	0.39	0.39
Uniform Delay (d), s/veh	54.6	0.0	0.0	49.4	0.0	0.0	66.9	0.0	0.0	67.2	10.7	5.4
Incr Delay (d2), s/veh	4.9	0.0	0.0	0.4	0.0	0.0	28.2	1.8	1.8	20.1	1.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	0.0	0.0	2.4	0.0	0.0	0.2	0.7	0.7	0.2	16.7	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.5	0.0	0.0	49.8	0.0	0.0	95.1	1.8	1.8	87.3	11.7	5.6
LnGrp LOS	E	A	A	D	A	A	F	A	A	F	B	A
Approach Vol, veh/h		215			77			1906			2359	
Approach Delay, s/veh		59.5			49.8			2.0			11.1	
Approach LOS		E			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	104.3		26.2	4.5	104.3		26.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	84.0		29.0	8.0	84.0		29.0
Max Q Clear Time (g_c+I1), s	2.4	50.8		7.4	2.4	2.0		20.7
Green Ext Time (p_c), s	0.0	31.5		0.2	0.0	62.7		0.5

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	35	45	95	25	20	55	1535	105	25	1845	150
Future Volume (veh/h)	180	35	45	95	25	20	55	1535	105	25	1845	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	196	38	8	103	27	4	60	1668	111	27	2005	159
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	315	51	368	148	376	56	76	2216	146	34	2107	165
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.23	0.09	1.00	1.00	0.04	1.00	1.00
Sat Flow, veh/h	1120	217	1553	1343	1587	235	1781	3383	223	1781	3338	261
Grp Volume(v), veh/h	234	0	8	103	0	31	60	870	909	27	1054	1110
Grp Sat Flow(s),veh/h/ln	1338	0	1553	1343	0	1822	1781	1777	1830	1781	1777	1822
Q Serve(g_s), s	20.7	0.0	0.5	9.5	0.0	1.8	4.5	0.0	0.0	2.0	0.0	0.0
Cycle Q Clear(g_c), s	22.5	0.0	0.5	32.0	0.0	1.8	4.5	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.84		1.00	1.00		0.13	1.00		0.12	1.00		0.14
Lane Grp Cap(c), veh/h	366	0	368	148	0	432	76	1164	1199	34	1122	1150
V/C Ratio(X)	0.64	0.00	0.02	0.70	0.00	0.07	0.79	0.75	0.76	0.80	0.94	0.96
Avail Cap(c_a), veh/h	366	0	368	148	0	432	106	1164	1199	106	1122	1150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.50	0.50	0.50
Uniform Delay (d), s/veh	48.7	0.0	39.5	63.2	0.0	40.0	61.1	0.0	0.0	64.7	0.0	0.0
Incr Delay (d2), s/veh	3.7	0.0	0.0	13.5	0.0	0.1	1.6	0.4	0.4	7.7	9.3	12.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	0.0	0.2	4.1	0.0	0.8	2.0	0.1	0.1	1.0	2.9	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.4	0.0	39.5	76.6	0.0	40.1	62.7	0.4	0.4	72.4	9.3	12.1
LnGrp LOS	D	A	D	E	A	D	E	A	A	E	A	B
Approach Vol, veh/h		242			134			1839			2191	
Approach Delay, s/veh		52.0			68.2			2.4			11.5	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	89.2		36.0	6.6	92.4		36.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	82.0		31.0	8.0	82.0		31.0
Max Q Clear Time (g_c+I1), s	16.5	2.0		34.0	4.0	2.0		24.5
Green Ext Time (p_c), s	0.0	60.9		0.0	0.0	42.4		0.5

Intersection Summary	
HCM 6th Ctrl Delay	11.7
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	85	85	190	85	985	50	665	220	620	1135	40
Future Volume (veh/h)	35	85	85	190	85	985	50	665	220	620	1135	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.96	0.98		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	92	13	207	92	0	54	723	156	674	1234	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	172	202	290	471		70	848	714	712	2174	74
Arrive On Green	0.13	0.13	0.13	0.09	0.25	0.00	0.04	0.45	0.45	0.41	1.00	1.00
Sat Flow, veh/h	387	1295	1521	1781	1870	1585	1781	1870	1575	3456	3506	119
Grp Volume(v), veh/h	130	0	13	207	92	0	54	723	156	674	625	651
Grp Sat Flow(s),veh/h/ln	1682	0	1521	1781	1870	1585	1781	1870	1575	1728	1777	1848
Q Serve(g_s), s	6.1	0.0	1.0	12.0	5.2	0.0	4.1	46.5	8.1	25.4	0.0	0.0
Cycle Q Clear(g_c), s	9.6	0.0	1.0	12.0	5.2	0.0	4.1	46.5	8.1	25.4	0.0	0.0
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	258	0	202	290	471		70	848	714	712	1102	1146
V/C Ratio(X)	0.50	0.00	0.06	0.71	0.20		0.77	0.85	0.22	0.95	0.57	0.57
Avail Cap(c_a), veh/h	380	0	315	290	610		238	848	714	742	1102	1146
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.88	0.88	0.88	0.29	0.29	0.29
Uniform Delay (d), s/veh	54.7	0.0	51.2	46.3	39.8	0.0	64.3	32.9	22.4	39.0	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.1	8.0	0.2	0.0	5.8	9.4	0.6	8.1	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	0.4	1.6	2.5	0.0	1.9	22.7	3.1	9.5	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.2	0.0	51.3	54.3	40.0	0.0	70.1	42.3	23.0	47.1	0.6	0.6
LnGrp LOS	E	A	D	D	D		E	D	C	D	A	A
Approach Vol, veh/h		143			299	A		933			1950	
Approach Delay, s/veh		55.8			49.9			40.7			16.7	
Approach LOS		E			D			D			B	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.3	87.7	16.0	22.0	31.8	65.2		38.0
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	18.0	60.0	11.0	27.0	29.0	49.0		43.0
Max Q Clear Time (g_c+I1), s	6.1	2.0	14.0	11.6	27.4	48.5		7.2
Green Ext Time (p_c), s	0.0	19.5	0.0	0.4	0.4	0.4		0.3

Intersection Summary			
HCM 6th Ctrl Delay			28.1
HCM 6th LOS			C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2022 with Mitigation WE Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	45	330	45	50	20	270	310	40	20	280	90
Future Volume (veh/h)	40	45	330	45	50	20	270	310	40	20	280	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	49	35	49	54	10	293	337	22	22	304	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	137	205	270	200	37	380	907	767	29	538	455
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.21	0.48	0.48	0.02	0.29	0.29
Sat Flow, veh/h	555	1051	1568	1303	1532	284	1781	1870	1582	1781	1870	1582
Grp Volume(v), veh/h	92	0	35	49	0	64	293	337	22	22	304	28
Grp Sat Flow(s),veh/h/ln	1605	0	1568	1303	0	1816	1781	1870	1582	1781	1870	1582
Q Serve(g_s), s	0.8	0.0	0.9	1.6	0.0	1.4	6.7	4.9	0.3	0.5	6.0	0.6
Cycle Q Clear(g_c), s	2.2	0.0	0.9	3.8	0.0	1.4	6.7	4.9	0.3	0.5	6.0	0.6
Prop In Lane	0.47		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	331	0	205	270	0	237	380	907	767	29	538	455
V/C Ratio(X)	0.28	0.00	0.17	0.18	0.00	0.27	0.77	0.37	0.03	0.77	0.57	0.06
Avail Cap(c_a), veh/h	994	0	867	820	0	1004	1231	3404	2878	615	2757	2333
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.3	0.0	16.8	19.1	0.0	17.0	16.1	7.0	5.8	21.3	13.2	11.2
Incr Delay (d2), s/veh	0.5	0.0	0.4	0.3	0.0	0.6	3.3	0.5	0.0	33.8	2.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.3	0.5	0.0	0.6	2.6	1.4	0.1	0.5	2.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.8	0.0	17.2	19.4	0.0	17.6	19.4	7.6	5.9	55.0	15.2	11.3
LnGrp LOS	B	A	B	B	A	B	B	A	A	E	B	B
Approach Vol, veh/h		127			113			652			354	
Approach Delay, s/veh		17.6			18.4			12.8			17.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	27.0		10.7	14.3	18.5		10.7				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.5	6.9		4.2	8.7	8.0		5.8				
Green Ext Time (p_c), s	0.0	4.8		0.5	0.8	4.2		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			15.1
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	20	195	40	15	5	135	445	25	15	485	60
Future Volume (veh/h)	55	20	195	40	15	5	135	445	25	15	485	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	22	23	43	16	1	147	484	0	16	527	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	292	85	233	311	260	16	444	856		437	723	610
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.08	0.46	0.00	0.01	0.39	0.39
Sat Flow, veh/h	958	566	1559	1343	1740	109	1781	1870	1585	1781	1870	1579
Grp Volume(v), veh/h	82	0	23	43	0	17	147	484	0	16	527	25
Grp Sat Flow(s),veh/h/ln	1524	0	1559	1343	0	1849	1781	1870	1585	1781	1870	1579
Q Serve(g_s), s	1.2	0.0	0.5	1.2	0.0	0.3	2.0	8.0	0.0	0.2	10.1	0.4
Cycle Q Clear(g_c), s	1.9	0.0	0.5	3.1	0.0	0.3	2.0	8.0	0.0	0.2	10.1	0.4
Prop In Lane	0.73		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	376	0	233	311	0	276	444	856		437	723	610
V/C Ratio(X)	0.22	0.00	0.10	0.14	0.00	0.06	0.33	0.57		0.04	0.73	0.04
Avail Cap(c_a), veh/h	1036	0	928	910	0	1101	932	2272		1052	2272	1918
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	0.0	15.4	17.4	0.0	15.3	7.9	8.3	0.0	8.0	11.0	8.0
Incr Delay (d2), s/veh	0.3	0.0	0.2	0.2	0.0	0.1	0.4	0.6	0.0	0.0	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	0.4	0.0	0.1	0.5	2.2	0.0	0.1	3.3	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.2	0.0	15.6	17.6	0.0	15.4	8.3	8.9	0.0	8.0	12.4	8.1
LnGrp LOS	B	A	B	B	A	B	A	A		A	B	A
Approach Vol, veh/h		105			60			631	A		568	
Approach Delay, s/veh		16.1			17.0			8.8			12.1	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	25.2		11.3	8.5	22.2		11.3				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0				
Max Q Clear Time (g_c+I1), s	2.2	10.0		3.9	4.0	12.1		5.1				
Green Ext Time (p_c), s	0.0	3.3		0.4	0.3	3.8		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			11.1
HCM 6th LOS			B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	5	85	10	5	10	80	550	15	5	675	50
Future Volume (veh/h)	40	5	85	10	5	10	80	550	15	5	675	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	5	7	11	5	1	87	598	9	5	734	26
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	79	110	20	167	141	115	1002	849	7	889	752
Arrive On Green	0.03	0.11	0.11	0.01	0.09	0.09	0.06	0.54	0.54	0.00	0.48	0.48
Sat Flow, veh/h	1781	701	982	1781	1870	1585	1781	1870	1585	1781	1870	1583
Grp Volume(v), veh/h	43	0	12	11	5	1	87	598	9	5	734	26
Grp Sat Flow(s),veh/h/ln	1781	0	1683	1781	1870	1585	1781	1870	1585	1781	1870	1583
Q Serve(g_s), s	1.4	0.0	0.4	0.4	0.1	0.0	2.9	13.0	0.2	0.2	20.1	0.5
Cycle Q Clear(g_c), s	1.4	0.0	0.4	0.4	0.1	0.0	2.9	13.0	0.2	0.2	20.1	0.5
Prop In Lane	1.00		0.58	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	61	0	189	20	167	141	115	1002	849	7	889	752
V/C Ratio(X)	0.71	0.00	0.06	0.55	0.03	0.01	0.76	0.60	0.01	0.70	0.83	0.03
Avail Cap(c_a), veh/h	600	0	596	600	662	561	750	2048	1736	750	2048	1734
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	0.0	23.6	29.2	24.7	24.6	27.3	9.4	6.4	29.5	13.5	8.3
Incr Delay (d2), s/veh	13.8	0.0	0.1	21.8	0.1	0.0	9.7	0.6	0.0	80.4	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.1	0.3	0.1	0.0	1.4	4.2	0.0	0.2	7.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.2	0.0	23.7	51.0	24.8	24.7	37.0	10.0	6.4	109.9	15.5	8.3
LnGrp LOS	D	A	C	D	C	C	D	A	A	F	B	A
Approach Vol, veh/h		55			17			694			765	
Approach Delay, s/veh		38.2			41.7			13.3			15.9	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	36.8	5.7	11.7	8.8	33.2	7.0	10.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.2	15.0	2.4	2.4	4.9	22.1	3.4	2.1
Green Ext Time (p_c), s	0.0	4.5	0.0	0.0	0.2	6.1	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	15.8
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	10	595	10	0	5	410	595	5	0	730	50
Future Volume (veh/h)	50	10	595	10	0	5	410	595	5	0	730	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	11	0	11	0	1	446	647	5	0	793	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	191	16		206	4	8	516	2703	21	3	1382	614
Arrive On Green	0.08	0.06	0.00	0.08	0.00	0.06	0.29	0.75	0.75	0.00	0.39	0.39
Sat Flow, veh/h	1244	253	1585	1412	67	134	1781	3614	28	1781	3554	1579
Grp Volume(v), veh/h	65	0	0	12	0	0	446	318	334	0	793	17
Grp Sat Flow(s),veh/h/ln	1497	0	1585	1613	0	0	1781	1777	1865	1781	1777	1579
Q Serve(g_s), s	2.0	0.0	0.0	0.0	0.0	0.0	13.7	3.2	3.2	0.0	10.1	0.4
Cycle Q Clear(g_c), s	2.4	0.0	0.0	0.4	0.0	0.0	13.7	3.2	3.2	0.0	10.1	0.4
Prop In Lane	0.83		1.00	0.92		0.08	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	232	0		247	0	0	516	1329	1395	3	1382	614
V/C Ratio(X)	0.28	0.00		0.05	0.00	0.00	0.86	0.24	0.24	0.00	0.57	0.03
Avail Cap(c_a), veh/h	652	0		774	0	0	2192	2125	2231	2192	4251	1889
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	0.0	0.0	25.1	0.0	0.0	19.4	2.2	2.2	0.0	13.9	10.9
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.1	0.0	0.0	1.7	0.2	0.2	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	0.1	0.0	0.0	5.2	0.4	0.5	0.0	3.6	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.7	0.0	0.0	25.2	0.0	0.0	21.1	2.4	2.4	0.0	14.7	10.9
LnGrp LOS	C	A		C	A	A	C	A	A	A	B	B
Approach Vol, veh/h		65	A		12			1098			810	
Approach Delay, s/veh		26.7			25.2			10.0			14.6	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.7	28.4		8.5	0.0	49.1		8.5				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0				
Max Q Clear Time (g_c+I1), s	15.7	12.1		2.4	0.0	5.2		4.4				
Green Ext Time (p_c), s	1.0	10.3		0.0	0.0	7.0		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			12.5									
HCM 6th LOS			B									

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	145	15	5	15	105	950	20	10	1295	65
Future Volume (veh/h)	55	5	145	15	5	15	105	950	20	10	1295	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	6	16	5	1	114	1033	21	11	1408	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	224	14	143	155	37	5	146	2502	51	15	2234	994
Arrive On Green	0.11	0.09	0.09	0.11	0.09	0.09	0.08	0.70	0.70	0.01	0.63	0.63
Sat Flow, veh/h	1375	156	1549	728	402	54	1781	3562	72	1781	3554	1581
Grp Volume(v), veh/h	65	0	6	22	0	0	114	515	539	11	1408	42
Grp Sat Flow(s),veh/h/ln	1531	0	1549	1184	0	0	1781	1777	1857	1781	1777	1581
Q Serve(g_s), s	0.0	0.0	0.3	0.1	0.0	0.0	4.5	8.6	8.6	0.4	17.3	0.7
Cycle Q Clear(g_c), s	2.4	0.0	0.3	2.5	0.0	0.0	4.5	8.6	8.6	0.4	17.3	0.7
Prop In Lane	0.92		1.00	0.73		0.05	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	260	0	143	213	0	0	146	1248	1305	15	2234	994
V/C Ratio(X)	0.25	0.00	0.04	0.10	0.00	0.00	0.78	0.41	0.41	0.75	0.63	0.04
Avail Cap(c_a), veh/h	588	0	502	555	0	0	527	2151	2249	276	3802	1692
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.9	0.0	29.4	29.4	0.0	0.0	32.0	4.4	4.4	35.2	8.1	5.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.3	0.5	0.4	24.2	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.1	0.3	0.0	0.0	2.0	2.2	2.3	0.3	5.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.1	0.0	29.4	29.4	0.0	0.0	35.3	4.9	4.9	59.3	8.7	5.1
LnGrp LOS	C	A	C	C	A	A	D	A	A	E	A	A
Approach Vol, veh/h		71			22			1168			1461	
Approach Delay, s/veh		30.1			29.4			7.9			9.0	
Approach LOS		C			C			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	49.7		11.5	4.6	54.9		11.5				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	6.5	19.3		4.5	2.4	10.6		4.4				
Green Ext Time (p_c), s	0.1	25.3		0.0	0.0	14.4		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			9.2									
HCM 6th LOS			A									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	180	45	5	35	110	1025	50	30	1375	75
Future Volume (veh/h)	60	5	180	45	5	35	110	1025	50	30	1375	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	12	49	5	2	120	1114	33	33	1495	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	277	18	233	232	187	75	154	2262	1009	57	2069	923
Arrive On Green	0.16	0.15	0.15	0.15	0.15	0.15	0.09	0.64	0.64	0.03	0.58	0.58
Sat Flow, veh/h	1299	122	1579	1391	1269	508	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	70	0	12	49	0	7	120	1114	33	33	1495	45
Grp Sat Flow(s),veh/h/ln	1421	0	1579	1391	0	1777	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.3	0.0	0.5	2.7	0.0	0.3	5.4	13.6	0.6	1.5	24.8	1.0
Cycle Q Clear(g_c), s	3.6	0.0	0.5	6.3	0.0	0.3	5.4	13.6	0.6	1.5	24.8	1.0
Prop In Lane	0.93		1.00	1.00		0.29	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	312	0	233	232	0	262	154	2262	1009	57	2069	923
V/C Ratio(X)	0.22	0.00	0.05	0.21	0.00	0.03	0.78	0.49	0.03	0.57	0.72	0.05
Avail Cap(c_a), veh/h	521	0	464	436	0	522	458	3004	1340	262	2612	1165
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.8	0.0	29.9	34.0	0.0	29.8	36.5	7.9	5.5	38.9	12.3	7.3
Incr Delay (d2), s/veh	0.4	0.0	0.1	0.4	0.0	0.0	3.2	0.4	0.0	3.3	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.2	0.9	0.0	0.1	2.4	4.3	0.2	0.7	8.6	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.2	0.0	30.0	34.5	0.0	29.8	39.7	8.2	5.5	42.3	13.5	7.4
LnGrp LOS	C	A	C	C	A	C	D	A	A	D	B	A
Approach Vol, veh/h		82			56			1267			1573	
Approach Delay, s/veh		31.0			33.9			11.1			13.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.1	53.5		17.0	6.6	58.0		17.0				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	21.0	60.0		24.0	12.0	69.0		24.0				
Max Q Clear Time (g_c+I1), s	7.4	26.8		8.3	3.5	15.6		5.6				
Green Ext Time (p_c), s	0.2	20.8		0.1	0.0	17.1		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	13.6
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	235	5	445	15	5	20	290	1150	15	55	1380	155
Future Volume (veh/h)	235	5	445	15	5	20	290	1150	15	55	1380	155
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	259	0	274	16	5	7	315	1250	16	60	1500	126
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	456	0	787	51	16	22	446	2215	28	120	1971	879
Arrive On Green	0.13	0.00	0.12	0.05	0.05	0.03	0.13	0.62	0.60	0.07	0.55	0.55
Sat Flow, veh/h	3563	0	3170	996	311	436	3456	3593	46	1781	3554	1584
Grp Volume(v), veh/h	259	0	274	28	0	0	315	618	648	60	1500	126
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1742	0	0	1728	1777	1862	1781	1777	1584
Q Serve(g_s), s	8.0	0.0	8.3	1.8	0.0	0.0	10.2	23.9	23.9	3.8	38.0	4.5
Cycle Q Clear(g_c), s	8.0	0.0	8.3	1.8	0.0	0.0	10.2	23.9	23.9	3.8	38.0	4.5
Prop In Lane	1.00		1.00	0.57		0.25	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	456	0	787	89	0	0	446	1096	1148	120	1971	879
V/C Ratio(X)	0.57	0.00	0.35	0.31	0.00	0.00	0.71	0.56	0.56	0.50	0.76	0.14
Avail Cap(c_a), veh/h	1037	0	1305	463	0	0	1716	2952	3094	229	4595	2049
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.9	0.0	36.1	53.8	0.0	0.0	48.7	13.2	13.2	52.6	20.0	12.6
Incr Delay (d2), s/veh	0.4	0.0	0.1	0.7	0.0	0.0	0.8	0.7	0.6	1.2	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	3.3	0.8	0.0	0.0	4.4	9.0	9.5	1.7	15.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.3	0.0	36.2	54.5	0.0	0.0	49.5	13.8	13.8	53.8	20.9	12.7
LnGrp LOS	D	A	D	D	A	A	D	B	B	D	C	B
Approach Vol, veh/h		533			28			1581			1686	
Approach Delay, s/veh		42.1			54.5			20.9			21.5	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	19.1	68.8		10.0	11.8	76.0		18.9				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0				
Max Q Clear Time (g_c+I1), s	12.2	40.0		3.8	5.8	25.9		10.3				
Green Ext Time (p_c), s	0.9	22.8		0.0	0.0	12.5		1.6				

Intersection Summary		
HCM 6th Ctrl Delay		24.4
HCM 6th LOS		C

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	135	5	60	5	1330	90	90	1810	10
Future Volume (veh/h)	5	0	5	135	5	60	5	1330	90	90	1810	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1446	95	98	1967	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2414	158	124	2813	16
Arrive On Green	0.13	0.00	0.12	0.13	0.13	0.12	0.01	0.95	0.94	0.07	0.78	0.77
Sat Flow, veh/h	1144	37	236	1416	858	858	1781	3386	222	1781	3623	20
Grp Volume(v), veh/h	6	0	0	147	0	10	5	756	785	98	964	1014
Grp Sat Flow(s),veh/h/ln	1418	0	0	1416	0	1716	1781	1777	1830	1781	1777	1867
Q Serve(g_s), s	0.0	0.0	0.0	12.3	0.0	0.7	0.4	6.6	6.9	7.0	34.5	34.6
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	6.6	6.9	7.0	34.5	34.6
Prop In Lane	0.83		0.17	1.00		0.50	1.00		0.12	1.00		0.01
Lane Grp Cap(c), veh/h	228	0	0	234	0	215	11	1267	1305	124	1379	1449
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.60	0.60	0.79	0.70	0.70
Avail Cap(c_a), veh/h	313	0	0	319	0	317	151	1267	1305	151	1379	1449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.83	0.83	0.83	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	0.0	0.0	55.4	0.0	50.3	64.2	1.1	1.2	59.5	7.1	7.1
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.7	0.0	0.1	8.1	1.7	1.7	16.4	3.0	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	4.9	0.0	0.3	0.2	1.7	1.8	3.7	11.6	12.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.4	72.3	2.9	2.9	76.0	10.1	10.0
LnGrp LOS	D	A	A	E	A	D	E	A	A	E	B	A
Approach Vol, veh/h		6			157			1546			2076	
Approach Delay, s/veh		50.0			57.6			3.1			13.1	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.8	104.9		20.3	13.1	96.7		20.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	82.0		23.0	11.0	82.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	36.6		15.0	9.0	8.9		2.7
Green Ext Time (p_c), s	0.0	34.8		0.3	0.0	30.3		0.0

Intersection Summary		
HCM 6th Ctrl Delay		10.9
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	5	15	65	5	15	15	1275	15	10	1595	260
Future Volume (veh/h)	135	5	15	65	5	15	15	1275	15	10	1595	260
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	147	5	13	71	5	9	16	1386	15	11	1734	208
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	6	16	227	17	23	19	2770	30	13	2722	1213
Arrive On Green	0.13	0.13	0.12	0.13	0.13	0.12	0.01	0.52	0.51	0.01	0.77	0.77
Sat Flow, veh/h	1344	46	119	1341	132	175	1781	3601	39	1781	3554	1584
Grp Volume(v), veh/h	165	0	0	85	0	0	16	684	717	11	1734	208
Grp Sat Flow(s),veh/h/ln	1509	0	0	1648	0	0	1781	1777	1863	1781	1777	1584
Q Serve(g_s), s	7.7	0.0	0.0	0.0	0.0	0.0	1.2	32.7	32.7	0.8	29.0	4.6
Cycle Q Clear(g_c), s	13.7	0.0	0.0	5.9	0.0	0.0	1.2	32.7	32.7	0.8	29.0	4.6
Prop In Lane	0.89		0.08	0.84		0.11	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	250	0	0	267	0	0	19	1367	1433	13	2722	1213
V/C Ratio(X)	0.66	0.00	0.00	0.32	0.00	0.00	0.84	0.50	0.50	0.82	0.64	0.17
Avail Cap(c_a), veh/h	348	0	0	366	0	0	110	1367	1433	110	2722	1213
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.77	0.77	0.77	0.62	0.62	0.62
Uniform Delay (d), s/veh	54.8	0.0	0.0	51.7	0.0	0.0	64.4	15.2	15.2	64.4	7.0	4.1
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.7	0.0	0.0	23.1	1.0	1.0	23.1	0.7	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	0.0	2.6	0.0	0.0	0.7	14.6	15.3	0.4	9.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.8	0.0	0.0	52.4	0.0	0.0	87.5	16.2	16.2	87.5	7.7	4.3
LnGrp LOS	E	A	A	D	A	A	F	B	B	F	A	A
Approach Vol, veh/h		165			85			1417			1953	
Approach Delay, s/veh		57.8			52.4			17.0			7.8	
Approach LOS		E			D			B			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	103.6		21.0	5.0	104.0		21.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	83.0		25.0	8.0	83.0		25.0
Max Q Clear Time (g_c+I1), s	3.2	31.0		7.9	2.8	34.7		15.7
Green Ext Time (p_c), s	0.0	42.4		0.2	0.0	28.6		0.4

Intersection Summary		
HCM 6th Ctrl Delay		14.7
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	20	50	90	20	20	60	1305	60	15	1605	130
Future Volume (veh/h)	190	20	50	90	20	20	60	1305	60	15	1605	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	207	22	11	98	22	2	65	1418	63	16	1745	137
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	325	29	352	139	377	34	83	2335	104	19	2132	165
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.06	0.90	0.89	0.01	0.85	0.84
Sat Flow, veh/h	1222	130	1579	1373	1688	153	1781	3465	154	1781	3341	259
Grp Volume(v), veh/h	229	0	11	98	0	24	65	726	755	16	918	964
Grp Sat Flow(s),veh/h/ln	1352	0	1579	1373	0	1842	1781	1777	1842	1781	1777	1823
Q Serve(g_s), s	19.7	0.0	0.7	7.9	0.0	1.3	4.7	12.1	12.2	1.2	32.5	35.2
Cycle Q Clear(g_c), s	21.1	0.0	0.7	29.0	0.0	1.3	4.7	12.1	12.2	1.2	32.5	35.2
Prop In Lane	0.90		1.00	1.00		0.08	1.00		0.08	1.00		0.14
Lane Grp Cap(c), veh/h	354	0	352	139	0	411	83	1197	1241	19	1134	1163
V/C Ratio(X)	0.65	0.00	0.03	0.70	0.00	0.06	0.78	0.61	0.61	0.84	0.81	0.83
Avail Cap(c_a), veh/h	354	0	352	139	0	411	110	1197	1241	110	1134	1163
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.19	0.19	0.19	0.70	0.70	0.70
Uniform Delay (d), s/veh	48.0	0.0	39.5	61.6	0.0	39.8	60.3	2.8	2.9	64.0	6.0	6.3
Incr Delay (d2), s/veh	4.0	0.0	0.0	14.8	0.0	0.1	3.6	0.4	0.4	21.5	4.5	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	0.0	0.3	3.8	0.0	0.6	2.2	2.4	2.6	0.6	6.3	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.1	0.0	39.5	76.4	0.0	39.8	64.0	3.3	3.3	85.4	10.5	11.2
LnGrp LOS	D	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		240			122			1546			1898	
Approach Delay, s/veh		51.5			69.2			5.8			11.5	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	87.0		33.0	5.4	91.6		33.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	80.0		28.0	8.0	80.0		28.0				
Max Q Clear Time (g_c+I1), s	6.7	37.2		31.0	3.2	14.2		23.1				
Green Ext Time (p_c), s	0.0	31.5		0.0	0.0	26.9		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			13.6
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	65	70	195	90	790	50	570	190	520	1020	75
Future Volume (veh/h)	25	65	70	195	90	790	50	570	190	520	1020	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.94	0.96		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	27	71	10	212	98	0	54	620	121	565	1109	79
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	191	208	361	519		70	830	694	645	1988	142
Arrive On Green	0.14	0.14	0.14	0.11	0.28	0.00	0.04	0.44	0.44	0.13	0.40	0.39
Sat Flow, veh/h	327	1374	1493	1781	1870	1585	1781	1870	1565	3456	3364	240
Grp Volume(v), veh/h	98	0	10	212	98	0	54	620	121	565	585	603
Grp Sat Flow(s),veh/h/ln	1701	0	1493	1781	1870	1585	1781	1870	1565	1728	1777	1827
Q Serve(g_s), s	1.4	0.0	0.8	13.0	5.2	0.0	3.9	35.9	6.1	20.9	33.2	33.3
Cycle Q Clear(g_c), s	6.4	0.0	0.8	13.0	5.2	0.0	3.9	35.9	6.1	20.9	33.2	33.3
Prop In Lane	0.28		1.00	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	272	0	208	361	519		70	830	694	645	1050	1079
V/C Ratio(X)	0.36	0.00	0.05	0.59	0.19		0.77	0.75	0.17	0.88	0.56	0.56
Avail Cap(c_a), veh/h	372	0	299	361	633		329	830	694	957	1050	1079
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.51	0.51	0.51
Uniform Delay (d), s/veh	50.9	0.0	48.5	40.5	35.8	0.0	61.9	30.1	21.8	55.4	26.1	26.1
Incr Delay (d2), s/veh	0.8	0.0	0.1	2.5	0.2	0.0	5.2	4.9	0.4	2.4	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.3	6.0	2.4	0.0	1.9	16.9	2.3	9.6	15.1	15.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	0.0	48.6	43.0	36.0	0.0	67.0	35.0	22.2	57.8	27.2	27.2
LnGrp LOS	D	A	D	D	D		E	C	C	E	C	C
Approach Vol, veh/h		108			310	A		795			1753	
Approach Delay, s/veh		51.4			40.7			35.2			37.1	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.1	80.8	18.0	22.1	28.3	61.7		40.1
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	24.0	49.0	13.0	25.0	36.0	37.0		43.0
Max Q Clear Time (g_c+I1), s	15.9	35.3	15.0	8.4	22.9	37.9		7.2
Green Ext Time (p_c), s	0.1	8.5	0.0	0.3	1.4	0.0		0.4

Intersection Summary	
HCM 6th Ctrl Delay	37.5
HCM 6th LOS	D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2025 AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	45	295	90	50	20	220	230	100	10	135	30
Future Volume (veh/h)	50	45	295	90	50	20	220	230	100	10	135	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	49	42	98	54	11	239	250	51	11	147	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	239	165	258	328	247	50	321	792	671	15	472	400
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.18	0.42	0.42	0.01	0.25	0.25
Sat Flow, veh/h	615	1003	1571	1297	1505	307	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	103	0	42	98	0	65	239	250	51	11	147	8
Grp Sat Flow(s),veh/h/ln	1618	0	1571	1297	0	1812	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.5	0.0	0.9	2.9	0.0	1.2	5.0	3.5	0.8	0.2	2.5	0.2
Cycle Q Clear(g_c), s	2.0	0.0	0.9	4.9	0.0	1.2	5.0	3.5	0.8	0.2	2.5	0.2
Prop In Lane	0.52		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	404	0	258	328	0	297	321	792	671	15	472	400
V/C Ratio(X)	0.25	0.00	0.16	0.30	0.00	0.22	0.75	0.32	0.08	0.72	0.31	0.02
Avail Cap(c_a), veh/h	1083	0	951	900	0	1097	1348	3727	3158	674	3019	2558
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.7	0.0	14.2	16.9	0.0	14.4	15.4	7.6	6.8	19.6	12.0	11.1
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.5	0.0	0.4	3.4	0.5	0.1	46.6	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.3	0.8	0.0	0.5	1.9	1.0	0.2	0.3	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	0.0	14.5	17.4	0.0	14.7	18.8	8.1	6.9	66.2	12.8	11.2
LnGrp LOS	B	A	B	B	A	B	B	A	A	E	B	B
Approach Vol, veh/h		145			163			540			166	
Approach Delay, s/veh		14.9			16.3			12.7			16.3	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.3	22.8		11.5	12.1	16.0		11.5				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.2	5.5		4.0	7.0	4.5		6.9				
Green Ext Time (p_c), s	0.0	3.7		0.6	0.7	1.8		0.6				
Intersection Summary												
HCM 6th Ctrl Delay			14.2									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	180	90	20	15	135	520	15	10	520	65
Future Volume (veh/h)	60	5	180	90	20	15	135	520	15	10	520	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	20	98	22	2	147	565	0	11	565	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	381	24	308	347	336	31	409	883		365	731	615
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.09	0.47	0.00	0.01	0.39	0.39
Sat Flow, veh/h	1214	122	1545	1356	1685	153	1781	1870	1585	1781	1870	1573
Grp Volume(v), veh/h	70	0	20	98	0	24	147	565	0	11	565	28
Grp Sat Flow(s),veh/h/ln	1337	0	1545	1356	0	1838	1781	1870	1585	1781	1870	1573
Q Serve(g_s), s	1.9	0.0	0.5	3.3	0.0	0.5	2.2	11.4	0.0	0.2	13.2	0.6
Cycle Q Clear(g_c), s	2.5	0.0	0.5	5.8	0.0	0.5	2.2	11.4	0.0	0.2	13.2	0.6
Prop In Lane	0.93		1.00	1.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	405	0	308	347	0	367	409	883		365	731	615
V/C Ratio(X)	0.17	0.00	0.06	0.28	0.00	0.07	0.36	0.64		0.03	0.77	0.05
Avail Cap(c_a), veh/h	820	0	772	754	0	918	783	1906		884	1906	1603
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.1	0.0	16.2	19.5	0.0	16.2	9.2	10.0	0.0	9.6	13.3	9.4
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.4	0.0	0.1	0.5	0.8	0.0	0.0	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	1.0	0.0	0.2	0.7	3.6	0.0	0.1	4.7	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.3	0.0	16.3	19.9	0.0	16.3	9.8	10.8	0.0	9.7	15.1	9.5
LnGrp LOS	B	A	B	B	A	B	A	B		A	B	A
Approach Vol, veh/h		90			122			712	A		604	
Approach Delay, s/veh		17.1			19.2			10.6			14.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	29.6		15.0	9.5	25.6		15.0
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	13.4		4.5	4.2	15.2		7.8
Green Ext Time (p_c), s	0.0	4.0		0.4	0.3	4.1		0.3

Intersection Summary		
HCM 6th Ctrl Delay		13.3
HCM 6th LOS		B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	5	125	5	5	5	60	610	15	5	725	30
Future Volume (veh/h)	40	5	125	5	5	5	60	610	15	5	725	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	5	10	5	5	1	65	663	9	5	788	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	60	67	134	9	174	145	84	1022	866	7	941	792
Arrive On Green	0.03	0.12	0.12	0.01	0.09	0.09	0.05	0.55	0.55	0.00	0.50	0.50
Sat Flow, veh/h	1781	552	1104	1781	1870	1565	1781	1870	1585	1781	1870	1574
Grp Volume(v), veh/h	43	0	15	5	5	1	65	663	9	5	788	18
Grp Sat Flow(s),veh/h/ln	1781	0	1655	1781	1870	1565	1781	1870	1585	1781	1870	1574
Q Serve(g_s), s	1.5	0.0	0.5	0.2	0.2	0.0	2.2	15.4	0.2	0.2	22.4	0.4
Cycle Q Clear(g_c), s	1.5	0.0	0.5	0.2	0.2	0.0	2.2	15.4	0.2	0.2	22.4	0.4
Prop In Lane	1.00		0.67	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	60	0	201	9	174	145	84	1022	866	7	941	792
V/C Ratio(X)	0.71	0.00	0.07	0.53	0.03	0.01	0.77	0.65	0.01	0.70	0.84	0.02
Avail Cap(c_a), veh/h	575	0	561	575	634	531	719	1963	1664	719	1963	1652
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.6	0.0	24.1	30.7	25.5	25.5	29.2	9.9	6.4	30.8	13.2	7.7
Incr Delay (d2), s/veh	14.6	0.0	0.2	38.7	0.1	0.0	13.7	0.7	0.0	80.7	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.2	0.2	0.1	0.0	1.2	5.0	0.0	0.2	7.9	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.2	0.0	24.3	69.4	25.6	25.5	42.8	10.6	6.4	111.5	15.3	7.7
LnGrp LOS	D	A	C	E	C	C	D	B	A	F	B	A
Approach Vol, veh/h		58			11			737			811	
Approach Delay, s/veh		39.0			45.5			13.4			15.7	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	38.8	5.3	12.5	7.9	36.1	7.1	10.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.2	17.4	2.2	2.5	4.2	24.4	3.5	2.2
Green Ext Time (p_c), s	0.0	5.2	0.0	0.0	0.1	6.7	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	15.7
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	10	480	20	5	0	315	685	45	10	815	10
Future Volume (veh/h)	35	10	480	20	5	0	315	685	45	10	815	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	11	0	22	5	0	342	745	48	11	886	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	31		199	31	0	410	2220	143	15	1538	686
Arrive On Green	0.09	0.07	0.00	0.09	0.07	0.00	0.23	0.65	0.65	0.01	0.43	0.43
Sat Flow, veh/h	1117	419	1585	1148	423	0	1781	3390	218	1781	3554	1585
Grp Volume(v), veh/h	49	0	0	27	0	0	342	390	403	11	886	3
Grp Sat Flow(s),veh/h/ln	1536	0	1585	1571	0	0	1781	1777	1831	1781	1777	1585
Q Serve(g_s), s	0.8	0.0	0.0	0.0	0.0	0.0	10.4	5.5	5.5	0.4	10.7	0.1
Cycle Q Clear(g_c), s	1.6	0.0	0.0	0.8	0.0	0.0	10.4	5.5	5.5	0.4	10.7	0.1
Prop In Lane	0.78		1.00	0.81		0.00	1.00		0.12	1.00		1.00
Lane Grp Cap(c), veh/h	252	0		258	0	0	410	1164	1199	15	1538	686
V/C Ratio(X)	0.19	0.00		0.10	0.00	0.00	0.83	0.34	0.34	0.73	0.58	0.00
Avail Cap(c_a), veh/h	665	0		793	0	0	2064	2308	2379	2064	4617	2059
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.8	0.0	0.0	24.4	0.0	0.0	20.9	4.3	4.3	28.2	12.2	9.2
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	1.7	0.4	0.4	22.4	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.3	0.0	0.0	4.0	1.3	1.3	0.2	3.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.2	0.0	0.0	24.6	0.0	0.0	22.6	4.7	4.7	50.6	12.9	9.2
LnGrp LOS	C	A		C	A	A	C	A	A	D	B	A
Approach Vol, veh/h		49	A		27			1135			900	
Approach Delay, s/veh		25.2			24.6			10.1			13.4	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.1	30.7		9.2	4.5	43.3		9.2				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	66.0	74.0		25.0	66.0	74.0		20.0				
Max Q Clear Time (g_c+I1), s	12.4	12.7		2.8	2.4	7.5		3.6				
Green Ext Time (p_c), s	0.8	11.9		0.0	0.0	9.2		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		12.0
HCM 6th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	70	10	5	10	135	1100	20	15	1290	65
Future Volume (veh/h)	30	0	70	10	5	10	135	1100	20	15	1290	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	0	1	11	5	1	147	1196	21	16	1402	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	178	0	72	120	19	3	186	2625	46	21	2280	1017
Arrive On Green	0.06	0.00	0.05	0.06	0.05	0.05	0.10	0.73	0.73	0.01	0.64	0.64
Sat Flow, veh/h	1558	0	1585	702	420	70	1781	3573	63	1781	3554	1585
Grp Volume(v), veh/h	33	0	1	17	0	0	147	595	622	16	1402	43
Grp Sat Flow(s),veh/h/ln	1558	0	1585	1193	0	0	1781	1777	1859	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	5.4	9.0	9.0	0.6	15.7	0.7
Cycle Q Clear(g_c), s	1.2	0.0	0.0	1.6	0.0	0.0	5.4	9.0	9.0	0.6	15.7	0.7
Prop In Lane	1.00		1.00	0.65		0.06	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	201	0	72	160	0	0	186	1305	1366	21	2280	1017
V/C Ratio(X)	0.16	0.00	0.01	0.11	0.00	0.00	0.79	0.46	0.46	0.78	0.61	0.04
Avail Cap(c_a), veh/h	619	0	542	615	0	0	556	2271	2376	291	4014	1791
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.7	0.0	30.7	31.2	0.0	0.0	29.4	3.6	3.6	33.2	7.1	4.4
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.1	0.0	0.0	2.8	0.5	0.5	20.5	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.3	0.0	0.0	2.3	1.8	1.9	0.4	4.4	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.9	0.0	30.7	31.3	0.0	0.0	32.2	4.1	4.1	53.7	7.7	4.5
LnGrp LOS	C	A	C	C	A	A	C	A	A	D	A	A
Approach Vol, veh/h		34			17			1364			1461	
Approach Delay, s/veh		30.9			31.3			7.1			8.1	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.0	48.2		8.1	4.8	54.4		8.1
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	7.4	17.7		3.6	2.6	11.0		3.2
Green Ext Time (p_c), s	0.1	25.5		0.0	0.0	18.8		0.0

Intersection Summary	
HCM 6th Ctrl Delay	8.0
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	35	40	15	45	110	1240	60	25	1240	45
Future Volume (veh/h)	55	5	35	40	15	45	110	1240	60	25	1240	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	1	43	16	1	120	1348	50	27	1348	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	12	152	111	168	10	142	2789	1244	39	2584	1153
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.08	0.78	0.78	0.02	0.73	0.73
Sat Flow, veh/h	1198	121	1580	1407	1742	109	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	65	0	1	43	0	17	120	1348	50	27	1348	35
Grp Sat Flow(s),veh/h/ln	1318	0	1580	1407	0	1850	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	6.6	0.0	0.1	4.7	0.0	1.3	10.3	20.4	1.1	2.3	25.8	1.0
Cycle Q Clear(g_c), s	7.8	0.0	0.1	12.5	0.0	1.3	10.3	20.4	1.1	2.3	25.8	1.0
Prop In Lane	0.92		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	172	0	152	111	0	178	142	2789	1244	39	2584	1153
V/C Ratio(X)	0.38	0.00	0.01	0.39	0.00	0.10	0.84	0.48	0.04	0.68	0.52	0.03
Avail Cap(c_a), veh/h	255	0	245	193	0	287	241	2789	1244	241	2584	1153
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.72	0.72	0.72	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.3	0.0	63.3	72.8	0.0	63.9	70.4	5.8	3.7	75.2	9.3	5.9
Incr Delay (d2), s/veh	1.4	0.0	0.0	2.2	0.0	0.2	3.8	0.4	0.0	7.5	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	0.0	1.8	0.0	0.6	4.8	6.9	0.3	1.2	9.7	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.7	0.0	63.3	75.0	0.0	64.1	74.2	6.2	3.8	82.8	10.1	5.9
LnGrp LOS	E	A	E	E	A	E	E	A	A	F	B	A
Approach Vol, veh/h		66			60			1518			1410	
Approach Delay, s/veh		68.6			71.9			11.5			11.3	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.7		19.9	7.4	127.6		19.9
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	27.8		14.5	4.3	22.4		9.8
Green Ext Time (p_c), s	0.1	24.8		0.1	0.0	25.7		0.1

Intersection Summary			
HCM 6th Ctrl Delay			13.9
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	10	220	10	10	10	425	1325	15	80	1200	95
Future Volume (veh/h)	135	10	220	10	10	10	425	1325	15	80	1200	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	155	0	60	11	11	3	462	1440	16	87	1304	75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	339	0	828	63	63	17	615	2100	23	154	1747	912
Arrive On Green	0.10	0.00	0.09	0.08	0.08	0.05	0.18	0.58	0.56	0.09	0.49	0.49
Sat Flow, veh/h	3563	0	3078	786	786	214	3456	3600	40	1781	3554	1579
Grp Volume(v), veh/h	155	0	60	25	0	0	462	710	746	87	1304	75
Grp Sat Flow(s),veh/h/ln	1781	0	1539	1787	0	0	1728	1777	1863	1781	1777	1579
Q Serve(g_s), s	4.3	0.0	1.5	1.4	0.0	0.0	13.1	28.7	28.8	4.9	30.5	2.2
Cycle Q Clear(g_c), s	4.3	0.0	1.5	1.4	0.0	0.0	13.1	28.7	28.8	4.9	30.5	2.2
Prop In Lane	1.00		1.00	0.44		0.12	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	339	0	828	144	0	0	615	1037	1087	154	1747	912
V/C Ratio(X)	0.46	0.00	0.07	0.17	0.00	0.00	0.75	0.69	0.69	0.57	0.75	0.08
Avail Cap(c_a), veh/h	1171	0	1546	536	0	0	1938	3333	3495	258	5189	2442
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.2	0.0	28.6	44.5	0.0	0.0	40.3	14.9	15.0	45.4	21.1	9.7
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.6	0.0	0.0	0.7	1.2	1.1	1.2	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.6	0.6	0.0	0.0	5.5	10.8	11.4	2.2	12.1	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.6	0.0	28.6	45.1	0.0	0.0	41.0	16.1	16.1	46.6	22.0	9.8
LnGrp LOS	D	A	C	D	A	A	D	B	B	D	C	A
Approach Vol, veh/h		215			25			1918			1466	
Approach Delay, s/veh		40.1			45.1			22.1			22.9	
Approach LOS		D			D			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	22.4	54.8		12.3	12.9	64.3		13.9				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0				
Max Q Clear Time (g_c+I1), s	15.1	32.5		3.4	6.9	30.8		6.3				
Green Ext Time (p_c), s	1.3	16.4		0.0	0.1	16.9		0.6				

Intersection Summary		
HCM 6th Ctrl Delay		23.6
HCM 6th LOS		C

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	60	0	45	5	1770	90	30	1405	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1770	90	30	1405	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	1924	96	33	1527	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	177	0	138	11	2719	135	64	2974	10
Arrive On Green	0.09	0.09	0.08	0.09	0.00	0.08	0.01	0.79	0.78	0.04	0.82	0.81
Sat Flow, veh/h	586	899	148	1378	0	1545	1781	3446	170	1781	3633	12
Grp Volume(v), veh/h	11	0	0	65	0	1	5	984	1036	33	747	785
Grp Sat Flow(s),veh/h/ln	1633	0	0	1378	0	1545	1781	1777	1839	1781	1777	1868
Q Serve(g_s), s	0.0	0.0	0.0	5.3	0.0	0.1	0.4	36.6	38.1	2.5	18.4	18.4
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	36.6	38.1	2.5	18.4	18.4
Prop In Lane	0.45		0.09	1.00		1.00	1.00		0.09	1.00		0.01
Lane Grp Cap(c), veh/h	183	0	0	177	0	138	11	1402	1452	64	1455	1529
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.44	0.70	0.71	0.52	0.51	0.51
Avail Cap(c_a), veh/h	313	0	0	290	0	265	102	1402	1452	102	1455	1529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.63	0.63	0.63	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.4	0.0	0.0	60.7	0.0	58.5	69.3	7.0	7.2	66.3	4.0	4.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	6.3	1.9	1.9	2.4	1.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.3	0.0	0.0	0.2	12.0	12.9	1.2	5.6	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	75.6	8.8	9.1	68.7	5.3	5.2
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	A	A
Approach Vol, veh/h		11			66			2025			1565	
Approach Delay, s/veh		58.6			62.0			9.1			6.6	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.9	118.6		16.5	9.0	114.5		16.5
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	95.0		23.0	8.0	95.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	20.4		8.1	4.5	40.1		2.8
Green Ext Time (p_c), s	0.0	29.8		0.1	0.0	41.5		0.0

Intersection Summary			
HCM 6th Ctrl Delay			9.1
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	5	5	105	15	15	5	1750	20	10	1250	185
Future Volume (veh/h)	90	5	5	105	15	15	5	1750	20	10	1250	185
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	98	5	3	114	16	12	5	1902	21	11	1359	143
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	210	8	5	199	20	15	7	2818	31	14	2795	1245
Arrive On Green	0.11	0.11	0.10	0.11	0.11	0.10	0.00	0.78	0.77	0.01	0.79	0.79
Sat Flow, veh/h	1393	71	43	1317	185	139	1781	3600	40	1781	3554	1583
Grp Volume(v), veh/h	106	0	0	142	0	0	5	937	986	11	1359	143
Grp Sat Flow(s),veh/h/ln	1506	0	0	1641	0	0	1781	1777	1863	1781	1777	1583
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.3	29.1	29.3	0.7	15.9	2.5
Cycle Q Clear(g_c), s	7.9	0.0	0.0	9.7	0.0	0.0	0.3	29.1	29.3	0.7	15.9	2.5
Prop In Lane	0.92		0.03	0.80		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	223	0	0	234	0	0	7	1391	1458	14	2795	1245
V/C Ratio(X)	0.48	0.00	0.00	0.61	0.00	0.00	0.73	0.67	0.68	0.80	0.49	0.11
Avail Cap(c_a), veh/h	432	0	0	451	0	0	119	1391	1458	119	2795	1245
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.62	0.62	0.62	0.85	0.85	0.85
Uniform Delay (d), s/veh	51.1	0.0	0.0	51.8	0.0	0.0	59.7	6.0	6.0	59.4	4.4	3.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.5	0.0	0.0	28.8	1.6	1.6	28.1	0.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.0	4.3	0.0	0.0	0.2	8.8	9.3	0.4	4.6	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.7	0.0	0.0	54.3	0.0	0.0	88.5	7.6	7.6	87.5	4.9	3.2
LnGrp LOS	D	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		106			142			1928			1513	
Approach Delay, s/veh		52.7			54.3			7.8			5.4	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.4		17.2	4.9	97.9		17.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.3	17.9		11.7	2.7	31.3		9.9
Green Ext Time (p_c), s	0.0	31.7		0.5	0.0	32.3		0.3

Intersection Summary		
HCM 6th Ctrl Delay		9.9
HCM 6th LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	30	20	145	25	35	25	1570	75	10	1290	70
Future Volume (veh/h)	145	30	20	145	25	35	25	1570	75	10	1290	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	158	33	4	158	27	5	27	1707	80	11	1402	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	336	60	403	225	394	73	34	2246	105	13	2191	115
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.25	0.04	1.00	1.00	0.01	0.64	0.63
Sat Flow, veh/h	1122	234	1568	1361	1532	284	1781	3457	161	1781	3434	181
Grp Volume(v), veh/h	191	0	4	158	0	32	27	873	914	11	724	752
Grp Sat Flow(s),veh/h/ln	1357	0	1568	1361	0	1816	1781	1777	1841	1781	1777	1838
Q Serve(g_s), s	16.3	0.0	0.3	16.1	0.0	1.9	2.1	0.0	0.0	0.9	34.8	35.2
Cycle Q Clear(g_c), s	18.2	0.0	0.3	34.2	0.0	1.9	2.1	0.0	0.0	0.9	34.8	35.2
Prop In Lane	0.83		1.00	1.00		0.16	1.00		0.09	1.00		0.10
Lane Grp Cap(c), veh/h	396	0	403	225	0	467	34	1154	1196	13	1134	1173
V/C Ratio(X)	0.48	0.00	0.01	0.70	0.00	0.07	0.79	0.76	0.76	0.83	0.64	0.64
Avail Cap(c_a), veh/h	396	0	403	225	0	467	140	1154	1196	140	1134	1173
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.85	0.85	0.85
Uniform Delay (d), s/veh	46.2	0.0	38.7	60.3	0.0	39.4	67.1	0.0	0.0	69.4	15.5	15.6
Incr Delay (d2), s/veh	0.9	0.0	0.0	9.5	0.0	0.1	1.4	0.4	0.4	31.6	2.3	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	0.0	0.1	6.2	0.0	0.9	1.0	0.1	0.1	0.5	14.1	14.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.1	0.0	38.7	69.8	0.0	39.4	68.5	0.4	0.4	101.0	17.8	17.9
LnGrp LOS	D	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		195			190			1814			1487	
Approach Delay, s/veh		46.9			64.7			1.4			18.5	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	93.3		40.0	5.0	95.0		40.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	80.0		35.0	11.0	80.0		35.0
Max Q Clear Time (g_c+I1), s	4.1	37.2		36.2	2.9	2.0		20.2
Green Ext Time (p_c), s	0.0	22.3		0.0	0.0	42.2		0.6

Intersection Summary			
HCM 6th Ctrl Delay			14.0
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	85	35	115	65	1085	25	665	165	540	1045	30
Future Volume (veh/h)	10	85	35	115	65	1085	25	665	165	540	1045	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	92	3	125	71	0	27	723	111	587	1136	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	39	176	158	255	392		34	981	828	623	2420	68
Arrive On Green	0.10	0.10	0.10	0.08	0.21	0.00	0.02	0.52	0.52	0.36	1.00	1.00
Sat Flow, veh/h	108	1715	1543	1781	1870	1585	1781	1870	1579	3456	3530	99
Grp Volume(v), veh/h	103	0	3	125	71	0	27	723	111	587	572	596
Grp Sat Flow(s),veh/h/ln	1823	0	1543	1781	1870	1585	1781	1870	1579	1728	1777	1852
Q Serve(g_s), s	1.1	0.0	0.2	8.5	4.4	0.0	2.1	42.0	5.0	23.0	0.0	0.0
Cycle Q Clear(g_c), s	7.4	0.0	0.2	8.5	4.4	0.0	2.1	42.0	5.0	23.0	0.0	0.0
Prop In Lane	0.11		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	215	0	158	255	392		34	981	828	623	1218	1270
V/C Ratio(X)	0.48	0.00	0.02	0.49	0.18		0.79	0.74	0.13	0.94	0.47	0.47
Avail Cap(c_a), veh/h	326	0	254	255	508		178	981	828	642	1218	1270
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.73	0.73	0.73
Uniform Delay (d), s/veh	59.7	0.0	56.5	49.1	45.5	0.0	68.4	25.8	17.0	44.0	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.0	1.5	0.2	0.0	11.3	3.9	0.3	17.3	1.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.1	3.9	2.1	0.0	1.1	19.2	1.9	9.8	0.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.3	0.0	56.6	50.6	45.7	0.0	79.7	29.7	17.3	61.3	1.0	0.9
LnGrp LOS	E	A	E	D	D		E	C	B	E	A	A
Approach Vol, veh/h		106			196	A		861			1755	
Approach Delay, s/veh		61.2			48.8			29.7			21.1	
Approach LOS		E			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	100.0	15.0	18.3	29.3	77.4		33.3
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	14.0	75.0	10.0	22.0	26.0	63.0		37.0
Max Q Clear Time (g_c+I1), s	4.1	2.0	10.5	9.4	25.0	44.0		6.4
Green Ext Time (p_c), s	0.0	17.3	0.0	0.2	0.2	7.8		0.2

Intersection Summary	
HCM 6th Ctrl Delay	27.0
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2025 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	25	370	60	25	5	380	220	65	10	285	75
Future Volume (veh/h)	55	25	370	60	25	5	380	220	65	10	285	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	27	24	65	27	1	413	239	45	11	310	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	231	72	183	235	207	8	501	1022	866	15	511	433
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.28	0.55	0.55	0.01	0.27	0.27
Sat Flow, veh/h	916	623	1585	1354	1792	66	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	87	0	24	65	0	28	413	239	45	11	310	20
Grp Sat Flow(s),veh/h/ln	1539	0	1585	1354	0	1858	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.8	0.0	0.7	2.3	0.0	0.7	10.5	3.2	0.6	0.3	7.0	0.5
Cycle Q Clear(g_c), s	2.5	0.0	0.7	4.8	0.0	0.7	10.5	3.2	0.6	0.3	7.0	0.5
Prop In Lane	0.69		1.00	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	303	0	183	235	0	215	501	1022	866	15	511	433
V/C Ratio(X)	0.29	0.00	0.13	0.28	0.00	0.13	0.82	0.23	0.05	0.72	0.61	0.05
Avail Cap(c_a), veh/h	873	0	784	748	0	919	1101	3043	2579	550	2466	2089
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.0	0.0	19.3	22.3	0.0	19.3	16.3	5.7	5.1	24.0	15.4	13.0
Incr Delay (d2), s/veh	0.5	0.0	0.3	0.6	0.0	0.3	3.5	0.2	0.1	48.5	2.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.2	0.7	0.0	0.3	4.0	0.9	0.2	0.3	2.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	0.0	19.6	23.0	0.0	19.5	19.8	6.0	5.2	72.5	17.8	13.1
LnGrp LOS	C	A	B	C	A	B	B	A	A	E	B	B
Approach Vol, veh/h		111			93			697			341	
Approach Delay, s/veh		20.3			21.9			14.1			19.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	32.5		10.6	18.7	19.3		10.6
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0
Max Q Clear Time (g_c+I1), s	2.3	5.2		4.5	12.5	9.0		6.8
Green Ext Time (p_c), s	0.0	3.5		0.5	1.2	4.3		0.2

Intersection Summary			
HCM 6th Ctrl Delay			16.7
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	20	150	45	15	10	195	595	45	25	580	80
Future Volume (veh/h)	75	20	150	45	15	10	195	595	45	25	580	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	22	13	49	16	1	212	647	0	27	630	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	274	55	206	241	227	14	446	970		390	813	685
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.10	0.52	0.00	0.02	0.43	0.43
Sat Flow, veh/h	1081	422	1585	1373	1742	109	1781	1870	1585	1781	1870	1578
Grp Volume(v), veh/h	104	0	13	49	0	17	212	647	0	27	630	44
Grp Sat Flow(s),veh/h/ln	1503	0	1585	1373	0	1851	1781	1870	1585	1781	1870	1578
Q Serve(g_s), s	2.6	0.0	0.3	1.7	0.0	0.4	2.9	12.3	0.0	0.4	13.8	0.8
Cycle Q Clear(g_c), s	3.0	0.0	0.3	4.7	0.0	0.4	2.9	12.3	0.0	0.4	13.8	0.8
Prop In Lane	0.79		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	329	0	206	241	0	241	446	970		390	813	685
V/C Ratio(X)	0.32	0.00	0.06	0.20	0.00	0.07	0.48	0.67		0.07	0.78	0.06
Avail Cap(c_a), veh/h	903	0	823	776	0	961	817	1981		911	1981	1671
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.5	0.0	18.4	21.7	0.0	18.4	8.5	8.5	0.0	8.0	11.6	7.9
Incr Delay (d2), s/veh	0.5	0.0	0.1	0.4	0.0	0.1	0.8	0.8	0.0	0.1	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.1	0.5	0.0	0.2	0.8	3.5	0.0	0.1	4.6	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.0	0.0	18.5	22.2	0.0	18.5	9.3	9.3	0.0	8.1	13.2	8.0
LnGrp LOS	C	A	B	C	A	B	A	A		A	B	A
Approach Vol, veh/h		117			66			859	A		701	
Approach Delay, s/veh		19.9			21.2			9.3			12.7	
Approach LOS		B			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	31.0		11.3	10.0	26.9		11.3				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0				
Max Q Clear Time (g_c+I1), s	2.4	14.3		5.0	4.9	15.8		6.7				
Green Ext Time (p_c), s	0.0	4.9		0.5	0.4	4.8		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			11.8
HCM 6th LOS			B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	95	10	5	10	165	825	10	5	775	75
Future Volume (veh/h)	60	5	95	10	5	10	165	825	10	5	775	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	4	11	5	1	179	897	8	5	842	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	113	90	19	154	127	221	1178	998	7	953	806
Arrive On Green	0.05	0.12	0.12	0.01	0.08	0.08	0.12	0.63	0.63	0.00	0.51	0.51
Sat Flow, veh/h	1781	948	759	1781	1870	1538	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	65	0	9	11	5	1	179	897	8	5	842	44
Grp Sat Flow(s),veh/h/ln	1781	0	1707	1781	1870	1538	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	3.1	0.0	0.4	0.5	0.2	0.1	8.3	28.9	0.2	0.2	34.0	1.2
Cycle Q Clear(g_c), s	3.1	0.0	0.4	0.5	0.2	0.1	8.3	28.9	0.2	0.2	34.0	1.2
Prop In Lane	1.00		0.44	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	85	0	204	19	154	127	221	1178	998	7	953	806
V/C Ratio(X)	0.77	0.00	0.04	0.57	0.03	0.01	0.81	0.76	0.01	0.71	0.88	0.05
Avail Cap(c_a), veh/h	421	0	423	421	464	381	526	1435	1216	526	1435	1214
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.9	0.0	33.0	41.7	35.8	35.7	36.1	11.1	5.8	42.1	18.5	10.5
Incr Delay (d2), s/veh	13.3	0.0	0.1	24.2	0.1	0.0	6.9	2.0	0.0	83.9	4.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.2	0.4	0.1	0.0	3.9	10.3	0.0	0.3	14.1	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.1	0.0	33.1	65.9	35.8	35.7	43.0	13.1	5.8	126.1	23.2	10.5
LnGrp LOS	D	A	C	E	D	D	D	B	A	F	C	B
Approach Vol, veh/h		74			17			1084			891	
Approach Delay, s/veh		50.7			55.3			18.0			23.1	
Approach LOS		D			E			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	58.4	5.9	15.1	15.5	48.2	9.0	12.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.2	30.9	2.5	2.4	10.3	36.0	5.1	2.2
Green Ext Time (p_c), s	0.0	8.1	0.0	0.0	0.4	7.2	0.1	0.0

Intersection Summary		
HCM 6th Ctrl Delay		21.7
HCM 6th LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	600	80	10	10	605	890	10	5	820	20
Future Volume (veh/h)	75	5	600	80	10	10	605	890	10	5	820	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	0	87	11	9	658	967	11	5	891	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	203	8		185	15	12	702	2696	31	7	1275	569
Arrive On Green	0.10	0.09	0.00	0.10	0.09	0.09	0.39	0.75	0.75	0.00	0.36	0.36
Sat Flow, veh/h	1466	89	1585	1325	168	137	1781	3599	41	1781	3554	1585
Grp Volume(v), veh/h	87	0	0	107	0	0	658	477	501	5	891	6
Grp Sat Flow(s),veh/h/ln	1556	0	1585	1630	0	0	1781	1777	1863	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	33.4	8.7	8.7	0.3	20.2	0.2
Cycle Q Clear(g_c), s	4.7	0.0	0.0	5.6	0.0	0.0	33.4	8.7	8.7	0.3	20.2	0.2
Prop In Lane	0.94		1.00	0.81		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	227	0		229	0	0	702	1331	1396	7	1275	569
V/C Ratio(X)	0.38	0.00		0.47	0.00	0.00	0.94	0.36	0.36	0.72	0.70	0.01
Avail Cap(c_a), veh/h	403	0		489	0	0	1343	1331	1396	1343	2604	1162
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.9	0.0	0.0	41.3	0.0	0.0	27.4	4.1	4.1	46.8	25.8	19.4
Incr Delay (d2), s/veh	1.1	0.0	0.0	1.5	0.0	0.0	2.8	0.3	0.3	40.2	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.0	2.4	0.0	0.0	13.8	2.4	2.5	0.2	8.4	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.9	0.0	0.0	42.7	0.0	0.0	30.2	4.4	4.4	87.1	27.3	19.4
LnGrp LOS	D	A		D	A	A	C	A	A	F	C	B
Approach Vol, veh/h		87	A		107			1636			902	
Approach Delay, s/veh		41.9			42.7			14.8			27.6	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	41.1	39.8		13.3	4.4	76.5		13.3
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0
Max Q Clear Time (g_c+I1), s	35.4	22.2		7.6	2.3	10.7		6.7
Green Ext Time (p_c), s	1.7	11.6		0.3	0.0	12.4		0.2

Intersection Summary		
HCM 6th Ctrl Delay		21.0
HCM 6th LOS		C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	5	140	15	0	5	135	1450	10	10	1505	60
Future Volume (veh/h)	50	5	140	15	0	5	135	1450	10	10	1505	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	5	6	16	0	1	147	1576	11	11	1636	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	18	173	186	2	7	180	2631	18	14	2254	1006
Arrive On Green	0.12	0.11	0.11	0.12	0.00	0.11	0.10	0.73	0.73	0.01	0.63	0.63
Sat Flow, veh/h	1359	156	1522	972	19	62	1781	3617	25	1781	3554	1585
Grp Volume(v), veh/h	59	0	6	17	0	0	147	774	813	11	1636	39
Grp Sat Flow(s),veh/h/ln	1515	0	1522	1052	0	0	1781	1777	1866	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.3	0.9	0.0	0.0	7.5	19.5	19.6	0.6	29.0	0.9
Cycle Q Clear(g_c), s	2.8	0.0	0.3	3.7	0.0	0.0	7.5	19.5	19.6	0.6	29.0	0.9
Prop In Lane	0.92		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	263	0	173	206	0	0	180	1292	1357	14	2254	1006
V/C Ratio(X)	0.22	0.00	0.03	0.08	0.00	0.00	0.82	0.60	0.60	0.77	0.73	0.04
Avail Cap(c_a), veh/h	451	0	377	389	0	0	403	1645	1727	211	2908	1297
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.3	0.0	36.6	38.5	0.0	0.0	40.9	6.1	6.1	46.0	11.5	6.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.4	1.0	0.9	27.3	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.1	0.4	0.0	0.0	3.4	5.7	6.0	0.4	9.9	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.5	0.0	36.6	38.6	0.0	0.0	44.3	7.1	7.0	73.3	12.6	6.4
LnGrp LOS	D	A	D	D	A	A	D	A	A	E	B	A
Approach Vol, veh/h		65			17			1734			1686	
Approach Delay, s/veh		37.4			38.6			10.2			12.9	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.4	63.9		15.6	4.7	72.6		15.6				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	9.5	31.0		5.7	2.6	21.6		4.8				
Green Ext Time (p_c), s	0.1	27.9		0.0	0.0	30.4		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			12.1									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	175	70	5	45	125	1440	60	35	1665	95
Future Volume (veh/h)	75	5	175	70	5	45	125	1440	60	35	1665	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	27	76	5	1	136	1565	49	38	1810	81
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	12	204	142	197	39	157	2668	1189	49	2452	1094
Arrive On Green	0.14	0.13	0.13	0.13	0.13	0.13	0.09	0.75	0.75	0.03	0.69	0.69
Sat Flow, veh/h	1303	90	1563	1363	1509	302	1781	3554	1584	1781	3554	1585
Grp Volume(v), veh/h	87	0	27	76	0	6	136	1565	49	38	1810	81
Grp Sat Flow(s),veh/h/ln	1393	0	1563	1363	0	1811	1781	1777	1584	1781	1777	1585
Q Serve(g_s), s	9.2	0.0	2.5	9.0	0.0	0.5	12.4	32.4	1.3	3.5	53.1	2.8
Cycle Q Clear(g_c), s	9.7	0.0	2.5	18.7	0.0	0.5	12.4	32.4	1.3	3.5	53.1	2.8
Prop In Lane	0.94		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	233	0	204	142	0	237	157	2668	1189	49	2452	1094
V/C Ratio(X)	0.37	0.00	0.13	0.54	0.00	0.03	0.86	0.59	0.04	0.77	0.74	0.07
Avail Cap(c_a), veh/h	254	0	227	162	0	263	281	2668	1189	108	2452	1094
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.70	0.70	0.70	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.3	0.0	63.4	75.2	0.0	62.5	74.2	9.2	5.3	79.7	16.2	8.4
Incr Delay (d2), s/veh	1.0	0.0	0.3	3.1	0.0	0.0	3.8	0.7	0.0	9.3	2.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	1.0	3.3	0.0	0.2	5.9	11.9	0.4	1.7	21.2	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.2	0.0	63.7	78.4	0.0	62.6	78.1	9.8	5.3	89.0	18.2	8.5
LnGrp LOS	E	A	E	E	A	E	E	A	A	F	B	A
Approach Vol, veh/h		114			82			1750			1929	
Approach Delay, s/veh		66.4			77.2			15.0			19.2	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.6	119.8		26.6	8.5	129.9		26.6				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	26.0	100.0		24.0	10.0	116.0		24.0				
Max Q Clear Time (g_c+I1), s	14.4	55.1		20.7	5.5	34.4		11.7				
Green Ext Time (p_c), s	0.2	32.1		0.1	0.0	35.2		0.3				

Intersection Summary			
HCM 6th Ctrl Delay			19.9
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	290	5	615	15	0	5	385	1490	10	75	1715	135
Future Volume (veh/h)	290	5	615	15	0	5	385	1490	10	75	1715	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	319	0	468	16	0	1	418	1620	11	82	1864	110
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	537	0	906	69	0	4	489	2427	16	113	2106	939
Arrive On Green	0.15	0.00	0.15	0.04	0.00	0.03	0.14	0.67	0.66	0.06	0.59	0.59
Sat Flow, veh/h	3563	0	3127	1659	0	104	3456	3618	25	1781	3554	1585
Grp Volume(v), veh/h	319	0	468	17	0	0	418	795	836	82	1864	110
Grp Sat Flow(s),veh/h/ln	1781	0	1563	1763	0	0	1728	1777	1866	1781	1777	1585
Q Serve(g_s), s	18.2	0.0	27.4	2.0	0.0	0.0	25.8	58.3	58.4	9.9	98.2	6.6
Cycle Q Clear(g_c), s	18.2	0.0	27.4	2.0	0.0	0.0	25.8	58.3	58.4	9.9	98.2	6.6
Prop In Lane	1.00		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	537	0	906	73	0	0	489	1192	1252	113	2106	939
V/C Ratio(X)	0.59	0.00	0.52	0.23	0.00	0.00	0.85	0.67	0.67	0.72	0.88	0.12
Avail Cap(c_a), veh/h	554	0	921	250	0	0	917	1578	1657	122	2456	1095
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	86.5	0.0	65.2	101.4	0.0	0.0	91.6	21.4	21.5	100.4	38.1	19.5
Incr Delay (d2), s/veh	1.1	0.0	0.2	0.6	0.0	0.0	1.7	0.9	0.9	14.7	4.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.6	0.0	11.2	1.0	0.0	0.0	11.8	24.6	25.9	5.1	43.5	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	87.6	0.0	65.4	102.0	0.0	0.0	93.2	22.4	22.4	115.1	42.2	19.6
LnGrp LOS	F	A	E	F	A	A	F	C	C	F	D	B
Approach Vol, veh/h		787			17			2049			2056	
Approach Delay, s/veh		74.4			102.0			36.8			43.9	
Approach LOS		E			F			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	34.9	133.5		13.1	17.9	150.6		36.9				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0				
Max Q Clear Time (g_c+I1), s	27.8	100.2		4.0	11.9	60.4		29.4				
Green Ext Time (p_c), s	1.1	27.3		0.0	0.0	22.2		0.6				

Intersection Summary	
HCM 6th Ctrl Delay	46.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	5	90	5	60	10	1830	90	85	2280	5
Future Volume (veh/h)	10	0	5	90	5	60	10	1830	90	85	2280	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	1989	96	92	2478	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	2	10	182	96	58	22	2612	125	118	2949	6
Arrive On Green	0.09	0.00	0.08	0.09	0.09	0.08	0.03	1.00	1.00	0.07	0.81	0.80
Sat Flow, veh/h	1240	26	115	1416	1095	657	1781	3452	165	1781	3639	7
Grp Volume(v), veh/h	12	0	0	98	0	8	11	1016	1069	92	1210	1273
Grp Sat Flow(s),veh/h/ln	1381	0	0	1416	0	1752	1781	1777	1841	1781	1777	1869
Q Serve(g_s), s	0.8	0.0	0.0	7.4	0.0	0.6	0.8	0.0	0.0	6.9	54.5	54.7
Cycle Q Clear(g_c), s	1.4	0.0	0.0	8.8	0.0	0.6	0.8	0.0	0.0	6.9	54.5	54.7
Prop In Lane	0.92		0.08	1.00		0.38	1.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	173	0	0	182	0	154	22	1345	1393	118	1440	1515
V/C Ratio(X)	0.07	0.00	0.00	0.54	0.00	0.05	0.49	0.76	0.77	0.78	0.84	0.84
Avail Cap(c_a), veh/h	300	0	0	309	0	311	145	1345	1393	251	1440	1515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.58	0.58	0.58	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.9	0.0	0.0	60.0	0.0	56.6	65.4	0.0	0.0	62.0	7.6	7.6
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.1	3.6	2.3	2.4	4.1	6.0	5.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	3.4	0.0	0.3	0.4	0.9	0.9	3.2	17.6	18.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.1	0.0	0.0	62.5	0.0	56.7	69.0	2.3	2.4	66.2	13.6	13.4
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	B	B
Approach Vol, veh/h		12			106			2096			2575	
Approach Delay, s/veh		57.1			62.0			2.7			15.4	
Approach LOS		E			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	113.4		15.9	13.0	106.2		15.9				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	87.0		23.0	19.0	79.0		23.0				
Max Q Clear Time (g_c+I1), s	2.8	56.7		10.8	8.9	2.0		3.4				
Green Ext Time (p_c), s	0.0	29.0		0.2	0.1	55.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			11.0									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	15	10	60	5	10	5	1755	20	5	1935	325
Future Volume (veh/h)	175	15	10	60	5	10	5	1755	20	5	1935	325
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	190	16	9	65	5	7	5	1908	21	5	2103	279
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	268	18	10	273	22	25	7	2675	29	7	2640	1178
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.01	1.00	1.00	0.00	0.74	0.74
Sat Flow, veh/h	1326	112	63	1363	133	150	1781	3600	40	1781	3554	1585
Grp Volume(v), veh/h	215	0	0	77	0	0	5	940	989	5	2103	279
Grp Sat Flow(s),veh/h/ln	1501	0	0	1645	0	0	1781	1777	1863	1781	1777	1585
Q Serve(g_s), s	13.3	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	50.3	7.4
Cycle Q Clear(g_c), s	18.7	0.0	0.0	5.4	0.0	0.0	0.4	0.0	0.0	0.4	50.3	7.4
Prop In Lane	0.88		0.04	0.84		0.09	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	297	0	0	320	0	0	7	1320	1384	7	2640	1178
V/C Ratio(X)	0.72	0.00	0.00	0.24	0.00	0.00	0.74	0.71	0.71	0.74	0.80	0.24
Avail Cap(c_a), veh/h	380	0	0	402	0	0	106	1320	1384	106	2640	1178
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.57	0.57	0.57	0.37	0.37	0.37
Uniform Delay (d), s/veh	54.6	0.0	0.0	49.4	0.0	0.0	66.9	0.0	0.0	67.2	10.9	5.4
Incr Delay (d2), s/veh	4.9	0.0	0.0	0.4	0.0	0.0	27.8	1.9	1.8	19.2	1.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	0.0	0.0	2.4	0.0	0.0	0.2	0.7	0.7	0.2	17.2	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.5	0.0	0.0	49.8	0.0	0.0	94.7	1.9	1.8	86.4	11.9	5.6
LnGrp LOS	E	A	A	D	A	A	F	A	A	F	B	A
Approach Vol, veh/h		215			77			1934			2387	
Approach Delay, s/veh		59.5			49.8			2.1			11.3	
Approach LOS		E			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	104.3		26.2	4.5	104.3		26.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	84.0		29.0	8.0	84.0		29.0
Max Q Clear Time (g_c+I1), s	2.4	52.3		7.4	2.4	2.0		20.7
Green Ext Time (p_c), s	0.0	30.2		0.2	0.0	63.9		0.5

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	35	45	95	25	20	55	1555	105	25	1870	150
Future Volume (veh/h)	180	35	45	95	25	20	55	1555	105	25	1870	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	196	38	8	103	27	4	60	1690	111	27	2033	159
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	315	51	368	148	376	56	76	2218	145	34	2110	163
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.23	0.09	1.00	1.00	0.04	1.00	1.00
Sat Flow, veh/h	1120	217	1553	1343	1587	235	1781	3386	221	1781	3342	258
Grp Volume(v), veh/h	234	0	8	103	0	31	60	880	921	27	1068	1124
Grp Sat Flow(s),veh/h/ln	1338	0	1553	1343	0	1822	1781	1777	1830	1781	1777	1823
Q Serve(g_s), s	20.7	0.0	0.5	9.5	0.0	1.8	4.5	0.0	0.0	2.0	0.0	0.0
Cycle Q Clear(g_c), s	22.5	0.0	0.5	32.0	0.0	1.8	4.5	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.84		1.00	1.00		0.13	1.00		0.12	1.00		0.14
Lane Grp Cap(c), veh/h	366	0	368	148	0	432	76	1164	1199	34	1122	1151
V/C Ratio(X)	0.64	0.00	0.02	0.70	0.00	0.07	0.79	0.76	0.77	0.80	0.95	0.98
Avail Cap(c_a), veh/h	366	0	368	148	0	432	106	1164	1199	106	1122	1151
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.48	0.48	0.48
Uniform Delay (d), s/veh	48.7	0.0	39.5	63.2	0.0	40.0	61.1	0.0	0.0	64.7	0.0	0.0
Incr Delay (d2), s/veh	3.7	0.0	0.0	13.5	0.0	0.1	1.6	0.4	0.4	7.4	10.4	13.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	0.0	0.2	4.1	0.0	0.8	2.0	0.1	0.1	1.0	3.2	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.4	0.0	39.5	76.6	0.0	40.1	62.7	0.4	0.4	72.1	10.4	13.7
LnGrp LOS	D	A	D	E	A	D	E	A	A	E	B	B
Approach Vol, veh/h		242			134			1861			2219	
Approach Delay, s/veh		52.0			68.2			2.4			12.8	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	89.2		36.0	6.6	92.4		36.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	82.0		31.0	8.0	82.0		31.0
Max Q Clear Time (g_c+I1), s	6.5	2.0		34.0	4.0	2.0		24.5
Green Ext Time (p_c), s	0.0	62.1		0.0	0.0	43.5		0.5

Intersection Summary		
HCM 6th Ctrl Delay		12.3
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	85	85	190	85	985	50	670	220	620	1150	40
Future Volume (veh/h)	35	85	85	190	85	985	50	670	220	620	1150	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.96	0.98		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	92	13	207	92	0	54	728	156	674	1250	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	172	202	290	471		70	848	714	712	2175	73
Arrive On Green	0.13	0.13	0.13	0.09	0.25	0.00	0.04	0.45	0.45	0.41	1.00	1.00
Sat Flow, veh/h	387	1295	1521	1781	1870	1585	1781	1870	1575	3456	3508	118
Grp Volume(v), veh/h	130	0	13	207	92	0	54	728	156	674	633	659
Grp Sat Flow(s),veh/h/ln	1682	0	1521	1781	1870	1585	1781	1870	1575	1728	1777	1848
Q Serve(g_s), s	6.1	0.0	1.0	12.0	5.2	0.0	4.1	47.0	8.1	25.4	0.0	0.0
Cycle Q Clear(g_c), s	9.6	0.0	1.0	12.0	5.2	0.0	4.1	47.0	8.1	25.4	0.0	0.0
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	258	0	202	290	471		70	848	714	712	1102	1146
V/C Ratio(X)	0.50	0.00	0.06	0.71	0.20		0.77	0.86	0.22	0.95	0.57	0.57
Avail Cap(c_a), veh/h	380	0	315	290	610		238	848	714	742	1102	1146
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.88	0.88	0.88	0.26	0.26	0.26
Uniform Delay (d), s/veh	54.7	0.0	51.2	46.3	39.8	0.0	64.3	33.0	22.4	39.0	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.1	8.0	0.2	0.0	5.8	9.8	0.6	7.4	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	0.4	1.6	2.5	0.0	1.9	23.0	3.1	9.5	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.2	0.0	51.3	54.3	40.0	0.0	70.1	42.8	23.0	46.4	0.6	0.6
LnGrp LOS	E	A	D	D	D		E	D	C	D	A	A
Approach Vol, veh/h		143			299	A		938			1966	
Approach Delay, s/veh		55.8			49.9			41.1			16.3	
Approach LOS		E			D			D			B	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.3	87.7	16.0	22.0	31.8	65.2		38.0
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	18.0	60.0	11.0	27.0	29.0	49.0		43.0
Max Q Clear Time (g_c+I1), s	6.1	2.0	14.0	11.6	27.4	49.0		7.2
Green Ext Time (p_c), s	0.0	20.0	0.0	0.4	0.4	0.0		0.3

Intersection Summary	
HCM 6th Ctrl Delay	27.9
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2025 WE Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	45	330	45	50	20	270	315	40	20	285	90
Future Volume (veh/h)	40	45	330	45	50	20	270	315	40	20	285	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	49	35	49	54	10	293	342	22	22	310	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	193	136	203	267	199	37	380	913	772	29	544	461
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.21	0.49	0.49	0.02	0.29	0.29
Sat Flow, veh/h	554	1047	1568	1303	1532	284	1781	1870	1582	1781	1870	1582
Grp Volume(v), veh/h	92	0	35	49	0	64	293	342	22	22	310	28
Grp Sat Flow(s),veh/h/ln	1601	0	1568	1303	0	1816	1781	1870	1582	1781	1870	1582
Q Serve(g_s), s	0.9	0.0	0.9	1.6	0.0	1.4	6.8	5.0	0.3	0.5	6.2	0.6
Cycle Q Clear(g_c), s	2.2	0.0	0.9	3.8	0.0	1.4	6.8	5.0	0.3	0.5	6.2	0.6
Prop In Lane	0.47		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	329	0	203	267	0	236	380	913	772	29	544	461
V/C Ratio(X)	0.28	0.00	0.17	0.18	0.00	0.27	0.77	0.37	0.03	0.77	0.57	0.06
Avail Cap(c_a), veh/h	986	0	861	813	0	997	1222	3380	2858	611	2738	2316
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.5	0.0	16.9	19.3	0.0	17.2	16.2	7.0	5.8	21.4	13.2	11.2
Incr Delay (d2), s/veh	0.5	0.0	0.4	0.3	0.0	0.6	3.4	0.5	0.0	33.9	2.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.3	0.5	0.0	0.6	2.6	1.4	0.1	0.5	2.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.9	0.0	17.3	19.6	0.0	17.8	19.6	7.6	5.8	55.3	15.2	11.3
LnGrp LOS	B	A	B	B	A	B	B	A	A	E	B	B
Approach Vol, veh/h		127			113			657			360	
Approach Delay, s/veh		17.8			18.6			12.8			17.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.7	27.3		10.7	14.3	18.7		10.7
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0
Max Q Clear Time (g_c+I1), s	2.5	7.0		4.2	8.8	8.2		5.8
Green Ext Time (p_c), s	0.0	4.9		0.5	0.8	4.3		0.4

Intersection Summary	
HCM 6th Ctrl Delay	15.1
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	20	195	40	15	5	135	450	25	15	490	60
Future Volume (veh/h)	55	20	195	40	15	5	135	450	25	15	490	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	22	23	43	16	1	147	489	0	16	533	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	290	84	232	310	259	16	442	861		436	728	615
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.08	0.46	0.00	0.01	0.39	0.39
Sat Flow, veh/h	958	566	1558	1343	1740	109	1781	1870	1585	1781	1870	1579
Grp Volume(v), veh/h	82	0	23	43	0	17	147	489	0	16	533	25
Grp Sat Flow(s),veh/h/ln	1524	0	1558	1343	0	1849	1781	1870	1585	1781	1870	1579
Q Serve(g_s), s	1.2	0.0	0.5	1.3	0.0	0.3	2.0	8.1	0.0	0.2	10.3	0.4
Cycle Q Clear(g_c), s	1.9	0.0	0.5	3.2	0.0	0.3	2.0	8.1	0.0	0.2	10.3	0.4
Prop In Lane	0.73		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	374	0	232	310	0	275	442	861		436	728	615
V/C Ratio(X)	0.22	0.00	0.10	0.14	0.00	0.06	0.33	0.57		0.04	0.73	0.04
Avail Cap(c_a), veh/h	1030	0	922	905	0	1094	927	2259		1047	2259	1907
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.1	0.0	15.5	17.5	0.0	15.4	7.9	8.3	0.0	7.9	11.0	8.0
Incr Delay (d2), s/veh	0.3	0.0	0.2	0.2	0.0	0.1	0.4	0.6	0.0	0.0	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	0.4	0.0	0.1	0.5	2.3	0.0	0.1	3.3	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	0.0	15.7	17.7	0.0	15.5	8.4	8.9	0.0	8.0	12.5	8.0
LnGrp LOS	B	A	B	B	A	B	A	A		A	B	A
Approach Vol, veh/h		105			60			636	A		574	
Approach Delay, s/veh		16.2			17.1			8.8			12.1	
Approach LOS		B			B			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	25.4		11.3	8.5	22.4		11.3				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0				
Max Q Clear Time (g_c+I1), s	2.2	10.1		3.9	4.0	12.3		5.2				
Green Ext Time (p_c), s	0.0	3.3		0.4	0.3	3.8		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	11.1
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	5	85	10	5	10	80	555	15	5	685	50
Future Volume (veh/h)	40	5	85	10	5	10	80	555	15	5	685	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	5	6	11	5	1	87	603	9	5	745	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	85	102	20	164	139	115	1012	858	7	899	761
Arrive On Green	0.03	0.11	0.11	0.01	0.09	0.09	0.06	0.54	0.54	0.00	0.48	0.48
Sat Flow, veh/h	1781	770	924	1781	1870	1585	1781	1870	1585	1781	1870	1583
Grp Volume(v), veh/h	43	0	11	11	5	1	87	603	9	5	745	27
Grp Sat Flow(s),veh/h/ln	1781	0	1694	1781	1870	1585	1781	1870	1585	1781	1870	1583
Q Serve(g_s), s	1.4	0.0	0.3	0.4	0.1	0.0	2.9	13.1	0.2	0.2	20.6	0.5
Cycle Q Clear(g_c), s	1.4	0.0	0.3	0.4	0.1	0.0	2.9	13.1	0.2	0.2	20.6	0.5
Prop In Lane	1.00		0.55	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	61	0	187	20	164	139	115	1012	858	7	899	761
V/C Ratio(X)	0.71	0.00	0.06	0.55	0.03	0.01	0.76	0.60	0.01	0.70	0.83	0.04
Avail Cap(c_a), veh/h	593	0	592	593	654	554	741	2024	1715	741	2024	1714
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	0.0	23.9	29.5	25.1	25.0	27.6	9.3	6.4	29.9	13.5	8.2
Incr Delay (d2), s/veh	14.0	0.0	0.1	21.8	0.1	0.0	9.7	0.6	0.0	80.5	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.1	0.3	0.1	0.0	1.5	4.2	0.0	0.2	7.4	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.7	0.0	24.0	51.4	25.1	25.0	37.3	9.9	6.4	110.3	15.5	8.3
LnGrp LOS	D	A	C	D	C	C	D	A	A	F	B	A
Approach Vol, veh/h		54			17			699			777	
Approach Delay, s/veh		38.9			42.1			13.3			15.9	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	37.5	5.7	11.6	8.9	33.9	7.0	10.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.2	15.1	2.4	2.3	4.9	22.6	3.4	2.1
Green Ext Time (p_c), s	0.0	4.5	0.0	0.0	0.2	6.2	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	15.8
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	10	595	10	0	5	410	605	5	0	740	50
Future Volume (veh/h)	50	10	595	10	0	5	410	605	5	0	740	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	11	0	11	0	1	446	658	5	0	804	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	189	15		205	4	8	515	2711	21	3	1393	619
Arrive On Green	0.08	0.06	0.00	0.08	0.00	0.06	0.29	0.75	0.75	0.00	0.39	0.39
Sat Flow, veh/h	1244	253	1585	1413	67	135	1781	3615	27	1781	3554	1579
Grp Volume(v), veh/h	65	0	0	12	0	0	446	323	340	0	804	17
Grp Sat Flow(s),veh/h/ln	1497	0	1585	1615	0	0	1781	1777	1865	1781	1777	1579
Q Serve(g_s), s	2.0	0.0	0.0	0.0	0.0	0.0	13.8	3.2	3.2	0.0	10.4	0.4
Cycle Q Clear(g_c), s	2.4	0.0	0.0	0.4	0.0	0.0	13.8	3.2	3.2	0.0	10.4	0.4
Prop In Lane	0.83		1.00	0.92		0.08	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	230	0		245	0	0	515	1333	1399	3	1393	619
V/C Ratio(X)	0.28	0.00		0.05	0.00	0.00	0.87	0.24	0.24	0.00	0.58	0.03
Avail Cap(c_a), veh/h	646	0		766	0	0	2170	2104	2209	2170	4208	1870
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	26.4	0.0	0.0	25.4	0.0	0.0	19.6	2.2	2.2	0.0	13.9	10.9
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.1	0.0	0.0	1.7	0.2	0.2	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	0.2	0.0	0.0	5.3	0.4	0.5	0.0	3.7	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.0	0.0	0.0	25.5	0.0	0.0	21.4	2.4	2.4	0.0	14.7	10.9
LnGrp LOS	C	A		C	A	A	C	A	A	A	B	B
Approach Vol, veh/h		65	A		12			1109			821	
Approach Delay, s/veh		27.0			25.5			10.0			14.6	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.9	28.8		8.6	0.0	49.7		8.6				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0				
Max Q Clear Time (g_c+I1), s	15.8	12.4		2.4	0.0	5.2		4.4				
Green Ext Time (p_c), s	1.0	10.5		0.0	0.0	7.1		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			12.6
HCM 6th LOS			B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	145	15	5	15	105	965	20	10	1310	65
Future Volume (veh/h)	55	5	145	15	5	15	105	965	20	10	1310	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	6	16	5	1	114	1049	21	11	1424	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	222	14	142	153	37	5	146	2514	50	15	2245	999
Arrive On Green	0.11	0.09	0.09	0.11	0.09	0.09	0.08	0.71	0.71	0.01	0.63	0.63
Sat Flow, veh/h	1376	156	1549	725	400	54	1781	3563	71	1781	3554	1581
Grp Volume(v), veh/h	65	0	6	22	0	0	114	523	547	11	1424	42
Grp Sat Flow(s),veh/h/ln	1532	0	1549	1179	0	0	1781	1777	1858	1781	1777	1581
Q Serve(g_s), s	0.0	0.0	0.3	0.1	0.0	0.0	4.5	8.8	8.8	0.4	17.7	0.7
Cycle Q Clear(g_c), s	2.5	0.0	0.3	2.5	0.0	0.0	4.5	8.8	8.8	0.4	17.7	0.7
Prop In Lane	0.92		1.00	0.73		0.05	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	258	0	142	211	0	0	146	1254	1311	15	2245	999
V/C Ratio(X)	0.25	0.00	0.04	0.10	0.00	0.00	0.78	0.42	0.42	0.75	0.63	0.04
Avail Cap(c_a), veh/h	581	0	495	548	0	0	520	2124	2221	272	3754	1671
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.4	0.0	29.8	29.8	0.0	0.0	32.4	4.4	4.4	35.6	8.1	5.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.4	0.5	0.5	24.3	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.1	0.3	0.0	0.0	2.0	2.2	2.3	0.3	5.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.6	0.0	29.8	29.9	0.0	0.0	35.7	4.9	4.9	59.9	8.8	5.0
LnGrp LOS	C	A	C	C	A	A	D	A	A	E	A	A
Approach Vol, veh/h		71			22			1184			1477	
Approach Delay, s/veh		30.5			29.9			7.9			9.1	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.9	50.4		11.6	4.6	55.8		11.6
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	6.5	19.7		4.5	2.4	10.8		4.5
Green Ext Time (p_c), s	0.1	25.7		0.0	0.0	14.8		0.1

Intersection Summary			
HCM 6th Ctrl Delay			9.3
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	180	45	5	35	110	1040	50	30	1390	75
Future Volume (veh/h)	60	5	180	45	5	35	110	1040	50	30	1390	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	12	49	5	2	120	1130	34	33	1511	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	275	18	231	230	186	74	154	2270	1013	57	2077	927
Arrive On Green	0.16	0.15	0.15	0.15	0.15	0.15	0.09	0.64	0.64	0.03	0.58	0.58
Sat Flow, veh/h	1299	122	1579	1391	1269	508	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	70	0	12	49	0	7	120	1130	34	33	1511	45
Grp Sat Flow(s),veh/h/ln	1421	0	1579	1391	0	1777	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.4	0.0	0.5	2.7	0.0	0.3	5.4	13.8	0.7	1.5	25.3	1.0
Cycle Q Clear(g_c), s	3.6	0.0	0.5	6.3	0.0	0.3	5.4	13.8	0.7	1.5	25.3	1.0
Prop In Lane	0.93		1.00	1.00		0.29	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	310	0	231	230	0	260	154	2270	1013	57	2077	927
V/C Ratio(X)	0.23	0.00	0.05	0.21	0.00	0.03	0.78	0.50	0.03	0.58	0.73	0.05
Avail Cap(c_a), veh/h	517	0	461	432	0	518	455	2982	1330	260	2593	1156
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.1	0.0	30.2	34.3	0.0	30.1	36.8	7.9	5.5	39.2	12.3	7.3
Incr Delay (d2), s/veh	0.4	0.0	0.1	0.5	0.0	0.0	3.2	0.4	0.0	3.4	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.2	0.9	0.0	0.1	2.4	4.4	0.2	0.7	8.8	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.5	0.0	30.3	34.8	0.0	30.1	40.0	8.2	5.5	42.6	13.6	7.3
LnGrp LOS	C	A	C	C	A	C	D	A	A	D	B	A
Approach Vol, veh/h		82			56			1284			1589	
Approach Delay, s/veh		31.3			34.2			11.1			14.0	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.1	54.1		17.1	6.6	58.5		17.1
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	60.0		24.0	12.0	69.0		24.0
Max Q Clear Time (g_c+I1), s	7.4	27.3		8.3	3.5	15.8		5.6
Green Ext Time (p_c), s	0.2	20.8		0.1	0.0	17.4		0.2

Intersection Summary		
HCM 6th Ctrl Delay		13.6
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	235	5	445	15	5	20	290	1160	15	55	1400	155
Future Volume (veh/h)	235	5	445	15	5	20	290	1160	15	55	1400	155
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	259	0	275	16	5	7	315	1261	16	60	1522	127
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	453	0	783	50	16	22	443	2235	28	118	1991	887
Arrive On Green	0.13	0.00	0.12	0.05	0.05	0.03	0.13	0.62	0.61	0.07	0.56	0.56
Sat Flow, veh/h	3563	0	3170	996	311	436	3456	3593	46	1781	3554	1584
Grp Volume(v), veh/h	259	0	275	28	0	0	315	623	654	60	1522	127
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1742	0	0	1728	1777	1862	1781	1777	1584
Q Serve(g_s), s	8.2	0.0	8.5	1.9	0.0	0.0	10.4	24.4	24.4	3.9	39.3	4.6
Cycle Q Clear(g_c), s	8.2	0.0	8.5	1.9	0.0	0.0	10.4	24.4	24.4	3.9	39.3	4.6
Prop In Lane	1.00		1.00	0.57		0.25	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	453	0	783	88	0	0	443	1105	1158	118	1991	887
V/C Ratio(X)	0.57	0.00	0.35	0.32	0.00	0.00	0.71	0.56	0.56	0.51	0.76	0.14
Avail Cap(c_a), veh/h	1015	0	1283	452	0	0	1679	2888	3027	224	4496	2004
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.0	0.0	37.1	55.1	0.0	0.0	49.9	13.1	13.2	53.8	20.2	12.6
Incr Delay (d2), s/veh	0.4	0.0	0.1	0.8	0.0	0.0	0.8	0.6	0.6	1.3	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	3.4	0.8	0.0	0.0	4.5	9.3	9.7	1.8	15.5	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.5	0.0	37.2	55.8	0.0	0.0	50.7	13.8	13.8	55.1	21.1	12.7
LnGrp LOS	D	A	D	E	A	A	D	B	B	E	C	B
Approach Vol, veh/h		534			28			1592			1709	
Approach Delay, s/veh		43.1			55.8			21.1			21.7	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	19.3	70.9		10.0	11.9	78.2		19.2
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	12.4	41.3		3.9	5.9	26.4		10.5
Green Ext Time (p_c), s	0.9	23.5		0.0	0.0	12.8		1.6

Intersection Summary	
HCM 6th Ctrl Delay	24.6
HCM 6th LOS	C

Notes
User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	135	5	60	5	1345	90	90	1835	10
Future Volume (veh/h)	5	0	5	135	5	60	5	1345	90	90	1835	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1462	95	98	1995	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2416	156	124	2813	15
Arrive On Green	0.13	0.00	0.12	0.13	0.13	0.12	0.01	0.95	0.94	0.07	0.78	0.77
Sat Flow, veh/h	1144	37	236	1416	858	858	1781	3388	219	1781	3624	20
Grp Volume(v), veh/h	6	0	0	147	0	10	5	764	793	98	977	1029
Grp Sat Flow(s),veh/h/ln	1418	0	0	1416	0	1716	1781	1777	1831	1781	1777	1867
Q Serve(g_s), s	0.0	0.0	0.0	12.3	0.0	0.7	0.4	6.8	7.0	7.0	35.5	35.7
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	6.8	7.0	7.0	35.5	35.7
Prop In Lane	0.83		0.17	1.00		0.50	1.00		0.12	1.00		0.01
Lane Grp Cap(c), veh/h	228	0	0	234	0	215	11	1267	1305	124	1379	1449
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.60	0.61	0.79	0.71	0.71
Avail Cap(c_a), veh/h	313	0	0	319	0	317	151	1267	1305	151	1379	1449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.82	0.82	0.82	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	0.0	0.0	55.4	0.0	50.3	64.2	1.1	1.2	59.5	7.2	7.2
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.7	0.0	0.1	8.0	1.8	1.7	16.4	3.1	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	4.9	0.0	0.3	0.2	1.7	1.8	3.7	12.0	12.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.4	72.2	2.9	2.9	76.0	10.3	10.2
LnGrp LOS	D	A	A	E	A	D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1562			2104	
Approach Delay, s/veh		50.0			57.6			3.1			13.3	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.8	104.9		20.3	13.1	96.7		20.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	82.0		23.0	11.0	82.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	37.7		15.0	9.0	9.0		2.7
Green Ext Time (p_c), s	0.0	34.7		0.3	0.0	30.9		0.0

Intersection Summary			
HCM 6th Ctrl Delay			11.0
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	5	15	65	5	15	15	1290	15	10	1615	260
Future Volume (veh/h)	135	5	15	65	5	15	15	1290	15	10	1615	260
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	147	5	13	71	5	9	16	1402	15	11	1755	209
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	6	16	227	17	23	19	2770	30	13	2722	1213
Arrive On Green	0.13	0.13	0.12	0.13	0.13	0.12	0.01	0.52	0.51	0.01	0.77	0.77
Sat Flow, veh/h	1344	46	119	1341	132	175	1781	3602	39	1781	3554	1584
Grp Volume(v), veh/h	165	0	0	85	0	0	16	691	726	11	1755	209
Grp Sat Flow(s),veh/h/ln	1509	0	0	1648	0	0	1781	1777	1863	1781	1777	1584
Q Serve(g_s), s	7.7	0.0	0.0	0.0	0.0	0.0	1.2	33.2	33.2	0.8	29.7	4.6
Cycle Q Clear(g_c), s	13.7	0.0	0.0	5.9	0.0	0.0	1.2	33.2	33.2	0.8	29.7	4.6
Prop In Lane	0.89		0.08	0.84		0.11	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	250	0	0	267	0	0	19	1367	1433	13	2722	1213
V/C Ratio(X)	0.66	0.00	0.00	0.32	0.00	0.00	0.84	0.51	0.51	0.82	0.64	0.17
Avail Cap(c_a), veh/h	348	0	0	366	0	0	110	1367	1433	110	2722	1213
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.76	0.76	0.76	0.61	0.61	0.61
Uniform Delay (d), s/veh	54.8	0.0	0.0	51.7	0.0	0.0	64.4	15.3	15.3	64.4	7.0	4.1
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.7	0.0	0.0	22.9	1.0	1.0	22.8	0.7	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	0.0	2.6	0.0	0.0	0.6	14.8	15.6	0.4	9.6	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.8	0.0	0.0	52.4	0.0	0.0	87.3	16.3	16.3	87.2	7.8	4.3
LnGrp LOS	E	A	A	D	A	A	F	B	B	F	A	A
Approach Vol, veh/h		165			85			1433			1975	
Approach Delay, s/veh		57.8			52.4			17.1			7.8	
Approach LOS		E			D			B			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	103.6		21.0	5.0	104.0		21.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	83.0		25.0	8.0	83.0		25.0
Max Q Clear Time (g_c+I1), s	13.2	31.7		7.9	2.8	35.2		15.7
Green Ext Time (p_c), s	0.0	42.4		0.2	0.0	28.9		0.4

Intersection Summary			
HCM 6th Ctrl Delay			14.8
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	20	50	90	20	20	60	1325	60	15	1630	130
Future Volume (veh/h)	190	20	50	90	20	20	60	1325	60	15	1630	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	207	22	11	98	22	2	65	1440	63	16	1772	137
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	325	29	352	139	377	34	83	2337	102	19	2135	163
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.06	0.90	0.89	0.01	0.85	0.84
Sat Flow, veh/h	1222	130	1579	1373	1688	153	1781	3468	151	1781	3345	255
Grp Volume(v), veh/h	229	0	11	98	0	24	65	736	767	16	931	978
Grp Sat Flow(s),veh/h/ln	1352	0	1579	1373	0	1842	1781	1777	1842	1781	1777	1824
Q Serve(g_s), s	19.7	0.0	0.7	7.9	0.0	1.3	4.7	12.4	12.7	1.2	34.0	37.0
Cycle Q Clear(g_c), s	21.1	0.0	0.7	29.0	0.0	1.3	4.7	12.4	12.7	1.2	34.0	37.0
Prop In Lane	0.90		1.00	1.00		0.08	1.00		0.08	1.00		0.14
Lane Grp Cap(c), veh/h	354	0	352	139	0	411	83	1197	1241	19	1134	1164
V/C Ratio(X)	0.65	0.00	0.03	0.70	0.00	0.06	0.78	0.61	0.62	0.84	0.82	0.84
Avail Cap(c_a), veh/h	354	0	352	139	0	411	110	1197	1241	110	1134	1164
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.18	0.18	0.18	0.69	0.69	0.69
Uniform Delay (d), s/veh	48.0	0.0	39.5	61.6	0.0	39.8	60.3	2.8	2.9	64.0	6.1	6.4
Incr Delay (d2), s/veh	4.0	0.0	0.0	14.8	0.0	0.1	3.5	0.4	0.4	21.2	4.7	5.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	0.0	0.3	3.8	0.0	0.6	2.2	2.5	2.6	0.6	6.5	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.1	0.0	39.5	76.4	0.0	39.8	63.8	3.3	3.3	85.2	10.9	11.7
LnGrp LOS	D	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		240			122			1568			1925	
Approach Delay, s/veh		51.5			69.2			5.8			11.9	
Approach LOS		D			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	87.0		33.0	5.4	91.6		33.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	80.0		28.0	8.0	80.0		28.0				
Max Q Clear Time (g_c+I1), s	16.7	39.0		31.0	3.2	14.7		23.1				
Green Ext Time (p_c), s	0.0	31.0		0.0	0.0	27.6		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			13.7
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	65	70	195	90	790	50	575	190	520	1030	75
Future Volume (veh/h)	25	65	70	195	90	790	50	575	190	520	1030	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.94	0.96		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	27	71	10	212	98	0	54	625	121	565	1120	79
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	191	208	361	519		70	830	694	645	1989	140
Arrive On Green	0.14	0.14	0.14	0.11	0.28	0.00	0.04	0.44	0.44	0.13	0.40	0.39
Sat Flow, veh/h	327	1374	1493	1781	1870	1585	1781	1870	1565	3456	3367	237
Grp Volume(v), veh/h	98	0	10	212	98	0	54	625	121	565	591	608
Grp Sat Flow(s),veh/h/ln	1701	0	1493	1781	1870	1585	1781	1870	1565	1728	1777	1827
Q Serve(g_s), s	1.4	0.0	0.8	13.0	5.2	0.0	3.9	36.3	6.1	20.9	33.6	33.7
Cycle Q Clear(g_c), s	6.4	0.0	0.8	13.0	5.2	0.0	3.9	36.3	6.1	20.9	33.6	33.7
Prop In Lane	0.28		1.00	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	272	0	208	361	519		70	830	694	645	1050	1080
V/C Ratio(X)	0.36	0.00	0.05	0.59	0.19		0.77	0.75	0.17	0.88	0.56	0.56
Avail Cap(c_a), veh/h	372	0	299	361	633		329	830	694	957	1050	1080
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.49	0.49	0.49
Uniform Delay (d), s/veh	50.9	0.0	48.5	40.5	35.8	0.0	61.9	30.2	21.8	55.4	26.2	26.3
Incr Delay (d2), s/veh	0.8	0.0	0.1	2.5	0.2	0.0	5.2	5.0	0.4	2.3	1.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.3	6.0	2.4	0.0	1.9	17.1	2.3	9.6	15.3	15.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	0.0	48.6	43.0	36.0	0.0	67.0	35.2	22.2	57.7	27.3	27.3
LnGrp LOS	D	A	D	D	D		E	D	C	E	C	C
Approach Vol, veh/h		108			310	A		800			1764	
Approach Delay, s/veh		51.4			40.7			35.4			37.0	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.1	80.8	18.0	22.1	28.3	61.7		40.1
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	24.0	49.0	13.0	25.0	36.0	37.0		43.0
Max Q Clear Time (g_c+I1), s	15.9	35.7	15.0	8.4	22.9	38.3		7.2
Green Ext Time (p_c), s	0.1	8.4	0.0	0.3	1.4	0.0		0.4

Intersection Summary	
HCM 6th Ctrl Delay	37.5
HCM 6th LOS	D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2030 AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	45	295	90	50	20	220	260	100	10	205	30
Future Volume (veh/h)	50	45	295	90	50	20	220	260	100	10	205	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	49	38	98	54	10	239	283	54	11	223	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	239	164	257	328	251	46	321	793	672	15	472	400
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.18	0.42	0.42	0.01	0.25	0.25
Sat Flow, veh/h	617	1002	1571	1301	1532	284	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	103	0	38	98	0	64	239	283	54	11	223	9
Grp Sat Flow(s),veh/h/ln	1618	0	1571	1301	0	1816	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.5	0.0	0.8	2.9	0.0	1.2	5.0	4.1	0.8	0.2	4.0	0.2
Cycle Q Clear(g_c), s	2.0	0.0	0.8	4.9	0.0	1.2	5.0	4.1	0.8	0.2	4.0	0.2
Prop In Lane	0.52		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	403	0	257	328	0	297	321	793	672	15	472	400
V/C Ratio(X)	0.26	0.00	0.15	0.30	0.00	0.22	0.75	0.36	0.08	0.72	0.47	0.02
Avail Cap(c_a), veh/h	1084	0	951	904	0	1100	1349	3730	3161	674	3022	2561
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.7	0.0	14.2	16.9	0.0	14.4	15.4	7.7	6.8	19.6	12.6	11.1
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.5	0.0	0.4	3.4	0.6	0.1	46.6	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.3	0.8	0.0	0.5	1.9	1.2	0.2	0.3	1.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	0.0	14.5	17.4	0.0	14.7	18.8	8.3	6.9	66.2	14.1	11.2
LnGrp LOS	B	A	B	B	A	B	B	A	A	E	B	B
Approach Vol, veh/h		141			162			576			243	
Approach Delay, s/veh		14.9			16.3			12.5			16.4	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.3	22.8		11.5	12.1	16.0		11.5				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.2	6.1		4.0	7.0	6.0		6.9				
Green Ext Time (p_c), s	0.0	4.2		0.6	0.7	2.9		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			14.2									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	180	90	20	15	135	555	15	10	600	65
Future Volume (veh/h)	60	5	180	90	20	15	135	555	15	10	600	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	18	98	22	2	147	603	0	11	652	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	363	23	302	328	330	30	374	946		366	807	679
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.08	0.51	0.00	0.01	0.43	0.43
Sat Flow, veh/h	1212	120	1545	1358	1685	153	1781	1870	1585	1781	1870	1574
Grp Volume(v), veh/h	70	0	18	98	0	24	147	603	0	11	652	31
Grp Sat Flow(s),veh/h/ln	1332	0	1545	1358	0	1838	1781	1870	1585	1781	1870	1574
Q Serve(g_s), s	2.2	0.0	0.5	3.7	0.0	0.6	2.3	13.0	0.0	0.2	16.8	0.6
Cycle Q Clear(g_c), s	2.8	0.0	0.5	6.4	0.0	0.6	2.3	13.0	0.0	0.2	16.8	0.6
Prop In Lane	0.93		1.00	1.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	387	0	302	328	0	360	374	946		366	807	679
V/C Ratio(X)	0.18	0.00	0.06	0.30	0.00	0.07	0.39	0.64		0.03	0.81	0.05
Avail Cap(c_a), veh/h	742	0	700	677	0	833	711	1728		835	1728	1454
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.1	0.0	18.1	21.7	0.0	18.1	10.1	9.9	0.0	9.4	13.7	9.1
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.5	0.0	0.1	0.7	0.7	0.0	0.0	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	1.1	0.0	0.2	0.7	4.2	0.0	0.1	6.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.3	0.0	18.1	22.2	0.0	18.2	10.8	10.7	0.0	9.5	15.7	9.1
LnGrp LOS	B	A	B	C	A	B	B	B		A	B	A
Approach Vol, veh/h		88			122			750	A		694	
Approach Delay, s/veh		19.1			21.4			10.7			15.3	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	33.9		15.8	9.6	29.8		15.8				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0				
Max Q Clear Time (g_c+I1), s	2.2	15.0		4.8	4.3	18.8		8.4				
Green Ext Time (p_c), s	0.0	4.4		0.4	0.3	4.9		0.3				

Intersection Summary			
HCM 6th Ctrl Delay			13.9
HCM 6th LOS			B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	5	125	5	5	5	60	645	15	5	805	30
Future Volume (veh/h)	40	5	125	5	5	5	60	645	15	5	805	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	5	8	5	5	1	65	701	11	5	875	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	58	73	117	9	162	135	85	1099	931	7	1017	857
Arrive On Green	0.03	0.11	0.11	0.01	0.09	0.09	0.05	0.59	0.59	0.00	0.54	0.54
Sat Flow, veh/h	1781	642	1027	1781	1870	1563	1781	1870	1585	1781	1870	1575
Grp Volume(v), veh/h	43	0	13	5	5	1	65	701	11	5	875	19
Grp Sat Flow(s),veh/h/ln	1781	0	1669	1781	1870	1563	1781	1870	1585	1781	1870	1575
Q Serve(g_s), s	1.7	0.0	0.5	0.2	0.2	0.0	2.5	17.1	0.2	0.2	27.7	0.4
Cycle Q Clear(g_c), s	1.7	0.0	0.5	0.2	0.2	0.0	2.5	17.1	0.2	0.2	27.7	0.4
Prop In Lane	1.00		0.62	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	58	0	190	9	162	135	85	1099	931	7	1017	857
V/C Ratio(X)	0.74	0.00	0.07	0.53	0.03	0.01	0.77	0.64	0.01	0.71	0.86	0.02
Avail Cap(c_a), veh/h	515	0	507	515	568	475	644	1759	1491	644	1759	1481
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.1	0.0	27.4	34.3	28.9	28.9	32.5	9.4	5.9	34.4	13.5	7.3
Incr Delay (d2), s/veh	16.9	0.0	0.2	39.2	0.1	0.0	13.4	0.6	0.0	81.7	2.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.2	0.2	0.1	0.0	1.3	5.6	0.1	0.2	9.9	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.0	0.0	27.5	73.5	29.0	28.9	45.9	10.0	5.9	116.1	15.8	7.3
LnGrp LOS	D	A	C	E	C	C	D	B	A	F	B	A
Approach Vol, veh/h		56			11			777			899	
Approach Delay, s/veh		44.8			49.2			13.0			16.2	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	45.6	5.4	12.9	8.3	42.6	7.2	11.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.2	19.1	2.2	2.5	4.5	29.7	3.7	2.2
Green Ext Time (p_c), s	0.0	5.6	0.0	0.0	0.1	7.9	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	15.9
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	10	480	20	5	0	315	720	45	10	900	10
Future Volume (veh/h)	35	10	480	20	5	0	315	720	45	10	900	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	11	0	22	5	0	342	783	48	11	978	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	182	30		187	30	0	405	2310	142	15	1634	729
Arrive On Green	0.09	0.07	0.00	0.09	0.07	0.00	0.23	0.68	0.68	0.01	0.46	0.46
Sat Flow, veh/h	1115	423	1585	1157	419	0	1781	3401	208	1781	3554	1585
Grp Volume(v), veh/h	49	0	0	27	0	0	342	409	422	11	978	4
Grp Sat Flow(s),veh/h/ln	1538	0	1585	1576	0	0	1781	1777	1833	1781	1777	1585
Q Serve(g_s), s	0.9	0.0	0.0	0.0	0.0	0.0	11.4	6.0	6.0	0.4	12.7	0.1
Cycle Q Clear(g_c), s	1.7	0.0	0.0	0.8	0.0	0.0	11.4	6.0	6.0	0.4	12.7	0.1
Prop In Lane	0.78		1.00	0.81		0.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	237	0		242	0	0	405	1207	1245	15	1634	729
V/C Ratio(X)	0.21	0.00		0.11	0.00	0.00	0.84	0.34	0.34	0.74	0.60	0.01
Avail Cap(c_a), veh/h	611	0		729	0	0	1896	2120	2187	1896	4241	1891
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.2	0.0	0.0	26.8	0.0	0.0	22.9	4.1	4.2	30.7	12.5	9.1
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	1.9	0.4	0.3	23.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.4	0.0	0.0	4.5	1.4	1.5	0.2	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.6	0.0	0.0	27.0	0.0	0.0	24.8	4.5	4.5	53.7	13.2	9.1
LnGrp LOS	C	A		C	A	A	C	A	A	D	B	A
Approach Vol, veh/h		49	A		27			1173			993	
Approach Delay, s/veh		27.6			27.0			10.4			13.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.1	34.5		9.4	4.5	48.1		9.4
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	66.0	74.0		25.0	66.0	74.0		20.0
Max Q Clear Time (g_c+I1), s	13.4	14.7		2.8	2.4	8.0		3.7
Green Ext Time (p_c), s	0.8	13.8		0.0	0.0	9.8		0.1

Intersection Summary	
HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	70	10	5	10	135	1145	20	15	1390	65
Future Volume (veh/h)	30	0	70	10	5	10	135	1145	20	15	1390	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	0	1	11	5	1	147	1245	21	16	1511	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	167	0	70	111	19	3	185	2695	45	20	2350	1048
Arrive On Green	0.06	0.00	0.04	0.06	0.04	0.04	0.10	0.75	0.75	0.01	0.66	0.66
Sat Flow, veh/h	1561	0	1585	687	440	70	1781	3576	60	1781	3554	1585
Grp Volume(v), veh/h	33	0	1	17	0	0	147	618	648	16	1511	44
Grp Sat Flow(s),veh/h/ln	1561	0	1585	1198	0	0	1781	1777	1860	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	5.9	9.6	9.7	0.7	18.4	0.7
Cycle Q Clear(g_c), s	1.3	0.0	0.0	1.7	0.0	0.0	5.9	9.6	9.7	0.7	18.4	0.7
Prop In Lane	1.00		1.00	0.65		0.06	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	188	0	70	150	0	0	185	1339	1401	20	2350	1048
V/C Ratio(X)	0.18	0.00	0.01	0.11	0.00	0.00	0.80	0.46	0.46	0.79	0.64	0.04
Avail Cap(c_a), veh/h	568	0	497	564	0	0	510	2084	2181	267	3683	1643
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.6	0.0	33.5	34.0	0.0	0.0	32.1	3.4	3.4	36.2	7.3	4.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	2.9	0.5	0.5	21.7	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.3	0.0	0.0	2.6	2.0	2.1	0.4	5.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.8	0.0	33.6	34.1	0.0	0.0	35.0	3.9	3.9	57.8	8.0	4.4
LnGrp LOS	C	A	C	C	A	A	D	A	A	E	A	A
Approach Vol, veh/h		34			17			1413			1571	
Approach Delay, s/veh		33.8			34.1			7.2			8.4	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.6	53.5		8.2	4.8	60.3		8.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	7.9	20.4		3.7	2.7	11.7		3.3
Green Ext Time (p_c), s	0.1	28.1		0.0	0.0	20.2		0.0

Intersection Summary	
HCM 6th Ctrl Delay	8.2
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	35	40	15	45	110	1290	60	25	1335	45
Future Volume (veh/h)	55	5	35	40	15	45	110	1290	60	25	1335	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	1	43	16	1	120	1402	50	27	1451	36
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	12	152	111	168	10	142	2789	1244	39	2584	1153
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.08	0.78	0.78	0.02	0.73	0.73
Sat Flow, veh/h	1198	121	1580	1407	1742	109	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	65	0	1	43	0	17	120	1402	50	27	1451	36
Grp Sat Flow(s),veh/h/ln	1318	0	1580	1407	0	1850	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	6.6	0.0	0.1	4.7	0.0	1.3	10.3	21.7	1.1	2.3	29.2	1.0
Cycle Q Clear(g_c), s	7.8	0.0	0.1	12.5	0.0	1.3	10.3	21.7	1.1	2.3	29.2	1.0
Prop In Lane	0.92		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	172	0	152	111	0	178	142	2789	1244	39	2584	1153
V/C Ratio(X)	0.38	0.00	0.01	0.39	0.00	0.10	0.84	0.50	0.04	0.68	0.56	0.03
Avail Cap(c_a), veh/h	255	0	245	193	0	287	241	2789	1244	241	2584	1153
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.73	0.73	0.73	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.3	0.0	63.3	72.8	0.0	63.9	70.4	5.9	3.7	75.2	9.8	5.9
Incr Delay (d2), s/veh	1.4	0.0	0.0	2.2	0.0	0.2	3.8	0.5	0.0	7.5	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	0.0	1.8	0.0	0.6	4.8	7.3	0.3	1.2	10.9	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.7	0.0	63.3	75.0	0.0	64.1	74.2	6.4	3.8	82.8	10.6	6.0
LnGrp LOS	E	A	E	E	A	E	E	A	A	F	B	A
Approach Vol, veh/h		66			60			1572			1514	
Approach Delay, s/veh		68.6			71.9			11.5			11.8	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.7		19.9	7.4	127.6		19.9
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	31.2		14.5	4.3	23.7		9.8
Green Ext Time (p_c), s	0.1	27.8		0.1	0.0	27.5		0.1

Intersection Summary	
HCM 6th Ctrl Delay	13.9
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	10	235	10	10	10	460	1360	15	80	1295	110
Future Volume (veh/h)	140	10	235	10	10	10	460	1360	15	80	1295	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	160	0	67	11	11	3	500	1478	16	87	1408	90
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	323	0	835	59	59	16	635	2224	24	145	1831	944
Arrive On Green	0.09	0.00	0.08	0.07	0.07	0.05	0.18	0.62	0.60	0.08	0.52	0.52
Sat Flow, veh/h	3563	0	3074	786	786	214	3456	3601	39	1781	3554	1580
Grp Volume(v), veh/h	160	0	67	25	0	0	500	729	765	87	1408	90
Grp Sat Flow(s),veh/h/ln	1781	0	1537	1786	0	0	1728	1777	1863	1781	1777	1580
Q Serve(g_s), s	5.1	0.0	1.9	1.6	0.0	0.0	16.3	31.4	31.5	5.6	37.6	2.9
Cycle Q Clear(g_c), s	5.1	0.0	1.9	1.6	0.0	0.0	16.3	31.4	31.5	5.6	37.6	2.9
Prop In Lane	1.00		1.00	0.44		0.12	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	323	0	835	134	0	0	635	1097	1151	145	1831	944
V/C Ratio(X)	0.50	0.00	0.08	0.19	0.00	0.00	0.79	0.66	0.66	0.60	0.77	0.10
Avail Cap(c_a), veh/h	1025	0	1441	469	0	0	1697	2918	3060	226	4542	2149
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.2	0.0	32.5	51.4	0.0	0.0	46.0	14.6	14.7	52.4	23.0	10.2
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.7	0.0	0.0	0.8	1.0	0.9	1.5	1.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	0.7	0.7	0.0	0.0	7.0	12.0	12.6	2.5	15.2	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.6	0.0	32.6	52.1	0.0	0.0	46.8	15.6	15.6	53.9	24.0	10.2
LnGrp LOS	D	A	C	D	A	A	D	B	B	D	C	B
Approach Vol, veh/h		227			25			1994			1585	
Approach Delay, s/veh		46.0			52.1			23.5			24.8	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	25.7	64.9		12.9	13.6	77.0		14.7
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	18.3	39.6		3.6	7.6	33.5		7.1
Green Ext Time (p_c), s	1.4	19.3		0.0	0.1	17.9		0.6

Intersection Summary		
HCM 6th Ctrl Delay		25.5
HCM 6th LOS		C

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	60	0	45	5	1845	90	30	1490	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1845	90	30	1490	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	2005	96	33	1620	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	177	0	138	11	2725	129	64	2975	9
Arrive On Green	0.09	0.09	0.08	0.09	0.00	0.08	0.01	0.79	0.78	0.04	0.82	0.81
Sat Flow, veh/h	586	899	148	1378	0	1545	1781	3453	164	1781	3634	11
Grp Volume(v), veh/h	11	0	0	65	0	1	5	1024	1077	33	792	833
Grp Sat Flow(s),veh/h/ln	1633	0	0	1378	0	1545	1781	1777	1840	1781	1777	1868
Q Serve(g_s), s	0.0	0.0	0.0	5.3	0.0	0.1	0.4	40.1	41.8	2.5	20.4	20.4
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	40.1	41.8	2.5	20.4	20.4
Prop In Lane	0.45		0.09	1.00		1.00	1.00		0.09	1.00		0.01
Lane Grp Cap(c), veh/h	183	0	0	177	0	138	11	1402	1452	64	1455	1529
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.44	0.73	0.74	0.52	0.54	0.54
Avail Cap(c_a), veh/h	313	0	0	290	0	265	102	1402	1452	102	1455	1529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.58	0.58	0.58	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.4	0.0	0.0	60.7	0.0	58.5	69.3	7.3	7.5	66.3	4.2	4.2
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	5.8	2.0	2.0	2.4	1.5	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.3	0.0	0.0	0.2	13.1	14.1	1.2	6.2	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	75.1	9.3	9.6	68.7	5.6	5.6
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	A	A
Approach Vol, veh/h		11			66			2106			1658	
Approach Delay, s/veh		58.6			62.0			9.6			6.8	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.9	118.6		16.5	9.0	114.5		16.5
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	95.0		23.0	8.0	95.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	22.4		8.1	4.5	43.8		2.8
Green Ext Time (p_c), s	0.0	33.4		0.1	0.0	41.2		0.0

Intersection Summary	
HCM 6th Ctrl Delay	9.5
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	5	5	105	15	15	5	1825	20	10	1330	185
Future Volume (veh/h)	90	5	5	105	15	15	5	1825	20	10	1330	185
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	98	5	3	114	16	12	5	1984	21	11	1446	146
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	210	8	5	199	20	15	7	2819	30	14	2795	1245
Arrive On Green	0.11	0.11	0.10	0.11	0.11	0.10	0.00	0.78	0.77	0.01	0.79	0.79
Sat Flow, veh/h	1393	71	43	1317	185	139	1781	3602	38	1781	3554	1583
Grp Volume(v), veh/h	106	0	0	142	0	0	5	977	1028	11	1446	146
Grp Sat Flow(s),veh/h/ln	1506	0	0	1641	0	0	1781	1777	1864	1781	1777	1583
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.3	31.8	32.1	0.7	17.6	2.6
Cycle Q Clear(g_c), s	7.9	0.0	0.0	9.7	0.0	0.0	0.3	31.8	32.1	0.7	17.6	2.6
Prop In Lane	0.92		0.03	0.80		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	223	0	0	234	0	0	7	1391	1458	14	2795	1245
V/C Ratio(X)	0.48	0.00	0.00	0.61	0.00	0.00	0.73	0.70	0.70	0.80	0.52	0.12
Avail Cap(c_a), veh/h	432	0	0	451	0	0	119	1391	1458	119	2795	1245
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.57	0.57	0.57	0.83	0.83	0.83
Uniform Delay (d), s/veh	51.1	0.0	0.0	51.8	0.0	0.0	59.7	6.3	6.3	59.4	4.6	3.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.5	0.0	0.0	26.8	1.7	1.7	27.5	0.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.0	4.3	0.0	0.0	0.2	9.6	10.2	0.4	5.1	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.7	0.0	0.0	54.3	0.0	0.0	86.5	8.0	8.0	87.0	5.2	3.2
LnGrp LOS	D	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		106			142			2010			1603	
Approach Delay, s/veh		52.7			54.3			8.2			5.6	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.4		17.2	4.9	97.9		17.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.3	19.6		11.7	2.7	34.1		9.9
Green Ext Time (p_c), s	0.0	33.2		0.5	0.0	30.9		0.3

Intersection Summary	
HCM 6th Ctrl Delay	10.0
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	30	20	145	25	35	25	1645	75	10	1375	70
Future Volume (veh/h)	145	30	20	145	25	35	25	1645	75	10	1375	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	158	33	4	158	27	5	27	1788	80	11	1495	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	336	60	403	225	394	73	34	2251	100	13	2199	109
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.25	0.04	1.00	1.00	0.01	0.64	0.63
Sat Flow, veh/h	1122	234	1568	1361	1532	284	1781	3465	154	1781	3447	170
Grp Volume(v), veh/h	191	0	4	158	0	32	27	911	957	11	768	801
Grp Sat Flow(s),veh/h/ln	1357	0	1568	1361	0	1816	1781	1777	1843	1781	1777	1840
Q Serve(g_s), s	16.3	0.0	0.3	16.1	0.0	1.9	2.1	0.0	0.0	0.9	38.6	39.1
Cycle Q Clear(g_c), s	18.2	0.0	0.3	34.2	0.0	1.9	2.1	0.0	0.0	0.9	38.6	39.1
Prop In Lane	0.83		1.00	1.00		0.16	1.00		0.08	1.00		0.09
Lane Grp Cap(c), veh/h	396	0	403	225	0	467	34	1154	1197	13	1134	1174
V/C Ratio(X)	0.48	0.00	0.01	0.70	0.00	0.07	0.79	0.79	0.80	0.83	0.68	0.68
Avail Cap(c_a), veh/h	396	0	403	225	0	467	140	1154	1197	140	1134	1174
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.83	0.83	0.83
Uniform Delay (d), s/veh	46.2	0.0	38.7	60.3	0.0	39.4	67.1	0.0	0.0	69.4	16.2	16.3
Incr Delay (d2), s/veh	0.9	0.0	0.0	9.5	0.0	0.1	1.4	0.5	0.5	31.0	2.7	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	0.0	0.1	6.2	0.0	0.9	1.0	0.2	0.2	0.5	15.7	16.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.1	0.0	38.7	69.8	0.0	39.4	68.5	0.5	0.5	100.4	18.9	19.0
LnGrp LOS	D	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		195			190			1895			1580	
Approach Delay, s/veh		46.9			64.7			1.5			19.5	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	93.3		40.0	5.0	95.0		40.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	80.0		35.0	11.0	80.0		35.0
Max Q Clear Time (g_c+I1), s	4.1	41.1		36.2	2.9	2.0		20.2
Green Ext Time (p_c), s	0.0	23.1		0.0	0.0	46.1		0.6

Intersection Summary			
HCM 6th Ctrl Delay			14.3
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	85	35	115	65	1085	25	720	165	540	1125	30
Future Volume (veh/h)	10	85	35	115	65	1085	25	720	165	540	1125	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	92	3	125	71	0	27	783	111	587	1223	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	39	176	158	255	392		34	981	828	623	2426	63
Arrive On Green	0.10	0.10	0.10	0.08	0.21	0.00	0.02	0.52	0.52	0.36	1.00	1.00
Sat Flow, veh/h	108	1715	1543	1781	1870	1585	1781	1870	1579	3456	3538	93
Grp Volume(v), veh/h	103	0	3	125	71	0	27	783	111	587	614	641
Grp Sat Flow(s),veh/h/ln	1823	0	1543	1781	1870	1585	1781	1870	1579	1728	1777	1854
Q Serve(g_s), s	1.1	0.0	0.2	8.5	4.4	0.0	2.1	47.9	5.0	23.0	0.0	0.0
Cycle Q Clear(g_c), s	7.4	0.0	0.2	8.5	4.4	0.0	2.1	47.9	5.0	23.0	0.0	0.0
Prop In Lane	0.11		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	215	0	158	255	392		34	981	828	623	1218	1271
V/C Ratio(X)	0.48	0.00	0.02	0.49	0.18		0.79	0.80	0.13	0.94	0.50	0.50
Avail Cap(c_a), veh/h	326	0	254	255	508		178	981	828	642	1218	1271
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.69	0.69	0.69
Uniform Delay (d), s/veh	59.7	0.0	56.5	49.1	45.5	0.0	68.4	27.2	17.0	44.0	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.0	1.5	0.2	0.0	11.3	5.4	0.3	16.6	1.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.1	3.9	2.1	0.0	1.1	22.2	1.9	9.7	0.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.3	0.0	56.6	50.6	45.7	0.0	79.7	32.7	17.3	60.7	1.0	1.0
LnGrp LOS	E	A	E	D	D		E	C	B	E	A	A
Approach Vol, veh/h		106			196	A		921			1842	
Approach Delay, s/veh		61.2			48.8			32.2			20.0	
Approach LOS		E			D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	100.0	15.0	18.3	29.3	77.4		33.3				
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	14.0	75.0	10.0	22.0	26.0	63.0		37.0				
Max Q Clear Time (g_c+I1), s	4.1	2.0	10.5	9.4	25.0	49.9		6.4				
Green Ext Time (p_c), s	0.0	19.9	0.0	0.2	0.2	6.8		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			26.9									
HCM 6th LOS			C									

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2030 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	25	370	60	25	5	380	280	65	10	380	75
Future Volume (veh/h)	55	25	370	60	25	5	380	280	65	10	380	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	27	22	65	27	1	413	304	46	11	413	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	207	65	172	202	195	7	489	1118	948	15	621	526
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.27	0.60	0.60	0.01	0.33	0.33
Sat Flow, veh/h	907	601	1585	1356	1792	66	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	87	0	22	65	0	28	413	304	46	11	413	24
Grp Sat Flow(s),veh/h/ln	1508	0	1585	1356	0	1858	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.3	0.0	0.7	2.7	0.0	0.8	12.3	4.4	0.7	0.3	10.6	0.6
Cycle Q Clear(g_c), s	3.1	0.0	0.7	5.7	0.0	0.8	12.3	4.4	0.7	0.3	10.6	0.6
Prop In Lane	0.69		1.00	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	272	0	172	202	0	202	489	1118	948	15	621	526
V/C Ratio(X)	0.32	0.00	0.13	0.32	0.00	0.14	0.84	0.27	0.05	0.73	0.67	0.05
Avail Cap(c_a), veh/h	752	0	678	634	0	794	952	2632	2230	476	2132	1807
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.6	0.0	22.6	26.4	0.0	22.6	19.2	5.4	4.7	27.8	16.1	12.7
Incr Delay (d2), s/veh	0.7	0.0	0.3	0.9	0.0	0.3	4.1	0.3	0.0	50.2	2.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.3	0.9	0.0	0.3	5.0	1.2	0.2	0.3	4.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.3	0.0	23.0	27.3	0.0	23.0	23.3	5.7	4.7	78.0	18.7	12.8
LnGrp LOS	C	A	C	C	A	C	C	A	A	E	B	B
Approach Vol, veh/h		109			93			763			448	
Approach Delay, s/veh		24.0			26.0			15.2			19.8	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	39.6		11.1	20.4	24.6		11.1
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0
Max Q Clear Time (g_c+I1), s	2.3	6.4		5.1	14.3	12.6		7.7
Green Ext Time (p_c), s	0.0	4.5		0.4	1.2	6.0		0.2

Intersection Summary	
HCM 6th Ctrl Delay	18.0
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	20	150	45	15	10	195	660	45	25	685	80
Future Volume (veh/h)	75	20	150	45	15	10	195	660	45	25	685	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	22	12	49	16	1	212	717	0	27	745	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	256	54	204	221	224	14	398	1050		376	909	767
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.09	0.56	0.00	0.02	0.49	0.49
Sat Flow, veh/h	1080	424	1585	1375	1742	109	1781	1870	1585	1781	1870	1579
Grp Volume(v), veh/h	104	0	12	49	0	17	212	717	0	27	745	49
Grp Sat Flow(s),veh/h/ln	1503	0	1585	1375	0	1851	1781	1870	1585	1781	1870	1579
Q Serve(g_s), s	3.0	0.0	0.4	1.9	0.0	0.4	3.0	15.0	0.0	0.4	18.7	0.9
Cycle Q Clear(g_c), s	3.5	0.0	0.4	5.4	0.0	0.4	3.0	15.0	0.0	0.4	18.7	0.9
Prop In Lane	0.79		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	311	0	204	221	0	238	398	1050		376	909	767
V/C Ratio(X)	0.33	0.00	0.06	0.22	0.00	0.07	0.53	0.68		0.07	0.82	0.06
Avail Cap(c_a), veh/h	793	0	722	670	0	843	718	1738		830	1738	1467
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.3	0.0	21.0	24.9	0.0	21.0	10.1	8.6	0.0	7.9	12.0	7.5
Incr Delay (d2), s/veh	0.6	0.0	0.1	0.5	0.0	0.1	1.1	0.8	0.0	0.1	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.1	0.6	0.0	0.2	0.9	4.4	0.0	0.1	6.4	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.9	0.0	21.1	25.4	0.0	21.2	11.2	9.4	0.0	8.0	13.9	7.5
LnGrp LOS	C	A	C	C	A	C	B	A		A	B	A
Approach Vol, veh/h		116			66			929	A		821	
Approach Delay, s/veh		22.7			24.3			9.8			13.4	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.0	36.8		12.1	10.2	32.7		12.1
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.4	17.0		5.5	5.0	20.7		7.4
Green Ext Time (p_c), s	0.0	5.6		0.5	0.4	6.0		0.1

Intersection Summary	
HCM 6th Ctrl Delay	12.6
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	95	10	5	10	165	900	10	5	880	75
Future Volume (veh/h)	60	5	95	10	5	10	165	900	10	5	880	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	4	11	5	1	179	978	8	5	957	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	103	82	19	133	109	216	1261	1069	7	1041	881
Arrive On Green	0.05	0.11	0.11	0.01	0.07	0.07	0.12	0.67	0.67	0.00	0.56	0.56
Sat Flow, veh/h	1781	947	757	1781	1870	1530	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	65	0	9	11	5	1	179	978	8	5	957	44
Grp Sat Flow(s),veh/h/ln	1781	0	1704	1781	1870	1530	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	3.6	0.0	0.5	0.6	0.2	0.1	9.7	35.2	0.2	0.3	45.8	1.2
Cycle Q Clear(g_c), s	3.6	0.0	0.5	0.6	0.2	0.1	9.7	35.2	0.2	0.3	45.8	1.2
Prop In Lane	1.00		0.44	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	85	0	185	19	133	109	216	1261	1069	7	1041	881
V/C Ratio(X)	0.77	0.00	0.05	0.59	0.04	0.01	0.83	0.78	0.01	0.72	0.92	0.05
Avail Cap(c_a), veh/h	362	0	363	362	399	326	452	1261	1069	452	1234	1044
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	0.0	39.4	48.5	42.6	42.5	42.3	11.0	5.3	49.0	19.8	10.0
Incr Delay (d2), s/veh	13.3	0.0	0.1	25.7	0.1	0.0	7.9	3.1	0.0	85.9	10.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.2	0.4	0.1	0.0	4.6	13.0	0.0	0.3	20.6	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.6	0.0	39.5	74.2	42.7	42.6	50.1	14.1	5.3	135.0	29.8	10.0
LnGrp LOS	E	A	D	E	D	D	D	B	A	F	C	A
Approach Vol, veh/h		74			17			1165			1006	
Approach Delay, s/veh		57.2			63.1			19.5			29.5	
Approach LOS		E			E			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	71.4	6.0	15.7	17.0	59.9	9.7	12.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.3	37.2	2.6	2.5	11.7	47.8	5.6	2.2
Green Ext Time (p_c), s	0.0	8.9	0.0	0.0	0.4	7.1	0.1	0.0

Intersection Summary		
HCM 6th Ctrl Delay		25.5
HCM 6th LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	600	80	10	10	605	965	10	5	930	20
Future Volume (veh/h)	75	5	600	80	10	10	605	965	10	5	930	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	0	87	11	9	658	1049	11	5	1011	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	187	7		173	14	12	696	2785	29	7	1371	612
Arrive On Green	0.09	0.08	0.00	0.09	0.08	0.08	0.39	0.77	0.77	0.00	0.39	0.39
Sat Flow, veh/h	1449	88	1585	1336	169	138	1781	3603	38	1781	3554	1585
Grp Volume(v), veh/h	87	0	0	107	0	0	658	517	543	5	1011	6
Grp Sat Flow(s),veh/h/ln	1538	0	1585	1643	0	0	1781	1777	1864	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	38.6	10.1	10.1	0.3	26.4	0.3
Cycle Q Clear(g_c), s	5.6	0.0	0.0	6.4	0.0	0.0	38.6	10.1	10.1	0.3	26.4	0.3
Prop In Lane	0.94		1.00	0.81		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	209	0		214	0	0	696	1373	1440	7	1371	612
V/C Ratio(X)	0.42	0.00		0.50	0.00	0.00	0.94	0.38	0.38	0.73	0.74	0.01
Avail Cap(c_a), veh/h	350	0		428	0	0	1169	1373	1440	1169	2267	1011
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.4	0.0	0.0	47.8	0.0	0.0	31.8	3.9	3.9	53.8	28.5	20.5
Incr Delay (d2), s/veh	1.3	0.0	0.0	1.8	0.0	0.0	6.8	0.4	0.3	41.5	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	0.0	2.9	0.0	0.0	17.2	2.9	3.0	0.2	11.2	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.8	0.0	0.0	49.6	0.0	0.0	38.6	4.3	4.3	95.3	30.2	20.5
LnGrp LOS	D	A		D	A	A	D	A	A	F	C	C
Approach Vol, veh/h		87	A		107			1718			1022	
Approach Delay, s/veh		48.8			49.6			17.4			30.4	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	46.3	47.7		14.1	4.4	89.6		14.1
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0
Max Q Clear Time (g_c+I1), s	40.6	28.4		8.4	2.3	12.1		7.6
Green Ext Time (p_c), s	1.7	13.3		0.3	0.0	14.1		0.2

Intersection Summary	
HCM 6th Ctrl Delay	24.1
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	5	140	15	0	5	135	1540	10	10	1635	60
Future Volume (veh/h)	50	5	140	15	0	5	135	1540	10	10	1635	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	5	5	16	0	1	147	1674	11	11	1777	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	221	17	170	177	2	7	178	2682	18	14	2306	1028
Arrive On Green	0.12	0.11	0.11	0.12	0.00	0.11	0.10	0.74	0.74	0.01	0.65	0.65
Sat Flow, veh/h	1363	155	1521	962	18	61	1781	3619	24	1781	3554	1585
Grp Volume(v), veh/h	59	0	5	17	0	0	147	821	864	11	1777	40
Grp Sat Flow(s),veh/h/ln	1517	0	1521	1041	0	0	1781	1777	1866	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.3	1.0	0.0	0.0	8.1	22.3	22.4	0.6	35.2	0.9
Cycle Q Clear(g_c), s	3.1	0.0	0.3	4.1	0.0	0.0	8.1	22.3	22.4	0.6	35.2	0.9
Prop In Lane	0.92		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	253	0	170	196	0	0	178	1317	1383	14	2306	1028
V/C Ratio(X)	0.23	0.00	0.03	0.09	0.00	0.00	0.82	0.62	0.62	0.78	0.77	0.04
Avail Cap(c_a), veh/h	419	0	349	357	0	0	373	1524	1600	195	2693	1201
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.5	0.0	39.7	41.9	0.0	0.0	44.3	6.3	6.3	49.7	12.4	6.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.6	1.1	1.1	28.5	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.1	0.4	0.0	0.0	3.7	6.7	7.0	0.4	12.4	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.7	0.0	39.7	42.0	0.0	0.0	47.9	7.4	7.4	78.1	14.0	6.4
LnGrp LOS	D	A	D	D	A	A	D	A	A	E	B	A
Approach Vol, veh/h		64			17			1832			1828	
Approach Delay, s/veh		40.6			42.0			10.6			14.2	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.0	70.1		16.2	4.8	79.3		16.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	10.1	37.2		6.1	2.6	24.4		5.1
Green Ext Time (p_c), s	0.1	27.8		0.0	0.0	33.3		0.1

Intersection Summary			
HCM 6th Ctrl Delay			13.0
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	175	70	5	45	125	1530	60	35	1790	95
Future Volume (veh/h)	75	5	175	70	5	45	125	1530	60	35	1790	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	27	76	5	1	136	1663	49	38	1946	81
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	12	204	142	197	39	157	2668	1189	49	2452	1094
Arrive On Green	0.14	0.13	0.13	0.13	0.13	0.13	0.09	0.75	0.75	0.03	0.69	0.69
Sat Flow, veh/h	1303	90	1563	1363	1509	302	1781	3554	1584	1781	3554	1585
Grp Volume(v), veh/h	87	0	27	76	0	6	136	1663	49	38	1946	81
Grp Sat Flow(s),veh/h/ln	1393	0	1563	1363	0	1811	1781	1777	1584	1781	1777	1585
Q Serve(g_s), s	9.2	0.0	2.5	9.0	0.0	0.5	12.4	36.2	1.3	3.5	61.9	2.8
Cycle Q Clear(g_c), s	9.7	0.0	2.5	18.7	0.0	0.5	12.4	36.2	1.3	3.5	61.9	2.8
Prop In Lane	0.94		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	233	0	204	142	0	237	157	2668	1189	49	2452	1094
V/C Ratio(X)	0.37	0.00	0.13	0.54	0.00	0.03	0.86	0.62	0.04	0.77	0.79	0.07
Avail Cap(c_a), veh/h	254	0	227	162	0	263	281	2668	1189	108	2452	1094
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.3	0.0	63.4	75.2	0.0	62.5	74.2	9.6	5.3	79.7	17.5	8.4
Incr Delay (d2), s/veh	1.0	0.0	0.3	3.1	0.0	0.0	3.7	0.7	0.0	9.3	2.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	1.0	3.3	0.0	0.2	5.9	13.3	0.4	1.7	24.8	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.2	0.0	63.7	78.4	0.0	62.6	77.9	10.4	5.3	89.0	20.3	8.5
LnGrp LOS	E	A	E	E	A	E	E	B	A	F	C	A
Approach Vol, veh/h		114			82			1848			2065	
Approach Delay, s/veh		66.4			77.2			15.2			21.1	
Approach LOS		E			E			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.6	119.8		26.6	8.5	129.9		26.6
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	26.0	100.0		24.0	10.0	116.0		24.0
Max Q Clear Time (g_c+I1), s	11.4	63.9		20.7	5.5	38.2		11.7
Green Ext Time (p_c), s	0.2	29.1		0.1	0.0	38.6		0.3

Intersection Summary			
HCM 6th Ctrl Delay			20.8
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	350	5	740	15	0	5	500	1525	10	75	1780	190
Future Volume (veh/h)	350	5	740	15	0	5	500	1525	10	75	1780	190
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.95	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	384	0	651	16	0	1	543	1658	11	82	1935	168
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	482	0	966	60	0	4	605	2552	17	106	2095	935
Arrive On Green	0.14	0.00	0.13	0.04	0.00	0.02	0.18	0.71	0.70	0.06	0.59	0.59
Sat Flow, veh/h	3563	0	3122	1659	0	104	3456	3619	24	1781	3554	1585
Grp Volume(v), veh/h	384	0	651	17	0	0	543	814	855	82	1935	168
Grp Sat Flow(s),veh/h/ln	1781	0	1561	1762	0	0	1728	1777	1866	1781	1777	1585
Q Serve(g_s), s	26.2	0.0	33.0	2.4	0.0	0.0	38.6	62.6	62.7	11.4	123.2	12.2
Cycle Q Clear(g_c), s	26.2	0.0	33.0	2.4	0.0	0.0	38.6	62.6	62.7	11.4	123.2	12.2
Prop In Lane	1.00		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	482	0	966	64	0	0	605	1253	1316	106	2095	935
V/C Ratio(X)	0.80	0.00	0.67	0.27	0.00	0.00	0.90	0.65	0.65	0.77	0.92	0.18
Avail Cap(c_a), veh/h	482	0	966	182	0	0	798	1408	1479	106	2208	985
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	105.2	0.0	76.2	117.9	0.0	0.0	101.3	20.1	20.2	116.4	46.4	23.7
Incr Delay (d2), s/veh	8.3	0.0	1.5	0.8	0.0	0.0	8.9	1.1	1.1	26.2	7.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.0	0.0	19.0	1.1	0.0	0.0	18.3	26.6	28.0	6.1	56.3	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	113.5	0.0	77.8	118.7	0.0	0.0	110.3	21.2	21.2	142.6	53.6	23.8
LnGrp LOS	F	A	E	F	A	A	F	C	C	F	D	C
Approach Vol, veh/h		1035			17			2212			2185	
Approach Delay, s/veh		91.0			118.7			43.1			54.6	
Approach LOS		F			F			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	48.0	152.1		13.1	19.0	181.1		38.0				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	56.0	154.0		23.0	13.0	197.0		31.0				
Max Q Clear Time (g_c+I1), s	40.6	125.2		4.4	13.4	64.7		35.0				
Green Ext Time (p_c), s	1.4	20.9		0.0	0.0	23.6		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		57.1
HCM 6th LOS		E

Notes
User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	5	90	5	60	10	2000	90	85	2495	5
Future Volume (veh/h)	10	0	5	90	5	60	10	2000	90	85	2495	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	2174	96	92	2712	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	2	10	182	96	58	22	2624	115	118	2950	5
Arrive On Green	0.09	0.00	0.08	0.09	0.09	0.08	0.02	1.00	1.00	0.07	0.81	0.80
Sat Flow, veh/h	1240	26	115	1416	1095	657	1781	3468	152	1781	3639	7
Grp Volume(v), veh/h	12	0	0	98	0	8	11	1106	1164	92	1324	1393
Grp Sat Flow(s),veh/h/ln	1381	0	0	1416	0	1752	1781	1777	1843	1781	1777	1869
Q Serve(g_s), s	0.8	0.0	0.0	7.4	0.0	0.6	0.8	0.0	0.1	6.9	74.7	74.9
Cycle Q Clear(g_c), s	1.4	0.0	0.0	8.8	0.0	0.6	0.8	0.0	0.1	6.9	74.7	74.9
Prop In Lane	0.92		0.08	1.00		0.38	1.00		0.08	1.00		0.00
Lane Grp Cap(c), veh/h	173	0	0	182	0	154	22	1345	1395	118	1440	1515
V/C Ratio(X)	0.07	0.00	0.00	0.54	0.00	0.05	0.49	0.82	0.83	0.78	0.92	0.92
Avail Cap(c_a), veh/h	300	0	0	309	0	311	145	1345	1395	251	1440	1515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.47	0.47	0.47	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.9	0.0	0.0	60.0	0.0	56.6	66.0	0.0	0.0	62.0	9.5	9.5
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.1	2.9	2.8	2.9	4.1	10.9	10.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	3.4	0.0	0.3	0.4	1.1	1.1	3.2	25.1	26.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.1	0.0	0.0	62.5	0.0	56.7	68.9	2.8	3.0	66.2	20.4	20.0
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	C	C
Approach Vol, veh/h		12			106			2281			2809	
Approach Delay, s/veh		57.1			62.0			3.2			21.7	
Approach LOS		E			E			A			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	113.4		15.9	13.0	106.2		15.9				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	87.0		23.0	19.0	79.0		23.0				
Max Q Clear Time (g_c+I1), s	2.8	76.9		10.8	8.9	2.1		3.4				
Green Ext Time (p_c), s	0.0	10.0		0.2	0.1	62.9		0.0				

Intersection Summary			
HCM 6th Ctrl Delay			14.5
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	15	10	60	5	10	5	1925	20	5	2140	325
Future Volume (veh/h)	175	15	10	60	5	10	5	1925	20	5	2140	325
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	190	16	9	65	5	7	5	2092	22	5	2326	286
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	268	18	10	273	22	25	7	2677	28	7	2640	1178
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.01	1.00	1.00	0.00	0.74	0.74
Sat Flow, veh/h	1326	112	63	1363	133	150	1781	3603	38	1781	3554	1585
Grp Volume(v), veh/h	215	0	0	77	0	0	5	1030	1084	5	2326	286
Grp Sat Flow(s),veh/h/ln	1501	0	0	1645	0	0	1781	1777	1864	1781	1777	1585
Q Serve(g_s), s	13.3	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	65.7	7.6
Cycle Q Clear(g_c), s	18.7	0.0	0.0	5.4	0.0	0.0	0.4	0.0	0.0	0.4	65.7	7.6
Prop In Lane	0.88		0.04	0.84		0.09	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	297	0	0	320	0	0	7	1320	1385	7	2640	1178
V/C Ratio(X)	0.72	0.00	0.00	0.24	0.00	0.00	0.74	0.78	0.78	0.74	0.88	0.24
Avail Cap(c_a), veh/h	380	0	0	402	0	0	106	1320	1385	106	2640	1178
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.48	0.48	0.48	0.19	0.19	0.19
Uniform Delay (d), s/veh	54.6	0.0	0.0	49.4	0.0	0.0	66.9	0.0	0.0	67.2	12.9	5.4
Incr Delay (d2), s/veh	4.9	0.0	0.0	0.4	0.0	0.0	24.1	2.3	2.2	10.5	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	0.0	0.0	2.4	0.0	0.0	0.2	0.8	0.8	0.2	22.4	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.5	0.0	0.0	49.8	0.0	0.0	91.0	2.3	2.2	77.7	13.9	5.5
LnGrp LOS	E	A	A	D	A	A	F	A	A	E	B	A
Approach Vol, veh/h		215			77			2119			2617	
Approach Delay, s/veh		59.5			49.8			2.4			13.1	
Approach LOS		E			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	104.3		26.2	4.5	104.3		26.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	84.0		29.0	8.0	84.0		29.0
Max Q Clear Time (g_c+I1), s	2.4	67.7		7.4	2.4	2.0		20.7
Green Ext Time (p_c), s	0.0	16.0		0.2	0.0	70.8		0.5

Intersection Summary			
HCM 6th Ctrl Delay			11.1
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	35	45	95	25	20	55	1720	105	25	2075	150
Future Volume (veh/h)	180	35	45	95	25	20	55	1720	105	25	2075	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	196	38	7	103	27	2	60	1870	111	27	2255	159
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	271	43	309	88	343	25	76	2360	139	34	2252	157
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.19	0.09	1.00	1.00	0.03	0.89	0.88
Sat Flow, veh/h	1109	215	1547	1344	1716	127	1781	3410	200	1781	3369	235
Grp Volume(v), veh/h	234	0	7	103	0	29	60	965	1016	27	1176	1238
Grp Sat Flow(s),veh/h/ln	1324	0	1547	1344	0	1844	1781	1777	1834	1781	1777	1827
Q Serve(g_s), s	21.8	0.0	0.5	3.5	0.0	1.7	4.5	0.0	0.0	2.0	83.0	90.2
Cycle Q Clear(g_c), s	23.5	0.0	0.5	27.0	0.0	1.7	4.5	0.0	0.0	2.0	83.0	90.2
Prop In Lane	0.84		1.00	1.00		0.07	1.00		0.11	1.00		0.13
Lane Grp Cap(c), veh/h	314	0	309	88	0	369	76	1230	1269	34	1187	1221
V/C Ratio(X)	0.75	0.00	0.02	1.17	0.00	0.08	0.79	0.78	0.80	0.80	0.99	1.01
Avail Cap(c_a), veh/h	314	0	309	88	0	369	106	1230	1269	106	1187	1221
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.32	0.32	0.32
Uniform Delay (d), s/veh	53.4	0.0	43.4	66.8	0.0	43.9	61.1	0.0	0.0	65.5	7.1	7.6
Incr Delay (d2), s/veh	9.4	0.0	0.0	147.4	0.0	0.1	1.6	0.5	0.5	5.0	12.7	18.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.6	0.0	0.2	6.7	0.0	0.8	2.0	0.2	0.2	1.0	8.9	11.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.8	0.0	43.4	214.2	0.0	44.0	62.7	0.5	0.5	70.5	19.8	25.7
LnGrp LOS	E	A	D	F	A	D	E	A	A	E	B	F
Approach Vol, veh/h		241			132			2041			2441	
Approach Delay, s/veh		62.2			176.8			2.3			23.4	
Approach LOS		E			F			A			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	94.2		31.0	6.6	97.4		31.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	87.0		26.0	8.0	87.0		26.0
Max Q Clear Time (g_c+I1), s	10.5	92.2		29.0	4.0	2.0		25.5
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	54.4		0.1

Intersection Summary			
HCM 6th Ctrl Delay			20.6
HCM 6th LOS			C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	85	85	190	85	985	50	815	220	620	1340	40
Future Volume (veh/h)	35	85	85	190	85	985	50	815	220	620	1340	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.96	0.98		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	92	9	207	92	0	54	886	163	674	1457	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	172	202	264	442		70	876	738	712	2241	64
Arrive On Green	0.13	0.13	0.13	0.07	0.24	0.00	0.04	0.47	0.47	0.41	1.00	1.00
Sat Flow, veh/h	387	1295	1521	1781	1870	1585	1781	1870	1575	3456	3527	102
Grp Volume(v), veh/h	130	0	9	207	92	0	54	886	163	674	733	766
Grp Sat Flow(s),veh/h/ln	1682	0	1521	1781	1870	1585	1781	1870	1575	1728	1777	1852
Q Serve(g_s), s	6.1	0.0	0.7	10.0	5.3	0.0	4.1	63.3	8.3	25.4	0.0	0.0
Cycle Q Clear(g_c), s	9.6	0.0	0.7	10.0	5.3	0.0	4.1	63.3	8.3	25.4	0.0	0.0
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	258	0	202	264	442		70	876	738	712	1129	1176
V/C Ratio(X)	0.50	0.00	0.04	0.79	0.21		0.77	1.01	0.22	0.95	0.65	0.65
Avail Cap(c_a), veh/h	331	0	270	264	526		238	876	738	742	1129	1176
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.88	0.88	0.88	0.10	0.10	0.10
Uniform Delay (d), s/veh	54.8	0.0	51.1	50.0	41.4	0.0	64.3	35.9	21.3	39.0	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.1	14.4	0.2	0.0	5.8	31.2	0.6	3.3	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	0.3	3.2	2.5	0.0	1.9	35.4	3.2	9.1	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.3	0.0	51.2	64.4	41.6	0.0	70.1	67.1	21.9	42.3	0.3	0.3
LnGrp LOS	E	A	D	E	D		E	F	C	D	A	A
Approach Vol, veh/h		139			299	A		1103			2173	
Approach Delay, s/veh		56.0			57.4			60.6			13.3	
Approach LOS		E			E			E			B	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.3	89.8	14.0	21.9	31.8	67.3		35.9
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	18.0	66.0	9.0	23.0	29.0	55.0		37.0
Max Q Clear Time (g_c+I1), s	6.1	2.0	12.0	11.6	27.4	65.3		7.3
Green Ext Time (p_c), s	0.0	27.2	0.0	0.3	0.4	0.0		0.3

Intersection Summary		
HCM 6th Ctrl Delay		32.5
HCM 6th LOS		C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2030 WE Peak

HCM 6th Signalized Intersection Summary

1: Napilihau Street

03/07/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	45	330	45	50	20	270	380	40	20	355	90
Future Volume (veh/h)	40	45	330	45	50	20	270	380	40	20	355	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	49	31	49	54	10	293	413	25	22	386	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	175	119	188	232	184	34	374	991	838	28	628	532
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.21	0.53	0.53	0.02	0.34	0.34
Sat Flow, veh/h	536	996	1566	1307	1532	284	1781	1870	1582	1781	1870	1583
Grp Volume(v), veh/h	92	0	31	49	0	64	293	413	25	22	386	33
Grp Sat Flow(s),veh/h/ln	1532	0	1566	1307	0	1815	1781	1870	1582	1781	1870	1583
Q Serve(g_s), s	1.2	0.0	0.9	1.7	0.0	1.5	7.4	6.4	0.4	0.6	8.3	0.7
Cycle Q Clear(g_c), s	2.8	0.0	0.9	4.5	0.0	1.5	7.4	6.4	0.4	0.6	8.3	0.7
Prop In Lane	0.47		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	294	0	188	232	0	218	374	991	838	28	628	532
V/C Ratio(X)	0.31	0.00	0.17	0.21	0.00	0.29	0.78	0.42	0.03	0.78	0.61	0.06
Avail Cap(c_a), veh/h	892	0	785	730	0	910	1116	3087	2611	558	2501	2116
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.7	0.0	18.9	21.9	0.0	19.2	17.9	6.8	5.4	23.5	13.3	10.8
Incr Delay (d2), s/veh	0.6	0.0	0.4	0.4	0.0	0.7	3.6	0.6	0.0	35.4	2.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.3	0.5	0.0	0.6	3.0	1.8	0.1	0.5	3.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.3	0.0	19.3	22.3	0.0	20.0	21.5	7.4	5.4	58.9	15.4	10.9
LnGrp LOS	C	A	B	C	A	B	C	A	A	E	B	B
Approach Vol, veh/h		123			113			731			441	
Approach Delay, s/veh		20.1			21.0			13.0			17.2	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	31.4		10.7	15.1	22.1		10.7				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.6	8.4		4.8	9.4	10.3		6.5				
Green Ext Time (p_c), s	0.0	6.1		0.5	0.8	5.6		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			15.6
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	20	195	40	15	5	135	520	25	15	570	60
Future Volume (veh/h)	55	20	195	40	15	5	135	520	25	15	570	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	22	17	43	16	1	147	565	0	16	620	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	271	79	219	284	245	15	415	933		416	808	682
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.08	0.50	0.00	0.01	0.43	0.43
Sat Flow, veh/h	960	562	1557	1349	1740	109	1781	1870	1585	1781	1870	1580
Grp Volume(v), veh/h	82	0	17	43	0	17	147	565	0	16	620	27
Grp Sat Flow(s),veh/h/ln	1522	0	1557	1349	0	1848	1781	1870	1585	1781	1870	1580
Q Serve(g_s), s	1.4	0.0	0.4	1.4	0.0	0.4	2.0	10.0	0.0	0.2	12.9	0.5
Cycle Q Clear(g_c), s	2.1	0.0	0.4	3.5	0.0	0.4	2.0	10.0	0.0	0.2	12.9	0.5
Prop In Lane	0.73		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	350	0	219	284	0	260	415	933		416	808	682
V/C Ratio(X)	0.23	0.00	0.08	0.15	0.00	0.07	0.35	0.61		0.04	0.77	0.04
Avail Cap(c_a), veh/h	947	0	848	830	0	1007	857	2078		977	2078	1755
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.8	0.0	17.1	19.4	0.0	17.1	8.2	8.3	0.0	7.7	11.1	7.5
Incr Delay (d2), s/veh	0.3	0.0	0.1	0.2	0.0	0.1	0.5	0.6	0.0	0.0	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	0.4	0.0	0.1	0.5	2.8	0.0	0.1	4.2	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.1	0.0	17.3	19.7	0.0	17.2	8.7	8.9	0.0	7.7	12.6	7.6
LnGrp LOS	B	A	B	B	A	B	A	A		A	B	A
Approach Vol, veh/h		99			60			712	A		663	
Approach Delay, s/veh		18.0			19.0			8.9			12.3	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.6	28.9		11.5	8.6	25.8		11.5
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	12.0		4.1	4.0	14.9		5.5
Green Ext Time (p_c), s	0.0	4.0		0.4	0.3	4.7		0.1

Intersection Summary		
HCM 6th Ctrl Delay		11.3
HCM 6th LOS		B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	5	85	10	5	10	80	625	15	5	765	50
Future Volume (veh/h)	40	5	85	10	5	10	80	625	15	5	765	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	5	4	11	5	1	87	679	11	5	832	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	59	99	79	20	153	130	115	1090	924	7	977	827
Arrive On Green	0.03	0.10	0.10	0.01	0.08	0.08	0.06	0.58	0.58	0.00	0.52	0.52
Sat Flow, veh/h	1781	957	766	1781	1870	1585	1781	1870	1585	1781	1870	1584
Grp Volume(v), veh/h	43	0	9	11	5	1	87	679	11	5	832	30
Grp Sat Flow(s),veh/h/ln	1781	0	1723	1781	1870	1585	1781	1870	1585	1781	1870	1584
Q Serve(g_s), s	1.6	0.0	0.3	0.4	0.2	0.0	3.2	15.9	0.2	0.2	25.7	0.6
Cycle Q Clear(g_c), s	1.6	0.0	0.3	0.4	0.2	0.0	3.2	15.9	0.2	0.2	25.7	0.6
Prop In Lane	1.00		0.44	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	59	0	179	20	153	130	115	1090	924	7	977	827
V/C Ratio(X)	0.73	0.00	0.05	0.56	0.03	0.01	0.76	0.62	0.01	0.71	0.85	0.04
Avail Cap(c_a), veh/h	532	0	540	532	586	497	664	1814	1537	664	1814	1536
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.1	0.0	27.1	33.0	28.3	28.3	30.8	9.2	5.9	33.3	13.8	7.8
Incr Delay (d2), s/veh	16.2	0.0	0.1	22.5	0.1	0.0	9.6	0.6	0.0	81.4	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.1	0.3	0.1	0.0	1.6	5.1	0.1	0.2	9.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.3	0.0	27.2	55.5	28.4	28.3	40.5	9.7	5.9	114.8	16.0	7.8
LnGrp LOS	D	A	C	E	C	C	D	A	A	F	B	A
Approach Vol, veh/h		52			17			777			867	
Approach Delay, s/veh		44.6			45.9			13.1			16.3	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	44.1	5.7	12.0	9.3	40.0	7.2	10.5
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.2	17.9	2.4	2.3	5.2	27.7	3.6	2.2
Green Ext Time (p_c), s	0.0	5.4	0.0	0.0	0.2	7.3	0.1	0.0

Intersection Summary			
HCM 6th Ctrl Delay			16.0
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	10	595	10	0	5	410	675	5	0	825	50
Future Volume (veh/h)	50	10	595	10	0	5	410	675	5	0	825	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	11	0	11	0	1	446	734	5	0	897	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	176	15		192	4	8	510	2780	19	3	1490	662
Arrive On Green	0.07	0.06	0.00	0.07	0.00	0.06	0.29	0.77	0.77	0.00	0.42	0.42
Sat Flow, veh/h	1245	254	1585	1426	65	136	1781	3618	25	1781	3554	1579
Grp Volume(v), veh/h	65	0	0	12	0	0	446	360	379	0	897	18
Grp Sat Flow(s),veh/h/ln	1498	0	1585	1626	0	0	1781	1777	1866	1781	1777	1579
Q Serve(g_s), s	2.2	0.0	0.0	0.0	0.0	0.0	15.2	3.7	3.7	0.0	12.5	0.4
Cycle Q Clear(g_c), s	2.6	0.0	0.0	0.4	0.0	0.0	15.2	3.7	3.7	0.0	12.5	0.4
Prop In Lane	0.83		1.00	0.92		0.08	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	215	0		229	0	0	510	1365	1434	3	1490	662
V/C Ratio(X)	0.30	0.00		0.05	0.00	0.00	0.87	0.26	0.26	0.00	0.60	0.03
Avail Cap(c_a), veh/h	592	0		704	0	0	1990	1929	2025	1990	3857	1714
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	29.0	0.0	0.0	27.9	0.0	0.0	21.6	2.1	2.1	0.0	14.3	10.8
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.1	0.0	0.0	1.9	0.2	0.2	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	0.2	0.0	0.0	5.9	0.5	0.6	0.0	4.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.8	0.0	0.0	28.0	0.0	0.0	23.5	2.4	2.3	0.0	15.2	10.9
LnGrp LOS	C	A		C	A	A	C	A	A	A	B	B
Approach Vol, veh/h		65	A		12			1185			915	
Approach Delay, s/veh		29.8			28.0			10.3			15.1	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	22.2	32.7		8.7	0.0	54.8		8.7				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0				
Max Q Clear Time (g_c+I1), s	17.2	14.5		2.4	0.0	5.7		4.6				
Green Ext Time (p_c), s	1.0	12.2		0.0	0.0	8.2		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			13.0									
HCM 6th LOS			B									

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	145	15	5	15	105	1045	20	10	1410	65
Future Volume (veh/h)	55	5	145	15	5	15	105	1045	20	10	1410	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	6	16	5	1	114	1136	21	11	1533	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	211	14	136	142	34	5	146	2586	48	15	2313	1029
Arrive On Green	0.10	0.09	0.09	0.10	0.09	0.09	0.08	0.72	0.72	0.01	0.65	0.65
Sat Flow, veh/h	1386	155	1547	707	388	52	1781	3569	66	1781	3554	1581
Grp Volume(v), veh/h	65	0	6	22	0	0	114	565	592	11	1533	43
Grp Sat Flow(s),veh/h/ln	1541	0	1547	1147	0	0	1781	1777	1858	1781	1777	1581
Q Serve(g_s), s	0.0	0.0	0.3	0.2	0.0	0.0	4.9	10.0	10.0	0.5	20.7	0.8
Cycle Q Clear(g_c), s	2.7	0.0	0.3	2.8	0.0	0.0	4.9	10.0	10.0	0.5	20.7	0.8
Prop In Lane	0.92		1.00	0.73		0.05	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	244	0	136	195	0	0	146	1287	1347	15	2313	1029
V/C Ratio(X)	0.27	0.00	0.04	0.11	0.00	0.00	0.78	0.44	0.44	0.76	0.66	0.04
Avail Cap(c_a), veh/h	536	0	456	500	0	0	479	1957	2047	251	3459	1539
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.3	0.0	32.6	32.8	0.0	0.0	35.2	4.3	4.3	38.6	8.4	4.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.4	0.5	0.5	25.1	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.1	0.4	0.0	0.0	2.2	2.6	2.7	0.3	6.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	0.0	32.6	32.8	0.0	0.0	38.6	4.8	4.8	63.8	9.1	4.9
LnGrp LOS	C	A	C	C	A	A	D	A	A	E	A	A
Approach Vol, veh/h		71			22			1271			1587	
Approach Delay, s/veh		33.4			32.8			7.9			9.3	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.4	55.8		11.9	4.6	61.6		11.9				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	6.9	22.7		4.8	2.5	12.0		4.7				
Green Ext Time (p_c), s	0.1	28.1		0.0	0.0	17.0		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			9.5
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	180	45	5	35	110	1115	50	30	1490	75
Future Volume (veh/h)	60	5	180	45	5	35	110	1115	50	30	1490	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	11	49	5	2	120	1212	34	33	1620	46
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	264	17	223	218	179	72	153	2321	1035	56	2128	949
Arrive On Green	0.15	0.14	0.14	0.14	0.14	0.14	0.09	0.65	0.65	0.03	0.60	0.60
Sat Flow, veh/h	1297	122	1578	1392	1269	508	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	70	0	11	49	0	7	120	1212	34	33	1620	46
Grp Sat Flow(s),veh/h/ln	1419	0	1578	1392	0	1776	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.6	0.0	0.5	2.8	0.0	0.3	5.7	15.5	0.7	1.6	28.9	1.0
Cycle Q Clear(g_c), s	3.9	0.0	0.5	6.7	0.0	0.3	5.7	15.5	0.7	1.6	28.9	1.0
Prop In Lane	0.93		1.00	1.00		0.29	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	297	0	223	218	0	251	153	2321	1035	56	2128	949
V/C Ratio(X)	0.24	0.00	0.05	0.23	0.00	0.03	0.78	0.52	0.03	0.58	0.76	0.05
Avail Cap(c_a), veh/h	494	0	440	409	0	495	435	2849	1271	248	2477	1105
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.0	0.0	32.0	36.4	0.0	31.9	38.5	7.9	5.3	41.1	12.7	7.1
Incr Delay (d2), s/veh	0.4	0.0	0.1	0.5	0.0	0.0	3.3	0.4	0.0	3.5	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.2	1.0	0.0	0.1	2.6	4.9	0.2	0.7	10.2	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.4	0.0	32.1	37.0	0.0	31.9	41.8	8.3	5.3	44.6	14.4	7.2
LnGrp LOS	C	A	C	D	A	C	D	A	A	D	B	A
Approach Vol, veh/h		81			56			1366			1699	
Approach Delay, s/veh		33.2			36.3			11.1			14.8	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	11.4	57.5	17.1	6.7	62.2	17.1
Change Period (Y+Rc), s	4.0	6.0	5.0	4.0	6.0	5.0
Max Green Setting (Gmax), s	21.0	60.0	24.0	12.0	69.0	24.0
Max Q Clear Time (g_c+I1), s	7.7	30.9	8.7	3.6	17.5	5.9
Green Ext Time (p_c), s	0.2	20.6	0.1	0.0	19.2	0.2

Intersection Summary	
HCM 6th Ctrl Delay	14.1
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	305	5	585	15	5	20	445	1175	15	55	1425	230
Future Volume (veh/h)	305	5	585	15	5	20	445	1175	15	55	1425	230
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	336	0	439	16	5	7	484	1277	16	60	1549	196
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	548	0	1002	40	13	18	582	2334	29	103	1914	853
Arrive On Green	0.15	0.00	0.15	0.04	0.04	0.02	0.17	0.65	0.64	0.06	0.54	0.54
Sat Flow, veh/h	3563	0	3170	996	311	436	3456	3594	45	1781	3554	1584
Grp Volume(v), veh/h	336	0	439	28	0	0	484	631	662	60	1549	196
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1742	0	0	1728	1777	1862	1781	1777	1584
Q Serve(g_s), s	14.3	0.0	17.8	2.6	0.0	0.0	22.0	31.3	31.4	5.3	57.8	10.6
Cycle Q Clear(g_c), s	14.3	0.0	17.8	2.6	0.0	0.0	22.0	31.3	31.4	5.3	57.8	10.6
Prop In Lane	1.00		1.00	0.57		0.25	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	548	0	1002	71	0	0	582	1154	1209	103	1914	853
V/C Ratio(X)	0.61	0.00	0.44	0.40	0.00	0.00	0.83	0.55	0.55	0.58	0.81	0.23
Avail Cap(c_a), veh/h	747	0	1179	333	0	0	1235	2124	2227	165	3307	1474
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.2	0.0	44.1	76.3	0.0	0.0	65.2	15.5	15.5	74.5	30.6	19.7
Incr Delay (d2), s/veh	0.4	0.0	0.1	1.3	0.0	0.0	1.2	0.6	0.6	2.0	1.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	0.0	7.2	1.2	0.0	0.0	9.8	12.6	13.2	2.5	24.6	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.6	0.0	44.2	77.6	0.0	0.0	66.4	16.0	16.0	76.5	31.8	19.9
LnGrp LOS	E	A	D	E	A	A	E	B	B	E	C	B
Approach Vol, veh/h		775			28			1777			1805	
Approach Delay, s/veh		53.0			77.6			29.8			32.0	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	31.3	91.4		10.6	13.4	109.4		28.9
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	24.0	59.8		4.6	7.3	33.4		19.8
Green Ext Time (p_c), s	1.4	25.6		0.0	0.0	13.1		2.1

Intersection Summary	
HCM 6th Ctrl Delay	35.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	135	5	60	5	1520	90	90	2015	10
Future Volume (veh/h)	5	0	5	135	5	60	5	1520	90	90	2015	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1652	95	98	2190	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2436	139	124	2815	14
Arrive On Green	0.13	0.00	0.12	0.13	0.13	0.12	0.01	0.95	0.94	0.07	0.78	0.77
Sat Flow, veh/h	1144	37	236	1416	858	858	1781	3417	195	1781	3626	18
Grp Volume(v), veh/h	6	0	0	147	0	10	5	854	893	98	1072	1129
Grp Sat Flow(s),veh/h/ln	1418	0	0	1416	0	1716	1781	1777	1835	1781	1777	1867
Q Serve(g_s), s	0.0	0.0	0.0	12.3	0.0	0.7	0.4	9.0	9.5	7.0	44.3	44.5
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	9.0	9.5	7.0	44.3	44.5
Prop In Lane	0.83		0.17	1.00		0.50	1.00		0.11	1.00		0.01
Lane Grp Cap(c), veh/h	228	0	0	234	0	215	11	1267	1308	124	1379	1449
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.67	0.68	0.79	0.78	0.78
Avail Cap(c_a), veh/h	313	0	0	319	0	317	151	1267	1308	151	1379	1449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.75	0.75	0.75	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	0.0	0.0	55.4	0.0	50.3	64.2	1.2	1.2	59.5	8.2	8.2
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.7	0.0	0.1	7.4	2.2	2.2	16.4	4.4	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	4.9	0.0	0.3	0.2	2.0	2.1	3.7	15.1	15.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.4	71.6	3.4	3.4	76.0	12.6	12.4
LnGrp LOS	D	A	A	E	A	D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1752			2299	
Approach Delay, s/veh		50.0			57.6			3.6			15.2	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.8	104.9		20.3	13.1	96.7		20.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	82.0		23.0	11.0	82.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	46.5		15.0	9.0	11.5		2.7
Green Ext Time (p_c), s	0.0	31.4		0.3	0.0	38.4		0.0

Intersection Summary			
HCM 6th Ctrl Delay			12.0
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	5	15	65	5	15	15	1465	15	10	1790	260
Future Volume (veh/h)	135	5	15	65	5	15	15	1465	15	10	1790	260
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	147	5	13	71	5	9	16	1592	15	11	1946	216
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	6	16	227	17	23	19	2774	26	13	2722	1213
Arrive On Green	0.13	0.13	0.12	0.13	0.13	0.12	0.01	0.77	0.76	0.01	0.77	0.77
Sat Flow, veh/h	1344	46	119	1341	132	175	1781	3607	34	1781	3554	1584
Grp Volume(v), veh/h	165	0	0	85	0	0	16	784	823	11	1946	216
Grp Sat Flow(s),veh/h/ln	1509	0	0	1648	0	0	1781	1777	1864	1781	1777	1584
Q Serve(g_s), s	7.7	0.0	0.0	0.0	0.0	0.0	1.2	23.7	23.8	0.8	36.8	4.8
Cycle Q Clear(g_c), s	13.7	0.0	0.0	5.9	0.0	0.0	1.2	23.7	23.8	0.8	36.8	4.8
Prop In Lane	0.89		0.08	0.84		0.11	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	250	0	0	267	0	0	19	1367	1434	13	2722	1213
V/C Ratio(X)	0.66	0.00	0.00	0.32	0.00	0.00	0.84	0.57	0.57	0.82	0.71	0.18
Avail Cap(c_a), veh/h	348	0	0	366	0	0	110	1367	1434	110	2722	1213
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.67	0.67	0.67	0.50	0.50	0.50
Uniform Delay (d), s/veh	54.8	0.0	0.0	51.7	0.0	0.0	64.2	6.2	6.2	64.4	7.9	4.1
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.7	0.0	0.0	20.7	1.2	1.1	19.3	0.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	0.0	2.6	0.0	0.0	0.6	7.8	8.2	0.4	11.8	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.8	0.0	0.0	52.4	0.0	0.0	84.9	7.4	7.3	83.7	8.7	4.3
LnGrp LOS	E	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		165			85			1623			2173	
Approach Delay, s/veh		57.8			52.4			8.1			8.6	
Approach LOS		E			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	103.6		21.0	5.0	104.0		21.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	83.0		25.0	8.0	83.0		25.0
Max Q Clear Time (g_c+I1), s	13.2	38.8		7.9	2.8	25.8		15.7
Green Ext Time (p_c), s	0.0	39.7		0.2	0.0	38.5		0.4

Intersection Summary		
HCM 6th Ctrl Delay		11.4
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	20	50	90	20	20	60	1500	60	15	1805	130
Future Volume (veh/h)	190	20	50	90	20	20	60	1500	60	15	1805	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	207	22	11	98	22	2	65	1630	63	16	1962	137
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	325	29	352	139	377	34	83	2350	91	19	2151	148
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.05	0.67	0.67	0.01	0.85	0.84
Sat Flow, veh/h	1222	130	1579	1373	1688	153	1781	3488	134	1781	3372	233
Grp Volume(v), veh/h	229	0	11	98	0	24	65	827	866	16	1023	1076
Grp Sat Flow(s),veh/h/ln	1352	0	1579	1373	0	1842	1781	1777	1845	1781	1777	1828
Q Serve(g_s), s	19.7	0.0	0.7	7.9	0.0	1.3	4.7	36.9	37.5	1.2	48.3	53.6
Cycle Q Clear(g_c), s	21.1	0.0	0.7	29.0	0.0	1.3	4.7	36.9	37.5	1.2	48.3	53.6
Prop In Lane	0.90		1.00	1.00		0.08	1.00		0.07	1.00		0.13
Lane Grp Cap(c), veh/h	354	0	352	139	0	411	83	1197	1244	19	1134	1166
V/C Ratio(X)	0.65	0.00	0.03	0.70	0.00	0.06	0.78	0.69	0.70	0.84	0.90	0.92
Avail Cap(c_a), veh/h	354	0	352	139	0	411	110	1197	1244	110	1134	1166
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.59	0.59	0.59
Uniform Delay (d), s/veh	48.0	0.0	39.5	61.6	0.0	39.8	61.3	12.9	13.0	64.0	7.2	7.7
Incr Delay (d2), s/veh	4.0	0.0	0.0	14.8	0.0	0.1	1.7	0.3	0.3	18.6	7.4	8.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	0.0	0.3	3.8	0.0	0.6	2.2	13.5	14.3	0.6	8.2	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.1	0.0	39.5	76.4	0.0	39.8	63.0	13.2	13.3	82.6	14.6	16.4
LnGrp LOS	D	A	D	E	A	D	E	B	B	F	B	B
Approach Vol, veh/h		240			122			1758			2115	
Approach Delay, s/veh		51.5			69.2			15.1			16.0	
Approach LOS		D			E			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.1	86.9		33.0	5.4	91.6		33.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	80.0		28.0	8.0	80.0		28.0				
Max Q Clear Time (g_c+I1), s	6.7	55.6		31.0	3.2	39.5		23.1				
Green Ext Time (p_c), s	0.0	21.7		0.0	0.0	26.3		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			19.2									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	65	70	195	90	790	50	735	190	520	1195	75
Future Volume (veh/h)	25	65	70	195	90	790	50	735	190	520	1195	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.94	0.96		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	27	71	10	212	98	0	54	799	145	565	1299	79
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	191	208	361	519		70	842	704	623	2011	122
Arrive On Green	0.14	0.14	0.14	0.11	0.28	0.00	0.04	0.45	0.45	0.18	0.59	0.58
Sat Flow, veh/h	327	1374	1493	1781	1870	1585	1781	1870	1566	3456	3403	207
Grp Volume(v), veh/h	98	0	10	212	98	0	54	799	145	565	677	701
Grp Sat Flow(s),veh/h/ln	1701	0	1493	1781	1870	1585	1781	1870	1566	1728	1777	1833
Q Serve(g_s), s	1.4	0.0	0.8	13.0	5.2	0.0	3.9	53.3	7.3	20.8	32.8	33.0
Cycle Q Clear(g_c), s	6.4	0.0	0.8	13.0	5.2	0.0	3.9	53.3	7.3	20.8	32.8	33.0
Prop In Lane	0.28		1.00	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	272	0	208	361	519		70	842	704	623	1050	1083
V/C Ratio(X)	0.36	0.00	0.05	0.59	0.19		0.77	0.95	0.21	0.91	0.64	0.65
Avail Cap(c_a), veh/h	372	0	299	361	633		329	842	704	691	1050	1083
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.35	0.35	0.35
Uniform Delay (d), s/veh	50.9	0.0	48.5	40.5	35.8	0.0	61.9	34.3	21.7	52.2	17.6	17.7
Incr Delay (d2), s/veh	0.8	0.0	0.1	2.5	0.2	0.0	5.2	17.8	0.5	5.8	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.3	6.0	2.4	0.0	1.9	27.6	2.8	9.4	13.1	13.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	0.0	48.6	43.0	36.0	0.0	67.0	52.1	22.2	58.0	18.7	18.7
LnGrp LOS	D	A	D	D	D		E	D	C	E	B	B
Approach Vol, veh/h		108			310	A		998			1943	
Approach Delay, s/veh		51.4			40.7			48.6			30.1	
Approach LOS		D			D			D			C	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	9.1	80.8	18.0	22.1	27.4	62.5		40.1				
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	24.0	49.0	13.0	25.0	26.0	47.0		43.0				
Max Q Clear Time (g_c+I1), s	5.9	35.0	15.0	8.4	22.8	55.3		7.2				
Green Ext Time (p_c), s	0.1	9.8	0.0	0.3	0.6	0.0		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		37.3
HCM 6th LOS		D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2030 with Mitigation AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	45	295	90	50	20	220	260	100	10	205	30
Future Volume (veh/h)	50	45	295	90	50	20	220	260	100	10	205	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	49	38	98	54	10	239	283	54	11	223	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	239	164	257	328	251	46	321	793	672	15	472	400
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.18	0.42	0.42	0.01	0.25	0.25
Sat Flow, veh/h	617	1002	1571	1301	1532	284	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	103	0	38	98	0	64	239	283	54	11	223	9
Grp Sat Flow(s),veh/h/ln	1618	0	1571	1301	0	1816	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.5	0.0	0.8	2.9	0.0	1.2	5.0	4.1	0.8	0.2	4.0	0.2
Cycle Q Clear(g_c), s	2.0	0.0	0.8	4.9	0.0	1.2	5.0	4.1	0.8	0.2	4.0	0.2
Prop In Lane	0.52		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	403	0	257	328	0	297	321	793	672	15	472	400
V/C Ratio(X)	0.26	0.00	0.15	0.30	0.00	0.22	0.75	0.36	0.08	0.72	0.47	0.02
Avail Cap(c_a), veh/h	1084	0	951	904	0	1100	1349	3730	3161	674	3022	2561
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.7	0.0	14.2	16.9	0.0	14.4	15.4	7.7	6.8	19.6	12.6	11.1
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.5	0.0	0.4	3.4	0.6	0.1	46.6	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.3	0.8	0.0	0.5	1.9	1.2	0.2	0.3	1.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	0.0	14.5	17.4	0.0	14.7	18.8	8.3	6.9	66.2	14.1	11.2
LnGrp LOS	B	A	B	B	A	B	B	A	A	E	B	B
Approach Vol, veh/h		141			162			576			243	
Approach Delay, s/veh		14.9			16.3			12.5			16.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.3	22.8		11.5	12.1	16.0		11.5				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.2	6.1		4.0	7.0	6.0		6.9				
Green Ext Time (p_c), s	0.0	4.2		0.6	0.7	2.9		0.5				

Intersection Summary			
HCM 6th Ctrl Delay			14.2
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	180	90	20	15	135	555	15	10	600	65
Future Volume (veh/h)	60	5	180	90	20	15	135	555	15	10	600	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	18	98	22	2	147	603	0	11	652	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	363	23	302	328	330	30	374	946		366	807	679
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.08	0.51	0.00	0.01	0.43	0.43
Sat Flow, veh/h	1212	120	1545	1358	1685	153	1781	1870	1585	1781	1870	1574
Grp Volume(v), veh/h	70	0	18	98	0	24	147	603	0	11	652	31
Grp Sat Flow(s),veh/h/ln	1332	0	1545	1358	0	1838	1781	1870	1585	1781	1870	1574
Q Serve(g_s), s	2.2	0.0	0.5	3.7	0.0	0.6	2.3	13.0	0.0	0.2	16.8	0.6
Cycle Q Clear(g_c), s	2.8	0.0	0.5	6.4	0.0	0.6	2.3	13.0	0.0	0.2	16.8	0.6
Prop In Lane	0.93		1.00	1.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	387	0	302	328	0	360	374	946		366	807	679
V/C Ratio(X)	0.18	0.00	0.06	0.30	0.00	0.07	0.39	0.64		0.03	0.81	0.05
Avail Cap(c_a), veh/h	742	0	700	677	0	833	711	1728		835	1728	1454
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.1	0.0	18.1	21.7	0.0	18.1	10.1	9.9	0.0	9.4	13.7	9.1
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.5	0.0	0.1	0.7	0.7	0.0	0.0	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	1.1	0.0	0.2	0.7	4.2	0.0	0.1	6.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.3	0.0	18.1	22.2	0.0	18.2	10.8	10.7	0.0	9.5	15.7	9.1
LnGrp LOS	B	A	B	C	A	B	B	B		A	B	A
Approach Vol, veh/h		88			122			750	A		694	
Approach Delay, s/veh		19.1			21.4			10.7			15.3	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	33.9		15.8	9.6	29.8		15.8
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	15.0		4.8	4.3	18.8		8.4
Green Ext Time (p_c), s	0.0	4.4		0.4	0.3	4.9		0.3

Intersection Summary	
HCM 6th Ctrl Delay	13.9
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	5	125	5	5	5	60	645	15	5	805	30
Future Volume (veh/h)	40	5	125	5	5	5	60	645	15	5	805	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	5	8	5	5	1	65	701	11	5	875	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	58	73	117	9	162	135	85	1099	931	7	1017	857
Arrive On Green	0.03	0.11	0.11	0.01	0.09	0.09	0.05	0.59	0.59	0.00	0.54	0.54
Sat Flow, veh/h	1781	642	1027	1781	1870	1563	1781	1870	1585	1781	1870	1575
Grp Volume(v), veh/h	43	0	13	5	5	1	65	701	11	5	875	19
Grp Sat Flow(s),veh/h/ln	1781	0	1669	1781	1870	1563	1781	1870	1585	1781	1870	1575
Q Serve(g_s), s	1.7	0.0	0.5	0.2	0.2	0.0	2.5	17.1	0.2	0.2	27.7	0.4
Cycle Q Clear(g_c), s	1.7	0.0	0.5	0.2	0.2	0.0	2.5	17.1	0.2	0.2	27.7	0.4
Prop In Lane	1.00		0.62	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	58	0	190	9	162	135	85	1099	931	7	1017	857
V/C Ratio(X)	0.74	0.00	0.07	0.53	0.03	0.01	0.77	0.64	0.01	0.71	0.86	0.02
Avail Cap(c_a), veh/h	515	0	507	515	568	475	644	1759	1491	644	1759	1481
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.1	0.0	27.4	34.3	28.9	28.9	32.5	9.4	5.9	34.4	13.5	7.3
Incr Delay (d2), s/veh	16.9	0.0	0.2	39.2	0.1	0.0	13.4	0.6	0.0	81.7	2.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.2	0.2	0.1	0.0	1.3	5.6	0.1	0.2	9.9	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.0	0.0	27.5	73.5	29.0	28.9	45.9	10.0	5.9	116.1	15.8	7.3
LnGrp LOS	D	A	C	E	C	C	D	B	A	F	B	A
Approach Vol, veh/h		56			11			777			899	
Approach Delay, s/veh		44.8			49.2			13.0			16.2	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	45.6	5.4	12.9	8.3	42.6	7.2	11.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.2	19.1	2.2	2.5	4.5	29.7	3.7	2.2
Green Ext Time (p_c), s	0.0	5.6	0.0	0.0	0.1	7.9	0.1	0.0

Intersection Summary		
HCM 6th Ctrl Delay		15.9
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	10	480	20	5	0	315	720	45	10	900	10
Future Volume (veh/h)	35	10	480	20	5	0	315	720	45	10	900	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	11	0	22	5	0	342	783	48	11	978	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	182	30		187	30	0	405	2310	142	15	1634	729
Arrive On Green	0.09	0.07	0.00	0.09	0.07	0.00	0.23	0.68	0.68	0.01	0.46	0.46
Sat Flow, veh/h	1115	423	1585	1157	419	0	1781	3401	208	1781	3554	1585
Grp Volume(v), veh/h	49	0	0	27	0	0	342	409	422	11	978	4
Grp Sat Flow(s),veh/h/ln	1538	0	1585	1576	0	0	1781	1777	1833	1781	1777	1585
Q Serve(g_s), s	0.9	0.0	0.0	0.0	0.0	0.0	11.4	6.0	6.0	0.4	12.7	0.1
Cycle Q Clear(g_c), s	1.7	0.0	0.0	0.8	0.0	0.0	11.4	6.0	6.0	0.4	12.7	0.1
Prop In Lane	0.78		1.00	0.81		0.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	237	0		242	0	0	405	1207	1245	15	1634	729
V/C Ratio(X)	0.21	0.00		0.11	0.00	0.00	0.84	0.34	0.34	0.74	0.60	0.01
Avail Cap(c_a), veh/h	611	0		729	0	0	1896	2120	2187	1896	4241	1891
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.2	0.0	0.0	26.8	0.0	0.0	22.9	4.1	4.2	30.7	12.5	9.1
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	1.9	0.4	0.3	23.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.4	0.0	0.0	4.5	1.4	1.5	0.2	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.6	0.0	0.0	27.0	0.0	0.0	24.8	4.5	4.5	53.7	13.2	9.1
LnGrp LOS	C	A		C	A	A	C	A	A	D	B	A
Approach Vol, veh/h		49	A		27			1173			993	
Approach Delay, s/veh		27.6			27.0			10.4			13.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.1	34.5		9.4	4.5	48.1		9.4
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	66.0	74.0		25.0	66.0	74.0		20.0
Max Q Clear Time (g_c+I1), s	13.4	14.7		2.8	2.4	8.0		3.7
Green Ext Time (p_c), s	0.8	13.8		0.0	0.0	9.8		0.1

Intersection Summary		
HCM 6th Ctrl Delay		12.4
HCM 6th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	70	10	5	10	135	1145	20	15	1390	65
Future Volume (veh/h)	30	0	70	10	5	10	135	1145	20	15	1390	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	0	1	11	5	1	147	1245	21	16	1511	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	167	0	70	111	19	3	185	2695	45	20	2350	1048
Arrive On Green	0.06	0.00	0.04	0.06	0.04	0.04	0.10	0.75	0.75	0.01	0.66	0.66
Sat Flow, veh/h	1561	0	1585	687	440	70	1781	3576	60	1781	3554	1585
Grp Volume(v), veh/h	33	0	1	17	0	0	147	618	648	16	1511	44
Grp Sat Flow(s),veh/h/ln	1561	0	1585	1198	0	0	1781	1777	1860	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	5.9	9.6	9.7	0.7	18.4	0.7
Cycle Q Clear(g_c), s	1.3	0.0	0.0	1.7	0.0	0.0	5.9	9.6	9.7	0.7	18.4	0.7
Prop In Lane	1.00		1.00	0.65		0.06	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	188	0	70	150	0	0	185	1339	1401	20	2350	1048
V/C Ratio(X)	0.18	0.00	0.01	0.11	0.00	0.00	0.80	0.46	0.46	0.79	0.64	0.04
Avail Cap(c_a), veh/h	568	0	497	564	0	0	510	2084	2181	267	3683	1643
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.6	0.0	33.5	34.0	0.0	0.0	32.1	3.4	3.4	36.2	7.3	4.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	2.9	0.5	0.5	21.7	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.3	0.0	0.0	2.6	2.0	2.1	0.4	5.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.8	0.0	33.6	34.1	0.0	0.0	35.0	3.9	3.9	57.8	8.0	4.4
LnGrp LOS	C	A	C	C	A	A	D	A	A	E	A	A
Approach Vol, veh/h		34			17			1413			1571	
Approach Delay, s/veh		33.8			34.1			7.2			8.4	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.6	53.5		8.2	4.8	60.3		8.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	17.9	20.4		3.7	2.7	11.7		3.3
Green Ext Time (p_c), s	0.1	28.1		0.0	0.0	20.2		0.0

Intersection Summary			
HCM 6th Ctrl Delay			8.2
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	35	40	15	45	110	1290	60	25	1335	45
Future Volume (veh/h)	55	5	35	40	15	45	110	1290	60	25	1335	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	1	43	16	1	120	1402	50	27	1451	36
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	12	152	111	168	10	142	2789	1244	39	2584	1153
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.08	0.78	0.78	0.02	0.73	0.73
Sat Flow, veh/h	1198	121	1580	1407	1742	109	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	65	0	1	43	0	17	120	1402	50	27	1451	36
Grp Sat Flow(s),veh/h/ln	1318	0	1580	1407	0	1850	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	6.6	0.0	0.1	4.7	0.0	1.3	10.3	21.7	1.1	2.3	29.2	1.0
Cycle Q Clear(g_c), s	7.8	0.0	0.1	12.5	0.0	1.3	10.3	21.7	1.1	2.3	29.2	1.0
Prop In Lane	0.92		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	172	0	152	111	0	178	142	2789	1244	39	2584	1153
V/C Ratio(X)	0.38	0.00	0.01	0.39	0.00	0.10	0.84	0.50	0.04	0.68	0.56	0.03
Avail Cap(c_a), veh/h	255	0	245	193	0	287	241	2789	1244	241	2584	1153
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.73	0.73	0.73	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.3	0.0	63.3	72.8	0.0	63.9	70.4	5.9	3.7	75.2	9.8	5.9
Incr Delay (d2), s/veh	1.4	0.0	0.0	2.2	0.0	0.2	3.8	0.5	0.0	7.5	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	0.0	1.8	0.0	0.6	4.8	7.3	0.3	1.2	10.9	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.7	0.0	63.3	75.0	0.0	64.1	74.2	6.4	3.8	82.8	10.6	6.0
LnGrp LOS	E	A	E	E	A	E	E	A	A	F	B	A
Approach Vol, veh/h		66			60			1572			1514	
Approach Delay, s/veh		68.6			71.9			11.5			11.8	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.7		19.9	7.4	127.6		19.9
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	31.2		14.5	4.3	23.7		9.8
Green Ext Time (p_c), s	0.1	27.8		0.1	0.0	27.5		0.1

Intersection Summary		
HCM 6th Ctrl Delay		13.9
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	10	235	10	10	10	460	1360	15	80	1295	110
Future Volume (veh/h)	140	10	235	10	10	10	460	1360	15	80	1295	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	160	0	67	11	11	3	500	1478	16	87	1408	90
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	323	0	835	59	59	16	635	2224	24	145	1831	944
Arrive On Green	0.09	0.00	0.08	0.07	0.07	0.05	0.18	0.62	0.60	0.08	0.52	0.52
Sat Flow, veh/h	3563	0	3074	786	786	214	3456	3601	39	1781	3554	1580
Grp Volume(v), veh/h	160	0	67	25	0	0	500	729	765	87	1408	90
Grp Sat Flow(s),veh/h/ln	1781	0	1537	1786	0	0	1728	1777	1863	1781	1777	1580
Q Serve(g_s), s	5.1	0.0	1.9	1.6	0.0	0.0	16.3	31.4	31.5	5.6	37.6	2.9
Cycle Q Clear(g_c), s	5.1	0.0	1.9	1.6	0.0	0.0	16.3	31.4	31.5	5.6	37.6	2.9
Prop In Lane	1.00		1.00	0.44		0.12	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	323	0	835	134	0	0	635	1097	1151	145	1831	944
V/C Ratio(X)	0.50	0.00	0.08	0.19	0.00	0.00	0.79	0.66	0.66	0.60	0.77	0.10
Avail Cap(c_a), veh/h	1025	0	1441	469	0	0	1697	2918	3060	226	4542	2149
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.2	0.0	32.5	51.4	0.0	0.0	46.0	14.6	14.7	52.4	23.0	10.2
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.7	0.0	0.0	0.8	1.0	0.9	1.5	1.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	0.7	0.7	0.0	0.0	7.0	12.0	12.6	2.5	15.2	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.6	0.0	32.6	52.1	0.0	0.0	46.8	15.6	15.6	53.9	24.0	10.2
LnGrp LOS	D	A	C	D	A	A	D	B	B	D	C	B
Approach Vol, veh/h		227			25			1994			1585	
Approach Delay, s/veh		46.0			52.1			23.5			24.8	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	25.7	64.9		12.9	13.6	77.0		14.7				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0				
Max Q Clear Time (g_c+I1), s	18.3	39.6		3.6	7.6	33.5		7.1				
Green Ext Time (p_c), s	1.4	19.3		0.0	0.1	17.9		0.6				

Intersection Summary			
HCM 6th Ctrl Delay			25.5
HCM 6th LOS			C

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	60	0	45	5	1845	90	30	1490	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1845	90	30	1490	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	2005	96	33	1620	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	177	0	138	11	2725	129	64	2975	9
Arrive On Green	0.09	0.09	0.08	0.09	0.00	0.08	0.01	0.79	0.78	0.04	0.82	0.81
Sat Flow, veh/h	586	899	148	1378	0	1545	1781	3453	164	1781	3634	11
Grp Volume(v), veh/h	11	0	0	65	0	1	5	1024	1077	33	792	833
Grp Sat Flow(s),veh/h/ln	1633	0	0	1378	0	1545	1781	1777	1840	1781	1777	1868
Q Serve(g_s), s	0.0	0.0	0.0	5.3	0.0	0.1	0.4	40.1	41.8	2.5	20.4	20.4
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	40.1	41.8	2.5	20.4	20.4
Prop In Lane	0.45		0.09	1.00		1.00	1.00		0.09	1.00		0.01
Lane Grp Cap(c), veh/h	183	0	0	177	0	138	11	1402	1452	64	1455	1529
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.44	0.73	0.74	0.52	0.54	0.54
Avail Cap(c_a), veh/h	313	0	0	290	0	265	102	1402	1452	102	1455	1529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.58	0.58	0.58	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.4	0.0	0.0	60.7	0.0	58.5	69.3	7.3	7.5	66.3	4.2	4.2
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	5.8	2.0	2.0	2.4	1.5	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.3	0.0	0.0	0.2	13.1	14.1	1.2	6.2	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	75.1	9.3	9.6	68.7	5.6	5.6
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	A	A
Approach Vol, veh/h		11			66			2106			1658	
Approach Delay, s/veh		58.6			62.0			9.6			6.8	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.9	118.6		16.5	9.0	114.5		16.5
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	95.0		23.0	8.0	95.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	22.4		8.1	4.5	43.8		2.8
Green Ext Time (p_c), s	0.0	33.4		0.1	0.0	41.2		0.0

Intersection Summary	
HCM 6th Ctrl Delay	9.5
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	5	5	105	15	15	5	1825	20	10	1330	185
Future Volume (veh/h)	90	5	5	105	15	15	5	1825	20	10	1330	185
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	98	5	3	114	16	12	5	1984	21	11	1446	146
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	210	8	5	199	20	15	7	2819	30	14	2795	1245
Arrive On Green	0.11	0.11	0.10	0.11	0.11	0.10	0.00	0.78	0.77	0.01	0.79	0.79
Sat Flow, veh/h	1393	71	43	1317	185	139	1781	3602	38	1781	3554	1583
Grp Volume(v), veh/h	106	0	0	142	0	0	5	977	1028	11	1446	146
Grp Sat Flow(s),veh/h/ln	1506	0	0	1641	0	0	1781	1777	1864	1781	1777	1583
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.3	31.8	32.1	0.7	17.6	2.6
Cycle Q Clear(g_c), s	7.9	0.0	0.0	9.7	0.0	0.0	0.3	31.8	32.1	0.7	17.6	2.6
Prop In Lane	0.92		0.03	0.80		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	223	0	0	234	0	0	7	1391	1458	14	2795	1245
V/C Ratio(X)	0.48	0.00	0.00	0.61	0.00	0.00	0.73	0.70	0.70	0.80	0.52	0.12
Avail Cap(c_a), veh/h	432	0	0	451	0	0	119	1391	1458	119	2795	1245
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.63	0.63	0.63	0.83	0.83	0.83
Uniform Delay (d), s/veh	51.1	0.0	0.0	51.8	0.0	0.0	59.7	6.3	6.3	59.4	4.6	3.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.5	0.0	0.0	29.2	1.9	1.8	27.5	0.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.0	4.3	0.0	0.0	0.2	9.7	10.2	0.4	5.1	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.7	0.0	0.0	54.3	0.0	0.0	88.9	8.2	8.2	87.0	5.2	3.2
LnGrp LOS	D	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		106			142			2010			1603	
Approach Delay, s/veh		52.7			54.3			8.4			5.6	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.4		17.2	4.9	97.9		17.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.3	19.6		11.7	2.7	34.1		9.9
Green Ext Time (p_c), s	0.0	33.2		0.5	0.0	30.9		0.3

Intersection Summary	
HCM 6th Ctrl Delay	10.1
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	30	20	145	25	35	25	1645	75	10	1375	70
Future Volume (veh/h)	145	30	20	145	25	35	25	1645	75	10	1375	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	158	33	2	158	27	3	27	1788	80	11	1495	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	257	288	17	253	273	30	34	2570	114	13	2516	124
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.16	0.04	1.00	1.00	0.01	0.73	0.72
Sat Flow, veh/h	1359	1744	106	1353	1650	183	1781	3465	154	1781	3447	170
Grp Volume(v), veh/h	158	0	35	158	0	30	27	911	957	11	768	801
Grp Sat Flow(s),veh/h/ln	1359	0	1849	1353	0	1834	1781	1777	1843	1781	1777	1840
Q Serve(g_s), s	15.6	0.0	2.3	15.7	0.0	1.9	2.1	0.0	0.0	0.9	28.8	29.2
Cycle Q Clear(g_c), s	17.6	0.0	2.3	18.0	0.0	1.9	2.1	0.0	0.0	0.9	28.8	29.2
Prop In Lane	1.00		0.06	1.00		0.10	1.00		0.08	1.00		0.09
Lane Grp Cap(c), veh/h	257	0	306	253	0	303	34	1318	1366	13	1297	1343
V/C Ratio(X)	0.61	0.00	0.11	0.62	0.00	0.10	0.79	0.69	0.70	0.83	0.59	0.60
Avail Cap(c_a), veh/h	333	0	409	329	0	406	140	1318	1366	140	1297	1343
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.83	0.83	0.83
Uniform Delay (d), s/veh	57.0	0.0	49.7	57.4	0.0	49.6	67.1	0.0	0.0	69.4	9.0	9.1
Incr Delay (d2), s/veh	2.4	0.0	0.2	2.5	0.0	0.1	1.4	0.3	0.3	31.0	1.7	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	0.0	1.1	5.6	0.0	0.9	1.0	0.1	0.1	0.5	10.6	11.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.4	0.0	49.9	59.9	0.0	49.8	68.5	0.3	0.3	100.4	10.7	10.7
LnGrp LOS	E	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		193			188			1895			1580	
Approach Delay, s/veh		57.7			58.3			1.2			11.3	
Approach LOS		E			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	106.2		27.1	5.0	107.8		27.1
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	85.0		30.0	11.0	85.0		30.0
Max Q Clear Time (g_c+I1), s	4.1	31.2		20.0	2.9	2.0		19.6
Green Ext Time (p_c), s	0.0	27.5		0.5	0.0	47.7		0.5

Intersection Summary			
HCM 6th Ctrl Delay			11.0
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	85	35	115	65	1085	25	720	165	540	1125	30
Future Volume (veh/h)	10	85	35	115	65	1085	25	720	165	540	1125	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	92	3	125	71	0	27	783	111	587	1223	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	39	176	158	255	392		34	981	828	623	2426	63
Arrive On Green	0.10	0.10	0.10	0.08	0.21	0.00	0.02	0.52	0.52	0.36	1.00	1.00
Sat Flow, veh/h	108	1715	1543	1781	1870	1585	1781	1870	1579	3456	3538	93
Grp Volume(v), veh/h	103	0	3	125	71	0	27	783	111	587	614	641
Grp Sat Flow(s),veh/h/ln	1823	0	1543	1781	1870	1585	1781	1870	1579	1728	1777	1854
Q Serve(g_s), s	1.1	0.0	0.2	8.5	4.4	0.0	2.1	47.9	5.0	23.0	0.0	0.0
Cycle Q Clear(g_c), s	7.4	0.0	0.2	8.5	4.4	0.0	2.1	47.9	5.0	23.0	0.0	0.0
Prop In Lane	0.11		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	215	0	158	255	392		34	981	828	623	1218	1271
V/C Ratio(X)	0.48	0.00	0.02	0.49	0.18		0.79	0.80	0.13	0.94	0.50	0.50
Avail Cap(c_a), veh/h	326	0	254	255	508		178	981	828	642	1218	1271
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.74	0.74	0.74
Uniform Delay (d), s/veh	59.7	0.0	56.5	49.1	45.5	0.0	68.4	27.2	17.0	44.0	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.0	1.5	0.2	0.0	11.3	5.4	0.3	17.5	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.1	3.9	2.1	0.0	1.1	22.2	1.9	9.8	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.3	0.0	56.6	50.6	45.7	0.0	79.7	32.7	17.3	61.5	1.1	1.1
LnGrp LOS	E	A	E	D	D		E	C	B	E	A	A
Approach Vol, veh/h		106			196	A		921			1842	
Approach Delay, s/veh		61.2			48.8			32.2			20.3	
Approach LOS		E			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	8
Phs Duration (G+Y+Rc), s	6.7	100.0	15.0	18.3	29.3	77.4	33.3
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0	5.0
Max Green Setting (Gmax), s	14.0	75.0	10.0	22.0	26.0	63.0	37.0
Max Q Clear Time (g_c+I1), s	4.1	2.0	10.5	9.4	25.0	49.9	6.4
Green Ext Time (p_c), s	0.0	19.9	0.0	0.2	0.2	6.8	0.2

Intersection Summary	
HCM 6th Ctrl Delay	27.1
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2030 with Mitigation PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	25	370	60	25	5	380	280	65	10	380	75
Future Volume (veh/h)	55	25	370	60	25	5	380	280	65	10	380	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	27	22	65	27	1	413	304	46	11	413	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	207	65	172	202	195	7	489	1118	948	15	621	526
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.27	0.60	0.60	0.01	0.33	0.33
Sat Flow, veh/h	907	601	1585	1356	1792	66	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	87	0	22	65	0	28	413	304	46	11	413	24
Grp Sat Flow(s),veh/h/ln	1508	0	1585	1356	0	1858	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.3	0.0	0.7	2.7	0.0	0.8	12.3	4.4	0.7	0.3	10.6	0.6
Cycle Q Clear(g_c), s	3.1	0.0	0.7	5.7	0.0	0.8	12.3	4.4	0.7	0.3	10.6	0.6
Prop In Lane	0.69		1.00	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	272	0	172	202	0	202	489	1118	948	15	621	526
V/C Ratio(X)	0.32	0.00	0.13	0.32	0.00	0.14	0.84	0.27	0.05	0.73	0.67	0.05
Avail Cap(c_a), veh/h	752	0	678	634	0	794	952	2632	2230	476	2132	1807
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.6	0.0	22.6	26.4	0.0	22.6	19.2	5.4	4.7	27.8	16.1	12.7
Incr Delay (d2), s/veh	0.7	0.0	0.3	0.9	0.0	0.3	4.1	0.3	0.0	50.2	2.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.3	0.9	0.0	0.3	5.0	1.2	0.2	0.3	4.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.3	0.0	23.0	27.3	0.0	23.0	23.3	5.7	4.7	78.0	18.7	12.8
LnGrp LOS	C	A	C	C	A	C	C	A	A	E	B	B
Approach Vol, veh/h		109			93			763			448	
Approach Delay, s/veh		24.0			26.0			15.2			19.8	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	39.6		11.1	20.4	24.6		11.1
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0
Max Q Clear Time (g_c+I1), s	2.3	6.4		5.1	14.3	12.6		7.7
Green Ext Time (p_c), s	0.0	4.5		0.4	1.2	6.0		0.2

Intersection Summary	
HCM 6th Ctrl Delay	18.0
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	20	150	45	15	10	195	660	45	25	685	80
Future Volume (veh/h)	75	20	150	45	15	10	195	660	45	25	685	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	22	12	49	16	1	212	717	0	27	745	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	256	54	204	221	224	14	398	1050		376	909	767
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.09	0.56	0.00	0.02	0.49	0.49
Sat Flow, veh/h	1080	424	1585	1375	1742	109	1781	1870	1585	1781	1870	1579
Grp Volume(v), veh/h	104	0	12	49	0	17	212	717	0	27	745	49
Grp Sat Flow(s),veh/h/ln	1503	0	1585	1375	0	1851	1781	1870	1585	1781	1870	1579
Q Serve(g_s), s	3.0	0.0	0.4	1.9	0.0	0.4	3.0	15.0	0.0	0.4	18.7	0.9
Cycle Q Clear(g_c), s	3.5	0.0	0.4	5.4	0.0	0.4	3.0	15.0	0.0	0.4	18.7	0.9
Prop In Lane	0.79		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	311	0	204	221	0	238	398	1050		376	909	767
V/C Ratio(X)	0.33	0.00	0.06	0.22	0.00	0.07	0.53	0.68		0.07	0.82	0.06
Avail Cap(c_a), veh/h	793	0	722	670	0	843	718	1738		830	1738	1467
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.3	0.0	21.0	24.9	0.0	21.0	10.1	8.6	0.0	7.9	12.0	7.5
Incr Delay (d2), s/veh	0.6	0.0	0.1	0.5	0.0	0.1	1.1	0.8	0.0	0.1	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.1	0.6	0.0	0.2	0.9	4.4	0.0	0.1	6.4	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.9	0.0	21.1	25.4	0.0	21.2	11.2	9.4	0.0	8.0	13.9	7.5
LnGrp LOS	C	A	C	C	A	C	B	A		A	B	A
Approach Vol, veh/h		116			66			929	A		821	
Approach Delay, s/veh		22.7			24.3			9.8			13.4	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	36.8		12.1	10.2	32.7		12.1				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0				
Max Q Clear Time (g_c+I1), s	2.4	17.0		5.5	5.0	20.7		7.4				
Green Ext Time (p_c), s	0.0	5.6		0.5	0.4	6.0		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		12.6
HCM 6th LOS		B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	95	10	5	10	165	900	10	5	880	75
Future Volume (veh/h)	60	5	95	10	5	10	165	900	10	5	880	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	4	11	5	1	179	978	8	5	957	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	103	82	19	133	109	216	1261	1069	7	1041	881
Arrive On Green	0.05	0.11	0.11	0.01	0.07	0.07	0.12	0.67	0.67	0.00	0.56	0.56
Sat Flow, veh/h	1781	947	757	1781	1870	1530	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	65	0	9	11	5	1	179	978	8	5	957	44
Grp Sat Flow(s),veh/h/ln	1781	0	1704	1781	1870	1530	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	3.6	0.0	0.5	0.6	0.2	0.1	9.7	35.2	0.2	0.3	45.8	1.2
Cycle Q Clear(g_c), s	3.6	0.0	0.5	0.6	0.2	0.1	9.7	35.2	0.2	0.3	45.8	1.2
Prop In Lane	1.00		0.44	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	85	0	185	19	133	109	216	1261	1069	7	1041	881
V/C Ratio(X)	0.77	0.00	0.05	0.59	0.04	0.01	0.83	0.78	0.01	0.72	0.92	0.05
Avail Cap(c_a), veh/h	362	0	363	362	399	326	452	1261	1069	452	1234	1044
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	0.0	39.4	48.5	42.6	42.5	42.3	11.0	5.3	49.0	19.8	10.0
Incr Delay (d2), s/veh	13.3	0.0	0.1	25.7	0.1	0.0	7.9	3.1	0.0	85.9	10.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.2	0.4	0.1	0.0	4.6	13.0	0.0	0.3	20.6	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.6	0.0	39.5	74.2	42.7	42.6	50.1	14.1	5.3	135.0	29.8	10.0
LnGrp LOS	E	A	D	E	D	D	D	B	A	F	C	A
Approach Vol, veh/h		74			17			1165			1006	
Approach Delay, s/veh		57.2			63.1			19.5			29.5	
Approach LOS		E			E			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	71.4	6.0	15.7	17.0	59.9	9.7	12.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	12.3	37.2	2.6	2.5	11.7	47.8	5.6	2.2
Green Ext Time (p_c), s	0.0	8.9	0.0	0.0	0.4	7.1	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	25.5
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	600	80	10	10	605	965	10	5	930	20
Future Volume (veh/h)	75	5	600	80	10	10	605	965	10	5	930	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	0	87	11	9	658	1049	11	5	1011	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	187	7		173	14	12	696	2785	29	7	1371	612
Arrive On Green	0.09	0.08	0.00	0.09	0.08	0.08	0.39	0.77	0.77	0.00	0.39	0.39
Sat Flow, veh/h	1449	88	1585	1336	169	138	1781	3603	38	1781	3554	1585
Grp Volume(v), veh/h	87	0	0	107	0	0	658	517	543	5	1011	6
Grp Sat Flow(s),veh/h/ln	1538	0	1585	1643	0	0	1781	1777	1864	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	38.6	10.1	10.1	0.3	26.4	0.3
Cycle Q Clear(g_c), s	5.6	0.0	0.0	6.4	0.0	0.0	38.6	10.1	10.1	0.3	26.4	0.3
Prop In Lane	0.94		1.00	0.81		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	209	0		214	0	0	696	1373	1440	7	1371	612
V/C Ratio(X)	0.42	0.00		0.50	0.00	0.00	0.94	0.38	0.38	0.73	0.74	0.01
Avail Cap(c_a), veh/h	350	0		428	0	0	1169	1373	1440	1169	2267	1011
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.4	0.0	0.0	47.8	0.0	0.0	31.8	3.9	3.9	53.8	28.5	20.5
Incr Delay (d2), s/veh	1.3	0.0	0.0	1.8	0.0	0.0	6.8	0.4	0.3	41.5	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	0.0	2.9	0.0	0.0	17.2	2.9	3.0	0.2	11.2	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.8	0.0	0.0	49.6	0.0	0.0	38.6	4.3	4.3	95.3	30.2	20.5
LnGrp LOS	D	A		D	A	A	D	A	A	F	C	C
Approach Vol, veh/h		87	A		107			1718			1022	
Approach Delay, s/veh		48.8			49.6			17.4			30.4	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	46.3	47.7		14.1	4.4	89.6		14.1
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0
Max Q Clear Time (g_c+I1), s	40.6	28.4		8.4	2.3	12.1		7.6
Green Ext Time (p_c), s	1.7	13.3		0.3	0.0	14.1		0.2

Intersection Summary	
HCM 6th Ctrl Delay	24.1
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	5	140	15	0	5	135	1540	10	10	1635	60
Future Volume (veh/h)	50	5	140	15	0	5	135	1540	10	10	1635	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	5	5	16	0	1	147	1674	11	11	1777	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	221	17	170	177	2	7	178	2682	18	14	2306	1028
Arrive On Green	0.12	0.11	0.11	0.12	0.00	0.11	0.10	0.74	0.74	0.01	0.65	0.65
Sat Flow, veh/h	1363	155	1521	962	18	61	1781	3619	24	1781	3554	1585
Grp Volume(v), veh/h	59	0	5	17	0	0	147	821	864	11	1777	40
Grp Sat Flow(s),veh/h/ln	1517	0	1521	1041	0	0	1781	1777	1866	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.3	1.0	0.0	0.0	8.1	22.3	22.4	0.6	35.2	0.9
Cycle Q Clear(g_c), s	3.1	0.0	0.3	4.1	0.0	0.0	8.1	22.3	22.4	0.6	35.2	0.9
Prop In Lane	0.92		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	253	0	170	196	0	0	178	1317	1383	14	2306	1028
V/C Ratio(X)	0.23	0.00	0.03	0.09	0.00	0.00	0.82	0.62	0.62	0.78	0.77	0.04
Avail Cap(c_a), veh/h	419	0	349	357	0	0	373	1524	1600	195	2693	1201
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.5	0.0	39.7	41.9	0.0	0.0	44.3	6.3	6.3	49.7	12.4	6.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.6	1.1	1.1	28.5	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.1	0.4	0.0	0.0	3.7	6.7	7.0	0.4	12.4	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.7	0.0	39.7	42.0	0.0	0.0	47.9	7.4	7.4	78.1	14.0	6.4
LnGrp LOS	D	A	D	D	A	A	D	A	A	E	B	A
Approach Vol, veh/h		64			17			1832			1828	
Approach Delay, s/veh		40.6			42.0			10.6			14.2	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.0	70.1		16.2	4.8	79.3		16.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	10.1	37.2		6.1	2.6	24.4		5.1
Green Ext Time (p_c), s	0.1	27.8		0.0	0.0	33.3		0.1

Intersection Summary		
HCM 6th Ctrl Delay		13.0
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	175	70	5	45	125	1530	60	35	1790	95
Future Volume (veh/h)	75	5	175	70	5	45	125	1530	60	35	1790	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	27	76	5	1	136	1663	49	38	1946	81
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	12	204	142	197	39	157	2668	1189	49	2452	1094
Arrive On Green	0.14	0.13	0.13	0.13	0.13	0.13	0.09	0.75	0.75	0.03	0.69	0.69
Sat Flow, veh/h	1303	90	1563	1363	1509	302	1781	3554	1584	1781	3554	1585
Grp Volume(v), veh/h	87	0	27	76	0	6	136	1663	49	38	1946	81
Grp Sat Flow(s),veh/h/ln	1393	0	1563	1363	0	1811	1781	1777	1584	1781	1777	1585
Q Serve(g_s), s	9.2	0.0	2.5	9.0	0.0	0.5	12.4	36.2	1.3	3.5	61.9	2.8
Cycle Q Clear(g_c), s	9.7	0.0	2.5	18.7	0.0	0.5	12.4	36.2	1.3	3.5	61.9	2.8
Prop In Lane	0.94		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	233	0	204	142	0	237	157	2668	1189	49	2452	1094
V/C Ratio(X)	0.37	0.00	0.13	0.54	0.00	0.03	0.86	0.62	0.04	0.77	0.79	0.07
Avail Cap(c_a), veh/h	254	0	227	162	0	263	281	2668	1189	108	2452	1094
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.3	0.0	63.4	75.2	0.0	62.5	74.2	9.6	5.3	79.7	17.5	8.4
Incr Delay (d2), s/veh	1.0	0.0	0.3	3.1	0.0	0.0	3.7	0.7	0.0	9.3	2.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	1.0	3.3	0.0	0.2	5.9	13.3	0.4	1.7	24.8	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.2	0.0	63.7	78.4	0.0	62.6	77.9	10.4	5.3	89.0	20.3	8.5
LnGrp LOS	E	A	E	E	A	E	E	B	A	F	C	A
Approach Vol, veh/h		114			82			1848			2065	
Approach Delay, s/veh		66.4			77.2			15.2			21.1	
Approach LOS		E			E			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.6	119.8		26.6	8.5	129.9		26.6				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	26.0	100.0		24.0	10.0	116.0		24.0				
Max Q Clear Time (g_c+I1), s	14.4	63.9		20.7	5.5	38.2		11.7				
Green Ext Time (p_c), s	0.2	29.1		0.1	0.0	38.6		0.3				

Intersection Summary			
HCM 6th Ctrl Delay			20.8
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	350	5	740	15	0	5	500	1525	10	75	1780	190
Future Volume (veh/h)	350	5	740	15	0	5	500	1525	10	75	1780	190
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.95	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	384	0	651	16	0	1	543	1658	11	82	1935	168
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	482	0	966	60	0	4	605	2552	17	106	2095	935
Arrive On Green	0.14	0.00	0.13	0.04	0.00	0.02	0.18	0.71	0.70	0.06	0.59	0.59
Sat Flow, veh/h	3563	0	3122	1659	0	104	3456	3619	24	1781	3554	1585
Grp Volume(v), veh/h	384	0	651	17	0	0	543	814	855	82	1935	168
Grp Sat Flow(s),veh/h/ln	1781	0	1561	1762	0	0	1728	1777	1866	1781	1777	1585
Q Serve(g_s), s	26.2	0.0	33.0	2.4	0.0	0.0	38.6	62.6	62.7	11.4	123.2	12.2
Cycle Q Clear(g_c), s	26.2	0.0	33.0	2.4	0.0	0.0	38.6	62.6	62.7	11.4	123.2	12.2
Prop In Lane	1.00		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	482	0	966	64	0	0	605	1253	1316	106	2095	935
V/C Ratio(X)	0.80	0.00	0.67	0.27	0.00	0.00	0.90	0.65	0.65	0.77	0.92	0.18
Avail Cap(c_a), veh/h	482	0	966	182	0	0	798	1408	1479	106	2208	985
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	105.2	0.0	76.2	117.9	0.0	0.0	101.3	20.1	20.2	116.4	46.4	23.7
Incr Delay (d2), s/veh	8.3	0.0	1.5	0.8	0.0	0.0	8.9	1.1	1.1	26.2	7.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.0	0.0	19.0	1.1	0.0	0.0	18.3	26.6	28.0	6.1	56.3	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	113.5	0.0	77.8	118.7	0.0	0.0	110.3	21.2	21.2	142.6	53.6	23.8
LnGrp LOS	F	A	E	F	A	A	F	C	C	F	D	C
Approach Vol, veh/h		1035			17			2212			2185	
Approach Delay, s/veh		91.0			118.7			43.1			54.6	
Approach LOS		F			F			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	48.0	152.1		13.1	19.0	181.1		38.0				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	56.0	154.0		23.0	13.0	197.0		31.0				
Max Q Clear Time (g_c+I1), s	40.6	125.2		4.4	13.4	64.7		35.0				
Green Ext Time (p_c), s	1.4	20.9		0.0	0.0	23.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			57.1									
HCM 6th LOS			E									

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	5	90	5	60	10	2000	90	85	2495	5
Future Volume (veh/h)	10	0	5	90	5	60	10	2000	90	85	2495	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	2174	96	92	2712	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	2	10	182	96	58	22	2624	115	118	2950	5
Arrive On Green	0.09	0.00	0.08	0.09	0.09	0.08	0.02	1.00	1.00	0.07	0.81	0.80
Sat Flow, veh/h	1240	26	115	1416	1095	657	1781	3468	152	1781	3639	7
Grp Volume(v), veh/h	12	0	0	98	0	8	11	1106	1164	92	1324	1393
Grp Sat Flow(s),veh/h/ln	1381	0	0	1416	0	1752	1781	1777	1843	1781	1777	1869
Q Serve(g_s), s	0.8	0.0	0.0	7.4	0.0	0.6	0.8	0.0	0.1	6.9	74.7	74.9
Cycle Q Clear(g_c), s	1.4	0.0	0.0	8.8	0.0	0.6	0.8	0.0	0.1	6.9	74.7	74.9
Prop In Lane	0.92		0.08	1.00		0.38	1.00		0.08	1.00		0.00
Lane Grp Cap(c), veh/h	173	0	0	182	0	154	22	1345	1395	118	1440	1515
V/C Ratio(X)	0.07	0.00	0.00	0.54	0.00	0.05	0.49	0.82	0.83	0.78	0.92	0.92
Avail Cap(c_a), veh/h	300	0	0	309	0	311	145	1345	1395	251	1440	1515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.47	0.47	0.47	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.9	0.0	0.0	60.0	0.0	56.6	66.0	0.0	0.0	62.0	9.5	9.5
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.1	2.9	2.8	2.9	4.1	10.9	10.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	3.4	0.0	0.3	0.4	1.1	1.1	3.2	25.1	26.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.1	0.0	0.0	62.5	0.0	56.7	68.9	2.8	3.0	66.2	20.4	20.0
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	C	C
Approach Vol, veh/h		12			106			2281			2809	
Approach Delay, s/veh		57.1			62.0			3.2			21.7	
Approach LOS		E			E			A			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.7	113.4		15.9	13.0	106.2		15.9
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	87.0		23.0	19.0	79.0		23.0
Max Q Clear Time (g_c+I1), s	2.8	76.9		10.8	8.9	2.1		3.4
Green Ext Time (p_c), s	0.0	10.0		0.2	0.1	62.9		0.0

Intersection Summary			
HCM 6th Ctrl Delay			14.5
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	15	10	60	5	10	5	1925	20	5	2140	325
Future Volume (veh/h)	175	15	10	60	5	10	5	1925	20	5	2140	325
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	190	16	9	65	5	7	5	2092	22	5	2326	286
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	268	18	10	273	22	25	7	2677	28	7	2640	1178
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.01	1.00	1.00	0.00	0.74	0.74
Sat Flow, veh/h	1326	112	63	1363	133	150	1781	3603	38	1781	3554	1585
Grp Volume(v), veh/h	215	0	0	77	0	0	5	1030	1084	5	2326	286
Grp Sat Flow(s),veh/h/ln	1501	0	0	1645	0	0	1781	1777	1864	1781	1777	1585
Q Serve(g_s), s	13.3	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	65.7	7.6
Cycle Q Clear(g_c), s	18.7	0.0	0.0	5.4	0.0	0.0	0.4	0.0	0.0	0.4	65.7	7.6
Prop In Lane	0.88		0.04	0.84		0.09	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	297	0	0	320	0	0	7	1320	1385	7	2640	1178
V/C Ratio(X)	0.72	0.00	0.00	0.24	0.00	0.00	0.74	0.78	0.78	0.74	0.88	0.24
Avail Cap(c_a), veh/h	380	0	0	402	0	0	106	1320	1385	106	2640	1178
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.52	0.52	0.52	0.19	0.19	0.19
Uniform Delay (d), s/veh	54.6	0.0	0.0	49.4	0.0	0.0	66.9	0.0	0.0	67.2	12.9	5.4
Incr Delay (d2), s/veh	4.9	0.0	0.0	0.4	0.0	0.0	25.7	2.5	2.4	10.5	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	0.0	0.0	2.4	0.0	0.0	0.2	0.9	0.9	0.2	22.4	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.5	0.0	0.0	49.8	0.0	0.0	92.7	2.5	2.4	77.7	13.9	5.5
LnGrp LOS	E	A	A	D	A	A	F	A	A	E	B	A
Approach Vol, veh/h		215			77			2119			2617	
Approach Delay, s/veh		59.5			49.8			2.6			13.1	
Approach LOS		E			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	104.3		26.2	4.5	104.3		26.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	84.0		29.0	8.0	84.0		29.0
Max Q Clear Time (g_c+I1), s	2.4	67.7		7.4	2.4	2.0		20.7
Green Ext Time (p_c), s	0.0	16.0		0.2	0.0	70.8		0.5

Intersection Summary			
HCM 6th Ctrl Delay			11.2
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	35	45	95	25	20	55	1720	105	25	2075	150
Future Volume (veh/h)	180	35	45	95	25	20	55	1720	105	25	2075	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.97	0.97		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	196	38	12	103	27	2	60	1870	111	27	2255	159
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	254	220	70	237	280	21	76	2486	146	34	2376	166
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.09	1.00	1.00	0.03	0.94	0.93
Sat Flow, veh/h	1344	1351	427	1320	1716	127	1781	3410	200	1781	3369	235
Grp Volume(v), veh/h	196	0	50	103	0	29	60	965	1016	27	1176	1238
Grp Sat Flow(s),veh/h/ln	1344	0	1778	1320	0	1843	1781	1777	1834	1781	1777	1827
Q Serve(g_s), s	19.6	0.0	3.3	9.8	0.0	1.8	4.5	0.0	0.0	2.0	46.3	57.7
Cycle Q Clear(g_c), s	21.4	0.0	3.3	13.1	0.0	1.8	4.5	0.0	0.0	2.0	46.3	57.7
Prop In Lane	1.00		0.24	1.00		0.07	1.00		0.11	1.00		0.13
Lane Grp Cap(c), veh/h	254	0	290	237	0	300	76	1295	1337	34	1253	1289
V/C Ratio(X)	0.77	0.00	0.17	0.44	0.00	0.10	0.79	0.74	0.76	0.80	0.94	0.96
Avail Cap(c_a), veh/h	254	0	290	237	0	300	106	1295	1337	106	1253	1289
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.32	0.32	0.32
Uniform Delay (d), s/veh	57.2	0.0	48.7	54.3	0.0	48.1	61.1	0.0	0.0	65.5	2.7	3.1
Incr Delay (d2), s/veh	13.5	0.0	0.3	1.3	0.0	0.1	1.6	0.4	0.4	5.0	5.8	7.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.7	0.0	1.5	3.4	0.0	0.9	2.0	0.1	0.1	1.0	4.3	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.6	0.0	48.9	55.6	0.0	48.2	62.7	0.4	0.4	70.5	8.5	10.7
LnGrp LOS	E	A	D	E	A	D	E	A	A	E	A	B
Approach Vol, veh/h		246			132			2041			2441	
Approach Delay, s/veh		66.2			54.0			2.2			10.3	
Approach LOS		E			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	99.2		26.0	6.6	102.4		26.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	92.0		21.0	8.0	92.0		21.0
Max Q Clear Time (g_c+I1), s	6.5	59.7		15.1	4.0	2.0		23.4
Green Ext Time (p_c), s	0.0	30.4		0.2	0.0	56.4		0.0

Intersection Summary	
HCM 6th Ctrl Delay	10.9
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	85	85	190	85	985	50	815	220	620	1340	40
Future Volume (veh/h)	35	85	85	190	85	985	50	815	220	620	1340	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.96	0.98		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	92	9	207	92	0	54	886	163	674	1457	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	172	202	264	442		70	876	738	712	2241	64
Arrive On Green	0.13	0.13	0.13	0.07	0.24	0.00	0.04	0.47	0.47	0.41	1.00	1.00
Sat Flow, veh/h	387	1295	1521	1781	1870	1585	1781	1870	1575	3456	3527	102
Grp Volume(v), veh/h	130	0	9	207	92	0	54	886	163	674	733	766
Grp Sat Flow(s),veh/h/ln	1682	0	1521	1781	1870	1585	1781	1870	1575	1728	1777	1852
Q Serve(g_s), s	6.1	0.0	0.7	10.0	5.3	0.0	4.1	63.3	8.3	25.4	0.0	0.0
Cycle Q Clear(g_c), s	9.6	0.0	0.7	10.0	5.3	0.0	4.1	63.3	8.3	25.4	0.0	0.0
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	258	0	202	264	442		70	876	738	712	1129	1176
V/C Ratio(X)	0.50	0.00	0.04	0.79	0.21		0.77	1.01	0.22	0.95	0.65	0.65
Avail Cap(c_a), veh/h	331	0	270	264	526		238	876	738	742	1129	1176
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.88	0.88	0.88	0.19	0.19	0.19
Uniform Delay (d), s/veh	54.8	0.0	51.1	50.0	41.4	0.0	64.3	35.9	21.3	39.0	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.1	14.4	0.2	0.0	5.8	31.2	0.6	5.7	0.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	0.3	3.2	2.5	0.0	1.9	35.4	3.2	9.3	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.3	0.0	51.2	64.4	41.6	0.0	70.1	67.1	21.9	44.7	0.6	0.5
LnGrp LOS	E	A	D	E	D		E	F	C	D	A	A
Approach Vol, veh/h		139			299	A		1103			2173	
Approach Delay, s/veh		56.0			57.4			60.6			14.2	
Approach LOS		E			E			E			B	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.3	89.8	14.0	21.9	31.8	67.3		35.9
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	66.0	9.0	23.0	29.0	55.0		37.0
Max Q Clear Time (g_c+I1), s	6.1	2.0	12.0	11.6	27.4	65.3		7.3
Green Ext Time (p_c), s	0.0	27.2	0.0	0.3	0.4	0.0		0.3

Intersection Summary	
HCM 6th Ctrl Delay	33.0
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2030 with Mitigation WE Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	45	330	45	50	20	270	380	40	20	355	90
Future Volume (veh/h)	40	45	330	45	50	20	270	380	40	20	355	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	49	31	49	54	10	293	413	25	22	386	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	175	119	188	232	184	34	374	991	838	28	628	532
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.21	0.53	0.53	0.02	0.34	0.34
Sat Flow, veh/h	536	996	1566	1307	1532	284	1781	1870	1582	1781	1870	1583
Grp Volume(v), veh/h	92	0	31	49	0	64	293	413	25	22	386	33
Grp Sat Flow(s),veh/h/ln	1532	0	1566	1307	0	1815	1781	1870	1582	1781	1870	1583
Q Serve(g_s), s	1.2	0.0	0.9	1.7	0.0	1.5	7.4	6.4	0.4	0.6	8.3	0.7
Cycle Q Clear(g_c), s	2.8	0.0	0.9	4.5	0.0	1.5	7.4	6.4	0.4	0.6	8.3	0.7
Prop In Lane	0.47		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	294	0	188	232	0	218	374	991	838	28	628	532
V/C Ratio(X)	0.31	0.00	0.17	0.21	0.00	0.29	0.78	0.42	0.03	0.78	0.61	0.06
Avail Cap(c_a), veh/h	892	0	785	730	0	910	1116	3087	2611	558	2501	2116
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.7	0.0	18.9	21.9	0.0	19.2	17.9	6.8	5.4	23.5	13.3	10.8
Incr Delay (d2), s/veh	0.6	0.0	0.4	0.4	0.0	0.7	3.6	0.6	0.0	35.4	2.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.3	0.5	0.0	0.6	3.0	1.8	0.1	0.5	3.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.3	0.0	19.3	22.3	0.0	20.0	21.5	7.4	5.4	58.9	15.4	10.9
LnGrp LOS	C	A	B	C	A	B	C	A	A	E	B	B
Approach Vol, veh/h		123			113			731			441	
Approach Delay, s/veh		20.1			21.0			13.0			17.2	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.8	31.4		10.7	15.1	22.1		10.7
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0
Max Q Clear Time (g_c+I1), s	2.6	8.4		4.8	9.4	10.3		6.5
Green Ext Time (p_c), s	0.0	6.1		0.5	0.8	5.6		0.4

Intersection Summary			
HCM 6th Ctrl Delay			15.6
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	20	195	40	15	5	135	520	25	15	570	60
Future Volume (veh/h)	55	20	195	40	15	5	135	520	25	15	570	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	22	17	43	16	1	147	565	0	16	620	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	271	79	219	284	245	15	415	933		416	808	682
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.08	0.50	0.00	0.01	0.43	0.43
Sat Flow, veh/h	960	562	1557	1349	1740	109	1781	1870	1585	1781	1870	1580
Grp Volume(v), veh/h	82	0	17	43	0	17	147	565	0	16	620	27
Grp Sat Flow(s),veh/h/ln	1522	0	1557	1349	0	1848	1781	1870	1585	1781	1870	1580
Q Serve(g_s), s	1.4	0.0	0.4	1.4	0.0	0.4	2.0	10.0	0.0	0.2	12.9	0.5
Cycle Q Clear(g_c), s	2.1	0.0	0.4	3.5	0.0	0.4	2.0	10.0	0.0	0.2	12.9	0.5
Prop In Lane	0.73		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	350	0	219	284	0	260	415	933		416	808	682
V/C Ratio(X)	0.23	0.00	0.08	0.15	0.00	0.07	0.35	0.61		0.04	0.77	0.04
Avail Cap(c_a), veh/h	947	0	848	830	0	1007	857	2078		977	2078	1755
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.8	0.0	17.1	19.4	0.0	17.1	8.2	8.3	0.0	7.7	11.1	7.5
Incr Delay (d2), s/veh	0.3	0.0	0.1	0.2	0.0	0.1	0.5	0.6	0.0	0.0	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	0.4	0.0	0.1	0.5	2.8	0.0	0.1	4.2	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.1	0.0	17.3	19.7	0.0	17.2	8.7	8.9	0.0	7.7	12.6	7.6
LnGrp LOS	B	A	B	B	A	B	A	A		A	B	A
Approach Vol, veh/h		99			60			712	A		663	
Approach Delay, s/veh		18.0			19.0			8.9			12.3	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.6	28.9		11.5	8.6	25.8		11.5
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	12.0		4.1	4.0	14.9		5.5
Green Ext Time (p_c), s	0.0	4.0		0.4	0.3	4.7		0.1

Intersection Summary	
HCM 6th Ctrl Delay	11.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	5	85	10	5	10	80	625	15	5	765	50
Future Volume (veh/h)	40	5	85	10	5	10	80	625	15	5	765	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	5	4	11	5	1	87	679	11	5	832	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	59	99	79	20	153	130	115	1090	924	7	977	827
Arrive On Green	0.03	0.10	0.10	0.01	0.08	0.08	0.06	0.58	0.58	0.00	0.52	0.52
Sat Flow, veh/h	1781	957	766	1781	1870	1585	1781	1870	1585	1781	1870	1584
Grp Volume(v), veh/h	43	0	9	11	5	1	87	679	11	5	832	30
Grp Sat Flow(s),veh/h/ln	1781	0	1723	1781	1870	1585	1781	1870	1585	1781	1870	1584
Q Serve(g_s), s	1.6	0.0	0.3	0.4	0.2	0.0	3.2	15.9	0.2	0.2	25.7	0.6
Cycle Q Clear(g_c), s	1.6	0.0	0.3	0.4	0.2	0.0	3.2	15.9	0.2	0.2	25.7	0.6
Prop In Lane	1.00		0.44	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	59	0	179	20	153	130	115	1090	924	7	977	827
V/C Ratio(X)	0.73	0.00	0.05	0.56	0.03	0.01	0.76	0.62	0.01	0.71	0.85	0.04
Avail Cap(c_a), veh/h	532	0	540	532	586	497	664	1814	1537	664	1814	1536
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.1	0.0	27.1	33.0	28.3	28.3	30.8	9.2	5.9	33.3	13.8	7.8
Incr Delay (d2), s/veh	16.2	0.0	0.1	22.5	0.1	0.0	9.6	0.6	0.0	81.4	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.1	0.3	0.1	0.0	1.6	5.1	0.1	0.2	9.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.3	0.0	27.2	55.5	28.4	28.3	40.5	9.7	5.9	114.8	16.0	7.8
LnGrp LOS	D	A	C	E	C	C	D	A	A	F	B	A
Approach Vol, veh/h		52			17			777			867	
Approach Delay, s/veh		44.6			45.9			13.1			16.3	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	44.1	5.7	12.0	9.3	40.0	7.2	10.5
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.2	17.9	2.4	2.3	5.2	27.7	3.6	2.2
Green Ext Time (p_c), s	0.0	5.4	0.0	0.0	0.2	7.3	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	16.0
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	10	595	10	0	5	410	675	5	0	825	50
Future Volume (veh/h)	50	10	595	10	0	5	410	675	5	0	825	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	11	0	11	0	1	446	734	5	0	897	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	176	15		192	4	8	510	2780	19	3	1490	662
Arrive On Green	0.07	0.06	0.00	0.07	0.00	0.06	0.29	0.77	0.77	0.00	0.42	0.42
Sat Flow, veh/h	1245	254	1585	1426	65	136	1781	3618	25	1781	3554	1579
Grp Volume(v), veh/h	65	0	0	12	0	0	446	360	379	0	897	18
Grp Sat Flow(s),veh/h/ln	1498	0	1585	1626	0	0	1781	1777	1866	1781	1777	1579
Q Serve(g_s), s	2.2	0.0	0.0	0.0	0.0	0.0	15.2	3.7	3.7	0.0	12.5	0.4
Cycle Q Clear(g_c), s	2.6	0.0	0.0	0.4	0.0	0.0	15.2	3.7	3.7	0.0	12.5	0.4
Prop In Lane	0.83		1.00	0.92		0.08	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	215	0		229	0	0	510	1365	1434	3	1490	662
V/C Ratio(X)	0.30	0.00		0.05	0.00	0.00	0.87	0.26	0.26	0.00	0.60	0.03
Avail Cap(c_a), veh/h	592	0		704	0	0	1990	1929	2025	1990	3857	1714
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	29.0	0.0	0.0	27.9	0.0	0.0	21.6	2.1	2.1	0.0	14.3	10.8
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.1	0.0	0.0	1.9	0.2	0.2	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	0.2	0.0	0.0	5.9	0.5	0.6	0.0	4.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.8	0.0	0.0	28.0	0.0	0.0	23.5	2.4	2.3	0.0	15.2	10.9
LnGrp LOS	C	A		C	A	A	C	A	A	A	B	B
Approach Vol, veh/h		65	A		12			1185			915	
Approach Delay, s/veh		29.8			28.0			10.3			15.1	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	22.2	32.7		8.7	0.0	54.8		8.7				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0				
Max Q Clear Time (g_c+I1), s	17.2	14.5		2.4	0.0	5.7		4.6				
Green Ext Time (p_c), s	1.0	12.2		0.0	0.0	8.2		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			13.0
HCM 6th LOS			B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	145	15	5	15	105	1045	20	10	1410	65
Future Volume (veh/h)	55	5	145	15	5	15	105	1045	20	10	1410	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	6	16	5	1	114	1136	21	11	1533	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	211	14	136	142	34	5	146	2586	48	15	2313	1029
Arrive On Green	0.10	0.09	0.09	0.10	0.09	0.09	0.08	0.72	0.72	0.01	0.65	0.65
Sat Flow, veh/h	1386	155	1547	707	388	52	1781	3569	66	1781	3554	1581
Grp Volume(v), veh/h	65	0	6	22	0	0	114	565	592	11	1533	43
Grp Sat Flow(s),veh/h/ln	1541	0	1547	1147	0	0	1781	1777	1858	1781	1777	1581
Q Serve(g_s), s	0.0	0.0	0.3	0.2	0.0	0.0	4.9	10.0	10.0	0.5	20.7	0.8
Cycle Q Clear(g_c), s	2.7	0.0	0.3	2.8	0.0	0.0	4.9	10.0	10.0	0.5	20.7	0.8
Prop In Lane	0.92		1.00	0.73		0.05	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	244	0	136	195	0	0	146	1287	1347	15	2313	1029
V/C Ratio(X)	0.27	0.00	0.04	0.11	0.00	0.00	0.78	0.44	0.44	0.76	0.66	0.04
Avail Cap(c_a), veh/h	536	0	456	500	0	0	479	1957	2047	251	3459	1539
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.3	0.0	32.6	32.8	0.0	0.0	35.2	4.3	4.3	38.6	8.4	4.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.4	0.5	0.5	25.1	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.1	0.4	0.0	0.0	2.2	2.6	2.7	0.3	6.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	0.0	32.6	32.8	0.0	0.0	38.6	4.8	4.8	63.8	9.1	4.9
LnGrp LOS	C	A	C	C	A	A	D	A	A	E	A	A
Approach Vol, veh/h		71			22			1271			1587	
Approach Delay, s/veh		33.4			32.8			7.9			9.3	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.4	55.8		11.9	4.6	61.6		11.9				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	6.9	22.7		4.8	2.5	12.0		4.7				
Green Ext Time (p_c), s	0.1	28.1		0.0	0.0	17.0		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			9.5
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	180	45	5	35	110	1115	50	30	1490	75
Future Volume (veh/h)	60	5	180	45	5	35	110	1115	50	30	1490	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	11	49	5	2	120	1212	34	33	1620	46
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	264	17	223	218	179	72	153	2321	1035	56	2128	949
Arrive On Green	0.15	0.14	0.14	0.14	0.14	0.14	0.09	0.65	0.65	0.03	0.60	0.60
Sat Flow, veh/h	1297	122	1578	1392	1269	508	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	70	0	11	49	0	7	120	1212	34	33	1620	46
Grp Sat Flow(s),veh/h/ln	1419	0	1578	1392	0	1776	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.6	0.0	0.5	2.8	0.0	0.3	5.7	15.5	0.7	1.6	28.9	1.0
Cycle Q Clear(g_c), s	3.9	0.0	0.5	6.7	0.0	0.3	5.7	15.5	0.7	1.6	28.9	1.0
Prop In Lane	0.93		1.00	1.00		0.29	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	297	0	223	218	0	251	153	2321	1035	56	2128	949
V/C Ratio(X)	0.24	0.00	0.05	0.23	0.00	0.03	0.78	0.52	0.03	0.58	0.76	0.05
Avail Cap(c_a), veh/h	494	0	440	409	0	495	435	2849	1271	248	2477	1105
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.0	0.0	32.0	36.4	0.0	31.9	38.5	7.9	5.3	41.1	12.7	7.1
Incr Delay (d2), s/veh	0.4	0.0	0.1	0.5	0.0	0.0	3.3	0.4	0.0	3.5	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.2	1.0	0.0	0.1	2.6	4.9	0.2	0.7	10.2	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.4	0.0	32.1	37.0	0.0	31.9	41.8	8.3	5.3	44.6	14.4	7.2
LnGrp LOS	C	A	C	D	A	C	D	A	A	D	B	A
Approach Vol, veh/h		81			56			1366			1699	
Approach Delay, s/veh		33.2			36.3			11.1			14.8	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.4	57.5		17.1	6.7	62.2		17.1
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	60.0		24.0	12.0	69.0		24.0
Max Q Clear Time (g_c+I1), s	17.7	30.9		8.7	3.6	17.5		5.9
Green Ext Time (p_c), s	0.2	20.6		0.1	0.0	19.2		0.2

Intersection Summary			
HCM 6th Ctrl Delay			14.1
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	305	5	585	15	5	20	445	1175	15	55	1425	230
Future Volume (veh/h)	305	5	585	15	5	20	445	1175	15	55	1425	230
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	336	0	439	16	5	7	484	1277	16	60	1549	196
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	548	0	1002	40	13	18	582	2334	29	103	1914	853
Arrive On Green	0.15	0.00	0.15	0.04	0.04	0.02	0.17	0.65	0.64	0.06	0.54	0.54
Sat Flow, veh/h	3563	0	3170	996	311	436	3456	3594	45	1781	3554	1584
Grp Volume(v), veh/h	336	0	439	28	0	0	484	631	662	60	1549	196
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1742	0	0	1728	1777	1862	1781	1777	1584
Q Serve(g_s), s	14.3	0.0	17.8	2.6	0.0	0.0	22.0	31.3	31.4	5.3	57.8	10.6
Cycle Q Clear(g_c), s	14.3	0.0	17.8	2.6	0.0	0.0	22.0	31.3	31.4	5.3	57.8	10.6
Prop In Lane	1.00		1.00	0.57		0.25	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	548	0	1002	71	0	0	582	1154	1209	103	1914	853
V/C Ratio(X)	0.61	0.00	0.44	0.40	0.00	0.00	0.83	0.55	0.55	0.58	0.81	0.23
Avail Cap(c_a), veh/h	747	0	1179	333	0	0	1235	2124	2227	165	3307	1474
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.2	0.0	44.1	76.3	0.0	0.0	65.2	15.5	15.5	74.5	30.6	19.7
Incr Delay (d2), s/veh	0.4	0.0	0.1	1.3	0.0	0.0	1.2	0.6	0.6	2.0	1.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	0.0	7.2	1.2	0.0	0.0	9.8	12.6	13.2	2.5	24.6	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.6	0.0	44.2	77.6	0.0	0.0	66.4	16.0	16.0	76.5	31.8	19.9
LnGrp LOS	E	A	D	E	A	A	E	B	B	E	C	B
Approach Vol, veh/h		775			28			1777			1805	
Approach Delay, s/veh		53.0			77.6			29.8			32.0	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	31.3	91.4		10.6	13.4	109.4		28.9
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	24.0	59.8		4.6	7.3	33.4		19.8
Green Ext Time (p_c), s	1.4	25.6		0.0	0.0	13.1		2.1

Intersection Summary		
HCM 6th Ctrl Delay		35.1
HCM 6th LOS		D

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	135	5	60	5	1520	90	90	2015	10
Future Volume (veh/h)	5	0	5	135	5	60	5	1520	90	90	2015	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1652	95	98	2190	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2436	139	124	2815	14
Arrive On Green	0.13	0.00	0.12	0.13	0.13	0.12	0.01	0.95	0.94	0.07	0.78	0.77
Sat Flow, veh/h	1144	37	236	1416	858	858	1781	3417	195	1781	3626	18
Grp Volume(v), veh/h	6	0	0	147	0	10	5	854	893	98	1072	1129
Grp Sat Flow(s),veh/h/ln	1418	0	0	1416	0	1716	1781	1777	1835	1781	1777	1867
Q Serve(g_s), s	0.0	0.0	0.0	12.3	0.0	0.7	0.4	9.0	9.5	7.0	44.3	44.5
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	9.0	9.5	7.0	44.3	44.5
Prop In Lane	0.83		0.17	1.00		0.50	1.00		0.11	1.00		0.01
Lane Grp Cap(c), veh/h	228	0	0	234	0	215	11	1267	1308	124	1379	1449
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.67	0.68	0.79	0.78	0.78
Avail Cap(c_a), veh/h	313	0	0	319	0	317	151	1267	1308	151	1379	1449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.75	0.75	0.75	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	0.0	0.0	55.4	0.0	50.3	64.2	1.2	1.2	59.5	8.2	8.2
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.7	0.0	0.1	7.4	2.2	2.2	16.4	4.4	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	4.9	0.0	0.3	0.2	2.0	2.1	3.7	15.1	15.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.4	71.6	3.4	3.4	76.0	12.6	12.4
LnGrp LOS	D	A	A	E	A	D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1752			2299	
Approach Delay, s/veh		50.0			57.6			3.6			15.2	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.8	104.9		20.3	13.1	96.7		20.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	82.0		23.0	11.0	82.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	46.5		15.0	9.0	11.5		2.7
Green Ext Time (p_c), s	0.0	31.4		0.3	0.0	38.4		0.0

Intersection Summary		
HCM 6th Ctrl Delay		12.0
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	5	15	65	5	15	15	1465	15	10	1790	260
Future Volume (veh/h)	135	5	15	65	5	15	15	1465	15	10	1790	260
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	147	5	13	71	5	9	16	1592	15	11	1946	216
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	6	16	227	17	23	19	2774	26	13	2722	1213
Arrive On Green	0.13	0.13	0.12	0.13	0.13	0.12	0.01	0.77	0.76	0.01	0.77	0.77
Sat Flow, veh/h	1344	46	119	1341	132	175	1781	3607	34	1781	3554	1584
Grp Volume(v), veh/h	165	0	0	85	0	0	16	784	823	11	1946	216
Grp Sat Flow(s),veh/h/ln	1509	0	0	1648	0	0	1781	1777	1864	1781	1777	1584
Q Serve(g_s), s	7.7	0.0	0.0	0.0	0.0	0.0	1.2	23.7	23.8	0.8	36.8	4.8
Cycle Q Clear(g_c), s	13.7	0.0	0.0	5.9	0.0	0.0	1.2	23.7	23.8	0.8	36.8	4.8
Prop In Lane	0.89		0.08	0.84		0.11	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	250	0	0	267	0	0	19	1367	1434	13	2722	1213
V/C Ratio(X)	0.66	0.00	0.00	0.32	0.00	0.00	0.84	0.57	0.57	0.82	0.71	0.18
Avail Cap(c_a), veh/h	348	0	0	366	0	0	110	1367	1434	110	2722	1213
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.67	0.67	0.67	0.50	0.50	0.50
Uniform Delay (d), s/veh	54.8	0.0	0.0	51.7	0.0	0.0	64.2	6.2	6.2	64.4	7.9	4.1
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.7	0.0	0.0	20.7	1.2	1.1	19.3	0.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	0.0	2.6	0.0	0.0	0.6	7.8	8.2	0.4	11.8	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.8	0.0	0.0	52.4	0.0	0.0	84.9	7.4	7.3	83.7	8.7	4.3
LnGrp LOS	E	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		165			85			1623			2173	
Approach Delay, s/veh		57.8			52.4			8.1			8.6	
Approach LOS		E			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	103.6		21.0	5.0	104.0		21.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	83.0		25.0	8.0	83.0		25.0
Max Q Clear Time (g_c+I1), s	3.2	38.8		7.9	2.8	25.8		15.7
Green Ext Time (p_c), s	0.0	39.7		0.2	0.0	38.5		0.4

Intersection Summary			
HCM 6th Ctrl Delay			11.4
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	20	50	90	20	20	60	1500	60	15	1805	130
Future Volume (veh/h)	190	20	50	90	20	20	60	1500	60	15	1805	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	207	22	6	98	22	2	65	1630	63	16	1962	137
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	292	258	70	288	308	28	83	2493	96	19	2289	158
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.17	0.06	0.95	0.94	0.02	1.00	1.00
Sat Flow, veh/h	1381	1413	385	1376	1688	153	1781	3488	134	1781	3372	233
Grp Volume(v), veh/h	207	0	28	98	0	24	65	827	866	16	1023	1076
Grp Sat Flow(s),veh/h/ln	1381	0	1799	1376	0	1842	1781	1777	1845	1781	1777	1828
Q Serve(g_s), s	19.0	0.0	1.7	8.3	0.0	1.4	4.7	7.9	8.1	1.2	0.0	0.0
Cycle Q Clear(g_c), s	20.4	0.0	1.7	10.0	0.0	1.4	4.7	7.9	8.1	1.2	0.0	0.0
Prop In Lane	1.00		0.21	1.00		0.08	1.00		0.07	1.00		0.13
Lane Grp Cap(c), veh/h	292	0	328	288	0	336	83	1270	1319	19	1206	1241
V/C Ratio(X)	0.71	0.00	0.09	0.34	0.00	0.07	0.78	0.65	0.66	0.84	0.85	0.87
Avail Cap(c_a), veh/h	327	0	374	323	0	383	110	1270	1319	110	1206	1241
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.59	0.59	0.59
Uniform Delay (d), s/veh	52.5	0.0	44.1	48.3	0.0	44.1	60.3	1.1	1.1	63.5	0.0	0.0
Incr Delay (d2), s/veh	6.1	0.0	0.1	0.7	0.0	0.1	1.8	0.2	0.2	18.7	4.6	5.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	0.0	0.8	2.9	0.0	0.7	2.1	1.2	1.3	0.6	1.5	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.5	0.0	44.3	49.0	0.0	44.2	62.1	1.4	1.4	82.2	4.6	5.2
LnGrp LOS	E	A	D	D	A	D	E	A	A	F	A	A
Approach Vol, veh/h		235			122			1758			2115	
Approach Delay, s/veh		56.8			48.0			3.6			5.5	
Approach LOS		E			D			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	92.2		27.7	5.4	96.9		27.7				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	82.0		26.0	8.0	82.0		26.0				
Max Q Clear Time (g_c+I1), s	6.7	2.0		12.0	3.2	10.1		22.4				
Green Ext Time (p_c), s	0.0	58.0		0.3	0.0	36.3		0.3				
Intersection Summary												
HCM 6th Ctrl Delay			8.8									
HCM 6th LOS			A									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	65	70	195	90	790	50	735	190	520	1195	75
Future Volume (veh/h)	25	65	70	195	90	790	50	735	190	520	1195	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.94	0.96		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	27	71	10	212	98	0	54	799	145	565	1299	79
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	191	208	361	519		70	840	703	626	2011	122
Arrive On Green	0.14	0.14	0.14	0.11	0.28	0.00	0.04	0.45	0.45	0.12	0.40	0.39
Sat Flow, veh/h	327	1374	1493	1781	1870	1585	1781	1870	1566	3456	3403	207
Grp Volume(v), veh/h	98	0	10	212	98	0	54	799	145	565	677	701
Grp Sat Flow(s),veh/h/ln	1701	0	1493	1781	1870	1585	1781	1870	1566	1728	1777	1833
Q Serve(g_s), s	1.4	0.0	0.8	13.0	5.2	0.0	3.9	53.4	7.3	21.0	40.2	40.4
Cycle Q Clear(g_c), s	6.4	0.0	0.8	13.0	5.2	0.0	3.9	53.4	7.3	21.0	40.2	40.4
Prop In Lane	0.28		1.00	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	272	0	208	361	519		70	840	703	626	1050	1083
V/C Ratio(X)	0.36	0.00	0.05	0.59	0.19		0.77	0.95	0.21	0.90	0.64	0.65
Avail Cap(c_a), veh/h	372	0	299	361	633		329	840	703	691	1050	1083
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.39	0.39	0.39
Uniform Delay (d), s/veh	50.9	0.0	48.5	40.5	35.8	0.0	61.9	34.4	21.7	56.0	28.2	28.3
Incr Delay (d2), s/veh	0.8	0.0	0.1	2.5	0.2	0.0	5.2	18.1	0.5	6.1	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.3	6.0	2.4	0.0	1.9	27.7	2.8	9.9	18.3	19.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	0.0	48.6	43.0	36.0	0.0	67.0	52.6	22.3	62.0	29.4	29.5
LnGrp LOS	D	A	D	D	D		E	D	C	E	C	C
Approach Vol, veh/h		108			310	A		998			1943	
Approach Delay, s/veh		51.4			40.7			48.9			38.9	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.1	80.8	18.0	22.1	27.6	62.4		40.1
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	24.0	49.0	13.0	25.0	26.0	47.0		43.0
Max Q Clear Time (g_c+I1), s	5.9	42.4	15.0	8.4	23.0	55.4		7.2
Green Ext Time (p_c), s	0.1	5.2	0.0	0.3	0.6	0.0		0.4

Intersection Summary		
HCM 6th Ctrl Delay		42.5
HCM 6th LOS		D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2035 AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	45	295	90	50	20	220	265	100	10	210	30
Future Volume (veh/h)	50	45	295	90	50	20	220	265	100	10	210	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	49	38	98	54	10	239	288	55	11	228	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	239	164	257	328	251	46	321	793	672	15	472	400
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.18	0.42	0.42	0.01	0.25	0.25
Sat Flow, veh/h	617	1002	1571	1301	1532	284	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	103	0	38	98	0	64	239	288	55	11	228	9
Grp Sat Flow(s),veh/h/ln	1618	0	1571	1301	0	1816	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.5	0.0	0.8	2.9	0.0	1.2	5.0	4.2	0.8	0.2	4.1	0.2
Cycle Q Clear(g_c), s	2.0	0.0	0.8	4.9	0.0	1.2	5.0	4.2	0.8	0.2	4.1	0.2
Prop In Lane	0.52		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	403	0	257	328	0	297	321	793	672	15	472	400
V/C Ratio(X)	0.26	0.00	0.15	0.30	0.00	0.22	0.75	0.36	0.08	0.72	0.48	0.02
Avail Cap(c_a), veh/h	1084	0	951	904	0	1100	1349	3730	3161	674	3022	2561
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.7	0.0	14.2	16.9	0.0	14.4	15.4	7.8	6.8	19.6	12.6	11.1
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.5	0.0	0.4	3.4	0.6	0.1	46.6	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.3	0.8	0.0	0.5	1.9	1.2	0.2	0.3	1.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	0.0	14.5	17.4	0.0	14.7	18.8	8.4	6.9	66.2	14.2	11.2
LnGrp LOS	B	A	B	B	A	B	B	A	A	E	B	B
Approach Vol, veh/h		141			162			582			248	
Approach Delay, s/veh		14.9			16.3			12.5			16.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.3	22.8		11.5	12.1	16.0		11.5
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0
Max Q Clear Time (g_c+I1), s	2.2	6.2		4.0	7.0	6.1		6.9
Green Ext Time (p_c), s	0.0	4.3		0.6	0.7	3.0		0.5

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	180	90	20	15	135	565	15	10	610	65
Future Volume (veh/h)	60	5	180	90	20	15	135	565	15	10	610	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	18	98	22	2	147	614	0	11	663	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	361	23	302	326	329	30	370	954		362	817	687
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.08	0.51	0.00	0.01	0.44	0.44
Sat Flow, veh/h	1212	120	1544	1358	1685	153	1781	1870	1585	1781	1870	1574
Grp Volume(v), veh/h	70	0	18	98	0	24	147	614	0	11	663	31
Grp Sat Flow(s),veh/h/ln	1332	0	1544	1358	0	1838	1781	1870	1585	1781	1870	1574
Q Serve(g_s), s	2.2	0.0	0.5	3.7	0.0	0.6	2.3	13.4	0.0	0.2	17.3	0.6
Cycle Q Clear(g_c), s	2.8	0.0	0.5	6.5	0.0	0.6	2.3	13.4	0.0	0.2	17.3	0.6
Prop In Lane	0.93		1.00	1.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	384	0	302	326	0	359	370	954		362	817	687
V/C Ratio(X)	0.18	0.00	0.06	0.30	0.00	0.07	0.40	0.64		0.03	0.81	0.05
Avail Cap(c_a), veh/h	732	0	691	668	0	822	702	1706		825	1706	1436
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.4	0.0	18.3	22.0	0.0	18.3	10.3	10.0	0.0	9.4	13.7	9.1
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.5	0.0	0.1	0.7	0.7	0.0	0.0	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.2	1.2	0.0	0.2	0.7	4.3	0.0	0.1	6.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.6	0.0	18.4	22.5	0.0	18.4	11.0	10.7	0.0	9.5	15.8	9.1
LnGrp LOS	B	A	B	C	A	B	B	B		A	B	A
Approach Vol, veh/h		88			122			761	A		705	
Approach Delay, s/veh		19.3			21.7			10.8			15.4	
Approach LOS		B			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	34.5		15.9	9.6	30.4		15.9				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0				
Max Q Clear Time (g_c+I1), s	2.2	15.4		4.8	4.3	19.3		8.5				
Green Ext Time (p_c), s	0.0	4.5		0.4	0.3	5.0		0.3				
Intersection Summary												
HCM 6th Ctrl Delay			13.9									
HCM 6th LOS			B									

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	5	125	5	5	5	60	660	15	5	825	30
Future Volume (veh/h)	40	5	125	5	5	5	60	660	15	5	825	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	5	8	5	5	1	65	717	11	5	897	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	57	72	115	9	160	133	85	1118	947	7	1036	872
Arrive On Green	0.03	0.11	0.11	0.01	0.09	0.09	0.05	0.60	0.60	0.00	0.55	0.55
Sat Flow, veh/h	1781	642	1027	1781	1870	1562	1781	1870	1585	1781	1870	1575
Grp Volume(v), veh/h	43	0	13	5	5	1	65	717	11	5	897	19
Grp Sat Flow(s),veh/h/ln	1781	0	1668	1781	1870	1562	1781	1870	1585	1781	1870	1575
Q Serve(g_s), s	1.7	0.0	0.5	0.2	0.2	0.0	2.6	17.8	0.2	0.2	29.3	0.4
Cycle Q Clear(g_c), s	1.7	0.0	0.5	0.2	0.2	0.0	2.6	17.8	0.2	0.2	29.3	0.4
Prop In Lane	1.00		0.62	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	57	0	187	9	160	133	85	1118	947	7	1036	872
V/C Ratio(X)	0.75	0.00	0.07	0.53	0.03	0.01	0.77	0.64	0.01	0.71	0.87	0.02
Avail Cap(c_a), veh/h	500	0	492	500	552	461	626	1708	1447	626	1708	1438
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.2	0.0	28.3	35.3	29.9	29.8	33.5	9.3	5.8	35.4	13.6	7.2
Incr Delay (d2), s/veh	17.6	0.0	0.2	39.3	0.1	0.0	13.3	0.6	0.0	82.0	2.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.2	0.2	0.1	0.0	1.4	5.8	0.1	0.2	10.6	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.8	0.0	28.4	74.6	29.9	29.8	46.8	10.0	5.8	117.4	16.4	7.2
LnGrp LOS	D	A	C	E	C	C	D	A	A	F	B	A
Approach Vol, veh/h		56			11			793			921	
Approach Delay, s/veh		46.3			50.2			12.9			16.7	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	47.5	5.4	13.0	8.4	44.4	7.3	11.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.2	19.8	2.2	2.5	4.6	31.3	3.7	2.2
Green Ext Time (p_c), s	0.0	5.8	0.0	0.0	0.1	8.2	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	16.2
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	10	480	20	5	0	315	735	45	10	920	10
Future Volume (veh/h)	35	10	480	20	5	0	315	735	45	10	920	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	11	0	22	5	0	342	799	48	11	1000	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	179	30		184	29	0	404	2331	140	15	1656	739
Arrive On Green	0.09	0.07	0.00	0.09	0.07	0.00	0.23	0.68	0.68	0.01	0.47	0.47
Sat Flow, veh/h	1115	423	1585	1159	418	0	1781	3406	205	1781	3554	1585
Grp Volume(v), veh/h	49	0	0	27	0	0	342	417	430	11	1000	4
Grp Sat Flow(s),veh/h/ln	1539	0	1585	1577	0	0	1781	1777	1834	1781	1777	1585
Q Serve(g_s), s	0.9	0.0	0.0	0.0	0.0	0.0	11.6	6.1	6.1	0.4	13.2	0.1
Cycle Q Clear(g_c), s	1.8	0.0	0.0	0.9	0.0	0.0	11.6	6.1	6.1	0.4	13.2	0.1
Prop In Lane	0.78		1.00	0.81		0.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	233	0		239	0	0	404	1216	1255	15	1656	739
V/C Ratio(X)	0.21	0.00		0.11	0.00	0.00	0.85	0.34	0.34	0.74	0.60	0.01
Avail Cap(c_a), veh/h	599	0		715	0	0	1858	2078	2144	1858	4155	1853
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.8	0.0	0.0	27.4	0.0	0.0	23.4	4.1	4.1	31.3	12.6	9.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	1.9	0.4	0.3	23.2	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.4	0.0	0.0	4.7	1.4	1.5	0.3	4.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.2	0.0	0.0	27.6	0.0	0.0	25.3	4.5	4.5	54.5	13.3	9.1
LnGrp LOS	C	A		C	A	A	C	A	A	D	B	A
Approach Vol, veh/h		49	A		27			1189			1015	
Approach Delay, s/veh		28.2			27.6			10.5			13.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.4	35.5		9.4	4.5	49.3		9.4
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	66.0	74.0		25.0	66.0	74.0		20.0
Max Q Clear Time (g_c+I1), s	13.6	15.2		2.9	2.4	8.1		3.8
Green Ext Time (p_c), s	0.8	14.3		0.0	0.0	10.1		0.1

Intersection Summary		
HCM 6th Ctrl Delay		12.5
HCM 6th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	70	10	5	10	135	1175	20	15	1420	65
Future Volume (veh/h)	30	0	70	10	5	10	135	1175	20	15	1420	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	0	1	11	5	1	147	1277	21	16	1543	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	164	0	69	109	19	3	184	2714	45	20	2369	1057
Arrive On Green	0.06	0.00	0.04	0.06	0.04	0.04	0.10	0.76	0.76	0.01	0.67	0.67
Sat Flow, veh/h	1562	0	1585	683	444	70	1781	3578	59	1781	3554	1585
Grp Volume(v), veh/h	33	0	1	17	0	0	147	634	664	16	1543	45
Grp Sat Flow(s),veh/h/ln	1562	0	1585	1198	0	0	1781	1777	1860	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	6.1	10.1	10.1	0.7	19.2	0.7
Cycle Q Clear(g_c), s	1.3	0.0	0.0	1.7	0.0	0.0	6.1	10.1	10.1	0.7	19.2	0.7
Prop In Lane	1.00		1.00	0.65		0.06	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	185	0	69	147	0	0	184	1348	1411	20	2369	1057
V/C Ratio(X)	0.18	0.00	0.01	0.12	0.00	0.00	0.80	0.47	0.47	0.79	0.65	0.04
Avail Cap(c_a), veh/h	555	0	485	550	0	0	498	2034	2129	261	3596	1604
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.5	0.0	34.4	34.9	0.0	0.0	32.9	3.4	3.4	37.0	7.4	4.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.0	0.5	0.5	22.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.3	0.0	0.0	2.7	2.1	2.2	0.4	5.5	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.7	0.0	34.4	35.0	0.0	0.0	35.9	3.9	3.9	59.1	8.0	4.3
LnGrp LOS	C	A	C	C	A	A	D	A	A	E	A	A
Approach Vol, veh/h		34			17			1445			1604	
Approach Delay, s/veh		34.7			35.0			7.2			8.4	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.8	55.1		8.3	4.9	62.0		8.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	18.1	21.2		3.7	2.7	12.1		3.3
Green Ext Time (p_c), s	0.1	28.8		0.0	0.0	21.2		0.0

Intersection Summary	
HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	35	40	15	45	110	1315	60	25	1365	45
Future Volume (veh/h)	55	5	35	40	15	45	110	1315	60	25	1365	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	1	43	16	1	120	1429	50	27	1484	36
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	12	152	111	168	10	142	2789	1244	39	2584	1153
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.08	0.78	0.78	0.02	0.73	0.73
Sat Flow, veh/h	1198	121	1580	1407	1742	109	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	65	0	1	43	0	17	120	1429	50	27	1484	36
Grp Sat Flow(s),veh/h/ln	1318	0	1580	1407	0	1850	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	6.6	0.0	0.1	4.7	0.0	1.3	10.3	22.4	1.1	2.3	30.3	1.0
Cycle Q Clear(g_c), s	7.8	0.0	0.1	12.5	0.0	1.3	10.3	22.4	1.1	2.3	30.3	1.0
Prop In Lane	0.92		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	172	0	152	111	0	178	142	2789	1244	39	2584	1153
V/C Ratio(X)	0.38	0.00	0.01	0.39	0.00	0.10	0.84	0.51	0.04	0.68	0.57	0.03
Avail Cap(c_a), veh/h	255	0	245	193	0	287	241	2789	1244	241	2584	1153
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.72	0.72	0.72	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.3	0.0	63.3	72.8	0.0	63.9	70.4	6.0	3.7	75.2	9.9	5.9
Incr Delay (d2), s/veh	1.4	0.0	0.0	2.2	0.0	0.2	3.8	0.5	0.0	7.5	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	0.0	1.8	0.0	0.6	4.8	7.6	0.3	1.2	11.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.7	0.0	63.3	75.0	0.0	64.1	74.2	6.5	3.8	82.8	10.8	6.0
LnGrp LOS	E	A	E	E	A	E	E	A	A	F	B	A
Approach Vol, veh/h		66			60			1599			1547	
Approach Delay, s/veh		68.6			71.9			11.5			12.0	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.7		19.9	7.4	127.6		19.9
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	32.3		14.5	4.3	24.4		9.8
Green Ext Time (p_c), s	0.1	28.6		0.1	0.0	28.3		0.1

Intersection Summary			
HCM 6th Ctrl Delay			14.0
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	10	235	10	10	10	460	1390	15	80	1320	110
Future Volume (veh/h)	140	10	235	10	10	10	460	1390	15	80	1320	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	160	0	66	11	11	3	500	1511	16	87	1435	90
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	318	0	829	58	58	16	632	2249	24	144	1855	953
Arrive On Green	0.09	0.00	0.08	0.07	0.07	0.05	0.18	0.62	0.61	0.08	0.52	0.52
Sat Flow, veh/h	3563	0	3072	786	786	214	3456	3602	38	1781	3554	1580
Grp Volume(v), veh/h	160	0	66	25	0	0	500	745	782	87	1435	90
Grp Sat Flow(s),veh/h/ln	1781	0	1536	1786	0	0	1728	1777	1863	1781	1777	1580
Q Serve(g_s), s	5.2	0.0	2.0	1.6	0.0	0.0	16.8	32.9	33.0	5.7	39.3	2.9
Cycle Q Clear(g_c), s	5.2	0.0	2.0	1.6	0.0	0.0	16.8	32.9	33.0	5.7	39.3	2.9
Prop In Lane	1.00		1.00	0.44		0.12	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	318	0	829	132	0	0	632	1109	1163	144	1855	953
V/C Ratio(X)	0.50	0.00	0.08	0.19	0.00	0.00	0.79	0.67	0.67	0.61	0.77	0.09
Avail Cap(c_a), veh/h	999	0	1416	457	0	0	1653	2843	2981	220	4425	2095
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.7	0.0	33.6	52.9	0.0	0.0	47.3	14.7	14.8	53.9	23.2	10.1
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.7	0.0	0.0	0.9	1.0	1.0	1.5	1.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	0.7	0.8	0.0	0.0	7.2	12.6	13.2	2.6	15.9	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.1	0.0	33.6	53.6	0.0	0.0	48.2	15.8	15.7	55.4	24.2	10.2
LnGrp LOS	D	A	C	D	A	A	D	B	B	E	C	B
Approach Vol, veh/h		226			25			2027			1612	
Approach Delay, s/veh		47.4			53.6			23.8			25.1	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	26.2	67.3		13.0	13.8	79.7		14.8				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0				
Max Q Clear Time (g_c+I1), s	18.8	41.3		3.6	7.7	35.0		7.2				
Green Ext Time (p_c), s	1.4	20.0		0.0	0.1	18.9		0.6				

Intersection Summary		
HCM 6th Ctrl Delay		25.9
HCM 6th LOS		C

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	60	0	45	5	1890	90	30	1525	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1890	90	30	1525	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	2054	96	33	1658	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	177	0	138	11	2729	127	64	2975	9
Arrive On Green	0.09	0.09	0.08	0.09	0.00	0.08	0.01	0.79	0.78	0.04	0.82	0.81
Sat Flow, veh/h	586	899	148	1378	0	1545	1781	3458	160	1781	3634	11
Grp Volume(v), veh/h	11	0	0	65	0	1	5	1047	1103	33	810	853
Grp Sat Flow(s),veh/h/ln	1633	0	0	1378	0	1545	1781	1777	1841	1781	1777	1868
Q Serve(g_s), s	0.0	0.0	0.0	5.3	0.0	0.1	0.4	42.4	44.1	2.5	21.3	21.3
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	42.4	44.1	2.5	21.3	21.3
Prop In Lane	0.45		0.09	1.00		1.00	1.00		0.09	1.00		0.01
Lane Grp Cap(c), veh/h	183	0	0	177	0	138	11	1402	1453	64	1455	1529
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.44	0.75	0.76	0.52	0.56	0.56
Avail Cap(c_a), veh/h	313	0	0	290	0	265	102	1402	1453	102	1455	1529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.56	0.56	0.56	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.4	0.0	0.0	60.7	0.0	58.5	69.3	7.6	7.8	66.3	4.2	4.2
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	5.6	2.1	2.1	2.4	1.5	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.3	0.0	0.0	0.2	13.8	14.9	1.2	6.5	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	74.9	9.7	9.9	68.7	5.8	5.7
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	A	A
Approach Vol, veh/h		11			66			2155			1696	
Approach Delay, s/veh		58.6			62.0			9.9			7.0	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.9	118.6		16.5	9.0	114.5		16.5
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	95.0		23.0	8.0	95.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	23.3		8.1	4.5	46.1		2.8
Green Ext Time (p_c), s	0.0	34.8		0.1	0.0	40.7		0.0

Intersection Summary		
HCM 6th Ctrl Delay		9.7
HCM 6th LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	5	5	105	15	15	5	1865	20	10	1360	185
Future Volume (veh/h)	90	5	5	105	15	15	5	1865	20	10	1360	185
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	98	5	3	114	16	12	5	2027	22	11	1478	148
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	210	8	5	199	20	15	7	2818	31	14	2795	1245
Arrive On Green	0.11	0.11	0.10	0.11	0.11	0.10	0.00	0.78	0.77	0.01	0.79	0.79
Sat Flow, veh/h	1393	71	43	1317	185	139	1781	3601	39	1781	3554	1583
Grp Volume(v), veh/h	106	0	0	142	0	0	5	998	1051	11	1478	148
Grp Sat Flow(s),veh/h/ln	1506	0	0	1641	0	0	1781	1777	1863	1781	1777	1583
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.3	33.4	33.7	0.7	18.2	2.6
Cycle Q Clear(g_c), s	7.9	0.0	0.0	9.7	0.0	0.0	0.3	33.4	33.7	0.7	18.2	2.6
Prop In Lane	0.92		0.03	0.80		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	223	0	0	234	0	0	7	1391	1458	14	2795	1245
V/C Ratio(X)	0.48	0.00	0.00	0.61	0.00	0.00	0.73	0.72	0.72	0.80	0.53	0.12
Avail Cap(c_a), veh/h	432	0	0	451	0	0	119	1391	1458	119	2795	1245
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.61	0.61	0.61	0.82	0.82	0.82
Uniform Delay (d), s/veh	51.1	0.0	0.0	51.8	0.0	0.0	59.7	6.5	6.5	59.4	4.7	3.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.5	0.0	0.0	28.4	2.0	1.9	27.2	0.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.0	4.3	0.0	0.0	0.2	10.2	10.7	0.4	5.3	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.7	0.0	0.0	54.3	0.0	0.0	88.1	8.4	8.4	86.7	5.3	3.2
LnGrp LOS	D	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		106			142			2054			1637	
Approach Delay, s/veh		52.7			54.3			8.6			5.6	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.4		17.2	4.9	97.9		17.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.3	20.2		11.7	2.7	35.7		9.9
Green Ext Time (p_c), s	0.0	33.7		0.5	0.0	29.8		0.3

Intersection Summary		
HCM 6th Ctrl Delay		10.2
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	30	20	145	25	35	25	1680	75	10	1405	70
Future Volume (veh/h)	145	30	20	145	25	35	25	1680	75	10	1405	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	158	33	2	158	27	3	27	1826	80	11	1527	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	257	288	17	253	273	30	34	2572	112	13	2518	122
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.16	0.04	1.00	1.00	0.01	0.73	0.72
Sat Flow, veh/h	1359	1744	106	1353	1650	183	1781	3469	151	1781	3451	167
Grp Volume(v), veh/h	158	0	35	158	0	30	27	929	977	11	784	817
Grp Sat Flow(s),veh/h/ln	1359	0	1849	1353	0	1834	1781	1777	1843	1781	1777	1840
Q Serve(g_s), s	15.6	0.0	2.3	15.7	0.0	1.9	2.1	0.0	0.0	0.9	29.8	30.3
Cycle Q Clear(g_c), s	17.6	0.0	2.3	18.0	0.0	1.9	2.1	0.0	0.0	0.9	29.8	30.3
Prop In Lane	1.00		0.06	1.00		0.10	1.00		0.08	1.00		0.09
Lane Grp Cap(c), veh/h	257	0	306	253	0	303	34	1318	1367	13	1297	1343
V/C Ratio(X)	0.61	0.00	0.11	0.62	0.00	0.10	0.79	0.71	0.71	0.83	0.60	0.61
Avail Cap(c_a), veh/h	333	0	409	329	0	406	140	1318	1367	140	1297	1343
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.82	0.82	0.82
Uniform Delay (d), s/veh	57.0	0.0	49.7	57.4	0.0	49.6	67.1	0.0	0.0	69.4	9.1	9.2
Incr Delay (d2), s/veh	2.4	0.0	0.2	2.5	0.0	0.1	1.4	0.3	0.3	30.7	1.7	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	0.0	1.1	5.6	0.0	0.9	1.0	0.1	0.1	0.5	11.0	11.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.4	0.0	49.9	59.9	0.0	49.8	68.5	0.3	0.3	100.1	10.9	10.9
LnGrp LOS	E	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		193			188			1933			1612	
Approach Delay, s/veh		57.7			58.3			1.2			11.5	
Approach LOS		E			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	106.2		27.1	5.0	107.8		27.1
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	85.0		30.0	11.0	85.0		30.0
Max Q Clear Time (g_c+I1), s	4.1	32.3		20.0	2.9	2.0		19.6
Green Ext Time (p_c), s	0.0	28.2		0.5	0.0	49.7		0.5

Intersection Summary			
HCM 6th Ctrl Delay			11.0
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	85	35	115	65	1085	25	735	165	540	1150	30
Future Volume (veh/h)	10	85	35	115	65	1085	25	735	165	540	1150	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	92	3	125	71	0	27	799	111	587	1250	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	39	176	158	255	392		34	981	828	623	2427	62
Arrive On Green	0.10	0.10	0.10	0.08	0.21	0.00	0.02	0.52	0.52	0.36	1.00	1.00
Sat Flow, veh/h	108	1715	1543	1781	1870	1585	1781	1870	1579	3456	3540	91
Grp Volume(v), veh/h	103	0	3	125	71	0	27	799	111	587	627	655
Grp Sat Flow(s),veh/h/ln	1823	0	1543	1781	1870	1585	1781	1870	1579	1728	1777	1854
Q Serve(g_s), s	1.1	0.0	0.2	8.5	4.4	0.0	2.1	49.7	5.0	23.0	0.0	0.0
Cycle Q Clear(g_c), s	7.4	0.0	0.2	8.5	4.4	0.0	2.1	49.7	5.0	23.0	0.0	0.0
Prop In Lane	0.11		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	215	0	158	255	392		34	981	828	623	1218	1271
V/C Ratio(X)	0.48	0.00	0.02	0.49	0.18		0.79	0.81	0.13	0.94	0.51	0.52
Avail Cap(c_a), veh/h	326	0	254	255	508		178	981	828	642	1218	1271
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.73	0.73	0.73
Uniform Delay (d), s/veh	59.7	0.0	56.5	49.1	45.5	0.0	68.4	27.6	17.0	44.0	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.0	1.5	0.2	0.0	11.3	5.9	0.3	17.3	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.1	3.9	2.1	0.0	1.1	23.1	1.9	9.8	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.3	0.0	56.6	50.6	45.7	0.0	79.7	33.6	17.3	61.3	1.1	1.1
LnGrp LOS	E	A	E	D	D		E	C	B	E	A	A
Approach Vol, veh/h		106			196	A		937			1869	
Approach Delay, s/veh		61.2			48.8			33.0			20.0	
Approach LOS		E			D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	100.0	15.0	18.3	29.3	77.4		33.3				
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	14.0	75.0	10.0	22.0	26.0	63.0		37.0				
Max Q Clear Time (g_c+I1), s	4.1	2.0	10.5	9.4	25.0	51.7		6.4				
Green Ext Time (p_c), s	0.0	20.7	0.0	0.2	0.2	6.2		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			27.2									
HCM 6th LOS			C									

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2035 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	25	370	60	25	5	380	285	65	10	385	75
Future Volume (veh/h)	55	25	370	60	25	5	380	285	65	10	385	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	27	20	65	27	1	413	310	46	11	418	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	206	65	172	201	195	7	489	1123	951	15	626	530
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.27	0.60	0.60	0.01	0.33	0.33
Sat Flow, veh/h	907	602	1585	1359	1792	66	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	87	0	20	65	0	28	413	310	46	11	418	24
Grp Sat Flow(s),veh/h/ln	1509	0	1585	1359	0	1858	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.3	0.0	0.6	2.7	0.0	0.8	12.4	4.5	0.7	0.3	10.8	0.6
Cycle Q Clear(g_c), s	3.1	0.0	0.6	5.8	0.0	0.8	12.4	4.5	0.7	0.3	10.8	0.6
Prop In Lane	0.69		1.00	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	271	0	172	201	0	202	489	1123	951	15	626	530
V/C Ratio(X)	0.32	0.00	0.12	0.32	0.00	0.14	0.85	0.28	0.05	0.73	0.67	0.05
Avail Cap(c_a), veh/h	746	0	672	630	0	788	944	2611	2213	472	2115	1793
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.8	0.0	22.8	26.6	0.0	22.8	19.4	5.4	4.7	28.0	16.1	12.7
Incr Delay (d2), s/veh	0.7	0.0	0.3	0.9	0.0	0.3	4.1	0.3	0.0	50.3	2.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.2	0.9	0.0	0.3	5.0	1.3	0.2	0.3	4.4	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.5	0.0	23.1	27.5	0.0	23.1	23.5	5.7	4.7	78.3	18.8	12.8
LnGrp LOS	C	A	C	C	A	C	C	A	A	E	B	B
Approach Vol, veh/h		107			93			769			453	
Approach Delay, s/veh		24.2			26.2			15.2			19.9	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	40.0		11.1	20.5	24.9		11.1				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.3	6.5		5.1	14.4	12.8		7.8				
Green Ext Time (p_c), s	0.0	4.6		0.4	1.1	6.1		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			18.1									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	20	150	45	15	10	195	675	45	25	695	80
Future Volume (veh/h)	75	20	150	45	15	10	195	675	45	25	695	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	22	12	49	16	1	212	734	0	27	755	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	255	54	204	219	224	14	394	1057		368	918	774
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.09	0.57	0.00	0.02	0.49	0.49
Sat Flow, veh/h	1080	424	1585	1375	1742	109	1781	1870	1585	1781	1870	1579
Grp Volume(v), veh/h	104	0	12	49	0	17	212	734	0	27	755	49
Grp Sat Flow(s),veh/h/ln	1503	0	1585	1375	0	1851	1781	1870	1585	1781	1870	1579
Q Serve(g_s), s	3.0	0.0	0.4	1.9	0.0	0.4	3.0	15.6	0.0	0.4	19.2	0.9
Cycle Q Clear(g_c), s	3.5	0.0	0.4	5.4	0.0	0.4	3.0	15.6	0.0	0.4	19.2	0.9
Prop In Lane	0.79		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	309	0	204	219	0	238	394	1057		368	918	774
V/C Ratio(X)	0.34	0.00	0.06	0.22	0.00	0.07	0.54	0.69		0.07	0.82	0.06
Avail Cap(c_a), veh/h	783	0	713	661	0	833	709	1717		816	1717	1449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.6	0.0	21.3	25.2	0.0	21.3	10.3	8.6	0.0	8.0	12.1	7.4
Incr Delay (d2), s/veh	0.6	0.0	0.1	0.5	0.0	0.1	1.1	0.8	0.0	0.1	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.1	0.6	0.0	0.2	0.9	4.6	0.0	0.1	6.5	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.2	0.0	21.4	25.7	0.0	21.4	11.5	9.5	0.0	8.1	14.0	7.5
LnGrp LOS	C	A	C	C	A	C	B	A		A	B	A
Approach Vol, veh/h		116			66			946	A		831	
Approach Delay, s/veh		23.0			24.6			9.9			13.4	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.0	37.4		12.1	10.2	33.3		12.1
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.4	17.6		5.5	5.0	21.2		7.4
Green Ext Time (p_c), s	0.0	5.8		0.5	0.4	6.1		0.1

Intersection Summary

HCM 6th Ctrl Delay 12.7

HCM 6th LOS B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	95	10	5	10	165	920	10	5	900	75
Future Volume (veh/h)	60	5	95	10	5	10	165	920	10	5	900	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	4	11	5	1	179	1000	8	5	978	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	101	81	19	130	106	215	1274	1079	7	1055	892
Arrive On Green	0.05	0.11	0.11	0.01	0.07	0.07	0.12	0.68	0.68	0.00	0.56	0.56
Sat Flow, veh/h	1781	947	757	1781	1870	1529	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	65	0	9	11	5	1	179	1000	8	5	978	44
Grp Sat Flow(s),veh/h/ln	1781	0	1704	1781	1870	1529	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	3.6	0.0	0.5	0.6	0.3	0.1	9.9	37.0	0.2	0.3	48.3	1.3
Cycle Q Clear(g_c), s	3.6	0.0	0.5	0.6	0.3	0.1	9.9	37.0	0.2	0.3	48.3	1.3
Prop In Lane	1.00		0.44	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	85	0	182	19	130	106	215	1274	1079	7	1055	892
V/C Ratio(X)	0.77	0.00	0.05	0.59	0.04	0.01	0.83	0.79	0.01	0.72	0.93	0.05
Avail Cap(c_a), veh/h	353	0	354	353	389	318	441	1274	1079	441	1204	1018
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.5	0.0	40.5	49.8	43.8	43.8	43.4	11.0	5.2	50.3	20.1	9.9
Incr Delay (d2), s/veh	13.3	0.0	0.1	25.9	0.1	0.0	8.0	3.3	0.0	86.3	11.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.2	0.4	0.1	0.0	4.8	13.8	0.0	0.3	22.1	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.8	0.0	40.6	75.7	44.0	43.8	51.4	14.4	5.2	136.6	31.5	9.9
LnGrp LOS	E	A	D	E	D	D	D	B	A	F	C	A
Approach Vol, veh/h		74			17			1187			1027	
Approach Delay, s/veh		58.4			64.5			19.9			31.1	
Approach LOS		E			E			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	73.8	6.1	15.8	17.2	62.0	9.8	12.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.3	39.0	2.6	2.5	11.9	50.3	5.6	2.3
Green Ext Time (p_c), s	0.0	9.1	0.0	0.0	0.4	6.7	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	26.4
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	600	80	10	10	605	985	10	5	950	20
Future Volume (veh/h)	75	5	600	80	10	10	605	985	10	5	950	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	0	87	11	9	658	1071	11	5	1033	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	184	7		171	14	12	695	2800	29	7	1387	619
Arrive On Green	0.09	0.08	0.00	0.09	0.08	0.08	0.39	0.78	0.78	0.00	0.39	0.39
Sat Flow, veh/h	1447	88	1585	1338	169	138	1781	3603	37	1781	3554	1585
Grp Volume(v), veh/h	87	0	0	107	0	0	658	528	554	5	1033	6
Grp Sat Flow(s),veh/h/ln	1535	0	1585	1646	0	0	1781	1777	1864	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	39.6	10.5	10.5	0.3	27.7	0.3
Cycle Q Clear(g_c), s	5.8	0.0	0.0	6.5	0.0	0.0	39.6	10.5	10.5	0.3	27.7	0.3
Prop In Lane	0.94		1.00	0.81		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	206	0		212	0	0	695	1381	1448	7	1387	619
V/C Ratio(X)	0.42	0.00		0.51	0.00	0.00	0.95	0.38	0.38	0.73	0.74	0.01
Avail Cap(c_a), veh/h	342	0		418	0	0	1141	1381	1448	1141	2212	986
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.7	0.0	0.0	49.1	0.0	0.0	32.7	3.9	3.9	55.2	29.0	20.7
Incr Delay (d2), s/veh	1.4	0.0	0.0	1.9	0.0	0.0	7.7	0.4	0.4	41.7	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	0.0	2.9	0.0	0.0	17.8	3.0	3.1	0.2	11.7	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.1	0.0	0.0	50.9	0.0	0.0	40.3	4.3	4.3	96.9	30.8	20.7
LnGrp LOS	D	A		D	A	A	D	A	A	F	C	C
Approach Vol, veh/h		87	A		107			1740			1044	
Approach Delay, s/veh		50.1			50.9			17.9			31.0	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	47.3	49.3		14.3	4.4	92.1		14.3
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0
Max Q Clear Time (g_c+I1), s	41.6	29.7		8.5	2.3	12.5		7.8
Green Ext Time (p_c), s	1.7	13.6		0.3	0.0	14.5		0.2

Intersection Summary	
HCM 6th Ctrl Delay	24.6
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	5	140	15	0	5	135	1575	10	10	1670	60
Future Volume (veh/h)	50	5	140	15	0	5	135	1575	10	10	1670	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	5	5	16	0	1	147	1712	11	11	1815	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	219	17	169	175	2	7	178	2693	17	14	2317	1033
Arrive On Green	0.12	0.11	0.11	0.12	0.00	0.11	0.10	0.74	0.74	0.01	0.65	0.65
Sat Flow, veh/h	1364	154	1521	960	18	61	1781	3620	23	1781	3554	1585
Grp Volume(v), veh/h	59	0	5	17	0	0	147	840	883	11	1815	40
Grp Sat Flow(s),veh/h/ln	1518	0	1521	1038	0	0	1781	1777	1866	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.3	1.0	0.0	0.0	8.3	23.4	23.5	0.6	37.1	0.9
Cycle Q Clear(g_c), s	3.1	0.0	0.3	4.1	0.0	0.0	8.3	23.4	23.5	0.6	37.1	0.9
Prop In Lane	0.92		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	251	0	169	194	0	0	178	1322	1388	14	2317	1033
V/C Ratio(X)	0.24	0.00	0.03	0.09	0.00	0.00	0.83	0.64	0.64	0.78	0.78	0.04
Avail Cap(c_a), veh/h	412	0	343	351	0	0	367	1498	1573	192	2647	1181
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.3	0.0	40.4	42.7	0.0	0.0	45.1	6.3	6.4	50.5	12.6	6.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.7	1.2	1.2	28.8	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.1	0.4	0.0	0.0	3.8	7.1	7.4	0.4	13.1	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.5	0.0	40.5	42.8	0.0	0.0	48.7	7.6	7.5	79.3	14.5	6.4
LnGrp LOS	D	A	D	D	A	A	D	A	A	E	B	A
Approach Vol, veh/h		64			17			1870			1866	
Approach Delay, s/veh		41.4			42.8			10.8			14.7	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.2	71.5		16.3	4.8	80.9		16.3				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	10.3	39.1		6.1	2.6	25.5		5.1				
Green Ext Time (p_c), s	0.1	27.4		0.0	0.0	34.3		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			13.3
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	175	70	5	45	125	1565	60	35	1825	95
Future Volume (veh/h)	75	5	175	70	5	45	125	1565	60	35	1825	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	27	76	5	1	136	1701	49	38	1984	81
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	12	204	142	197	39	157	2668	1189	49	2452	1094
Arrive On Green	0.14	0.13	0.13	0.13	0.13	0.13	0.09	0.75	0.75	0.03	0.69	0.69
Sat Flow, veh/h	1303	90	1563	1363	1509	302	1781	3554	1584	1781	3554	1585
Grp Volume(v), veh/h	87	0	27	76	0	6	136	1701	49	38	1984	81
Grp Sat Flow(s),veh/h/ln	1393	0	1563	1363	0	1811	1781	1777	1584	1781	1777	1585
Q Serve(g_s), s	9.2	0.0	2.5	9.0	0.0	0.5	12.4	37.7	1.3	3.5	64.7	2.8
Cycle Q Clear(g_c), s	9.7	0.0	2.5	18.7	0.0	0.5	12.4	37.7	1.3	3.5	64.7	2.8
Prop In Lane	0.94		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	233	0	204	142	0	237	157	2668	1189	49	2452	1094
V/C Ratio(X)	0.37	0.00	0.13	0.54	0.00	0.03	0.86	0.64	0.04	0.77	0.81	0.07
Avail Cap(c_a), veh/h	254	0	227	162	0	263	281	2668	1189	108	2452	1094
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.66	0.66	0.66	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.3	0.0	63.4	75.2	0.0	62.5	74.2	9.8	5.3	79.7	18.0	8.4
Incr Delay (d2), s/veh	1.0	0.0	0.3	3.1	0.0	0.0	3.6	0.8	0.0	9.3	3.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	1.0	3.3	0.0	0.2	5.9	13.9	0.4	1.7	26.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.2	0.0	63.7	78.4	0.0	62.6	77.8	10.6	5.3	89.0	21.0	8.5
LnGrp LOS	E	A	E	E	A	E	E	B	A	F	C	A
Approach Vol, veh/h		114			82			1886			2103	
Approach Delay, s/veh		66.4			77.2			15.3			21.7	
Approach LOS		E			E			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.6	119.8		26.6	8.5	129.9		26.6				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	26.0	100.0		24.0	10.0	116.0		24.0				
Max Q Clear Time (g_c+I1), s	14.4	66.7		20.7	5.5	39.7		11.7				
Green Ext Time (p_c), s	0.2	27.6		0.1	0.0	39.9		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		21.1
HCM 6th LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	350	5	740	15	0	5	500	1560	10	75	1820	190
Future Volume (veh/h)	350	5	740	15	0	5	500	1560	10	75	1820	190
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.95	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	384	0	652	16	0	1	543	1696	11	82	1978	169
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	467	0	947	59	0	4	600	2584	17	103	2126	948
Arrive On Green	0.13	0.00	0.13	0.04	0.00	0.02	0.17	0.71	0.71	0.06	0.60	0.60
Sat Flow, veh/h	3563	0	3120	1659	0	104	3456	3619	23	1781	3554	1585
Grp Volume(v), veh/h	384	0	652	17	0	0	543	832	875	82	1978	169
Grp Sat Flow(s),veh/h/ln	1781	0	1560	1762	0	0	1728	1777	1866	1781	1777	1585
Q Serve(g_s), s	27.2	0.0	33.0	2.4	0.0	0.0	40.0	65.3	65.5	11.8	130.8	12.4
Cycle Q Clear(g_c), s	27.2	0.0	33.0	2.4	0.0	0.0	40.0	65.3	65.5	11.8	130.8	12.4
Prop In Lane	1.00		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	467	0	947	62	0	0	600	1269	1332	103	2126	948
V/C Ratio(X)	0.82	0.00	0.69	0.27	0.00	0.00	0.91	0.66	0.66	0.80	0.93	0.18
Avail Cap(c_a), veh/h	467	0	947	177	0	0	693	1363	1431	103	2219	990
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	109.8	0.0	80.1	122.0	0.0	0.0	105.1	19.9	20.0	120.7	47.2	23.4
Incr Delay (d2), s/veh	10.6	0.0	1.8	0.9	0.0	0.0	13.2	1.2	1.2	31.7	7.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.6	0.0	19.9	1.2	0.0	0.0	19.3	27.8	29.3	6.5	59.9	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	120.4	0.0	81.9	122.8	0.0	0.0	118.3	21.2	21.2	152.4	54.9	23.6
LnGrp LOS	F	A	F	F	A	A	F	C	C	F	D	C
Approach Vol, veh/h		1036			17			2250			2229	
Approach Delay, s/veh		96.2			122.8			44.6			56.1	
Approach LOS		F			F			D			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	49.0	159.2		13.2	19.0	189.3		38.0				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	50.0	160.0		23.0	13.0	197.0		31.0				
Max Q Clear Time (g_c+I1), s	42.0	132.8		4.4	13.8	67.5		35.0				
Green Ext Time (p_c), s	1.1	20.4		0.0	0.0	25.1		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		59.2
HCM 6th LOS		E

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	5	90	5	60	10	2040	90	85	2550	5
Future Volume (veh/h)	10	0	5	90	5	60	10	2040	90	85	2550	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	2217	96	92	2772	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	2	10	182	96	58	22	2627	113	118	2950	5
Arrive On Green	0.09	0.00	0.08	0.09	0.09	0.08	0.02	1.00	1.00	0.07	0.81	0.80
Sat Flow, veh/h	1240	26	115	1416	1095	657	1781	3471	149	1781	3639	7
Grp Volume(v), veh/h	12	0	0	98	0	8	11	1127	1186	92	1353	1424
Grp Sat Flow(s),veh/h/ln	1381	0	0	1416	0	1752	1781	1777	1844	1781	1777	1869
Q Serve(g_s), s	0.8	0.0	0.0	7.4	0.0	0.6	0.8	0.0	0.2	6.9	81.6	81.8
Cycle Q Clear(g_c), s	1.4	0.0	0.0	8.8	0.0	0.6	0.8	0.0	0.2	6.9	81.6	81.8
Prop In Lane	0.92		0.08	1.00		0.38	1.00		0.08	1.00		0.00
Lane Grp Cap(c), veh/h	173	0	0	182	0	154	22	1345	1395	118	1440	1515
V/C Ratio(X)	0.07	0.00	0.00	0.54	0.00	0.05	0.49	0.84	0.85	0.78	0.94	0.94
Avail Cap(c_a), veh/h	300	0	0	309	0	311	145	1345	1395	251	1440	1515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.44	0.44	0.44	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.9	0.0	0.0	60.0	0.0	56.6	66.0	0.0	0.0	62.0	10.2	10.2
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.1	2.7	2.9	3.1	4.1	13.1	12.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	3.4	0.0	0.3	0.4	1.1	1.2	3.2	27.9	29.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.1	0.0	0.0	62.5	0.0	56.7	68.7	2.9	3.1	66.2	23.2	22.8
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	C	C
Approach Vol, veh/h		12			106			2324			2869	
Approach Delay, s/veh		57.1			62.0			3.3			24.4	
Approach LOS		E			E			A			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	113.4		15.9	13.0	106.2		15.9				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	87.0		23.0	19.0	79.0		23.0				
Max Q Clear Time (g_c+I1), s	2.8	83.8		10.8	8.9	2.2		3.4				
Green Ext Time (p_c), s	0.0	3.2		0.2	0.1	64.4		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		16.0
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	15	10	60	5	10	5	1965	20	5	2185	325
Future Volume (veh/h)	175	15	10	60	5	10	5	1965	20	5	2185	325
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	190	16	9	65	5	7	5	2136	22	5	2375	287
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	268	18	10	273	22	25	7	2677	28	7	2640	1178
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.01	1.00	1.00	0.00	0.74	0.74
Sat Flow, veh/h	1326	112	63	1363	133	150	1781	3603	37	1781	3554	1585
Grp Volume(v), veh/h	215	0	0	77	0	0	5	1051	1107	5	2375	287
Grp Sat Flow(s),veh/h/ln	1501	0	0	1645	0	0	1781	1777	1864	1781	1777	1585
Q Serve(g_s), s	13.3	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	69.9	7.7
Cycle Q Clear(g_c), s	18.7	0.0	0.0	5.4	0.0	0.0	0.4	0.0	0.0	0.4	69.9	7.7
Prop In Lane	0.88		0.04	0.84		0.09	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	297	0	0	320	0	0	7	1320	1385	7	2640	1178
V/C Ratio(X)	0.72	0.00	0.00	0.24	0.00	0.00	0.74	0.80	0.80	0.74	0.90	0.24
Avail Cap(c_a), veh/h	380	0	0	402	0	0	106	1320	1385	106	2640	1178
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.50	0.50	0.50	0.15	0.15	0.15
Uniform Delay (d), s/veh	54.6	0.0	0.0	49.4	0.0	0.0	66.9	0.0	0.0	67.2	13.4	5.4
Incr Delay (d2), s/veh	4.9	0.0	0.0	0.4	0.0	0.0	24.9	2.6	2.5	8.4	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	0.0	0.0	2.4	0.0	0.0	0.2	1.0	1.0	0.2	23.8	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.5	0.0	0.0	49.8	0.0	0.0	91.8	2.6	2.5	75.6	14.3	5.5
LnGrp LOS	E	A	A	D	A	A	F	A	A	E	B	A
Approach Vol, veh/h		215			77			2163			2667	
Approach Delay, s/veh		59.5			49.8			2.8			13.5	
Approach LOS		E			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.5	104.3		26.2	4.5	104.3		26.2				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	84.0		29.0	8.0	84.0		29.0				
Max Q Clear Time (g_c+I1), s	2.4	71.9		7.4	2.4	2.0		20.7				
Green Ext Time (p_c), s	0.0	12.0		0.2	0.0	72.1		0.5				

Intersection Summary			
HCM 6th Ctrl Delay			11.4
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	35	45	95	25	20	55	1755	105	25	2120	150
Future Volume (veh/h)	180	35	45	95	25	20	55	1755	105	25	2120	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.97	0.97		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	196	38	11	103	27	1	60	1908	111	27	2304	159
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	245	215	62	227	278	10	76	2515	145	34	2405	164
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.15	0.09	1.00	1.00	0.03	0.95	0.94
Sat Flow, veh/h	1343	1383	400	1320	1790	66	1781	3415	197	1781	3375	230
Grp Volume(v), veh/h	196	0	49	103	0	28	60	984	1035	27	1200	1263
Grp Sat Flow(s),veh/h/ln	1343	0	1783	1320	0	1856	1781	1777	1835	1781	1777	1828
Q Serve(g_s), s	19.3	0.0	3.2	9.9	0.0	1.7	4.5	0.0	0.0	2.0	46.7	60.5
Cycle Q Clear(g_c), s	21.0	0.0	3.2	13.1	0.0	1.7	4.5	0.0	0.0	2.0	46.7	60.5
Prop In Lane	1.00		0.22	1.00		0.04	1.00		0.11	1.00		0.13
Lane Grp Cap(c), veh/h	245	0	277	227	0	289	76	1309	1351	34	1266	1303
V/C Ratio(X)	0.80	0.00	0.18	0.45	0.00	0.10	0.79	0.75	0.77	0.80	0.95	0.97
Avail Cap(c_a), veh/h	245	0	277	227	0	289	106	1309	1351	106	1266	1303
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.28	0.28	0.28
Uniform Delay (d), s/veh	58.1	0.0	49.5	55.2	0.0	48.9	61.1	0.0	0.0	65.5	2.2	2.6
Incr Delay (d2), s/veh	17.0	0.0	0.3	1.4	0.0	0.1	1.6	0.4	0.4	4.4	5.8	7.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.9	0.0	1.5	3.4	0.0	0.8	2.0	0.1	0.1	1.0	3.9	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	75.1	0.0	49.8	56.6	0.0	49.0	62.7	0.4	0.4	69.9	8.0	10.5
LnGrp LOS	E	A	D	E	A	D	E	A	A	E	A	B
Approach Vol, veh/h		245			131			2079			2490	
Approach Delay, s/veh		70.1			55.0			2.2			9.9	
Approach LOS		E			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	100.2		25.0	6.6	103.4		25.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	93.0		20.0	8.0	93.0		20.0
Max Q Clear Time (g_c+I1), s	6.5	62.5		15.1	4.0	2.0		23.0
Green Ext Time (p_c), s	0.0	29.1		0.2	0.0	58.9		0.0

Intersection Summary	
HCM 6th Ctrl Delay	10.8
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	85	85	190	85	985	50	835	220	620	1365	40
Future Volume (veh/h)	35	85	85	190	85	985	50	835	220	620	1365	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.96	0.98		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	92	9	207	92	0	54	908	163	674	1484	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	172	202	264	442		70	876	738	712	2242	63
Arrive On Green	0.13	0.13	0.13	0.07	0.24	0.00	0.04	0.47	0.47	0.41	1.00	1.00
Sat Flow, veh/h	387	1295	1521	1781	1870	1585	1781	1870	1575	3456	3529	100
Grp Volume(v), veh/h	130	0	9	207	92	0	54	908	163	674	746	780
Grp Sat Flow(s),veh/h/ln	1682	0	1521	1781	1870	1585	1781	1870	1575	1728	1777	1852
Q Serve(g_s), s	6.1	0.0	0.7	10.0	5.3	0.0	4.1	63.3	8.3	25.4	0.0	0.0
Cycle Q Clear(g_c), s	9.6	0.0	0.7	10.0	5.3	0.0	4.1	63.3	8.3	25.4	0.0	0.0
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	258	0	202	264	442		70	876	738	712	1129	1177
V/C Ratio(X)	0.50	0.00	0.04	0.79	0.21		0.77	1.04	0.22	0.95	0.66	0.66
Avail Cap(c_a), veh/h	331	0	270	264	526		238	876	738	742	1129	1177
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.88	0.88	0.88	0.16	0.16	0.16
Uniform Delay (d), s/veh	54.8	0.0	51.1	50.0	41.4	0.0	64.3	35.9	21.3	39.0	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.1	14.4	0.2	0.0	5.8	38.2	0.6	5.0	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	0.3	3.2	2.5	0.0	1.9	37.1	3.2	9.2	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.3	0.0	51.2	64.4	41.6	0.0	70.1	74.1	21.9	43.9	0.5	0.5
LnGrp LOS	E	A	D	E	D		E	F	C	D	A	A
Approach Vol, veh/h		139			299	A		1125			2200	
Approach Delay, s/veh		56.0			57.4			66.4			13.8	
Approach LOS		E			E			E			B	

Timer - Assigned Phs	1	2	3	4	5	6	8
Phs Duration (G+Y+Rc), s	9.3	89.8	14.0	21.9	31.8	67.3	35.9
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0	5.0
Max Green Setting (Gmax), s	18.0	66.0	9.0	23.0	29.0	55.0	37.0
Max Q Clear Time (g_c+I1), s	6.1	2.0	12.0	11.6	27.4	65.3	7.3
Green Ext Time (p_c), s	0.0	28.1	0.0	0.3	0.4	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	34.5
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2035 WE Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	45	330	45	50	20	270	385	40	20	365	90
Future Volume (veh/h)	40	45	330	45	50	20	270	385	40	20	365	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	49	31	49	54	10	293	418	25	22	397	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	173	120	188	230	184	34	373	1001	847	28	639	541
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.21	0.54	0.54	0.02	0.34	0.34
Sat Flow, veh/h	536	998	1566	1307	1532	284	1781	1870	1582	1781	1870	1583
Grp Volume(v), veh/h	92	0	31	49	0	64	293	418	25	22	397	33
Grp Sat Flow(s),veh/h/ln	1535	0	1566	1307	0	1815	1781	1870	1582	1781	1870	1583
Q Serve(g_s), s	1.2	0.0	0.9	1.8	0.0	1.6	7.6	6.5	0.4	0.6	8.6	0.7
Cycle Q Clear(g_c), s	2.8	0.0	0.9	4.6	0.0	1.6	7.6	6.5	0.4	0.6	8.6	0.7
Prop In Lane	0.47		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	293	0	188	230	0	218	373	1001	847	28	639	541
V/C Ratio(X)	0.31	0.00	0.17	0.21	0.00	0.29	0.79	0.42	0.03	0.78	0.62	0.06
Avail Cap(c_a), veh/h	879	0	773	718	0	896	1099	3038	2570	549	2461	2083
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.0	0.0	19.2	22.2	0.0	19.5	18.2	6.8	5.3	23.8	13.4	10.8
Incr Delay (d2), s/veh	0.6	0.0	0.4	0.5	0.0	0.7	3.7	0.6	0.0	35.7	2.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.3	0.5	0.0	0.7	3.0	1.9	0.1	0.5	3.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	0.0	19.6	22.7	0.0	20.3	21.9	7.4	5.4	59.5	15.5	10.9
LnGrp LOS	C	A	B	C	A	C	C	A	A	E	B	B
Approach Vol, veh/h		123			113			736			452	
Approach Delay, s/veh		20.4			21.3			13.1			17.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.8	32.0		10.8	15.2	22.6		10.8
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0
Max Q Clear Time (g_c+I1), s	2.6	8.5		4.8	9.6	10.6		6.6
Green Ext Time (p_c), s	0.0	6.2		0.5	0.8	5.8		0.4

Intersection Summary	
HCM 6th Ctrl Delay	15.7
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	20	195	40	15	5	135	530	25	15	580	60
Future Volume (veh/h)	55	20	195	40	15	5	135	530	25	15	580	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	22	17	43	16	1	147	576	0	16	630	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	269	78	218	282	243	15	412	941		412	817	690
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.08	0.50	0.00	0.01	0.44	0.44
Sat Flow, veh/h	961	561	1557	1349	1740	109	1781	1870	1585	1781	1870	1580
Grp Volume(v), veh/h	82	0	17	43	0	17	147	576	0	16	630	28
Grp Sat Flow(s),veh/h/ln	1522	0	1557	1349	0	1848	1781	1870	1585	1781	1870	1580
Q Serve(g_s), s	1.4	0.0	0.4	1.4	0.0	0.4	2.0	10.3	0.0	0.2	13.3	0.5
Cycle Q Clear(g_c), s	2.1	0.0	0.4	3.5	0.0	0.4	2.0	10.3	0.0	0.2	13.3	0.5
Prop In Lane	0.73		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	347	0	218	282	0	258	412	941		412	817	690
V/C Ratio(X)	0.24	0.00	0.08	0.15	0.00	0.07	0.36	0.61		0.04	0.77	0.04
Avail Cap(c_a), veh/h	937	0	839	820	0	997	848	2057		967	2057	1737
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.0	0.0	17.3	19.7	0.0	17.3	8.3	8.3	0.0	7.7	11.1	7.5
Incr Delay (d2), s/veh	0.3	0.0	0.2	0.2	0.0	0.1	0.5	0.7	0.0	0.0	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.2	0.4	0.0	0.2	0.5	2.9	0.0	0.1	4.3	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.4	0.0	17.5	19.9	0.0	17.4	8.8	8.9	0.0	7.7	12.7	7.5
LnGrp LOS	B	A	B	B	A	B	A	A		A	B	A
Approach Vol, veh/h		99			60			723	A		674	
Approach Delay, s/veh		18.2			19.2			8.9			12.3	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.6	29.3		11.5	8.6	26.3		11.5
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	12.3		4.1	4.0	15.3		5.5
Green Ext Time (p_c), s	0.0	4.1		0.4	0.3	4.8		0.1

Intersection Summary	
HCM 6th Ctrl Delay	11.4
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	5	85	10	5	10	80	640	15	5	780	50
Future Volume (veh/h)	40	5	85	10	5	10	80	640	15	5	780	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	5	4	11	5	1	87	696	11	5	848	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	58	98	79	20	152	129	115	1104	936	7	991	839
Arrive On Green	0.03	0.10	0.10	0.01	0.08	0.08	0.06	0.59	0.59	0.00	0.53	0.53
Sat Flow, veh/h	1781	957	766	1781	1870	1585	1781	1870	1585	1781	1870	1584
Grp Volume(v), veh/h	43	0	9	11	5	1	87	696	11	5	848	31
Grp Sat Flow(s),veh/h/ln	1781	0	1723	1781	1870	1585	1781	1870	1585	1781	1870	1584
Q Serve(g_s), s	1.6	0.0	0.3	0.4	0.2	0.0	3.3	16.6	0.2	0.2	26.7	0.6
Cycle Q Clear(g_c), s	1.6	0.0	0.3	0.4	0.2	0.0	3.3	16.6	0.2	0.2	26.7	0.6
Prop In Lane	1.00		0.44	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	58	0	177	20	152	129	115	1104	936	7	991	839
V/C Ratio(X)	0.74	0.00	0.05	0.56	0.03	0.01	0.76	0.63	0.01	0.71	0.86	0.04
Avail Cap(c_a), veh/h	520	0	528	520	573	486	650	1775	1504	650	1775	1503
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.8	0.0	27.7	33.7	29.0	28.9	31.5	9.2	5.8	34.1	13.9	7.7
Incr Delay (d2), s/veh	16.7	0.0	0.1	22.6	0.1	0.0	9.7	0.6	0.0	81.6	2.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.1	0.3	0.1	0.0	1.7	5.4	0.1	0.2	9.7	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.5	0.0	27.8	56.3	29.1	29.0	41.2	9.8	5.8	115.7	16.1	7.7
LnGrp LOS	D	A	C	E	C	C	D	A	A	F	B	A
Approach Vol, veh/h		52			17			794			884	
Approach Delay, s/veh		45.7			46.7			13.1			16.4	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	45.4	5.8	12.0	9.4	41.3	7.2	10.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.2	18.6	2.4	2.3	5.3	28.7	3.6	2.2
Green Ext Time (p_c), s	0.0	5.6	0.0	0.0	0.2	7.6	0.1	0.0

Intersection Summary		
HCM 6th Ctrl Delay		16.1
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	10	595	10	0	5	410	685	5	0	845	50
Future Volume (veh/h)	50	10	595	10	0	5	410	685	5	0	845	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	11	0	11	0	1	446	745	5	0	918	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	174	15		189	4	8	509	2795	19	3	1512	672
Arrive On Green	0.07	0.06	0.00	0.07	0.00	0.06	0.29	0.77	0.77	0.00	0.43	0.43
Sat Flow, veh/h	1245	254	1585	1429	64	136	1781	3619	24	1781	3554	1579
Grp Volume(v), veh/h	65	0	0	12	0	0	446	366	384	0	918	19
Grp Sat Flow(s),veh/h/ln	1499	0	1585	1629	0	0	1781	1777	1866	1781	1777	1579
Q Serve(g_s), s	2.3	0.0	0.0	0.0	0.0	0.0	15.5	3.8	3.8	0.0	13.0	0.5
Cycle Q Clear(g_c), s	2.7	0.0	0.0	0.4	0.0	0.0	15.5	3.8	3.8	0.0	13.0	0.5
Prop In Lane	0.83		1.00	0.92		0.08	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	211	0		226	0	0	509	1373	1442	3	1512	672
V/C Ratio(X)	0.31	0.00		0.05	0.00	0.00	0.88	0.27	0.27	0.00	0.61	0.03
Avail Cap(c_a), veh/h	580	0		690	0	0	1950	1891	1985	1950	3781	1680
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	29.6	0.0	0.0	28.5	0.0	0.0	22.1	2.1	2.1	0.0	14.4	10.8
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.1	0.0	0.0	2.0	0.2	0.2	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	0.2	0.0	0.0	6.1	0.5	0.6	0.0	4.7	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.4	0.0	0.0	28.6	0.0	0.0	24.0	2.3	2.3	0.0	15.3	10.9
LnGrp LOS	C	A		C	A	A	C	A	A	A	B	B
Approach Vol, veh/h		65	A		12			1196			937	
Approach Delay, s/veh		30.4			28.6			10.4			15.2	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	22.5	33.6		8.8	0.0	56.1		8.8				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0				
Max Q Clear Time (g_c+I1), s	17.5	15.0		2.4	0.0	5.8		4.7				
Green Ext Time (p_c), s	1.0	12.6		0.0	0.0	8.4		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		13.1
HCM 6th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	145	15	5	15	105	1065	20	10	1440	65
Future Volume (veh/h)	55	5	145	15	5	15	105	1065	20	10	1440	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	5	16	5	1	114	1158	21	11	1565	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	207	13	134	139	33	4	145	2605	47	14	2331	1038
Arrive On Green	0.10	0.09	0.09	0.10	0.09	0.09	0.08	0.73	0.73	0.01	0.66	0.66
Sat Flow, veh/h	1389	155	1547	701	385	52	1781	3571	65	1781	3554	1581
Grp Volume(v), veh/h	65	0	5	22	0	0	114	576	603	11	1565	43
Grp Sat Flow(s),veh/h/ln	1544	0	1547	1139	0	0	1781	1777	1859	1781	1777	1581
Q Serve(g_s), s	0.0	0.0	0.2	0.2	0.0	0.0	5.0	10.4	10.4	0.5	21.6	0.8
Cycle Q Clear(g_c), s	2.7	0.0	0.2	2.9	0.0	0.0	5.0	10.4	10.4	0.5	21.6	0.8
Prop In Lane	0.92		1.00	0.73		0.05	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	240	0	134	191	0	0	145	1296	1356	14	2331	1038
V/C Ratio(X)	0.27	0.00	0.04	0.12	0.00	0.00	0.78	0.44	0.44	0.76	0.67	0.04
Avail Cap(c_a), veh/h	525	0	446	488	0	0	469	1915	2003	246	3384	1506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.1	0.0	33.4	33.6	0.0	0.0	36.0	4.3	4.3	39.5	8.4	4.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.5	0.5	0.5	25.4	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.1	0.4	0.0	0.0	2.2	2.6	2.7	0.3	6.6	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.3	0.0	33.4	33.7	0.0	0.0	39.4	4.8	4.8	64.9	9.2	4.9
LnGrp LOS	C	A	C	C	A	A	D	A	A	E	A	A
Approach Vol, veh/h		70			22			1293			1619	
Approach Delay, s/veh		34.2			33.7			7.9			9.4	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.5	57.4		11.9	4.6	63.2		11.9
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	7.0	23.6		4.9	2.5	12.4		4.7
Green Ext Time (p_c), s	0.1	28.8		0.0	0.0	17.6		0.1

Intersection Summary		
HCM 6th Ctrl Delay		9.5
HCM 6th LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	180	45	5	35	110	1140	50	30	1520	75
Future Volume (veh/h)	60	5	180	45	5	35	110	1140	50	30	1520	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	11	49	5	2	120	1239	34	33	1652	47
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	17	220	215	177	71	153	2333	1041	56	2140	955
Arrive On Green	0.15	0.14	0.14	0.14	0.14	0.14	0.09	0.66	0.66	0.03	0.60	0.60
Sat Flow, veh/h	1297	122	1578	1392	1269	508	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	70	0	11	49	0	7	120	1239	34	33	1652	47
Grp Sat Flow(s),veh/h/ln	1418	0	1578	1392	0	1776	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.6	0.0	0.5	2.9	0.0	0.3	5.8	16.0	0.7	1.6	30.1	1.1
Cycle Q Clear(g_c), s	3.9	0.0	0.5	6.8	0.0	0.3	5.8	16.0	0.7	1.6	30.1	1.1
Prop In Lane	0.93		1.00	1.00		0.29	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	294	0	220	215	0	248	153	2333	1041	56	2140	955
V/C Ratio(X)	0.24	0.00	0.05	0.23	0.00	0.03	0.78	0.53	0.03	0.59	0.77	0.05
Avail Cap(c_a), veh/h	488	0	435	404	0	490	429	2815	1256	245	2448	1092
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.5	0.0	32.5	37.0	0.0	32.4	39.0	7.9	5.2	41.6	12.9	7.1
Incr Delay (d2), s/veh	0.4	0.0	0.1	0.5	0.0	0.0	3.3	0.4	0.0	3.6	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.2	1.0	0.0	0.1	2.6	5.1	0.2	0.7	10.6	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	0.0	32.6	37.5	0.0	32.4	42.3	8.3	5.3	45.2	14.7	7.1
LnGrp LOS	C	A	C	D	A	C	D	A	A	D	B	A
Approach Vol, veh/h		81			56			1393			1732	
Approach Delay, s/veh		33.8			36.9			11.1			15.1	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.5	58.5		17.2	6.7	63.2		17.2
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	60.0		24.0	12.0	69.0		24.0
Max Q Clear Time (g_c+I1), s	7.8	32.1		8.8	3.6	18.0		5.9
Green Ext Time (p_c), s	0.2	20.4		0.1	0.0	19.8		0.2

Intersection Summary			
HCM 6th Ctrl Delay			14.2
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	305	5	585	15	5	20	445	1200	15	55	1455	230
Future Volume (veh/h)	305	5	585	15	5	20	445	1200	15	55	1455	230
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	336	0	436	16	5	7	484	1304	16	60	1582	200
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	540	0	992	39	12	17	579	2361	29	101	1941	865
Arrive On Green	0.15	0.00	0.15	0.04	0.04	0.02	0.17	0.66	0.64	0.06	0.55	0.55
Sat Flow, veh/h	3563	0	3170	996	311	436	3456	3595	44	1781	3554	1584
Grp Volume(v), veh/h	336	0	436	28	0	0	484	644	676	60	1582	200
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1742	0	0	1728	1777	1862	1781	1777	1584
Q Serve(g_s), s	14.8	0.0	18.4	2.6	0.0	0.0	22.8	32.8	32.8	5.5	61.2	11.0
Cycle Q Clear(g_c), s	14.8	0.0	18.4	2.6	0.0	0.0	22.8	32.8	32.8	5.5	61.2	11.0
Prop In Lane	1.00		1.00	0.57		0.25	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	540	0	992	69	0	0	579	1167	1223	101	1941	865
V/C Ratio(X)	0.62	0.00	0.44	0.41	0.00	0.00	0.84	0.55	0.55	0.59	0.82	0.23
Avail Cap(c_a), veh/h	721	0	1154	322	0	0	1193	2052	2151	159	3195	1424
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.8	0.0	46.0	79.1	0.0	0.0	67.7	15.5	15.5	77.3	31.2	19.8
Incr Delay (d2), s/veh	0.4	0.0	0.1	1.4	0.0	0.0	1.3	0.6	0.6	2.0	1.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.9	0.0	7.4	1.2	0.0	0.0	10.2	13.2	13.9	2.6	26.1	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.2	0.0	46.1	80.5	0.0	0.0	68.9	16.1	16.1	79.4	32.4	20.0
LnGrp LOS	E	A	D	F	A	A	E	B	B	E	C	B
Approach Vol, veh/h		772			28			1804			1842	
Approach Delay, s/veh		55.3			80.5			30.3			32.6	
Approach LOS		E			F			C			C	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	32.1	95.7	10.6	13.6	114.3	29.5
Change Period (Y+Rc), s	6.0	6.0	7.0	6.0	6.0	7.0
Max Green Setting (Gmax), s	56.0	149.0	28.0	13.0	192.0	31.0
Max Q Clear Time (g_c+I1), s	24.8	63.2	4.6	7.5	34.8	20.4
Green Ext Time (p_c), s	1.3	26.6	0.0	0.0	13.6	2.1

Intersection Summary	
HCM 6th Ctrl Delay	35.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	135	5	60	5	1550	90	90	2055	10
Future Volume (veh/h)	5	0	5	135	5	60	5	1550	90	90	2055	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1685	95	98	2234	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2439	137	124	2815	14
Arrive On Green	0.13	0.00	0.12	0.13	0.13	0.12	0.01	0.95	0.94	0.07	0.78	0.77
Sat Flow, veh/h	1144	37	236	1416	858	858	1781	3421	192	1781	3626	18
Grp Volume(v), veh/h	6	0	0	147	0	10	5	870	910	98	1094	1151
Grp Sat Flow(s),veh/h/ln	1418	0	0	1416	0	1716	1781	1777	1836	1781	1777	1867
Q Serve(g_s), s	0.0	0.0	0.0	12.3	0.0	0.7	0.4	9.5	10.0	7.0	46.6	46.8
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	9.5	10.0	7.0	46.6	46.8
Prop In Lane	0.83		0.17	1.00		0.50	1.00		0.10	1.00		0.01
Lane Grp Cap(c), veh/h	228	0	0	234	0	215	11	1267	1309	124	1379	1449
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.69	0.70	0.79	0.79	0.79
Avail Cap(c_a), veh/h	313	0	0	319	0	317	151	1267	1309	151	1379	1449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.74	0.74	0.74	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	0.0	0.0	55.4	0.0	50.3	64.2	1.2	1.3	59.5	8.5	8.5
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.7	0.0	0.1	7.3	2.3	2.3	16.4	4.8	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	4.9	0.0	0.3	0.2	2.0	2.2	3.7	15.9	16.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.4	71.5	3.5	3.5	76.0	13.2	13.1
LnGrp LOS	D	A	A	E	A	D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1785			2343	
Approach Delay, s/veh		50.0			57.6			3.7			15.8	
Approach LOS		D			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.8	104.9		20.3	13.1	96.7		20.3				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	82.0		23.0	11.0	82.0		23.0				
Max Q Clear Time (g_c+I1), s	2.4	48.8		15.0	9.0	12.0		2.7				
Green Ext Time (p_c), s	0.0	30.0		0.3	0.0	39.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			12.3									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	5	15	65	5	15	15	1490	15	10	1830	260
Future Volume (veh/h)	135	5	15	65	5	15	15	1490	15	10	1830	260
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	147	5	13	71	5	9	16	1620	16	11	1989	218
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	6	16	227	17	23	19	2773	27	13	2722	1213
Arrive On Green	0.13	0.13	0.12	0.13	0.13	0.12	0.01	0.77	0.76	0.01	0.77	0.77
Sat Flow, veh/h	1344	46	119	1341	132	175	1781	3605	36	1781	3554	1584
Grp Volume(v), veh/h	165	0	0	85	0	0	16	798	838	11	1989	218
Grp Sat Flow(s),veh/h/ln	1509	0	0	1648	0	0	1781	1777	1864	1781	1777	1584
Q Serve(g_s), s	7.7	0.0	0.0	0.0	0.0	0.0	1.2	24.5	24.5	0.8	38.7	4.9
Cycle Q Clear(g_c), s	13.7	0.0	0.0	5.9	0.0	0.0	1.2	24.5	24.5	0.8	38.7	4.9
Prop In Lane	0.89		0.08	0.84		0.11	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	250	0	0	267	0	0	19	1367	1434	13	2722	1213
V/C Ratio(X)	0.66	0.00	0.00	0.32	0.00	0.00	0.84	0.58	0.58	0.82	0.73	0.18
Avail Cap(c_a), veh/h	348	0	0	366	0	0	110	1367	1434	110	2722	1213
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.65	0.65	0.65	0.48	0.48	0.48
Uniform Delay (d), s/veh	54.8	0.0	0.0	51.7	0.0	0.0	64.2	6.3	6.3	64.4	8.1	4.1
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.7	0.0	0.0	20.2	1.2	1.1	18.7	0.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	0.0	2.6	0.0	0.0	0.6	8.1	8.4	0.4	12.4	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.8	0.0	0.0	52.4	0.0	0.0	84.4	7.5	7.4	83.1	8.9	4.3
LnGrp LOS	E	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		165			85			1652			2218	
Approach Delay, s/veh		57.8			52.4			8.2			8.9	
Approach LOS		E			D			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	103.6		21.0	5.0	104.0		21.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	83.0		25.0	8.0	83.0		25.0				
Max Q Clear Time (g_c+I1), s	3.2	40.7		7.9	2.8	26.5		15.7				
Green Ext Time (p_c), s	0.0	38.6		0.2	0.0	39.1		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			11.4									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	20	50	90	20	20	60	1530	60	15	1840	130
Future Volume (veh/h)	190	20	50	90	20	20	60	1530	60	15	1840	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	207	22	6	98	22	2	65	1663	63	16	2000	137
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	292	258	70	288	308	28	83	2495	94	19	2292	155
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.17	0.06	0.95	0.94	0.02	1.00	1.00
Sat Flow, veh/h	1381	1413	385	1376	1688	153	1781	3491	132	1781	3377	229
Grp Volume(v), veh/h	207	0	28	98	0	24	65	843	883	16	1041	1096
Grp Sat Flow(s),veh/h/ln	1381	0	1799	1376	0	1842	1781	1777	1846	1781	1777	1829
Q Serve(g_s), s	19.0	0.0	1.7	8.3	0.0	1.4	4.7	8.3	8.6	1.2	0.0	0.0
Cycle Q Clear(g_c), s	20.4	0.0	1.7	10.0	0.0	1.4	4.7	8.3	8.6	1.2	0.0	0.0
Prop In Lane	1.00		0.21	1.00		0.08	1.00		0.07	1.00		0.13
Lane Grp Cap(c), veh/h	292	0	328	288	0	336	83	1270	1319	19	1206	1241
V/C Ratio(X)	0.71	0.00	0.09	0.34	0.00	0.07	0.78	0.66	0.67	0.84	0.86	0.88
Avail Cap(c_a), veh/h	327	0	374	323	0	383	110	1270	1319	110	1206	1241
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.56	0.56	0.56
Uniform Delay (d), s/veh	52.5	0.0	44.1	48.3	0.0	44.1	60.3	1.1	1.1	63.5	0.0	0.0
Incr Delay (d2), s/veh	6.1	0.0	0.1	0.7	0.0	0.1	1.8	0.3	0.2	17.9	4.9	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	0.0	0.8	2.9	0.0	0.7	2.1	1.2	1.3	0.6	1.6	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.5	0.0	44.3	49.0	0.0	44.2	62.1	1.4	1.4	81.4	4.9	5.5
LnGrp LOS	E	A	D	D	A	D	E	A	A	F	A	A
Approach Vol, veh/h		235			122			1791			2153	
Approach Delay, s/veh		56.8			48.0			3.6			5.8	
Approach LOS		E			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	92.2		27.7	5.4	96.9		27.7
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	82.0		26.0	8.0	82.0		26.0
Max Q Clear Time (g_c+I1), s	6.7	2.0		12.0	3.2	10.6		22.4
Green Ext Time (p_c), s	0.0	59.7		0.3	0.0	37.6		0.3

Intersection Summary	
HCM 6th Ctrl Delay	8.9
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	65	70	195	90	790	50	750	190	520	1220	75
Future Volume (veh/h)	25	65	70	195	90	790	50	750	190	520	1220	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.94	0.96		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	27	71	10	212	98	0	54	815	147	565	1326	79
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	191	208	348	505		70	863	723	610	2040	121
Arrive On Green	0.14	0.14	0.14	0.10	0.27	0.00	0.04	0.46	0.46	0.18	0.60	0.59
Sat Flow, veh/h	327	1374	1493	1781	1870	1585	1781	1870	1566	3456	3408	203
Grp Volume(v), veh/h	98	0	10	212	98	0	54	815	147	565	690	715
Grp Sat Flow(s),veh/h/ln	1701	0	1493	1781	1870	1585	1781	1870	1566	1728	1777	1834
Q Serve(g_s), s	1.4	0.0	0.8	13.0	5.2	0.0	3.9	54.1	7.3	20.9	33.1	33.4
Cycle Q Clear(g_c), s	6.4	0.0	0.8	13.0	5.2	0.0	3.9	54.1	7.3	20.9	33.1	33.4
Prop In Lane	0.28		1.00	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	272	0	208	348	505		70	863	723	610	1064	1098
V/C Ratio(X)	0.36	0.00	0.05	0.61	0.19		0.77	0.94	0.20	0.93	0.65	0.65
Avail Cap(c_a), veh/h	372	0	299	348	619		301	863	723	611	1064	1098
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.36	0.36	0.36
Uniform Delay (d), s/veh	50.9	0.0	48.5	41.4	36.6	0.0	61.9	33.4	20.8	52.7	17.1	17.2
Incr Delay (d2), s/veh	0.8	0.0	0.1	3.1	0.2	0.0	5.2	16.8	0.5	9.0	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.3	6.1	2.5	0.0	1.9	27.6	2.8	9.8	13.2	13.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	0.0	48.6	44.5	36.8	0.0	67.1	50.2	21.3	61.7	18.2	18.3
LnGrp LOS	D	A	D	D	D		E	D	C	E	B	B
Approach Vol, veh/h		108			310	A		1016			1970	
Approach Delay, s/veh		51.4			42.0			46.9			30.7	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.1	81.8	17.0	22.1	26.9	64.0		39.1
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	22.0	52.0	12.0	25.0	23.0	51.0		42.0
Max Q Clear Time (g_c+I1), s	15.9	35.4	15.0	8.4	22.9	56.1		7.2
Green Ext Time (p_c), s	0.1	11.4	0.0	0.3	0.0	0.0		0.4

Intersection Summary	
HCM 6th Ctrl Delay	37.2
HCM 6th LOS	D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2022 Scenario 1 AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	45	295	90	50	20	225	235	105	10	135	30
Future Volume (veh/h)	50	45	295	90	50	20	225	235	105	10	135	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	49	42	98	54	11	245	255	53	11	147	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	239	165	258	327	247	50	328	797	675	15	469	397
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.18	0.43	0.43	0.01	0.25	0.25
Sat Flow, veh/h	615	1003	1571	1297	1505	307	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	103	0	42	98	0	65	245	255	53	11	147	8
Grp Sat Flow(s),veh/h/ln	1618	0	1571	1297	0	1812	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.5	0.0	0.9	2.9	0.0	1.2	5.2	3.6	0.8	0.2	2.5	0.2
Cycle Q Clear(g_c), s	2.0	0.0	0.9	4.9	0.0	1.2	5.2	3.6	0.8	0.2	2.5	0.2
Prop In Lane	0.52		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	403	0	258	327	0	297	328	797	675	15	469	397
V/C Ratio(X)	0.26	0.00	0.16	0.30	0.00	0.22	0.75	0.32	0.08	0.72	0.31	0.02
Avail Cap(c_a), veh/h	1077	0	945	895	0	1090	1340	3704	3139	670	3001	2543
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.8	0.0	14.3	17.0	0.0	14.5	15.4	7.6	6.8	19.7	12.2	11.3
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.5	0.0	0.4	3.4	0.5	0.1	46.6	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.3	0.8	0.0	0.5	2.0	1.1	0.2	0.3	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.1	0.0	14.6	17.5	0.0	14.8	18.8	8.1	6.9	66.4	13.0	11.3
LnGrp LOS	B	A	B	B	A	B	B	A	A	E	B	B
Approach Vol, veh/h		145			163			553			166	
Approach Delay, s/veh		14.9			16.4			12.7			16.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.3	23.0		11.5	12.3	16.0		11.5				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.2	5.6		4.0	7.2	4.5		6.9				
Green Ext Time (p_c), s	0.0	3.8		0.6	0.7	1.8		0.6				

Intersection Summary			
HCM 6th Ctrl Delay			14.2
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	180	90	20	15	140	535	15	10	515	65
Future Volume (veh/h)	60	5	180	90	20	15	140	535	15	10	515	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	20	98	22	2	152	582	0	11	560	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	381	24	308	347	336	31	413	882		353	726	611
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.09	0.47	0.00	0.01	0.39	0.39
Sat Flow, veh/h	1214	122	1545	1356	1685	153	1781	1870	1585	1781	1870	1573
Grp Volume(v), veh/h	70	0	20	98	0	24	152	582	0	11	560	28
Grp Sat Flow(s),veh/h/ln	1337	0	1545	1356	0	1838	1781	1870	1585	1781	1870	1573
Q Serve(g_s), s	1.9	0.0	0.5	3.3	0.0	0.5	2.3	11.9	0.0	0.2	13.1	0.6
Cycle Q Clear(g_c), s	2.5	0.0	0.5	5.8	0.0	0.5	2.3	11.9	0.0	0.2	13.1	0.6
Prop In Lane	0.93		1.00	1.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	406	0	308	347	0	367	413	882		353	726	611
V/C Ratio(X)	0.17	0.00	0.06	0.28	0.00	0.07	0.37	0.66		0.03	0.77	0.05
Avail Cap(c_a), veh/h	822	0	774	756	0	920	784	1911		873	1911	1607
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.1	0.0	16.2	19.4	0.0	16.2	9.2	10.1	0.0	9.8	13.3	9.5
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.4	0.0	0.1	0.5	0.9	0.0	0.0	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.2	1.0	0.0	0.2	0.7	3.8	0.0	0.1	4.7	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.3	0.0	16.3	19.9	0.0	16.3	9.8	11.0	0.0	9.8	15.1	9.5
LnGrp LOS	B	A	B	B	A	B	A	B		A	B	A
Approach Vol, veh/h		90			122			734	A		599	
Approach Delay, s/veh		17.1			19.2			10.7			14.7	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	29.5		15.0	9.6	25.4		15.0				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0				
Max Q Clear Time (g_c+I1), s	2.2	13.9		4.5	4.3	15.1		7.8				
Green Ext Time (p_c), s	0.0	4.2		0.4	0.3	4.1		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	5	125	40	15	20	60	605	20	10	715	30
Future Volume (veh/h)	40	5	125	40	15	20	60	605	20	10	715	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	5	7	43	16	1	65	658	12	11	777	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	59	87	121	59	232	195	85	993	841	15	919	779
Arrive On Green	0.03	0.12	0.12	0.03	0.12	0.12	0.05	0.53	0.53	0.01	0.49	0.49
Sat Flow, veh/h	1781	699	979	1781	1870	1573	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	43	0	12	43	16	1	65	658	12	11	777	17
Grp Sat Flow(s),veh/h/ln	1781	0	1679	1781	1870	1573	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.6	0.0	0.4	1.6	0.5	0.0	2.4	16.8	0.2	0.4	23.8	0.4
Cycle Q Clear(g_c), s	1.6	0.0	0.4	1.6	0.5	0.0	2.4	16.8	0.2	0.4	23.8	0.4
Prop In Lane	1.00		0.58	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	59	0	208	59	232	195	85	993	841	15	919	779
V/C Ratio(X)	0.73	0.00	0.06	0.73	0.07	0.01	0.77	0.66	0.01	0.74	0.85	0.02
Avail Cap(c_a), veh/h	541	0	536	541	597	502	677	1848	1566	677	1848	1566
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.5	0.0	25.4	31.5	25.5	25.3	31.0	11.2	7.3	32.6	14.6	8.6
Incr Delay (d2), s/veh	15.8	0.0	0.1	15.8	0.1	0.0	13.5	0.8	0.0	52.4	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.2	0.9	0.2	0.0	1.3	5.7	0.1	0.4	8.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.3	0.0	25.5	47.3	25.6	25.3	44.5	11.9	7.3	85.0	16.8	8.6
LnGrp LOS	D	A	C	D	C	C	D	B	A	F	B	A
Approach Vol, veh/h		55			60			735			805	
Approach Delay, s/veh		42.5			41.1			14.7			17.6	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.5	39.9	7.2	13.2	8.1	37.3	7.2	13.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.4	18.8	3.6	2.4	4.4	25.8	3.6	2.5
Green Ext Time (p_c), s	0.0	5.1	0.1	0.0	0.1	6.6	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	18.0
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	10	480	20	5	0	315	685	45	10	835	10
Future Volume (veh/h)	35	10	480	20	5	0	315	685	45	10	835	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	11	0	22	5	0	342	745	48	11	908	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	191	31		196	31	0	409	2240	144	15	1562	696
Arrive On Green	0.09	0.07	0.00	0.09	0.07	0.00	0.23	0.66	0.66	0.01	0.44	0.44
Sat Flow, veh/h	1116	420	1585	1150	422	0	1781	3390	218	1781	3554	1585
Grp Volume(v), veh/h	49	0	0	27	0	0	342	390	403	11	908	3
Grp Sat Flow(s),veh/h/ln	1536	0	1585	1572	0	0	1781	1777	1831	1781	1777	1585
Q Serve(g_s), s	0.8	0.0	0.0	0.0	0.0	0.0	10.6	5.6	5.6	0.4	11.2	0.1
Cycle Q Clear(g_c), s	1.6	0.0	0.0	0.8	0.0	0.0	10.6	5.6	5.6	0.4	11.2	0.1
Prop In Lane	0.78		1.00	0.81		0.00	1.00		0.12	1.00		1.00
Lane Grp Cap(c), veh/h	248	0		254	0	0	409	1174	1210	15	1562	696
V/C Ratio(X)	0.20	0.00		0.11	0.00	0.00	0.84	0.33	0.33	0.74	0.58	0.00
Avail Cap(c_a), veh/h	651	0		777	0	0	2023	2262	2331	2023	4525	2018
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.3	0.0	0.0	25.0	0.0	0.0	21.3	4.3	4.3	28.8	12.3	9.2
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	1.8	0.4	0.3	22.5	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.3	0.0	0.0	4.1	1.3	1.3	0.2	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.7	0.0	0.0	25.1	0.0	0.0	23.1	4.6	4.6	51.3	13.0	9.2
LnGrp LOS	C	A		C	A	A	C	A	A	D	B	A
Approach Vol, veh/h		49	A		27			1135			922	
Approach Delay, s/veh		25.7			25.1			10.2			13.4	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	17.4	31.5	9.2	4.5	44.4	9.2
Change Period (Y+Rc), s	4.0	6.0	5.0	4.0	6.0	5.0
Max Green Setting (Gmax), s	66.0	74.0	25.0	66.0	74.0	20.0
Max Q Clear Time (g_c+I1), s	12.6	13.2	2.8	2.4	7.6	3.6
Green Ext Time (p_c), s	0.8	12.4	0.0	0.0	9.2	0.1

Intersection Summary	
HCM 6th Ctrl Delay	12.1
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	70	10	5	10	135	1095	20	15	1305	70
Future Volume (veh/h)	30	0	70	10	5	10	135	1095	20	15	1305	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	0	1	11	5	1	147	1190	21	16	1418	47
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	176	0	72	119	19	3	186	2637	47	20	2293	1023
Arrive On Green	0.06	0.00	0.05	0.06	0.05	0.05	0.10	0.74	0.74	0.01	0.65	0.65
Sat Flow, veh/h	1559	0	1585	700	424	70	1781	3573	63	1781	3554	1585
Grp Volume(v), veh/h	33	0	1	17	0	0	147	592	619	16	1418	47
Grp Sat Flow(s),veh/h/ln	1559	0	1585	1194	0	0	1781	1777	1859	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	5.5	8.9	8.9	0.6	16.1	0.7
Cycle Q Clear(g_c), s	1.2	0.0	0.0	1.6	0.0	0.0	5.5	8.9	8.9	0.6	16.1	0.7
Prop In Lane	1.00		1.00	0.65		0.06	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	199	0	72	159	0	0	186	1311	1372	20	2293	1023
V/C Ratio(X)	0.17	0.00	0.01	0.11	0.00	0.00	0.79	0.45	0.45	0.78	0.62	0.05
Avail Cap(c_a), veh/h	610	0	534	606	0	0	548	2238	2342	287	3956	1765
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.2	0.0	31.1	31.6	0.0	0.0	29.8	3.5	3.5	33.7	7.2	4.4
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.1	0.0	0.0	2.8	0.5	0.5	20.7	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.3	0.0	0.0	2.4	1.8	1.9	0.4	4.5	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.3	0.0	31.2	31.8	0.0	0.0	32.7	4.0	4.0	54.4	7.7	4.5
LnGrp LOS	C	A	C	C	A	A	C	A	A	D	A	A
Approach Vol, veh/h		34			17			1358			1481	
Approach Delay, s/veh		31.3			31.8			7.1			8.1	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.1	49.0		8.1	4.8	55.4		8.1
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	7.5	18.1		3.6	2.6	10.9		3.2
Green Ext Time (p_c), s	0.1	26.0		0.0	0.0	18.6		0.0

Intersection Summary		
HCM 6th Ctrl Delay		8.1
HCM 6th LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	35	40	15	45	110	1235	60	30	1250	45
Future Volume (veh/h)	55	5	35	40	15	45	110	1235	60	30	1250	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	1	43	16	1	120	1342	50	33	1359	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	12	152	111	168	10	142	2780	1240	44	2584	1153
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.08	0.78	0.78	0.02	0.73	0.73
Sat Flow, veh/h	1198	121	1580	1407	1742	109	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	65	0	1	43	0	17	120	1342	50	33	1359	35
Grp Sat Flow(s),veh/h/ln	1318	0	1580	1407	0	1850	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	6.6	0.0	0.1	4.7	0.0	1.3	10.3	20.5	1.1	2.9	26.2	1.0
Cycle Q Clear(g_c), s	7.8	0.0	0.1	12.5	0.0	1.3	10.3	20.5	1.1	2.9	26.2	1.0
Prop In Lane	0.92		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	172	0	152	111	0	178	142	2780	1240	44	2584	1153
V/C Ratio(X)	0.38	0.00	0.01	0.39	0.00	0.10	0.84	0.48	0.04	0.76	0.53	0.03
Avail Cap(c_a), veh/h	255	0	245	193	0	287	241	2780	1240	241	2584	1153
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.73	0.73	0.73	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.3	0.0	63.3	72.8	0.0	63.9	70.4	5.9	3.8	75.1	9.3	5.9
Incr Delay (d2), s/veh	1.4	0.0	0.0	2.2	0.0	0.2	3.8	0.4	0.0	9.5	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	0.0	1.8	0.0	0.6	4.8	6.9	0.3	1.4	9.8	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.7	0.0	63.3	75.0	0.0	64.1	74.2	6.3	3.8	84.7	10.1	5.9
LnGrp LOS	E	A	E	E	A	E	E	A	A	F	B	A
Approach Vol, veh/h		66			60			1512			1427	
Approach Delay, s/veh		68.6			71.9			11.6			11.7	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.7		19.9	7.8	127.3		19.9
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	28.2		14.5	4.9	22.5		9.8
Green Ext Time (p_c), s	0.1	25.2		0.1	0.0	25.5		0.1

Intersection Summary			
HCM 6th Ctrl Delay			14.1
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	10	220	10	10	10	425	1315	15	80	1205	100
Future Volume (veh/h)	135	10	220	10	10	10	425	1315	15	80	1205	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	155	0	60	11	11	3	462	1429	16	87	1310	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	338	0	826	63	63	17	614	2107	24	153	1754	915
Arrive On Green	0.09	0.00	0.09	0.08	0.08	0.05	0.18	0.59	0.57	0.09	0.49	0.49
Sat Flow, veh/h	3563	0	3077	786	786	214	3456	3600	40	1781	3554	1579
Grp Volume(v), veh/h	155	0	60	25	0	0	462	705	740	87	1310	80
Grp Sat Flow(s),veh/h/ln	1781	0	1539	1787	0	0	1728	1777	1863	1781	1777	1579
Q Serve(g_s), s	4.3	0.0	1.5	1.4	0.0	0.0	13.2	28.4	28.5	4.9	30.8	2.3
Cycle Q Clear(g_c), s	4.3	0.0	1.5	1.4	0.0	0.0	13.2	28.4	28.5	4.9	30.8	2.3
Prop In Lane	1.00		1.00	0.44		0.12	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	338	0	826	143	0	0	614	1040	1091	153	1754	915
V/C Ratio(X)	0.46	0.00	0.07	0.17	0.00	0.00	0.75	0.68	0.68	0.57	0.75	0.09
Avail Cap(c_a), veh/h	1164	0	1539	532	0	0	1925	3311	3472	257	5155	2426
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.6	0.0	28.8	44.8	0.0	0.0	40.6	14.8	14.9	45.7	21.1	9.7
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.6	0.0	0.0	0.7	1.1	1.1	1.2	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.6	0.6	0.0	0.0	5.6	10.7	11.2	2.2	12.2	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.9	0.0	28.8	45.4	0.0	0.0	41.3	15.9	15.9	47.0	22.1	9.8
LnGrp LOS	D	A	C	D	A	A	D	B	B	D	C	A
Approach Vol, veh/h		215			25			1907			1477	
Approach Delay, s/veh		40.4			45.4			22.1			22.9	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	22.5	55.4		12.3	12.9	64.9		13.9
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	15.2	32.8		3.4	6.9	30.5		6.3
Green Ext Time (p_c), s	1.3	16.6		0.0	0.1	16.6		0.6

Intersection Summary	
HCM 6th Ctrl Delay	23.7
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	60	0	45	5	1755	90	30	1405	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1755	90	30	1405	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	1908	96	33	1527	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	177	0	138	11	2718	136	64	2974	10
Arrive On Green	0.09	0.09	0.08	0.09	0.00	0.08	0.01	0.79	0.78	0.04	0.82	0.81
Sat Flow, veh/h	586	899	148	1378	0	1545	1781	3444	172	1781	3633	12
Grp Volume(v), veh/h	11	0	0	65	0	1	5	976	1028	33	747	785
Grp Sat Flow(s),veh/h/ln	1633	0	0	1378	0	1545	1781	1777	1839	1781	1777	1868
Q Serve(g_s), s	0.0	0.0	0.0	5.3	0.0	0.1	0.4	36.0	37.5	2.5	18.4	18.4
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	36.0	37.5	2.5	18.4	18.4
Prop In Lane	0.45		0.09	1.00		1.00	1.00		0.09	1.00		0.01
Lane Grp Cap(c), veh/h	183	0	0	177	0	138	11	1402	1451	64	1455	1529
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.44	0.70	0.71	0.52	0.51	0.51
Avail Cap(c_a), veh/h	313	0	0	290	0	265	102	1402	1451	102	1455	1529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.63	0.63	0.63	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.4	0.0	0.0	60.7	0.0	58.5	69.3	6.9	7.1	66.3	4.0	4.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	6.3	1.8	1.9	2.4	1.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.3	0.0	0.0	0.2	11.8	12.7	1.2	5.6	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	75.6	8.7	8.9	68.7	5.3	5.2
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	A	A
Approach Vol, veh/h		11			66			2009			1565	
Approach Delay, s/veh		58.6			62.0			9.0			6.6	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.9	118.6		16.5	9.0	114.5		16.5
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	95.0		23.0	8.0	95.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	20.4		8.1	4.5	39.5		2.8
Green Ext Time (p_c), s	0.0	29.8		0.1	0.0	41.4		0.0

Intersection Summary			
HCM 6th Ctrl Delay			9.1
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	5	5	105	15	15	5	1735	20	10	1250	190
Future Volume (veh/h)	90	5	5	105	15	15	5	1735	20	10	1250	190
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	98	5	3	114	16	12	5	1886	21	11	1359	147
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	210	8	5	199	20	15	7	2818	31	14	2795	1247
Arrive On Green	0.11	0.11	0.10	0.11	0.11	0.10	0.00	0.78	0.77	0.01	0.79	0.79
Sat Flow, veh/h	1393	71	43	1317	185	139	1781	3600	40	1781	3554	1585
Grp Volume(v), veh/h	106	0	0	142	0	0	5	929	978	11	1359	147
Grp Sat Flow(s),veh/h/ln	1506	0	0	1641	0	0	1781	1777	1863	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.3	28.6	28.8	0.7	15.9	2.6
Cycle Q Clear(g_c), s	7.9	0.0	0.0	9.7	0.0	0.0	0.3	28.6	28.8	0.7	15.9	2.6
Prop In Lane	0.92		0.03	0.80		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	223	0	0	234	0	0	7	1391	1458	14	2795	1247
V/C Ratio(X)	0.48	0.00	0.00	0.61	0.00	0.00	0.73	0.67	0.67	0.80	0.49	0.12
Avail Cap(c_a), veh/h	432	0	0	451	0	0	119	1391	1458	119	2795	1247
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.63	0.63	0.63	0.85	0.85	0.85
Uniform Delay (d), s/veh	51.1	0.0	0.0	51.8	0.0	0.0	59.7	5.9	6.0	59.4	4.4	3.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.5	0.0	0.0	29.2	1.6	1.6	28.1	0.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.0	4.3	0.0	0.0	0.2	8.7	9.1	0.4	4.6	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.7	0.0	0.0	54.3	0.0	0.0	88.9	7.6	7.5	87.5	4.9	3.2
LnGrp LOS	D	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		106			142			1912			1517	
Approach Delay, s/veh		52.7			54.3			7.8			5.4	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.4		17.2	4.9	97.9		17.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.3	17.9		11.7	2.7	30.8		9.9
Green Ext Time (p_c), s	0.0	31.8		0.5	0.0	32.6		0.3

Intersection Summary			
HCM 6th Ctrl Delay			9.9
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	30	20	145	25	35	25	1555	75	10	1290	70
Future Volume (veh/h)	145	30	20	145	25	35	25	1555	75	10	1290	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	158	33	4	158	27	5	27	1690	80	11	1402	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	336	60	403	225	394	73	34	2245	106	13	2191	115
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.25	0.04	1.00	1.00	0.01	0.64	0.63
Sat Flow, veh/h	1122	234	1568	1361	1532	284	1781	3455	163	1781	3434	181
Grp Volume(v), veh/h	191	0	4	158	0	32	27	865	905	11	724	752
Grp Sat Flow(s),veh/h/ln	1357	0	1568	1361	0	1816	1781	1777	1841	1781	1777	1838
Q Serve(g_s), s	16.3	0.0	0.3	16.1	0.0	1.9	2.1	0.0	0.0	0.9	34.8	35.2
Cycle Q Clear(g_c), s	18.2	0.0	0.3	34.2	0.0	1.9	2.1	0.0	0.0	0.9	34.8	35.2
Prop In Lane	0.83		1.00	1.00		0.16	1.00		0.09	1.00		0.10
Lane Grp Cap(c), veh/h	396	0	403	225	0	467	34	1154	1196	13	1134	1173
V/C Ratio(X)	0.48	0.00	0.01	0.70	0.00	0.07	0.79	0.75	0.76	0.83	0.64	0.64
Avail Cap(c_a), veh/h	396	0	403	225	0	467	140	1154	1196	140	1134	1173
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.85	0.85	0.85
Uniform Delay (d), s/veh	46.2	0.0	38.7	60.3	0.0	39.4	67.1	0.0	0.0	69.4	15.5	15.6
Incr Delay (d2), s/veh	0.9	0.0	0.0	9.5	0.0	0.1	1.4	0.4	0.4	31.6	2.3	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	0.0	0.1	6.2	0.0	0.9	1.0	0.1	0.1	0.5	14.1	14.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.1	0.0	38.7	69.8	0.0	39.4	68.5	0.4	0.4	101.0	17.8	17.9
LnGrp LOS	D	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		195			190			1797			1487	
Approach Delay, s/veh		46.9			64.7			1.4			18.5	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	93.3		40.0	5.0	95.0		40.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	80.0		35.0	11.0	80.0		35.0
Max Q Clear Time (g_c+I1), s	4.1	37.2		36.2	2.9	2.0		20.2
Green Ext Time (p_c), s	0.0	22.3		0.0	0.0	41.4		0.6

Intersection Summary		
HCM 6th Ctrl Delay		14.0
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	85	35	115	65	1090	25	655	165	545	1045	30
Future Volume (veh/h)	10	85	35	115	65	1090	25	655	165	545	1045	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	92	3	125	71	0	27	712	108	592	1136	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	39	176	158	255	392		34	969	818	645	2420	68
Arrive On Green	0.10	0.10	0.10	0.08	0.21	0.00	0.02	0.52	0.52	0.37	1.00	1.00
Sat Flow, veh/h	108	1715	1543	1781	1870	1585	1781	1870	1579	3456	3530	99
Grp Volume(v), veh/h	103	0	3	125	71	0	27	712	108	592	572	596
Grp Sat Flow(s),veh/h/ln	1823	0	1543	1781	1870	1585	1781	1870	1579	1728	1777	1852
Q Serve(g_s), s	1.1	0.0	0.2	8.5	4.4	0.0	2.1	41.5	5.0	22.9	0.0	0.0
Cycle Q Clear(g_c), s	7.4	0.0	0.2	8.5	4.4	0.0	2.1	41.5	5.0	22.9	0.0	0.0
Prop In Lane	0.11		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	215	0	158	255	392		34	969	818	645	1218	1270
V/C Ratio(X)	0.48	0.00	0.02	0.49	0.18		0.79	0.73	0.13	0.92	0.47	0.47
Avail Cap(c_a), veh/h	326	0	254	255	508		178	969	818	839	1218	1270
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.73	0.73	0.73
Uniform Delay (d), s/veh	59.7	0.0	56.5	49.1	45.5	0.0	68.4	26.2	17.4	42.8	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.0	1.5	0.2	0.0	11.3	3.9	0.3	8.5	1.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.1	3.9	2.1	0.0	1.1	19.0	1.9	8.9	0.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.3	0.0	56.6	50.6	45.7	0.0	79.7	30.2	17.7	51.3	1.0	0.9
LnGrp LOS	E	A	E	D	D		E	C	B	D	A	A
Approach Vol, veh/h		106			196	A		847			1760	
Approach Delay, s/veh		61.2			48.8			30.2			17.9	
Approach LOS		E			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	100.0	15.0	18.3	30.1	76.5		33.3
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	14.0	75.0	10.0	22.0	34.0	55.0		37.0
Max Q Clear Time (g_c+I1), s	4.1	2.0	10.5	9.4	24.9	43.5		6.4
Green Ext Time (p_c), s	0.0	17.3	0.0	0.2	1.3	5.6		0.2

Intersection Summary		
HCM 6th Ctrl Delay		25.1
HCM 6th LOS		C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	15	660	5	0	790
Future Vol, veh/h	0	15	660	5	0	790
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	717	5	0	859

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	717	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	430	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	430	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	430	-
HCM Lane V/C Ratio	-	-	0.038	-
HCM Control Delay (s)	-	-	13.7	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	715	0	0	875
Future Vol, veh/h	0	0	715	0	0	875
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	777	0	0	951

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1728	777	0	0	777	0
Stage 1	777	-	-	-	-	-
Stage 2	951	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	97	397	-	-	839	-
Stage 1	453	-	-	-	-	-
Stage 2	375	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	97	397	-	-	839	-
Mov Cap-2 Maneuver	231	-	-	-	-	-
Stage 1	453	-	-	-	-	-
Stage 2	375	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	-	839	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	0	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-

Intersection						
Int Delay, s/veh	5.9					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	20	10	0	0	60
Future Vol, veh/h	15	20	10	0	0	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	22	11	0	0	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	11	0	-	0	54	11
Stage 1	-	-	-	-	11	-
Stage 2	-	-	-	-	43	-
Critical Hdwy	4.13	-	-	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	2.219	-	-	-	3.519	3.319
Pot Cap-1 Maneuver	1607	-	-	-	951	1070
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	974	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1607	-	-	-	941	1070
Mov Cap-2 Maneuver	-	-	-	-	941	-
Stage 1	-	-	-	-	1002	-
Stage 2	-	-	-	-	974	-

Approach	EB	WB	SB
HCM Control Delay, s	3.1	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1607	-	-	-	1070
HCM Lane V/C Ratio	0.01	-	-	-	0.061
HCM Control Delay (s)	7.3	0	-	-	8.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	0

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

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	11	0	0	22	0	0	33	33	11	22	33	11
Stage 1	-	-	-	-	-	-	22	22	-	11	11	-
Stage 2	-	-	-	-	-	-	11	11	-	11	22	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1607	-	-	1593	-	-	972	859	1067	989	859	1070
Stage 1	-	-	-	-	-	-	994	877	-	1009	886	-
Stage 2	-	-	-	-	-	-	1009	886	-	1008	877	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1607	-	-	1593	-	-	972	859	1067	989	859	1070
Mov Cap-2 Maneuver	-	-	-	-	-	-	972	859	-	989	859	-
Stage 1	-	-	-	-	-	-	994	877	-	1009	886	-
Stage 2	-	-	-	-	-	-	1009	886	-	1008	877	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1607	-	-	1593	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2022 Scenario 1 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	25	380	60	25	5	385	220	65	10	285	75
Future Volume (veh/h)	55	25	380	60	25	5	385	220	65	10	285	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	27	24	65	27	1	418	239	45	11	310	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	230	72	183	234	206	8	506	1026	869	15	510	432
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.28	0.55	0.55	0.01	0.27	0.27
Sat Flow, veh/h	915	621	1585	1354	1792	66	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	87	0	24	65	0	28	418	239	45	11	310	20
Grp Sat Flow(s),veh/h/ln	1536	0	1585	1354	0	1858	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.9	0.0	0.7	2.3	0.0	0.7	10.7	3.2	0.6	0.3	7.0	0.5
Cycle Q Clear(g_c), s	2.5	0.0	0.7	4.8	0.0	0.7	10.7	3.2	0.6	0.3	7.0	0.5
Prop In Lane	0.69		1.00	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	302	0	183	234	0	214	506	1026	869	15	510	432
V/C Ratio(X)	0.29	0.00	0.13	0.28	0.00	0.13	0.83	0.23	0.05	0.73	0.61	0.05
Avail Cap(c_a), veh/h	868	0	780	743	0	914	1095	3028	2566	548	2453	2079
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.2	0.0	19.4	22.5	0.0	19.4	16.3	5.7	5.1	24.1	15.5	13.1
Incr Delay (d2), s/veh	0.5	0.0	0.3	0.6	0.0	0.3	3.5	0.2	0.1	48.6	2.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.2	0.7	0.0	0.3	4.1	0.9	0.2	0.3	2.9	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.7	0.0	19.7	23.1	0.0	19.7	19.8	6.0	5.2	72.7	18.0	13.2
LnGrp LOS	C	A	B	C	A	B	B	A	A	E	B	B
Approach Vol, veh/h		111			93			702			341	
Approach Delay, s/veh		20.5			22.1			14.2			19.4	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	32.8		10.6	18.9	19.3		10.6				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.3	5.2		4.5	12.7	9.0		6.8				
Green Ext Time (p_c), s	0.0	3.5		0.5	1.2	4.3		0.2				

Intersection Summary			
HCM 6th Ctrl Delay			16.8
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	20	155	45	15	10	200	595	45	25	590	80
Future Volume (veh/h)	75	20	155	45	15	10	200	595	45	25	590	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	22	14	49	16	1	217	647	0	27	641	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	272	55	206	239	227	14	443	980		394	821	693
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.10	0.52	0.00	0.02	0.44	0.44
Sat Flow, veh/h	1080	423	1585	1372	1742	109	1781	1870	1585	1781	1870	1578
Grp Volume(v), veh/h	104	0	14	49	0	17	217	647	0	27	641	45
Grp Sat Flow(s),veh/h/ln	1503	0	1585	1372	0	1851	1781	1870	1585	1781	1870	1578
Q Serve(g_s), s	2.6	0.0	0.4	1.7	0.0	0.4	2.9	12.3	0.0	0.4	14.3	0.8
Cycle Q Clear(g_c), s	3.1	0.0	0.4	4.8	0.0	0.4	2.9	12.3	0.0	0.4	14.3	0.8
Prop In Lane	0.79		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	327	0	206	239	0	241	443	980		394	821	693
V/C Ratio(X)	0.32	0.00	0.07	0.21	0.00	0.07	0.49	0.66		0.07	0.78	0.06
Avail Cap(c_a), veh/h	889	0	810	761	0	946	804	1949		906	1949	1644
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.8	0.0	18.7	22.1	0.0	18.7	8.7	8.5	0.0	8.0	11.7	7.9
Incr Delay (d2), s/veh	0.6	0.0	0.1	0.4	0.0	0.1	0.8	0.8	0.0	0.1	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.1	0.5	0.0	0.2	0.8	3.5	0.0	0.1	4.8	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.4	0.0	18.8	22.5	0.0	18.8	9.5	9.2	0.0	8.1	13.4	8.0
LnGrp LOS	C	A	B	C	A	B	A	A		A	B	A
Approach Vol, veh/h		118			66			864	A		713	
Approach Delay, s/veh		20.2			21.6			9.3			12.8	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.9	31.6		11.4	10.1	27.5		11.4
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.4	14.3		5.1	4.9	16.3		6.8
Green Ext Time (p_c), s	0.0	4.9		0.5	0.4	4.9		0.1

Intersection Summary	
HCM 6th Ctrl Delay	11.9
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	15	95	30	15	15	165	835	30	25	765	75
Future Volume (veh/h)	60	15	95	30	15	15	165	835	30	25	765	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	16	3	33	16	1	179	908	21	27	832	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	186	35	45	186	155	220	1134	961	33	938	793
Arrive On Green	0.05	0.12	0.12	0.03	0.10	0.10	0.12	0.61	0.61	0.02	0.50	0.50
Sat Flow, veh/h	1781	1523	286	1781	1870	1556	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	65	0	19	33	16	1	179	908	21	27	832	42
Grp Sat Flow(s),veh/h/ln	1781	0	1809	1781	1870	1556	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	3.2	0.0	0.8	1.6	0.7	0.1	8.6	32.6	0.5	1.3	35.1	1.2
Cycle Q Clear(g_c), s	3.2	0.0	0.8	1.6	0.7	0.1	8.6	32.6	0.5	1.3	35.1	1.2
Prop In Lane	1.00		0.16	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	85	0	221	45	186	155	220	1134	961	33	938	793
V/C Ratio(X)	0.76	0.00	0.09	0.74	0.09	0.01	0.81	0.80	0.02	0.82	0.89	0.05
Avail Cap(c_a), veh/h	406	0	433	406	447	372	507	1385	1173	507	1385	1171
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.3	0.0	34.2	42.5	35.9	35.6	37.5	13.2	6.9	42.9	19.7	11.2
Incr Delay (d2), s/veh	13.2	0.0	0.2	20.6	0.2	0.0	7.1	2.8	0.0	37.1	5.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	0.4	1.0	0.3	0.0	4.1	12.3	0.1	0.9	14.9	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.6	0.0	34.4	63.1	36.1	35.6	44.6	16.1	6.9	80.0	24.8	11.2
LnGrp LOS	D	A	C	E	D	D	D	B	A	F	C	B
Approach Vol, veh/h		84			50			1108			901	
Approach Delay, s/veh		50.0			53.9			20.5			25.8	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	58.2	7.2	15.7	15.8	49.0	9.2	13.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	3.3	34.6	3.6	2.8	10.6	37.1	5.2	2.7
Green Ext Time (p_c), s	0.0	8.1	0.0	0.0	0.4	6.9	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	24.7
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	5	600	80	10	10	605	915	10	5	830	20
Future Volume (veh/h)	80	5	600	80	10	10	605	915	10	5	830	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	87	5	0	87	11	9	658	995	11	5	902	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	201	7		184	15	12	702	2706	30	7	1285	573
Arrive On Green	0.10	0.09	0.00	0.10	0.09	0.09	0.39	0.75	0.75	0.00	0.36	0.36
Sat Flow, veh/h	1470	84	1585	1335	169	138	1781	3600	40	1781	3554	1585
Grp Volume(v), veh/h	92	0	0	107	0	0	658	491	515	5	902	6
Grp Sat Flow(s),veh/h/ln	1555	0	1585	1642	0	0	1781	1777	1863	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.5	0.0	0.0	33.8	9.0	9.0	0.3	20.7	0.2
Cycle Q Clear(g_c), s	5.1	0.0	0.0	5.6	0.0	0.0	33.8	9.0	9.0	0.3	20.7	0.2
Prop In Lane	0.95		1.00	0.81		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	225	0		228	0	0	702	1336	1401	7	1285	573
V/C Ratio(X)	0.41	0.00		0.47	0.00	0.00	0.94	0.37	0.37	0.72	0.70	0.01
Avail Cap(c_a), veh/h	399	0		485	0	0	1329	1336	1401	1329	2576	1149
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.5	0.0	0.0	41.8	0.0	0.0	27.7	4.1	4.1	47.4	26.0	19.5
Incr Delay (d2), s/veh	1.2	0.0	0.0	1.5	0.0	0.0	2.8	0.4	0.3	40.3	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	0.0	2.5	0.0	0.0	14.0	2.5	2.6	0.2	8.6	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.7	0.0	0.0	43.3	0.0	0.0	30.5	4.4	4.4	87.7	27.5	19.5
LnGrp LOS	D	A		D	A	A	C	A	A	F	C	B
Approach Vol, veh/h		92	A		107			1664			913	
Approach Delay, s/veh		42.7			43.3			14.7			27.8	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	41.5	40.4		13.3	4.4	77.5		13.3
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0
Max Q Clear Time (g_c+I1), s	35.8	22.7		7.6	2.3	11.0		7.1
Green Ext Time (p_c), s	1.7	11.8		0.3	0.0	13.0		0.2

Intersection Summary		
HCM 6th Ctrl Delay		21.1
HCM 6th LOS		C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	5	140	15	0	5	135	1470	10	10	1505	60
Future Volume (veh/h)	50	5	140	15	0	5	135	1470	10	10	1505	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	5	6	16	0	1	147	1598	11	11	1636	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	18	173	186	2	7	180	2631	18	14	2254	1005
Arrive On Green	0.12	0.11	0.11	0.12	0.00	0.11	0.10	0.73	0.73	0.01	0.63	0.63
Sat Flow, veh/h	1359	156	1522	972	19	62	1781	3618	25	1781	3554	1584
Grp Volume(v), veh/h	59	0	6	17	0	0	147	784	825	11	1636	39
Grp Sat Flow(s),veh/h/ln	1515	0	1522	1052	0	0	1781	1777	1866	1781	1777	1584
Q Serve(g_s), s	0.0	0.0	0.3	0.9	0.0	0.0	7.5	20.0	20.1	0.6	29.0	0.9
Cycle Q Clear(g_c), s	2.8	0.0	0.3	3.7	0.0	0.0	7.5	20.0	20.1	0.6	29.0	0.9
Prop In Lane	0.92		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	263	0	173	206	0	0	180	1292	1357	14	2254	1005
V/C Ratio(X)	0.22	0.00	0.03	0.08	0.00	0.00	0.82	0.61	0.61	0.77	0.73	0.04
Avail Cap(c_a), veh/h	451	0	377	389	0	0	403	1645	1727	211	2908	1296
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.3	0.0	36.6	38.5	0.0	0.0	40.9	6.2	6.2	46.0	11.5	6.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.4	1.0	0.9	27.3	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.1	0.4	0.0	0.0	3.4	5.9	6.2	0.4	9.9	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.5	0.0	36.6	38.6	0.0	0.0	44.3	7.2	7.1	73.3	12.6	6.4
LnGrp LOS	D	A	D	D	A	A	D	A	A	E	B	A
Approach Vol, veh/h		65			17			1756			1686	
Approach Delay, s/veh		37.4			38.6			10.3			12.9	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.4	63.9		15.6	4.7	72.6		15.6				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	19.5	31.0		5.7	2.6	22.1		4.8				
Green Ext Time (p_c), s	0.1	28.0		0.0	0.0	31.1		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			12.1									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	175	70	5	45	125	1460	60	35	1660	100
Future Volume (veh/h)	75	5	175	70	5	45	125	1460	60	35	1660	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	27	76	5	1	136	1587	49	38	1804	85
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	12	204	142	197	39	157	2668	1189	49	2452	1094
Arrive On Green	0.14	0.13	0.13	0.13	0.13	0.13	0.09	0.75	0.75	0.03	0.69	0.69
Sat Flow, veh/h	1303	90	1563	1363	1509	302	1781	3554	1584	1781	3554	1585
Grp Volume(v), veh/h	87	0	27	76	0	6	136	1587	49	38	1804	85
Grp Sat Flow(s),veh/h/ln	1393	0	1563	1363	0	1811	1781	1777	1584	1781	1777	1585
Q Serve(g_s), s	9.2	0.0	2.5	9.0	0.0	0.5	12.4	33.2	1.3	3.5	52.7	2.9
Cycle Q Clear(g_c), s	9.7	0.0	2.5	18.7	0.0	0.5	12.4	33.2	1.3	3.5	52.7	2.9
Prop In Lane	0.94		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	233	0	204	142	0	237	157	2668	1189	49	2452	1094
V/C Ratio(X)	0.37	0.00	0.13	0.54	0.00	0.03	0.86	0.59	0.04	0.77	0.74	0.08
Avail Cap(c_a), veh/h	254	0	227	162	0	263	281	2668	1189	108	2452	1094
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.70	0.70	0.70	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.3	0.0	63.4	75.2	0.0	62.5	74.2	9.3	5.3	79.7	16.1	8.4
Incr Delay (d2), s/veh	1.0	0.0	0.3	3.1	0.0	0.0	3.8	0.7	0.0	9.3	2.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	1.0	3.3	0.0	0.2	5.9	12.2	0.4	1.7	21.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.2	0.0	63.7	78.4	0.0	62.6	78.1	9.9	5.3	89.0	18.1	8.5
LnGrp LOS	E	A	E	E	A	E	E	A	A	F	B	A
Approach Vol, veh/h		114			82			1772			1927	
Approach Delay, s/veh		66.4			77.2			15.0			19.1	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.6	119.8		26.6	8.5	129.9		26.6
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	26.0	100.0		24.0	10.0	116.0		24.0
Max Q Clear Time (g_c+I1), s	11.4	54.7		20.7	5.5	35.2		11.7
Green Ext Time (p_c), s	0.2	32.2		0.1	0.0	36.0		0.3

Intersection Summary	
HCM 6th Ctrl Delay	19.9
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	5	615	15	0	5	385	1500	10	75	1705	135
Future Volume (veh/h)	295	5	615	15	0	5	385	1500	10	75	1705	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	325	0	460	16	0	1	418	1630	11	82	1853	126
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	534	0	904	70	0	4	490	2426	16	114	2105	1169
Arrive On Green	0.15	0.00	0.15	0.04	0.00	0.03	0.14	0.67	0.66	0.06	0.59	0.59
Sat Flow, veh/h	3563	0	3126	1660	0	104	3456	3618	24	1781	3554	1585
Grp Volume(v), veh/h	325	0	460	17	0	0	418	800	841	82	1853	126
Grp Sat Flow(s),veh/h/ln	1781	0	1563	1763	0	0	1728	1777	1866	1781	1777	1585
Q Serve(g_s), s	18.4	0.0	26.6	2.0	0.0	0.0	25.5	58.3	58.4	9.8	95.9	4.9
Cycle Q Clear(g_c), s	18.4	0.0	26.6	2.0	0.0	0.0	25.5	58.3	58.4	9.8	95.9	4.9
Prop In Lane	1.00		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	534	0	904	74	0	0	490	1191	1251	114	2105	1169
V/C Ratio(X)	0.61	0.00	0.51	0.23	0.00	0.00	0.85	0.67	0.67	0.72	0.88	0.11
Avail Cap(c_a), veh/h	561	0	928	253	0	0	928	1596	1676	124	2485	1339
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	85.9	0.0	64.3	100.1	0.0	0.0	90.4	21.3	21.4	99.2	37.5	8.1
Incr Delay (d2), s/veh	1.2	0.0	0.2	0.6	0.0	0.0	1.7	1.0	0.9	14.0	3.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	0.0	10.8	1.0	0.0	0.0	11.6	24.6	25.8	5.0	42.4	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	87.0	0.0	64.5	100.7	0.0	0.0	92.1	22.3	22.3	113.2	41.3	8.1
LnGrp LOS	F	A	E	F	A	A	F	C	C	F	D	A
Approach Vol, veh/h		785			17			2059			2061	
Approach Delay, s/veh		73.8			100.7			36.5			42.1	
Approach LOS		E			F			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	34.6	131.9		13.1	17.8	148.7		36.3
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	27.5	97.9		4.0	11.8	60.4		28.6
Green Ext Time (p_c), s	1.1	28.0		0.0	0.0	22.6		0.8

Intersection Summary	
HCM 6th Ctrl Delay	45.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	5	90	5	60	10	1835	90	85	2265	5
Future Volume (veh/h)	10	0	5	90	5	60	10	1835	90	85	2265	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	1995	96	92	2462	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	2	10	182	96	58	22	2613	125	118	2949	6
Arrive On Green	0.09	0.00	0.08	0.09	0.09	0.08	0.03	1.00	1.00	0.07	0.81	0.80
Sat Flow, veh/h	1240	26	115	1416	1095	657	1781	3453	165	1781	3638	7
Grp Volume(v), veh/h	12	0	0	98	0	8	11	1019	1072	92	1202	1265
Grp Sat Flow(s),veh/h/ln	1381	0	0	1416	0	1752	1781	1777	1841	1781	1777	1869
Q Serve(g_s), s	0.8	0.0	0.0	7.4	0.0	0.6	0.8	0.0	0.0	6.9	53.5	53.6
Cycle Q Clear(g_c), s	1.4	0.0	0.0	8.8	0.0	0.6	0.8	0.0	0.0	6.9	53.5	53.6
Prop In Lane	0.92		0.08	1.00		0.38	1.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	173	0	0	182	0	154	22	1345	1393	118	1440	1515
V/C Ratio(X)	0.07	0.00	0.00	0.54	0.00	0.05	0.49	0.76	0.77	0.78	0.83	0.84
Avail Cap(c_a), veh/h	300	0	0	309	0	311	145	1345	1393	251	1440	1515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.58	0.58	0.58	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.9	0.0	0.0	60.0	0.0	56.6	65.4	0.0	0.0	62.0	7.5	7.5
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.1	3.6	2.4	2.4	4.1	5.8	5.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	3.4	0.0	0.3	0.4	0.9	0.9	3.2	17.2	18.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.1	0.0	0.0	62.5	0.0	56.7	69.0	2.4	2.4	66.2	13.3	13.1
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	B	B
Approach Vol, veh/h		12			106			2102			2559	
Approach Delay, s/veh		57.1			62.0			2.8			15.1	
Approach LOS		E			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	113.4		15.9	13.0	106.2		15.9				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	87.0		23.0	19.0	79.0		23.0				
Max Q Clear Time (g_c+I1), s	2.8	55.6		10.8	8.9	2.0		3.4				
Green Ext Time (p_c), s	0.0	29.9		0.2	0.1	56.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			10.8									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	15	10	60	5	10	5	1755	20	5	1920	325
Future Volume (veh/h)	180	15	10	60	5	10	5	1755	20	5	1920	325
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	196	16	9	65	5	7	5	1908	21	5	2087	277
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	274	18	10	280	22	25	7	2660	29	7	2626	1171
Arrive On Green	0.17	0.17	0.16	0.17	0.17	0.16	0.01	1.00	1.00	0.00	0.74	0.74
Sat Flow, veh/h	1329	108	61	1368	132	150	1781	3600	40	1781	3554	1585
Grp Volume(v), veh/h	221	0	0	77	0	0	5	940	989	5	2087	277
Grp Sat Flow(s),veh/h/ln	1498	0	0	1651	0	0	1781	1777	1863	1781	1777	1585
Q Serve(g_s), s	13.9	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	50.2	7.5
Cycle Q Clear(g_c), s	19.2	0.0	0.0	5.3	0.0	0.0	0.4	0.0	0.0	0.4	50.2	7.5
Prop In Lane	0.89		0.04	0.84		0.09	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	303	0	0	327	0	0	7	1313	1377	7	2626	1171
V/C Ratio(X)	0.73	0.00	0.00	0.24	0.00	0.00	0.74	0.72	0.72	0.74	0.79	0.24
Avail Cap(c_a), veh/h	380	0	0	404	0	0	106	1313	1377	106	2626	1171
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.57	0.57	0.57	0.38	0.38	0.38
Uniform Delay (d), s/veh	54.4	0.0	0.0	48.9	0.0	0.0	66.9	0.0	0.0	67.2	11.2	5.6
Incr Delay (d2), s/veh	5.3	0.0	0.0	0.4	0.0	0.0	27.8	1.9	1.9	19.7	1.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	0.0	0.0	2.3	0.0	0.0	0.2	0.7	0.7	0.2	17.3	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.7	0.0	0.0	49.3	0.0	0.0	94.7	1.9	1.9	86.8	12.2	5.8
LnGrp LOS	E	A	A	D	A	A	F	A	A	F	B	A
Approach Vol, veh/h		221			77			1934			2369	
Approach Delay, s/veh		59.7			49.3			2.1			11.6	
Approach LOS		E			D			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.5	103.7		26.7	4.5	103.7		26.7				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	84.0		29.0	8.0	84.0		29.0				
Max Q Clear Time (g_c+I1), s	2.4	52.2		7.3	2.4	2.0		21.2				
Green Ext Time (p_c), s	0.0	30.2		0.2	0.0	63.9		0.5				

Intersection Summary			
HCM 6th Ctrl Delay			10.5
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	35	45	95	25	20	55	1560	105	25	1855	150
Future Volume (veh/h)	180	35	45	95	25	20	55	1560	105	25	1855	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	196	38	8	103	27	4	60	1696	111	27	2016	159
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	315	51	368	148	376	56	76	2219	144	34	2108	164
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.23	0.09	1.00	1.00	0.04	1.00	1.00
Sat Flow, veh/h	1120	217	1553	1343	1587	235	1781	3387	220	1781	3340	260
Grp Volume(v), veh/h	234	0	8	103	0	31	60	883	924	27	1060	1115
Grp Sat Flow(s),veh/h/ln	1338	0	1553	1343	0	1822	1781	1777	1830	1781	1777	1823
Q Serve(g_s), s	20.7	0.0	0.5	9.5	0.0	1.8	4.5	0.0	0.0	2.0	0.0	0.0
Cycle Q Clear(g_c), s	22.5	0.0	0.5	32.0	0.0	1.8	4.5	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.84		1.00	1.00		0.13	1.00		0.12	1.00		0.14
Lane Grp Cap(c), veh/h	366	0	368	148	0	432	76	1164	1199	34	1122	1150
V/C Ratio(X)	0.64	0.00	0.02	0.70	0.00	0.07	0.79	0.76	0.77	0.80	0.94	0.97
Avail Cap(c_a), veh/h	366	0	368	148	0	432	106	1164	1199	106	1122	1150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.48	0.48	0.48
Uniform Delay (d), s/veh	48.7	0.0	39.5	63.2	0.0	40.0	61.1	0.0	0.0	64.7	0.0	0.0
Incr Delay (d2), s/veh	3.7	0.0	0.0	13.5	0.0	0.1	1.6	0.4	0.5	7.4	9.5	12.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	0.0	0.2	4.1	0.0	0.8	1.9	0.1	0.2	1.0	3.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.4	0.0	39.5	76.6	0.0	40.1	62.7	0.4	0.5	72.1	9.5	12.5
LnGrp LOS	D	A	D	E	A	D	E	A	A	E	A	B
Approach Vol, veh/h		242			134			1867			2202	
Approach Delay, s/veh		52.0			68.2			2.4			11.8	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	89.2		36.0	6.6	92.4		36.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	82.0		31.0	8.0	82.0		31.0
Max Q Clear Time (g_c+I1), s	6.5	2.0		34.0	4.0	2.0		24.5
Green Ext Time (p_c), s	0.0	59.7		0.0	0.0	41.9		0.5

Intersection Summary		
HCM 6th Ctrl Delay		11.8
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	85	85	190	85	1000	50	670	220	625	1145	40
Future Volume (veh/h)	35	85	85	190	85	1000	50	670	220	625	1145	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.96	0.98		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	92	13	207	92	0	54	728	157	679	1245	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	172	202	277	457		70	860	724	716	2201	74
Arrive On Green	0.13	0.13	0.13	0.08	0.24	0.00	0.04	0.46	0.46	0.41	1.00	1.00
Sat Flow, veh/h	387	1295	1521	1781	1870	1585	1781	1870	1575	3456	3507	118
Grp Volume(v), veh/h	130	0	13	207	92	0	54	728	157	679	630	657
Grp Sat Flow(s),veh/h/ln	1682	0	1521	1781	1870	1585	1781	1870	1575	1728	1777	1848
Q Serve(g_s), s	6.1	0.0	1.0	11.0	5.3	0.0	4.1	46.5	8.1	25.6	0.0	0.0
Cycle Q Clear(g_c), s	9.6	0.0	1.0	11.0	5.3	0.0	4.1	46.5	8.1	25.6	0.0	0.0
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	258	0	202	277	457		70	860	724	716	1115	1160
V/C Ratio(X)	0.50	0.00	0.06	0.75	0.20		0.77	0.85	0.22	0.95	0.57	0.57
Avail Cap(c_a), veh/h	380	0	315	277	596		238	860	724	742	1115	1160
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.88	0.88	0.88	0.28	0.28	0.28
Uniform Delay (d), s/veh	54.7	0.0	51.2	48.1	40.5	0.0	64.3	32.3	21.9	38.8	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.1	10.6	0.2	0.0	5.8	9.0	0.6	8.1	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	0.4	2.4	2.5	0.0	1.9	22.6	3.1	9.6	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.2	0.0	51.3	58.7	40.8	0.0	70.1	41.3	22.5	46.9	0.6	0.6
LnGrp LOS	E	A	D	E	D		E	D	C	D	A	A
Approach Vol, veh/h		143			299	A		939			1966	
Approach Delay, s/veh		55.8			53.2			39.8			16.6	
Approach LOS		E			D			D			B	

Timer - Assigned Phs	1	2	3	4	5	6	8
Phs Duration (G+Y+Rc), s	9.3	88.7	15.0	22.0	32.0	66.1	37.0
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0	5.0
Max Green Setting (Gmax), s	18.0	61.0	10.0	27.0	29.0	50.0	42.0
Max Q Clear Time (g_c+I1), s	6.1	2.0	13.0	11.6	27.6	48.5	7.3
Green Ext Time (p_c), s	0.0	19.9	0.0	0.4	0.4	1.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	28.0
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	10	885	25	0	790
Future Vol, veh/h	0	10	885	25	0	790
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	962	27	0	859

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	962	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	310	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	310	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB		NB		SB
HCM Control Delay, s	17		0		0
HCM LOS	C				

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	310	-
HCM Lane V/C Ratio	-	-	0.035	-
HCM Control Delay (s)	-	-	17	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1005	0	0	895
Future Vol, veh/h	0	0	1005	0	0	895
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	1092	0	0	973

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2065	1092	0	0	1092	0
Stage 1	1092	-	-	-	-	-
Stage 2	973	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	60	261	-	-	639	-
Stage 1	322	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	60	261	-	-	639	-
Mov Cap-2 Maneuver	184	-	-	-	-	-
Stage 1	322	-	-	-	-	-
Stage 2	366	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	-	639	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	0	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	60	15	20	0	0	40
Future Vol, veh/h	60	15	20	0	0	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	16	22	0	0	43

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	22	0	-	0	160	22
Stage 1	-	-	-	-	22	-
Stage 2	-	-	-	-	138	-
Critical Hdwy	4.13	-	-	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	2.219	-	-	-	3.519	3.319
Pot Cap-1 Maneuver	1593	-	-	-	823	1055
Stage 1	-	-	-	-	1000	-
Stage 2	-	-	-	-	875	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1593	-	-	-	789	1055
Mov Cap-2 Maneuver	-	-	-	-	789	-
Stage 1	-	-	-	-	959	-
Stage 2	-	-	-	-	875	-

Approach	EB	WB	SB
HCM Control Delay, s	5.9	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1593	-	-	-	1055
HCM Lane V/C Ratio	0.041	-	-	-	0.041
HCM Control Delay (s)	7.4	0	-	-	8.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Intersection	
Int Delay, s/veh	0

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

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	22	0	0	16	0	0	38	38	8	30	38	22
Stage 1	-	-	-	-	-	-	16	16	-	22	22	-
Stage 2	-	-	-	-	-	-	22	22	-	8	16	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1593	-	-	1601	-	-	965	854	1072	977	854	1055
Stage 1	-	-	-	-	-	-	1002	882	-	996	877	-
Stage 2	-	-	-	-	-	-	996	877	-	1012	882	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1593	-	-	1601	-	-	965	854	1072	977	854	1055
Mov Cap-2 Maneuver	-	-	-	-	-	-	965	854	-	977	854	-
Stage 1	-	-	-	-	-	-	1002	882	-	996	877	-
Stage 2	-	-	-	-	-	-	996	877	-	1012	882	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1593	-	-	1601	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2022 Scenario 1 WE Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	45	335	45	50	20	275	315	40	20	285	90
Future Volume (veh/h)	40	45	335	45	50	20	275	315	40	20	285	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	49	35	49	54	10	299	342	23	22	310	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	191	135	202	264	198	37	386	918	777	29	543	459
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.22	0.49	0.49	0.02	0.29	0.29
Sat Flow, veh/h	553	1044	1568	1303	1532	284	1781	1870	1582	1781	1870	1582
Grp Volume(v), veh/h	92	0	35	49	0	64	299	342	23	22	310	28
Grp Sat Flow(s),veh/h/ln	1596	0	1568	1303	0	1816	1781	1870	1582	1781	1870	1582
Q Serve(g_s), s	0.9	0.0	0.9	1.6	0.0	1.4	6.9	5.0	0.3	0.5	6.2	0.6
Cycle Q Clear(g_c), s	2.3	0.0	0.9	3.9	0.0	1.4	6.9	5.0	0.3	0.5	6.2	0.6
Prop In Lane	0.47		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	326	0	202	264	0	234	386	918	777	29	543	459
V/C Ratio(X)	0.28	0.00	0.17	0.19	0.00	0.27	0.77	0.37	0.03	0.77	0.57	0.06
Avail Cap(c_a), veh/h	980	0	855	807	0	991	1215	3359	2841	608	2722	2302
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.6	0.0	17.1	19.5	0.0	17.3	16.2	7.0	5.8	21.6	13.3	11.3
Incr Delay (d2), s/veh	0.5	0.0	0.4	0.3	0.0	0.6	3.3	0.5	0.0	34.0	2.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.3	0.5	0.0	0.6	2.7	1.4	0.1	0.5	2.4	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.1	0.0	17.5	19.8	0.0	17.9	19.6	7.5	5.8	55.5	15.3	11.4
LnGrp LOS	B	A	B	B	A	B	B	A	A	E	B	B
Approach Vol, veh/h		127			113			664			360	
Approach Delay, s/veh		17.9			18.7			12.9			17.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	27.6		10.7	14.5	18.8		10.7				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.5	7.0		4.3	8.9	8.2		5.9				
Green Ext Time (p_c), s	0.0	4.9		0.5	0.8	4.3		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			15.2
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	20	200	40	15	5	135	460	25	15	495	60
Future Volume (veh/h)	55	20	200	40	15	5	135	460	25	15	495	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	22	24	43	16	1	147	500	0	16	538	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	289	84	232	308	259	16	441	865		430	733	619
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.08	0.46	0.00	0.01	0.39	0.39
Sat Flow, veh/h	958	565	1558	1342	1740	109	1781	1870	1585	1781	1870	1579
Grp Volume(v), veh/h	82	0	24	43	0	17	147	500	0	16	538	25
Grp Sat Flow(s),veh/h/ln	1524	0	1558	1342	0	1849	1781	1870	1585	1781	1870	1579
Q Serve(g_s), s	1.2	0.0	0.6	1.3	0.0	0.3	2.0	8.3	0.0	0.2	10.4	0.4
Cycle Q Clear(g_c), s	1.9	0.0	0.6	3.2	0.0	0.3	2.0	8.3	0.0	0.2	10.4	0.4
Prop In Lane	0.73		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	373	0	232	308	0	275	441	865		430	733	619
V/C Ratio(X)	0.22	0.00	0.10	0.14	0.00	0.06	0.33	0.58		0.04	0.73	0.04
Avail Cap(c_a), veh/h	1024	0	918	899	0	1089	923	2247		1038	2247	1897
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.2	0.0	15.6	17.6	0.0	15.5	7.9	8.4	0.0	8.0	11.0	8.0
Incr Delay (d2), s/veh	0.3	0.0	0.2	0.2	0.0	0.1	0.4	0.6	0.0	0.0	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	0.4	0.0	0.1	0.5	2.4	0.0	0.1	3.4	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	0.0	15.8	17.8	0.0	15.6	8.4	9.0	0.0	8.0	12.5	8.0
LnGrp LOS	B	A	B	B	A	B	A	A		A	B	A
Approach Vol, veh/h		106			60			647	A		579	
Approach Delay, s/veh		16.3			17.2			8.9			12.2	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	25.6		11.3	8.5	22.6		11.3
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	10.3		3.9	4.0	12.4		5.2
Green Ext Time (p_c), s	0.0	3.4		0.4	0.3	3.9		0.1

Intersection Summary	
HCM 6th Ctrl Delay	11.2
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	15	85	35	15	20	80	565	30	25	675	50
Future Volume (veh/h)	40	15	85	35	15	20	80	565	30	25	675	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	16	4	38	16	1	87	614	18	27	734	26
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	59	178	44	55	226	191	115	964	817	32	877	742
Arrive On Green	0.03	0.12	0.12	0.03	0.12	0.12	0.06	0.52	0.52	0.02	0.47	0.47
Sat Flow, veh/h	1781	1441	360	1781	1870	1585	1781	1870	1585	1781	1870	1583
Grp Volume(v), veh/h	43	0	20	38	16	1	87	614	18	27	734	26
Grp Sat Flow(s),veh/h/ln	1781	0	1801	1781	1870	1585	1781	1870	1585	1781	1870	1583
Q Serve(g_s), s	1.5	0.0	0.6	1.4	0.5	0.0	3.1	15.2	0.4	1.0	22.0	0.6
Cycle Q Clear(g_c), s	1.5	0.0	0.6	1.4	0.5	0.0	3.1	15.2	0.4	1.0	22.0	0.6
Prop In Lane	1.00		0.20	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	59	0	222	55	226	191	115	964	817	32	877	742
V/C Ratio(X)	0.72	0.00	0.09	0.69	0.07	0.01	0.76	0.64	0.02	0.85	0.84	0.04
Avail Cap(c_a), veh/h	557	0	591	557	614	520	696	1900	1610	696	1900	1608
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.6	0.0	24.9	30.7	25.0	24.8	29.4	11.2	7.6	31.3	14.9	9.2
Incr Delay (d2), s/veh	15.2	0.0	0.2	14.6	0.1	0.0	9.6	0.7	0.0	42.1	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.3	0.8	0.2	0.0	1.5	5.2	0.1	0.8	8.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.8	0.0	25.0	45.4	25.1	24.8	39.1	11.9	7.6	73.4	17.1	9.2
LnGrp LOS	D	A	C	D	C	C	D	B	A	E	B	A
Approach Vol, veh/h		63			55			719			787	
Approach Delay, s/veh		39.2			39.1			15.1			18.7	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.1	38.0	7.0	12.9	9.1	35.0	7.1	12.7				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0				
Max Q Clear Time (g_c+I1), s	3.0	17.2	3.4	2.6	5.1	24.0	3.5	2.5				
Green Ext Time (p_c), s	0.0	4.7	0.0	0.0	0.2	6.1	0.1	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			18.6									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	10	595	10	0	5	410	630	5	0	755	55
Future Volume (veh/h)	55	10	595	10	0	5	410	630	5	0	755	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	11	0	11	0	1	446	685	5	0	821	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	191	14		206	4	9	514	2721	20	3	1410	627
Arrive On Green	0.08	0.06	0.00	0.08	0.00	0.06	0.29	0.75	0.75	0.00	0.40	0.40
Sat Flow, veh/h	1261	231	1585	1431	65	136	1781	3616	26	1781	3554	1579
Grp Volume(v), veh/h	71	0	0	12	0	0	446	337	353	0	821	20
Grp Sat Flow(s),veh/h/ln	1492	0	1585	1631	0	0	1781	1777	1866	1781	1777	1579
Q Serve(g_s), s	2.3	0.0	0.0	0.0	0.0	0.0	14.1	3.4	3.4	0.0	10.8	0.5
Cycle Q Clear(g_c), s	2.7	0.0	0.0	0.4	0.0	0.0	14.1	3.4	3.4	0.0	10.8	0.5
Prop In Lane	0.85		1.00	0.92		0.08	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	230	0		246	0	0	514	1337	1404	3	1410	627
V/C Ratio(X)	0.31	0.00		0.05	0.00	0.00	0.87	0.25	0.25	0.00	0.58	0.03
Avail Cap(c_a), veh/h	631	0		752	0	0	2124	2059	2162	2124	4118	1830
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	27.0	0.0	0.0	25.9	0.0	0.0	20.1	2.2	2.2	0.0	14.1	11.0
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.1	0.0	0.0	1.8	0.2	0.2	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	0.2	0.0	0.0	5.4	0.5	0.5	0.0	3.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.7	0.0	0.0	26.0	0.0	0.0	21.9	2.5	2.4	0.0	14.9	11.0
LnGrp LOS	C	A		C	A	A	C	A	A	A	B	B
Approach Vol, veh/h		71	A		12			1136			841	
Approach Delay, s/veh		27.7			26.0			10.1			14.8	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	21.2	29.6		8.7	0.0	50.8		8.7				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0				
Max Q Clear Time (g_c+I1), s	16.1	12.8		2.4	0.0	5.4		4.7				
Green Ext Time (p_c), s	1.0	10.8		0.0	0.0	7.5		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		12.7
HCM 6th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	145	15	5	15	105	980	20	10	1315	65
Future Volume (veh/h)	60	5	145	15	5	15	105	980	20	10	1315	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	7	16	5	1	114	1065	21	11	1429	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	225	13	143	151	36	5	146	2516	50	15	2246	1000
Arrive On Green	0.11	0.09	0.09	0.11	0.09	0.09	0.08	0.71	0.71	0.01	0.63	0.63
Sat Flow, veh/h	1395	145	1549	700	390	52	1781	3564	70	1781	3554	1581
Grp Volume(v), veh/h	70	0	7	22	0	0	114	531	555	11	1429	42
Grp Sat Flow(s),veh/h/ln	1539	0	1549	1142	0	0	1781	1777	1858	1781	1777	1581
Q Serve(g_s), s	0.0	0.0	0.3	0.1	0.0	0.0	4.5	9.1	9.1	0.4	17.9	0.7
Cycle Q Clear(g_c), s	2.7	0.0	0.3	2.7	0.0	0.0	4.5	9.1	9.1	0.4	17.9	0.7
Prop In Lane	0.93		1.00	0.73		0.05	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	259	0	143	207	0	0	146	1254	1312	15	2246	1000
V/C Ratio(X)	0.27	0.00	0.05	0.11	0.00	0.00	0.78	0.42	0.42	0.75	0.64	0.04
Avail Cap(c_a), veh/h	578	0	492	540	0	0	517	2112	2208	271	3732	1661
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.6	0.0	29.9	29.9	0.0	0.0	32.6	4.5	4.5	35.8	8.2	5.0
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.1	0.0	0.0	3.4	0.5	0.5	24.3	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.1	0.3	0.0	0.0	2.0	2.3	2.4	0.3	5.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.8	0.0	30.0	30.0	0.0	0.0	35.9	4.9	4.9	60.2	8.8	5.1
LnGrp LOS	C	A	C	C	A	A	D	A	A	E	A	A
Approach Vol, veh/h		77			22			1200			1482	
Approach Delay, s/veh		30.7			30.0			7.9			9.1	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.9	50.7		11.7	4.6	56.1		11.7
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	6.5	19.9		4.7	2.4	11.1		4.7
Green Ext Time (p_c), s	0.1	25.8		0.0	0.0	15.2		0.1

Intersection Summary	
HCM 6th Ctrl Delay	9.3
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	5	180	45	5	35	110	1055	50	30	1395	75
Future Volume (veh/h)	65	5	180	45	5	35	110	1055	50	30	1395	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	71	5	12	49	5	2	120	1147	34	33	1516	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	276	16	232	224	186	75	154	2271	1013	57	2079	927
Arrive On Green	0.16	0.15	0.15	0.15	0.15	0.15	0.09	0.64	0.64	0.03	0.58	0.58
Sat Flow, veh/h	1305	112	1579	1391	1269	508	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	76	0	12	49	0	7	120	1147	34	33	1516	45
Grp Sat Flow(s),veh/h/ln	1417	0	1579	1391	0	1777	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.7	0.0	0.5	2.7	0.0	0.3	5.4	14.2	0.7	1.5	25.5	1.0
Cycle Q Clear(g_c), s	4.0	0.0	0.5	6.7	0.0	0.3	5.4	14.2	0.7	1.5	25.5	1.0
Prop In Lane	0.93		1.00	1.00		0.29	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	310	0	232	224	0	261	154	2271	1013	57	2079	927
V/C Ratio(X)	0.25	0.00	0.05	0.22	0.00	0.03	0.78	0.50	0.03	0.58	0.73	0.05
Avail Cap(c_a), veh/h	515	0	459	424	0	517	453	2971	1325	259	2584	1152
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.4	0.0	30.3	34.8	0.0	30.1	36.9	7.9	5.5	39.4	12.4	7.3
Incr Delay (d2), s/veh	0.4	0.0	0.1	0.5	0.0	0.0	3.2	0.4	0.0	3.4	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.2	0.9	0.0	0.1	2.4	4.5	0.2	0.7	8.8	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.8	0.0	30.4	35.3	0.0	30.2	40.2	8.3	5.5	42.8	13.7	7.4
LnGrp LOS	C	A	C	D	A	C	D	A	A	D	B	A
Approach Vol, veh/h		88			56			1301			1594	
Approach Delay, s/veh		31.6			34.6			11.2			14.1	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.1	54.3		17.1	6.7	58.8		17.1				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	21.0	60.0		24.0	12.0	69.0		24.0				
Max Q Clear Time (g_c+I1), s	7.4	27.5		8.7	3.5	16.2		6.0				
Green Ext Time (p_c), s	0.2	20.8		0.1	0.0	17.8		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			13.7									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	5	445	15	5	20	290	1170	15	55	1395	155
Future Volume (veh/h)	240	5	445	15	5	20	290	1170	15	55	1395	155
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	265	0	268	16	5	7	315	1272	16	60	1516	134
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	450	0	780	50	16	22	444	2233	28	119	1989	1073
Arrive On Green	0.13	0.00	0.12	0.05	0.05	0.03	0.13	0.62	0.60	0.07	0.56	0.56
Sat Flow, veh/h	3563	0	3170	996	311	436	3456	3594	45	1781	3554	1584
Grp Volume(v), veh/h	265	0	268	28	0	0	315	629	659	60	1516	134
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1742	0	0	1728	1777	1862	1781	1777	1584
Q Serve(g_s), s	8.3	0.0	8.3	1.8	0.0	0.0	10.4	24.6	24.6	3.9	38.8	3.5
Cycle Q Clear(g_c), s	8.3	0.0	8.3	1.8	0.0	0.0	10.4	24.6	24.6	3.9	38.8	3.5
Prop In Lane	1.00		1.00	0.57		0.25	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	450	0	780	88	0	0	444	1104	1157	119	1989	1073
V/C Ratio(X)	0.59	0.00	0.34	0.32	0.00	0.00	0.71	0.57	0.57	0.51	0.76	0.12
Avail Cap(c_a), veh/h	1022	0	1290	456	0	0	1691	2908	3048	225	4527	2205
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.9	0.0	36.8	54.6	0.0	0.0	49.5	13.1	13.2	53.4	20.0	6.7
Incr Delay (d2), s/veh	0.5	0.0	0.1	0.8	0.0	0.0	0.8	0.7	0.6	1.2	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	3.2	0.8	0.0	0.0	4.5	9.3	9.8	1.8	15.3	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.3	0.0	36.9	55.4	0.0	0.0	50.3	13.8	13.8	54.7	20.9	6.8
LnGrp LOS	D	A	D	E	A	A	D	B	B	D	C	A
Approach Vol, veh/h		533			28			1603			1710	
Approach Delay, s/veh		43.1			55.4			21.0			21.0	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	19.2	70.3		10.0	11.9	77.7		19.0				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0				
Max Q Clear Time (g_c+I1), s	12.4	40.8		3.8	5.9	26.6		10.3				
Green Ext Time (p_c), s	0.9	23.5		0.0	0.0	13.0		1.6				

Intersection Summary	
HCM 6th Ctrl Delay	24.3
HCM 6th LOS	C

Notes
User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	135	5	60	5	1350	90	90	1825	10
Future Volume (veh/h)	5	0	5	135	5	60	5	1350	90	90	1825	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1467	95	98	1984	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2416	156	124	2813	16
Arrive On Green	0.13	0.00	0.12	0.13	0.13	0.12	0.01	0.95	0.94	0.07	0.78	0.77
Sat Flow, veh/h	1144	37	236	1416	858	858	1781	3389	219	1781	3624	20
Grp Volume(v), veh/h	6	0	0	147	0	10	5	766	796	98	972	1023
Grp Sat Flow(s),veh/h/ln	1418	0	0	1416	0	1716	1781	1777	1831	1781	1777	1867
Q Serve(g_s), s	0.0	0.0	0.0	12.3	0.0	0.7	0.4	6.8	7.1	7.0	35.1	35.3
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	6.8	7.1	7.0	35.1	35.3
Prop In Lane	0.83		0.17	1.00		0.50	1.00		0.12	1.00		0.01
Lane Grp Cap(c), veh/h	228	0	0	234	0	215	11	1267	1305	124	1379	1449
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.60	0.61	0.79	0.70	0.71
Avail Cap(c_a), veh/h	313	0	0	319	0	317	151	1267	1305	151	1379	1449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.82	0.82	0.82	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	0.0	0.0	55.4	0.0	50.3	64.2	1.1	1.2	59.5	7.2	7.2
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.7	0.0	0.1	8.0	1.8	1.7	16.4	3.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	4.9	0.0	0.3	0.2	1.7	1.8	3.7	11.8	12.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.4	72.2	2.9	2.9	76.0	10.2	10.1
LnGrp LOS	D	A	A	E	A	D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1567			2093	
Approach Delay, s/veh		50.0			57.6			3.1			13.3	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.8	104.9		20.3	13.1	96.7		20.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	82.0		23.0	11.0	82.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	37.3		15.0	9.0	9.1		2.7
Green Ext Time (p_c), s	0.0	34.8		0.3	0.0	31.1		0.0

Intersection Summary		
HCM 6th Ctrl Delay		11.0
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	5	15	65	5	15	15	1295	15	10	1610	265
Future Volume (veh/h)	135	5	15	65	5	15	15	1295	15	10	1610	265
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	147	5	13	71	5	9	16	1408	15	11	1750	212
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	6	16	227	17	23	19	2770	30	13	2722	1213
Arrive On Green	0.13	0.13	0.12	0.13	0.13	0.12	0.01	0.52	0.51	0.01	0.77	0.77
Sat Flow, veh/h	1344	46	119	1341	132	175	1781	3602	38	1781	3554	1584
Grp Volume(v), veh/h	165	0	0	85	0	0	16	694	729	11	1750	212
Grp Sat Flow(s),veh/h/ln	1509	0	0	1648	0	0	1781	1777	1863	1781	1777	1584
Q Serve(g_s), s	7.7	0.0	0.0	0.0	0.0	0.0	1.2	33.4	33.4	0.8	29.5	4.7
Cycle Q Clear(g_c), s	13.7	0.0	0.0	5.9	0.0	0.0	1.2	33.4	33.4	0.8	29.5	4.7
Prop In Lane	0.89		0.08	0.84		0.11	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	250	0	0	267	0	0	19	1367	1433	13	2722	1213
V/C Ratio(X)	0.66	0.00	0.00	0.32	0.00	0.00	0.84	0.51	0.51	0.82	0.64	0.17
Avail Cap(c_a), veh/h	348	0	0	366	0	0	110	1367	1433	110	2722	1213
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.76	0.76	0.76	0.61	0.61	0.61
Uniform Delay (d), s/veh	54.8	0.0	0.0	51.7	0.0	0.0	64.4	15.4	15.4	64.4	7.0	4.1
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.7	0.0	0.0	22.9	1.0	1.0	22.8	0.7	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	0.0	2.6	0.0	0.0	0.6	14.9	15.7	0.4	9.5	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.8	0.0	0.0	52.4	0.0	0.0	87.3	16.4	16.4	87.2	7.7	4.3
LnGrp LOS	E	A	A	D	A	A	F	B	B	F	A	A
Approach Vol, veh/h		165			85			1439			1973	
Approach Delay, s/veh		57.8			52.4			17.2			7.8	
Approach LOS		E			D			B			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	103.6		21.0	5.0	104.0		21.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	83.0		25.0	8.0	83.0		25.0
Max Q Clear Time (g_c+I1), s	3.2	31.5		7.9	2.8	35.4		15.7
Green Ext Time (p_c), s	0.0	42.4		0.2	0.0	29.0		0.4

Intersection Summary			
HCM 6th Ctrl Delay			14.8
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	20	50	90	20	20	60	1320	60	15	1620	130
Future Volume (veh/h)	190	20	50	90	20	20	60	1320	60	15	1620	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	207	22	11	98	22	2	65	1435	63	16	1761	137
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	325	29	352	139	377	34	83	2336	102	19	2133	164
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.06	0.90	0.89	0.01	0.85	0.84
Sat Flow, veh/h	1222	130	1579	1373	1688	153	1781	3467	152	1781	3343	257
Grp Volume(v), veh/h	229	0	11	98	0	24	65	734	764	16	926	972
Grp Sat Flow(s),veh/h/ln	1352	0	1579	1373	0	1842	1781	1777	1842	1781	1777	1824
Q Serve(g_s), s	19.7	0.0	0.7	7.9	0.0	1.3	4.7	12.4	12.6	1.2	33.4	36.2
Cycle Q Clear(g_c), s	21.1	0.0	0.7	29.0	0.0	1.3	4.7	12.4	12.6	1.2	33.4	36.2
Prop In Lane	0.90		1.00	1.00		0.08	1.00		0.08	1.00		0.14
Lane Grp Cap(c), veh/h	354	0	352	139	0	411	83	1197	1241	19	1134	1164
V/C Ratio(X)	0.65	0.00	0.03	0.70	0.00	0.06	0.78	0.61	0.62	0.84	0.82	0.84
Avail Cap(c_a), veh/h	354	0	352	139	0	411	110	1197	1241	110	1134	1164
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.16	0.16	0.16	0.69	0.69	0.69
Uniform Delay (d), s/veh	48.0	0.0	39.5	61.6	0.0	39.8	60.3	2.8	2.9	64.0	6.1	6.4
Incr Delay (d2), s/veh	4.0	0.0	0.0	14.8	0.0	0.1	3.1	0.4	0.4	21.2	4.6	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	0.0	0.3	3.8	0.0	0.6	2.1	2.5	2.6	0.6	6.4	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.1	0.0	39.5	76.4	0.0	39.8	63.4	3.2	3.2	85.2	10.7	11.4
LnGrp LOS	D	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		240			122			1563			1914	
Approach Delay, s/veh		51.5			69.2			5.7			11.7	
Approach LOS		D			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	87.0		33.0	5.4	91.6		33.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	80.0		28.0	8.0	80.0		28.0				
Max Q Clear Time (g_c+I1), s	10.7	38.2		31.0	3.2	14.6		23.1				
Green Ext Time (p_c), s	0.0	31.2		0.0	0.0	27.4		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			13.6									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	65	70	195	90	800	50	575	190	525	1025	75
Future Volume (veh/h)	25	65	70	195	90	800	50	575	190	525	1025	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.94	0.96		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	27	71	10	212	98	0	54	625	120	571	1114	79
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	191	208	361	519		70	826	691	651	1988	141
Arrive On Green	0.14	0.14	0.14	0.11	0.28	0.00	0.04	0.44	0.44	0.13	0.40	0.39
Sat Flow, veh/h	327	1374	1493	1781	1870	1585	1781	1870	1565	3456	3365	239
Grp Volume(v), veh/h	98	0	10	212	98	0	54	625	120	571	588	605
Grp Sat Flow(s),veh/h/ln	1701	0	1493	1781	1870	1585	1781	1870	1565	1728	1777	1827
Q Serve(g_s), s	1.4	0.0	0.8	13.0	5.2	0.0	3.9	36.4	6.0	21.1	33.4	33.5
Cycle Q Clear(g_c), s	6.4	0.0	0.8	13.0	5.2	0.0	3.9	36.4	6.0	21.1	33.4	33.5
Prop In Lane	0.28		1.00	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	272	0	208	361	519		70	826	691	651	1050	1080
V/C Ratio(X)	0.36	0.00	0.05	0.59	0.19		0.77	0.76	0.17	0.88	0.56	0.56
Avail Cap(c_a), veh/h	372	0	299	361	633		329	826	691	957	1050	1080
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.50	0.50	0.50
Uniform Delay (d), s/veh	50.9	0.0	48.5	40.5	35.8	0.0	61.9	30.4	21.9	55.3	26.2	26.2
Incr Delay (d2), s/veh	0.8	0.0	0.1	2.5	0.2	0.0	5.2	5.1	0.4	2.4	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.3	6.0	2.4	0.0	1.9	17.2	2.3	9.7	15.2	15.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	0.0	48.6	43.0	36.0	0.0	67.0	35.5	22.4	57.7	27.2	27.3
LnGrp LOS	D	A	D	D	D		E	D	C	E	C	C
Approach Vol, veh/h		108			310	A		799			1764	
Approach Delay, s/veh		51.4			40.7			35.7			37.1	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.1	80.8	18.0	22.1	28.5	61.4		40.1
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	24.0	49.0	13.0	25.0	36.0	37.0		43.0
Max Q Clear Time (g_c+I1), s	15.9	35.5	15.0	8.4	23.1	38.4		7.2
Green Ext Time (p_c), s	0.1	8.4	0.0	0.3	1.4	0.0		0.4

Intersection Summary		
HCM 6th Ctrl Delay		37.6
HCM 6th LOS		D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	10	610	20	0	740
Future Vol, veh/h	0	10	610	20	0	740
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	663	22	0	804

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	663	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	461	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	461	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	461	-
HCM Lane V/C Ratio	-	-	0.024	-
HCM Control Delay (s)	-	-	13	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	685	0	0	795
Future Vol, veh/h	0	0	685	0	0	795
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	745	0	0	864

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1609	745	0	0	745	0
Stage 1	745	-	-	-	-	-
Stage 2	864	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	115	414	-	-	863	-
Stage 1	469	-	-	-	-	-
Stage 2	413	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	115	414	-	-	863	-
Mov Cap-2 Maneuver	253	-	-	-	-	-
Stage 1	469	-	-	-	-	-
Stage 2	413	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	-	863	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	0	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	20	25	0	0	45
Future Vol, veh/h	50	20	25	0	0	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	22	27	0	0	49

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	27	0	-	0	146	27
Stage 1	-	-	-	-	27	-
Stage 2	-	-	-	-	119	-
Critical Hdwy	4.13	-	-	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	2.219	-	-	-	3.519	3.319
Pot Cap-1 Maneuver	1586	-	-	-	839	1048
Stage 1	-	-	-	-	995	-
Stage 2	-	-	-	-	894	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1586	-	-	-	810	1048
Mov Cap-2 Maneuver	-	-	-	-	810	-
Stage 1	-	-	-	-	961	-
Stage 2	-	-	-	-	894	-

Approach	EB	WB	SB
HCM Control Delay, s	5.3	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1586	-	-	-	1048
HCM Lane V/C Ratio	0.034	-	-	-	0.047
HCM Control Delay (s)	7.4	0	-	-	8.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Intersection	
Int Delay, s/veh	0

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

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	27	0	0	22	0	0	49	49	11	38	49	27
Stage 1	-	-	-	-	-	-	22	22	-	27	27	-
Stage 2	-	-	-	-	-	-	27	27	-	11	22	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1586	-	-	1593	-	-	948	842	1067	965	842	1048
Stage 1	-	-	-	-	-	-	994	877	-	990	872	-
Stage 2	-	-	-	-	-	-	990	872	-	1008	877	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1586	-	-	1593	-	-	948	842	1067	965	842	1048
Mov Cap-2 Maneuver	-	-	-	-	-	-	948	842	-	965	842	-
Stage 1	-	-	-	-	-	-	994	877	-	990	872	-
Stage 2	-	-	-	-	-	-	990	872	-	1008	877	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1586	-	-	1593	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2025 Scenario 2 AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	45	300	95	50	20	240	250	110	10	135	30
Future Volume (veh/h)	50	45	300	95	50	20	240	250	110	10	135	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	49	42	103	54	11	261	272	57	11	147	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	237	170	265	330	253	52	346	806	683	15	458	388
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.19	0.43	0.43	0.01	0.25	0.25
Sat Flow, veh/h	611	1010	1571	1297	1505	307	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	103	0	42	103	0	65	261	272	57	11	147	8
Grp Sat Flow(s),veh/h/ln	1620	0	1571	1297	0	1812	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.4	0.0	0.9	3.1	0.0	1.3	5.6	4.0	0.9	0.3	2.6	0.2
Cycle Q Clear(g_c), s	2.0	0.0	0.9	5.2	0.0	1.3	5.6	4.0	0.9	0.3	2.6	0.2
Prop In Lane	0.52		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	407	0	265	330	0	305	346	806	683	15	458	388
V/C Ratio(X)	0.25	0.00	0.16	0.31	0.00	0.21	0.75	0.34	0.08	0.72	0.32	0.02
Avail Cap(c_a), veh/h	1054	0	924	874	0	1066	1310	3621	3069	655	2934	2486
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.9	0.0	14.5	17.2	0.0	14.6	15.5	7.7	6.9	20.2	12.6	11.7
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.5	0.0	0.3	3.3	0.5	0.1	46.8	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.3	0.9	0.0	0.5	2.2	1.2	0.2	0.3	1.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.3	0.0	14.8	17.8	0.0	15.0	18.9	8.3	7.0	67.0	13.5	11.7
LnGrp LOS	B	A	B	B	A	B	B	A	A	E	B	B
Approach Vol, veh/h		145			168			590			166	
Approach Delay, s/veh		15.1			16.7			12.8			16.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	23.6		11.9	12.9	16.0		11.9				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.3	6.0		4.0	7.6	4.6		7.2				
Green Ext Time (p_c), s	0.0	4.1		0.6	0.7	1.8		0.6				

Intersection Summary			
HCM 6th Ctrl Delay			14.4
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	180	90	20	15	150	570	15	10	530	65
Future Volume (veh/h)	60	5	180	90	20	15	150	570	15	10	530	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	19	98	22	2	163	620	0	11	576	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	377	24	307	343	334	30	410	898		334	739	622
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.09	0.48	0.00	0.01	0.40	0.40
Sat Flow, veh/h	1214	122	1545	1358	1685	153	1781	1870	1585	1781	1870	1573
Grp Volume(v), veh/h	70	0	19	98	0	24	163	620	0	11	576	29
Grp Sat Flow(s),veh/h/ln	1336	0	1545	1358	0	1838	1781	1870	1585	1781	1870	1573
Q Serve(g_s), s	2.0	0.0	0.5	3.4	0.0	0.5	2.5	13.2	0.0	0.2	13.8	0.6
Cycle Q Clear(g_c), s	2.5	0.0	0.5	5.9	0.0	0.5	2.5	13.2	0.0	0.2	13.8	0.6
Prop In Lane	0.93		1.00	1.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	401	0	307	343	0	365	410	898		334	739	622
V/C Ratio(X)	0.17	0.00	0.06	0.29	0.00	0.07	0.40	0.69		0.03	0.78	0.05
Avail Cap(c_a), veh/h	801	0	755	736	0	898	765	1864		841	1864	1568
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.6	0.0	16.6	20.0	0.0	16.7	9.4	10.3	0.0	9.9	13.5	9.5
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.5	0.0	0.1	0.6	1.0	0.0	0.0	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	1.0	0.0	0.2	0.7	4.2	0.0	0.1	5.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.8	0.0	16.7	20.4	0.0	16.7	10.0	11.3	0.0	10.0	15.3	9.6
LnGrp LOS	B	A	B	C	A	B	B	B		A	B	A
Approach Vol, veh/h		89			122			783	A		616	
Approach Delay, s/veh		17.6			19.7			11.0			15.0	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	30.6		15.2	9.8	26.2		15.2				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0				
Max Q Clear Time (g_c+I1), s	2.2	15.2		4.5	4.5	15.8		7.9				
Green Ext Time (p_c), s	0.0	4.6		0.4	0.3	4.2		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		13.6
HCM 6th LOS		B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	10	125	85	40	55	60	615	35	20	725	30
Future Volume (veh/h)	40	10	125	85	40	55	60	615	35	20	725	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	11	6	92	43	6	65	668	21	22	788	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	56	148	80	121	312	262	85	974	825	26	912	773
Arrive On Green	0.03	0.13	0.13	0.07	0.17	0.17	0.05	0.52	0.52	0.01	0.49	0.49
Sat Flow, veh/h	1781	1131	617	1781	1870	1574	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	43	0	17	92	43	6	65	668	21	22	788	16
Grp Sat Flow(s),veh/h/ln	1781	0	1748	1781	1870	1574	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.8	0.0	0.6	3.8	1.5	0.2	2.7	20.0	0.5	0.9	28.0	0.4
Cycle Q Clear(g_c), s	1.8	0.0	0.6	3.8	1.5	0.2	2.7	20.0	0.5	0.9	28.0	0.4
Prop In Lane	1.00		0.35	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	56	0	228	121	312	262	85	974	825	26	912	773
V/C Ratio(X)	0.77	0.00	0.07	0.76	0.14	0.02	0.76	0.69	0.03	0.84	0.86	0.02
Avail Cap(c_a), veh/h	475	0	489	475	523	440	593	1620	1373	593	1620	1373
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.1	0.0	28.7	34.4	26.7	26.2	35.3	13.4	8.7	36.9	17.0	10.0
Incr Delay (d2), s/veh	19.1	0.0	0.1	9.4	0.2	0.0	13.2	0.9	0.0	47.1	2.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.3	1.9	0.7	0.1	1.4	7.4	0.2	0.7	11.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.2	0.0	28.8	43.8	26.9	26.2	48.5	14.3	8.8	84.0	19.6	10.0
LnGrp LOS	E	A	C	D	C	C	D	B	A	F	B	A
Approach Vol, veh/h		60			141			754			826	
Approach Delay, s/veh		47.7			37.9			17.1			21.2	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	44.1	10.1	14.8	8.6	41.6	7.4	17.5
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.9	22.0	5.8	2.6	4.7	30.0	3.8	3.5
Green Ext Time (p_c), s	0.0	5.2	0.2	0.0	0.1	6.6	0.1	0.1

Intersection Summary			
HCM 6th Ctrl Delay			21.7
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	10	480	20	5	0	315	705	45	10	890	15
Future Volume (veh/h)	35	10	480	20	5	0	315	705	45	10	890	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	11	0	22	5	0	342	766	48	11	967	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	183	30		188	30	0	406	2297	144	15	1624	724
Arrive On Green	0.09	0.07	0.00	0.09	0.07	0.00	0.23	0.68	0.68	0.01	0.46	0.46
Sat Flow, veh/h	1115	423	1585	1156	419	0	1781	3396	213	1781	3554	1585
Grp Volume(v), veh/h	49	0	0	27	0	0	342	401	413	11	967	6
Grp Sat Flow(s),veh/h/ln	1538	0	1585	1575	0	0	1781	1777	1832	1781	1777	1585
Q Serve(g_s), s	0.9	0.0	0.0	0.0	0.0	0.0	11.3	5.8	5.8	0.4	12.5	0.1
Cycle Q Clear(g_c), s	1.7	0.0	0.0	0.8	0.0	0.0	11.3	5.8	5.8	0.4	12.5	0.1
Prop In Lane	0.78		1.00	0.81		0.00	1.00		0.12	1.00		1.00
Lane Grp Cap(c), veh/h	238	0		244	0	0	406	1202	1239	15	1624	724
V/C Ratio(X)	0.21	0.00		0.11	0.00	0.00	0.84	0.33	0.33	0.74	0.60	0.01
Avail Cap(c_a), veh/h	616	0		736	0	0	1914	2140	2207	1914	4280	1909
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	0.0	0.0	26.5	0.0	0.0	22.7	4.2	4.2	30.4	12.4	9.1
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	1.9	0.3	0.3	23.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.4	0.0	0.0	4.5	1.4	1.4	0.2	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.3	0.0	0.0	26.7	0.0	0.0	24.5	4.5	4.5	53.4	13.2	9.1
LnGrp LOS	C	A		C	A	A	C	A	A	D	B	A
Approach Vol, veh/h		49	A		27			1156			984	
Approach Delay, s/veh		27.3			26.7			10.4			13.6	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	34.1		9.4	4.5	47.6		9.4				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	66.0	74.0		25.0	66.0	74.0		20.0				
Max Q Clear Time (g_c+I1), s	13.3	14.5		2.8	2.4	7.8		3.7				
Green Ext Time (p_c), s	0.8	13.6		0.0	0.0	9.5		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			12.4
HCM 6th LOS			B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	70	10	5	10	135	1125	20	15	1365	70
Future Volume (veh/h)	30	0	70	10	5	10	135	1125	20	15	1365	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	0	1	11	5	1	147	1223	21	16	1484	47
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	169	0	70	113	19	3	185	2679	46	20	2335	1041
Arrive On Green	0.06	0.00	0.04	0.06	0.04	0.04	0.10	0.75	0.75	0.01	0.66	0.66
Sat Flow, veh/h	1560	0	1585	691	436	70	1781	3575	61	1781	3554	1585
Grp Volume(v), veh/h	33	0	1	17	0	0	147	608	636	16	1484	47
Grp Sat Flow(s),veh/h/ln	1560	0	1585	1197	0	0	1781	1777	1859	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	5.8	9.4	9.4	0.6	17.7	0.8
Cycle Q Clear(g_c), s	1.3	0.0	0.0	1.7	0.0	0.0	5.8	9.4	9.4	0.6	17.7	0.8
Prop In Lane	1.00		1.00	0.65		0.06	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	191	0	70	152	0	0	185	1332	1394	20	2335	1041
V/C Ratio(X)	0.17	0.00	0.01	0.11	0.00	0.00	0.79	0.46	0.46	0.79	0.64	0.05
Avail Cap(c_a), veh/h	579	0	507	575	0	0	520	2125	2223	272	3755	1675
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.0	0.0	32.9	33.4	0.0	0.0	31.5	3.4	3.4	35.5	7.3	4.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	2.9	0.5	0.5	21.4	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.3	0.0	0.0	2.5	1.9	2.0	0.4	5.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.1	0.0	32.9	33.5	0.0	0.0	34.4	4.0	3.9	56.9	7.9	4.4
LnGrp LOS	C	A	C	C	A	A	C	A	A	E	A	A
Approach Vol, veh/h		34			17			1391			1547	
Approach Delay, s/veh		33.1			33.5			7.2			8.3	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.5	52.3		8.2	4.8	58.9		8.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	7.8	19.7		3.7	2.6	11.4		3.3
Green Ext Time (p_c), s	0.1	27.6		0.0	0.0	19.6		0.0

Intersection Summary	
HCM 6th Ctrl Delay	8.2
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	35	40	15	50	110	1260	60	30	1310	45
Future Volume (veh/h)	55	5	35	40	15	50	110	1260	60	30	1310	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	1	43	16	1	120	1370	49	33	1424	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	12	152	111	168	10	142	2780	1240	44	2584	1153
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.08	0.78	0.78	0.02	0.73	0.73
Sat Flow, veh/h	1198	121	1580	1407	1742	109	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	65	0	1	43	0	17	120	1370	49	33	1424	35
Grp Sat Flow(s),veh/h/ln	1318	0	1580	1407	0	1850	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	6.6	0.0	0.1	4.7	0.0	1.3	10.3	21.2	1.1	2.9	28.3	1.0
Cycle Q Clear(g_c), s	7.8	0.0	0.1	12.5	0.0	1.3	10.3	21.2	1.1	2.9	28.3	1.0
Prop In Lane	0.92		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	172	0	152	111	0	178	142	2780	1240	44	2584	1153
V/C Ratio(X)	0.38	0.00	0.01	0.39	0.00	0.10	0.84	0.49	0.04	0.76	0.55	0.03
Avail Cap(c_a), veh/h	255	0	245	193	0	287	241	2780	1240	241	2584	1153
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.72	0.72	0.72	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.3	0.0	63.3	72.8	0.0	63.9	70.4	6.0	3.8	75.1	9.6	5.9
Incr Delay (d2), s/veh	1.4	0.0	0.0	2.2	0.0	0.2	3.8	0.5	0.0	9.5	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	0.0	1.8	0.0	0.6	4.8	7.2	0.3	1.4	10.6	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.7	0.0	63.3	75.0	0.0	64.1	74.2	6.4	3.8	84.7	10.5	5.9
LnGrp LOS	E	A	E	E	A	E	E	A	A	F	B	A
Approach Vol, veh/h		66			60			1539			1492	
Approach Delay, s/veh		68.6			71.9			11.6			12.0	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.7		19.9	7.8	127.3		19.9
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	30.3		14.5	4.9	23.2		9.8
Green Ext Time (p_c), s	0.1	27.0		0.1	0.0	26.4		0.1

Intersection Summary	
HCM 6th Ctrl Delay	14.1
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	10	220	10	10	10	425	1345	15	85	1255	100
Future Volume (veh/h)	135	10	220	10	10	10	425	1345	15	85	1255	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	155	0	61	11	11	3	462	1462	16	92	1364	81
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	330	0	813	61	61	17	607	2147	23	155	1804	934
Arrive On Green	0.09	0.00	0.08	0.08	0.08	0.05	0.18	0.60	0.58	0.09	0.51	0.51
Sat Flow, veh/h	3563	0	3075	786	786	214	3456	3601	39	1781	3554	1579
Grp Volume(v), veh/h	155	0	61	25	0	0	462	721	757	92	1364	81
Grp Sat Flow(s),veh/h/ln	1781	0	1538	1786	0	0	1728	1777	1863	1781	1777	1579
Q Serve(g_s), s	4.5	0.0	1.6	1.4	0.0	0.0	13.9	30.2	30.2	5.4	33.5	2.4
Cycle Q Clear(g_c), s	4.5	0.0	1.6	1.4	0.0	0.0	13.9	30.2	30.2	5.4	33.5	2.4
Prop In Lane	1.00		1.00	0.44		0.12	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	330	0	813	139	0	0	607	1060	1111	155	1804	934
V/C Ratio(X)	0.47	0.00	0.08	0.18	0.00	0.00	0.76	0.68	0.68	0.59	0.76	0.09
Avail Cap(c_a), veh/h	1108	0	1485	506	0	0	1833	3152	3305	244	4906	2313
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	0.0	30.6	47.3	0.0	0.0	42.9	15.0	15.0	48.1	21.5	9.6
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.6	0.0	0.0	0.8	1.1	1.1	1.4	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	0.6	0.7	0.0	0.0	5.9	11.4	12.0	2.4	13.3	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.5	0.0	30.6	47.9	0.0	0.0	43.7	16.1	16.1	49.4	22.5	9.7
LnGrp LOS	D	A	C	D	A	A	D	B	B	D	C	A
Approach Vol, veh/h		216			25			1940			1537	
Approach Delay, s/veh		42.7			47.9			22.7			23.4	
Approach LOS		D			D			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	23.2	59.5		12.5	13.5	69.2		14.1				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0				
Max Q Clear Time (g_c+I1), s	15.9	35.5		3.4	7.4	32.2		6.5				
Green Ext Time (p_c), s	1.3	18.0		0.0	0.1	17.4		0.6				
Intersection Summary												
HCM 6th Ctrl Delay			24.3									
HCM 6th LOS			C									

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	60	0	45	5	1785	90	30	1460	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1785	90	30	1460	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	1940	96	33	1587	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	177	0	138	11	2721	133	64	2975	9
Arrive On Green	0.09	0.09	0.08	0.09	0.00	0.08	0.01	0.79	0.78	0.04	0.82	0.81
Sat Flow, veh/h	586	899	148	1378	0	1545	1781	3447	169	1781	3634	11
Grp Volume(v), veh/h	11	0	0	65	0	1	5	992	1044	33	776	816
Grp Sat Flow(s),veh/h/ln	1633	0	0	1378	0	1545	1781	1777	1839	1781	1777	1868
Q Serve(g_s), s	0.0	0.0	0.0	5.3	0.0	0.1	0.4	37.3	38.8	2.5	19.7	19.7
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	37.3	38.8	2.5	19.7	19.7
Prop In Lane	0.45		0.09	1.00		1.00	1.00		0.09	1.00		0.01
Lane Grp Cap(c), veh/h	183	0	0	177	0	138	11	1402	1452	64	1455	1529
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.44	0.71	0.72	0.52	0.53	0.53
Avail Cap(c_a), veh/h	313	0	0	290	0	265	102	1402	1452	102	1455	1529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.62	0.62	0.62	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.4	0.0	0.0	60.7	0.0	58.5	69.3	7.0	7.2	66.3	4.1	4.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	6.2	1.9	1.9	2.4	1.4	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.3	0.0	0.0	0.2	12.2	13.2	1.2	6.0	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	75.5	8.9	9.2	68.7	5.5	5.4
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	A	A
Approach Vol, veh/h		11			66			2041			1625	
Approach Delay, s/veh		58.6			62.0			9.2			6.7	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.9	118.6		16.5	9.0	114.5		16.5
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	95.0		23.0	8.0	95.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	21.7		8.1	4.5	40.8		2.8
Green Ext Time (p_c), s	0.0	32.1		0.1	0.0	41.5		0.0

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	5	5	105	15	15	5	1765	20	10	1295	195
Future Volume (veh/h)	90	5	5	105	15	15	5	1765	20	10	1295	195
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	98	5	3	114	16	12	5	1918	21	11	1408	152
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	210	8	5	199	20	15	7	2818	31	14	2795	1247
Arrive On Green	0.11	0.11	0.10	0.11	0.11	0.10	0.00	0.78	0.77	0.01	0.79	0.79
Sat Flow, veh/h	1393	71	43	1317	185	139	1781	3601	39	1781	3554	1585
Grp Volume(v), veh/h	106	0	0	142	0	0	5	945	994	11	1408	152
Grp Sat Flow(s),veh/h/ln	1506	0	0	1641	0	0	1781	1777	1863	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.3	29.6	29.9	0.7	16.8	2.7
Cycle Q Clear(g_c), s	7.9	0.0	0.0	9.7	0.0	0.0	0.3	29.6	29.9	0.7	16.8	2.7
Prop In Lane	0.92		0.03	0.80		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	223	0	0	234	0	0	7	1391	1458	14	2795	1247
V/C Ratio(X)	0.48	0.00	0.00	0.61	0.00	0.00	0.73	0.68	0.68	0.80	0.50	0.12
Avail Cap(c_a), veh/h	432	0	0	451	0	0	119	1391	1458	119	2795	1247
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.61	0.61	0.61	0.84	0.84	0.84
Uniform Delay (d), s/veh	51.1	0.0	0.0	51.8	0.0	0.0	59.7	6.1	6.1	59.4	4.5	3.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.5	0.0	0.0	28.4	1.7	1.6	27.8	0.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.0	4.3	0.0	0.0	0.2	9.0	9.5	0.4	4.9	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.7	0.0	0.0	54.3	0.0	0.0	88.1	7.7	7.7	87.2	5.1	3.2
LnGrp LOS	D	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		106			142			1944			1571	
Approach Delay, s/veh		52.7			54.3			7.9			5.5	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.4		17.2	4.9	97.9		17.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.3	18.8		11.7	2.7	31.9		9.9
Green Ext Time (p_c), s	0.0	32.7		0.5	0.0	32.1		0.3

Intersection Summary	
HCM 6th Ctrl Delay	9.9
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	30	20	145	25	35	25	1585	75	10	1330	75
Future Volume (veh/h)	150	30	20	145	25	35	25	1585	75	10	1330	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	163	33	4	158	27	5	27	1723	80	11	1446	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	337	59	403	220	394	73	34	2247	104	13	2185	121
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.25	0.04	1.00	1.00	0.01	0.64	0.63
Sat Flow, veh/h	1127	228	1568	1361	1532	284	1781	3459	160	1781	3424	189
Grp Volume(v), veh/h	196	0	4	158	0	32	27	880	923	11	748	778
Grp Sat Flow(s),veh/h/ln	1355	0	1568	1361	0	1816	1781	1777	1842	1781	1777	1836
Q Serve(g_s), s	16.8	0.0	0.3	16.1	0.0	1.9	2.1	0.0	0.0	0.9	36.9	37.3
Cycle Q Clear(g_c), s	18.7	0.0	0.3	34.8	0.0	1.9	2.1	0.0	0.0	0.9	36.9	37.3
Prop In Lane	0.83		1.00	1.00		0.16	1.00		0.09	1.00		0.10
Lane Grp Cap(c), veh/h	396	0	403	220	0	467	34	1154	1196	13	1134	1172
V/C Ratio(X)	0.50	0.00	0.01	0.72	0.00	0.07	0.79	0.76	0.77	0.83	0.66	0.66
Avail Cap(c_a), veh/h	396	0	403	220	0	467	140	1154	1196	140	1134	1172
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.84	0.84	0.84
Uniform Delay (d), s/veh	46.4	0.0	38.7	60.8	0.0	39.4	67.1	0.0	0.0	69.4	15.8	16.0
Incr Delay (d2), s/veh	1.0	0.0	0.0	10.8	0.0	0.1	1.4	0.4	0.5	31.3	2.5	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.0	0.1	6.3	0.0	0.9	1.0	0.1	0.2	0.5	15.0	15.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.4	0.0	38.7	71.7	0.0	39.4	68.5	0.4	0.5	100.7	18.4	18.5
LnGrp LOS	D	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		200			190			1830			1537	
Approach Delay, s/veh		47.2			66.2			1.5			19.0	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	93.3		40.0	5.0	95.0		40.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	80.0		35.0	11.0	80.0		35.0
Max Q Clear Time (g_c+I1), s	4.1	39.3		36.8	2.9	2.0		20.7
Green Ext Time (p_c), s	0.0	22.8		0.0	0.0	43.0		0.6

Intersection Summary			
HCM 6th Ctrl Delay			14.3
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	85	35	115	65	1095	25	670	165	555	1075	30
Future Volume (veh/h)	10	85	35	115	65	1095	25	670	165	555	1075	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	92	3	125	71	0	27	728	107	603	1168	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	39	176	158	255	392		34	963	813	655	2422	66
Arrive On Green	0.10	0.10	0.10	0.08	0.21	0.00	0.02	0.52	0.52	0.38	1.00	1.00
Sat Flow, veh/h	108	1715	1543	1781	1870	1585	1781	1870	1579	3456	3533	97
Grp Volume(v), veh/h	103	0	3	125	71	0	27	728	107	603	587	613
Grp Sat Flow(s),veh/h/ln	1823	0	1543	1781	1870	1585	1781	1870	1579	1728	1777	1853
Q Serve(g_s), s	1.1	0.0	0.2	8.5	4.4	0.0	2.1	43.3	4.9	23.3	0.0	0.0
Cycle Q Clear(g_c), s	7.4	0.0	0.2	8.5	4.4	0.0	2.1	43.3	4.9	23.3	0.0	0.0
Prop In Lane	0.11		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	215	0	158	255	392		34	963	813	655	1218	1270
V/C Ratio(X)	0.48	0.00	0.02	0.49	0.18		0.79	0.76	0.13	0.92	0.48	0.48
Avail Cap(c_a), veh/h	326	0	254	255	508		178	963	813	839	1218	1270
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.70	0.70	0.70
Uniform Delay (d), s/veh	59.7	0.0	56.5	49.1	45.5	0.0	68.4	26.9	17.7	42.4	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.0	1.5	0.2	0.0	11.3	4.4	0.3	8.6	1.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.1	3.9	2.1	0.0	1.1	19.9	1.9	9.1	0.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.3	0.0	56.6	50.6	45.7	0.0	79.7	31.3	17.9	51.0	1.0	0.9
LnGrp LOS	E	A	E	D	D		E	C	B	D	A	A
Approach Vol, veh/h		106			196	A		862			1803	
Approach Delay, s/veh		61.2			48.8			31.2			17.7	
Approach LOS		E			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	100.0	15.0	18.3	30.6	76.1		33.3				
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	14.0	75.0	10.0	22.0	34.0	55.0		37.0				
Max Q Clear Time (g_c+I1), s	4.1	2.0	10.5	9.4	25.3	45.3		6.4				
Green Ext Time (p_c), s	0.0	18.2	0.0	0.2	1.3	5.1		0.2				

Intersection Summary			
HCM 6th Ctrl Delay			25.2
HCM 6th LOS			C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	15	705	5	0	810
Future Vol, veh/h	0	15	705	5	0	810
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	766	5	0	880

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	766	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	403	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	403	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	403	-
HCM Lane V/C Ratio	-	-	0.04	-
HCM Control Delay (s)	-	-	14.3	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	740	0	0	930
Future Vol, veh/h	0	0	740	0	0	930
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	804	0	0	1011

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1815	804	0	0	804	0
Stage 1	804	-	-	-	-	-
Stage 2	1011	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	86	383	-	-	820	-
Stage 1	440	-	-	-	-	-
Stage 2	352	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	86	383	-	-	820	-
Mov Cap-2 Maneuver	217	-	-	-	-	-
Stage 1	440	-	-	-	-	-
Stage 2	352	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	-	820	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	0	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	40	5	0	95	0	25	0	0	0	0	60
Future Vol, veh/h	15	40	5	0	95	0	25	0	0	0	0	60
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	43	5	0	103	0	27	0	0	0	0	65

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	103	0	0	48	0	0	214	181	24	157	183	103
Stage 1	-	-	-	-	-	-	78	78	-	103	103	-
Stage 2	-	-	-	-	-	-	136	103	-	54	80	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1488	-	-	1558	-	-	733	712	1047	802	711	951
Stage 1	-	-	-	-	-	-	922	830	-	902	809	-
Stage 2	-	-	-	-	-	-	867	809	-	952	828	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1488	-	-	1558	-	-	677	704	1047	796	703	951
Mov Cap-2 Maneuver	-	-	-	-	-	-	677	704	-	796	703	-
Stage 1	-	-	-	-	-	-	912	821	-	892	809	-
Stage 2	-	-	-	-	-	-	808	809	-	942	819	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	0	10.5	9.1
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	677	1488	-	-	1558	-	-	951
HCM Lane V/C Ratio	0.04	0.011	-	-	-	-	-	0.069
HCM Control Delay (s)	10.5	7.4	-	-	0	-	-	9.1
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	20	25	0	10	0	85	0	0	0	0	0
Future Vol, veh/h	0	20	25	0	10	0	85	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	22	27	0	11	0	92	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	11	0	0	49	0	0	47	47	25	22	60	11
Stage 1	-	-	-	-	-	-	36	36	-	11	11	-
Stage 2	-	-	-	-	-	-	11	11	-	11	49	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1607	-	-	1557	-	-	951	844	1046	989	831	1070
Stage 1	-	-	-	-	-	-	975	865	-	1009	886	-
Stage 2	-	-	-	-	-	-	1009	886	-	1008	854	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1607	-	-	1557	-	-	951	844	1046	989	831	1070
Mov Cap-2 Maneuver	-	-	-	-	-	-	951	844	-	989	831	-
Stage 1	-	-	-	-	-	-	975	865	-	1009	886	-
Stage 2	-	-	-	-	-	-	1009	886	-	1008	854	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	9.2	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	951	1607	-	-	1557	-	-	-
HCM Lane V/C Ratio	0.097	-	-	-	-	-	-	-
HCM Control Delay (s)	9.2	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2025 Scenario 2 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	25	395	60	25	5	395	225	65	10	300	75
Future Volume (veh/h)	55	25	395	60	25	5	395	225	65	10	300	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	27	26	65	27	1	429	245	45	11	326	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	223	68	178	223	201	7	515	1050	890	15	526	446
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.29	0.56	0.56	0.01	0.28	0.28
Sat Flow, veh/h	912	609	1585	1351	1792	66	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	87	0	26	65	0	28	429	245	45	11	326	21
Grp Sat Flow(s),veh/h/ln	1521	0	1585	1351	0	1858	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.0	0.0	0.7	2.4	0.0	0.7	11.4	3.3	0.6	0.3	7.6	0.5
Cycle Q Clear(g_c), s	2.7	0.0	0.7	5.1	0.0	0.7	11.4	3.3	0.6	0.3	7.6	0.5
Prop In Lane	0.69		1.00	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	292	0	178	223	0	209	515	1050	890	15	526	446
V/C Ratio(X)	0.30	0.00	0.15	0.29	0.00	0.13	0.83	0.23	0.05	0.73	0.62	0.05
Avail Cap(c_a), veh/h	839	0	755	715	0	885	1061	2932	2485	530	2376	2013
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.0	0.0	20.2	23.4	0.0	20.2	16.8	5.6	5.0	24.9	15.8	13.2
Incr Delay (d2), s/veh	0.6	0.0	0.4	0.7	0.0	0.3	3.6	0.2	0.0	48.9	2.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.3	0.8	0.0	0.3	4.4	0.9	0.2	0.3	3.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	0.0	20.6	24.1	0.0	20.4	20.4	5.8	5.0	73.8	18.3	13.3
LnGrp LOS	C	A	C	C	A	C	C	A	A	E	B	B
Approach Vol, veh/h		113			93			719			358	
Approach Delay, s/veh		21.3			23.0			14.5			19.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	34.3		10.7	19.6	20.2		10.7
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0
Max Q Clear Time (g_c+I1), s	2.3	5.3		4.7	13.4	9.6		7.1
Green Ext Time (p_c), s	0.0	3.5		0.5	1.2	4.5		0.2

Intersection Summary			
HCM 6th Ctrl Delay			17.2
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	20	160	50	15	10	205	620	45	25	620	80
Future Volume (veh/h)	75	20	160	50	15	10	205	620	45	25	620	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	22	14	54	16	1	223	674	0	27	674	46
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	268	58	211	237	232	15	429	1004		384	847	714
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.10	0.54	0.00	0.02	0.45	0.45
Sat Flow, veh/h	1072	434	1585	1372	1742	109	1781	1870	1585	1781	1870	1578
Grp Volume(v), veh/h	104	0	14	54	0	17	223	674	0	27	674	46
Grp Sat Flow(s),veh/h/ln	1506	0	1585	1372	0	1851	1781	1870	1585	1781	1870	1578
Q Serve(g_s), s	2.7	0.0	0.4	2.0	0.0	0.4	3.1	13.4	0.0	0.4	15.8	0.8
Cycle Q Clear(g_c), s	3.2	0.0	0.4	5.2	0.0	0.4	3.1	13.4	0.0	0.4	15.8	0.8
Prop In Lane	0.79		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	326	0	211	237	0	247	429	1004		384	847	714
V/C Ratio(X)	0.32	0.00	0.07	0.23	0.00	0.07	0.52	0.67		0.07	0.80	0.06
Avail Cap(c_a), veh/h	847	0	771	722	0	900	766	1856		871	1856	1566
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.6	0.0	19.5	23.1	0.0	19.5	9.3	8.6	0.0	8.1	12.0	7.9
Incr Delay (d2), s/veh	0.6	0.0	0.1	0.5	0.0	0.1	1.0	0.8	0.0	0.1	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.1	0.6	0.0	0.2	0.8	3.9	0.0	0.1	5.4	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.2	0.0	19.6	23.6	0.0	19.6	10.3	9.4	0.0	8.2	13.8	8.0
LnGrp LOS	C	A	B	C	A	B	B	A		A	B	A
Approach Vol, veh/h		118			71			897	A		747	
Approach Delay, s/veh		21.0			22.6			9.6			13.2	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.0	33.6		11.8	10.3	29.3		11.8
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.4	15.4		5.2	5.1	17.8		7.2
Green Ext Time (p_c), s	0.0	5.1		0.5	0.4	5.3		0.2

Intersection Summary	
HCM 6th Ctrl Delay	12.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	35	95	60	30	40	165	845	90	60	775	75
Future Volume (veh/h)	60	35	95	60	30	40	165	845	90	60	775	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	38	29	65	33	1	179	918	61	65	842	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	116	89	85	225	187	217	1075	911	85	936	792
Arrive On Green	0.05	0.12	0.12	0.05	0.12	0.12	0.12	0.57	0.57	0.05	0.50	0.50
Sat Flow, veh/h	1781	970	741	1781	1870	1557	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	65	0	67	65	33	1	179	918	61	65	842	41
Grp Sat Flow(s),veh/h/ln	1781	0	1711	1781	1870	1557	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	3.4	0.0	3.4	3.4	1.5	0.1	9.4	39.1	1.6	3.4	39.0	1.3
Cycle Q Clear(g_c), s	3.4	0.0	3.4	3.4	1.5	0.1	9.4	39.1	1.6	3.4	39.0	1.3
Prop In Lane	1.00		0.43	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	85	0	205	85	225	187	217	1075	911	85	936	792
V/C Ratio(X)	0.76	0.00	0.33	0.76	0.15	0.01	0.82	0.85	0.07	0.76	0.90	0.05
Avail Cap(c_a), veh/h	374	0	377	374	412	343	467	1275	1080	467	1275	1078
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	0.0	38.4	44.9	37.6	37.0	40.9	16.9	9.0	44.9	21.6	12.2
Incr Delay (d2), s/veh	13.2	0.0	0.9	13.2	0.3	0.0	7.6	5.1	0.0	13.1	7.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	1.5	1.8	0.7	0.0	4.5	16.2	0.5	1.8	17.3	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	39.3	58.1	37.9	37.0	48.5	22.0	9.0	57.9	28.6	12.2
LnGrp LOS	E	A	D	E	D	D	D	C	A	E	C	B
Approach Vol, veh/h		132			99			1158			948	
Approach Delay, s/veh		48.6			51.2			25.4			29.9	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	59.8	9.6	16.4	16.6	52.7	9.6	16.4
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	5.4	41.1	5.4	5.4	11.4	41.0	5.4	3.5
Green Ext Time (p_c), s	0.1	7.8	0.1	0.2	0.4	6.7	0.1	0.1

Intersection Summary	
HCM 6th Ctrl Delay	29.6
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	5	600	80	10	10	605	985	10	5	870	20
Future Volume (veh/h)	85	5	600	80	10	10	605	985	10	5	870	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	92	5	0	87	11	9	658	1071	11	5	946	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	195	7		180	14	12	700	2742	28	7	1323	590
Arrive On Green	0.09	0.08	0.00	0.09	0.08	0.08	0.39	0.76	0.76	0.00	0.37	0.37
Sat Flow, veh/h	1469	80	1585	1349	171	140	1781	3603	37	1781	3554	1585
Grp Volume(v), veh/h	97	0	0	107	0	0	658	528	554	5	946	6
Grp Sat Flow(s),veh/h/ln	1549	0	1585	1660	0	0	1781	1777	1864	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.1	0.0	0.0	35.6	10.1	10.1	0.3	22.8	0.2
Cycle Q Clear(g_c), s	5.7	0.0	0.0	5.8	0.0	0.0	35.6	10.1	10.1	0.3	22.8	0.2
Prop In Lane	0.95		1.00	0.81		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	217	0		223	0	0	700	1352	1418	7	1323	590
V/C Ratio(X)	0.45	0.00		0.48	0.00	0.00	0.94	0.39	0.39	0.72	0.72	0.01
Avail Cap(c_a), veh/h	379	0		464	0	0	1265	1352	1418	1265	2453	1094
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.0	0.0	0.0	44.1	0.0	0.0	29.2	4.1	4.1	49.7	26.8	19.8
Incr Delay (d2), s/veh	1.4	0.0	0.0	1.6	0.0	0.0	4.1	0.4	0.4	40.7	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	0.0	2.6	0.0	0.0	15.1	2.8	2.9	0.2	9.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.4	0.0	0.0	45.7	0.0	0.0	33.4	4.5	4.4	90.5	28.4	19.8
LnGrp LOS	D	A		D	A	A	C	A	A	F	C	B
Approach Vol, veh/h		97	A		107			1740			957	
Approach Delay, s/veh		45.4			45.7			15.4			28.7	
Approach LOS		D			D			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	43.3	43.2		13.5	4.4	82.1		13.5				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0				
Max Q Clear Time (g_c+I1), s	37.6	24.8		7.8	2.3	12.1		7.7				
Green Ext Time (p_c), s	1.7	12.4		0.3	0.0	14.6		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	21.9
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	140	15	0	5	135	1545	10	10	1555	60
Future Volume (veh/h)	55	5	140	15	0	5	135	1545	10	10	1555	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	6	16	0	1	147	1679	11	11	1690	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	231	16	176	181	2	7	179	2647	17	14	2270	1012
Arrive On Green	0.13	0.12	0.12	0.13	0.00	0.12	0.10	0.73	0.73	0.01	0.64	0.64
Sat Flow, veh/h	1380	141	1523	942	18	60	1781	3619	24	1781	3554	1584
Grp Volume(v), veh/h	65	0	6	17	0	0	147	824	866	11	1690	39
Grp Sat Flow(s),veh/h/ln	1521	0	1523	1020	0	0	1781	1777	1866	1781	1777	1584
Q Serve(g_s), s	0.0	0.0	0.3	0.9	0.0	0.0	7.8	22.4	22.4	0.6	31.6	0.9
Cycle Q Clear(g_c), s	3.3	0.0	0.3	4.2	0.0	0.0	7.8	22.4	22.4	0.6	31.6	0.9
Prop In Lane	0.92		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	263	0	176	201	0	0	179	1300	1365	14	2270	1012
V/C Ratio(X)	0.25	0.00	0.03	0.08	0.00	0.00	0.82	0.63	0.63	0.78	0.74	0.04
Avail Cap(c_a), veh/h	436	0	363	369	0	0	388	1585	1665	203	2802	1249
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.7	0.0	37.9	40.1	0.0	0.0	42.5	6.5	6.5	47.7	12.0	6.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.5	1.2	1.1	27.9	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.1	0.4	0.0	0.0	3.5	6.7	7.0	0.4	11.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.9	0.0	37.9	40.2	0.0	0.0	46.0	7.6	7.6	75.6	13.3	6.5
LnGrp LOS	D	A	D	D	A	A	D	A	A	E	B	A
Approach Vol, veh/h		71			17			1837			1740	
Approach Delay, s/veh		38.8			40.2			10.7			13.5	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.7	66.6		16.1	4.8	75.5		16.1				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	9.8	33.6		6.2	2.6	24.4		5.3				
Green Ext Time (p_c), s	0.1	28.0		0.0	0.0	33.5		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		12.7
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	5	175	70	5	45	125	1530	60	35	1705	100
Future Volume (veh/h)	80	5	175	70	5	45	125	1530	60	35	1705	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	87	5	37	76	5	1	136	1663	49	38	1853	86
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	218	11	210	140	202	40	157	2657	1184	49	2440	1088
Arrive On Green	0.14	0.13	0.13	0.13	0.13	0.13	0.09	0.75	0.75	0.03	0.69	0.69
Sat Flow, veh/h	1308	79	1564	1351	1509	302	1781	3554	1584	1781	3554	1585
Grp Volume(v), veh/h	92	0	37	76	0	6	136	1663	49	38	1853	86
Grp Sat Flow(s),veh/h/ln	1387	0	1564	1351	0	1811	1781	1777	1584	1781	1777	1585
Q Serve(g_s), s	9.9	0.0	3.5	9.1	0.0	0.5	12.4	36.6	1.3	3.5	56.3	3.0
Cycle Q Clear(g_c), s	10.3	0.0	3.5	19.5	0.0	0.5	12.4	36.6	1.3	3.5	56.3	3.0
Prop In Lane	0.95		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	237	0	210	140	0	243	157	2657	1184	49	2440	1088
V/C Ratio(X)	0.39	0.00	0.18	0.54	0.00	0.02	0.86	0.63	0.04	0.77	0.76	0.08
Avail Cap(c_a), veh/h	253	0	227	156	0	263	281	2657	1184	108	2440	1088
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.66	0.66	0.66	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.1	0.0	63.4	75.4	0.0	62.1	74.2	9.9	5.4	79.7	16.9	8.6
Incr Delay (d2), s/veh	1.0	0.0	0.4	3.2	0.0	0.0	3.6	0.7	0.0	9.3	2.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	1.4	3.3	0.0	0.2	5.9	13.5	0.4	1.7	22.5	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.1	0.0	63.8	78.6	0.0	62.1	77.8	10.6	5.5	89.0	19.2	8.7
LnGrp LOS	E	A	E	E	A	E	E	B	A	F	B	A
Approach Vol, veh/h		129			82			1848			1977	
Approach Delay, s/veh		66.2			77.4			15.4			20.1	
Approach LOS		E			E			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.6	119.3		27.1	8.5	129.3		27.1				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	26.0	100.0		24.0	10.0	116.0		24.0				
Max Q Clear Time (g_c+I1), s	14.4	58.3		21.5	5.5	38.6		12.3				
Green Ext Time (p_c), s	0.2	31.2		0.0	0.0	38.5		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		20.6
HCM 6th LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	305	5	615	15	0	5	385	1560	10	80	1745	135
Future Volume (veh/h)	305	5	615	15	0	5	385	1560	10	80	1745	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	336	0	463	16	0	1	418	1696	11	87	1897	127
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	529	0	898	68	0	4	488	2436	16	117	2124	1176
Arrive On Green	0.15	0.00	0.14	0.04	0.00	0.03	0.14	0.67	0.66	0.07	0.60	0.60
Sat Flow, veh/h	3563	0	3126	1659	0	104	3456	3619	23	1781	3554	1585
Grp Volume(v), veh/h	336	0	463	17	0	0	418	832	875	87	1897	127
Grp Sat Flow(s),veh/h/ln	1781	0	1563	1763	0	0	1728	1777	1866	1781	1777	1585
Q Serve(g_s), s	19.8	0.0	27.8	2.1	0.0	0.0	26.4	64.4	64.6	10.7	103.1	5.0
Cycle Q Clear(g_c), s	19.8	0.0	27.8	2.1	0.0	0.0	26.4	64.4	64.6	10.7	103.1	5.0
Prop In Lane	1.00		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	529	0	898	73	0	0	488	1196	1256	117	2124	1176
V/C Ratio(X)	0.63	0.00	0.52	0.23	0.00	0.00	0.86	0.70	0.70	0.74	0.89	0.11
Avail Cap(c_a), veh/h	541	0	909	244	0	0	896	1541	1618	119	2399	1298
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	89.5	0.0	67.1	103.9	0.0	0.0	93.9	22.5	22.5	102.6	38.8	8.1
Incr Delay (d2), s/veh	1.8	0.0	0.2	0.6	0.0	0.0	1.7	1.2	1.2	18.9	4.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	0.0	11.4	1.0	0.0	0.0	12.1	27.3	28.8	5.6	45.9	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	91.3	0.0	67.3	104.5	0.0	0.0	95.6	23.7	23.7	121.6	43.4	8.2
LnGrp LOS	F	A	E	F	A	A	F	C	C	F	D	A
Approach Vol, veh/h		799			17			2125			2111	
Approach Delay, s/veh		77.4			104.5			37.9			44.5	
Approach LOS		E			F			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	35.6	137.7		13.2	18.7	154.5		37.2
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	28.4	105.1		4.1	12.7	66.6		29.8
Green Ext Time (p_c), s	1.1	26.6		0.0	0.0	25.1		0.4

Intersection Summary	
HCM 6th Ctrl Delay	47.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	5	90	5	60	10	1895	90	85	2315	5
Future Volume (veh/h)	10	0	5	90	5	60	10	1895	90	85	2315	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	2060	96	92	2516	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	2	10	182	96	58	22	2617	121	118	2949	6
Arrive On Green	0.09	0.00	0.08	0.09	0.09	0.08	0.02	1.00	1.00	0.07	0.81	0.80
Sat Flow, veh/h	1240	26	115	1416	1095	657	1781	3459	160	1781	3639	7
Grp Volume(v), veh/h	12	0	0	98	0	8	11	1050	1106	92	1228	1293
Grp Sat Flow(s),veh/h/ln	1381	0	0	1416	0	1752	1781	1777	1842	1781	1777	1869
Q Serve(g_s), s	0.8	0.0	0.0	7.4	0.0	0.6	0.8	0.0	0.1	6.9	57.2	57.4
Cycle Q Clear(g_c), s	1.4	0.0	0.0	8.8	0.0	0.6	0.8	0.0	0.1	6.9	57.2	57.4
Prop In Lane	0.92		0.08	1.00		0.38	1.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	173	0	0	182	0	154	22	1345	1394	118	1440	1515
V/C Ratio(X)	0.07	0.00	0.00	0.54	0.00	0.05	0.49	0.78	0.79	0.78	0.85	0.85
Avail Cap(c_a), veh/h	300	0	0	309	0	311	145	1345	1394	251	1440	1515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.53	0.53	0.53	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.9	0.0	0.0	60.0	0.0	56.6	66.0	0.0	0.0	62.0	7.8	7.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.1	3.3	2.5	2.6	4.1	6.6	6.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	3.4	0.0	0.3	0.4	0.9	1.0	3.2	18.5	19.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.1	0.0	0.0	62.5	0.0	56.7	69.2	2.5	2.6	66.2	14.4	14.2
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	B	B
Approach Vol, veh/h		12			106			2167			2613	
Approach Delay, s/veh		57.1			62.0			2.9			16.1	
Approach LOS		E			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	113.4		15.9	13.0	106.2		15.9				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	87.0		23.0	19.0	79.0		23.0				
Max Q Clear Time (g_c+I1), s	2.8	59.4		10.8	8.9	2.1		3.4				
Green Ext Time (p_c), s	0.0	26.6		0.2	0.1	58.6		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		11.3
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	15	10	60	5	10	5	1815	20	5	1960	330
Future Volume (veh/h)	185	15	10	60	5	10	5	1815	20	5	1960	330
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	201	16	9	65	5	7	5	1973	21	5	2130	283
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	279	18	10	285	23	26	7	2649	28	7	2613	1166
Arrive On Green	0.17	0.17	0.16	0.17	0.17	0.16	0.01	1.00	1.00	0.00	0.74	0.74
Sat Flow, veh/h	1331	106	60	1372	132	150	1781	3602	38	1781	3554	1585
Grp Volume(v), veh/h	226	0	0	77	0	0	5	971	1023	5	2130	283
Grp Sat Flow(s),veh/h/ln	1496	0	0	1655	0	0	1781	1777	1863	1781	1777	1585
Q Serve(g_s), s	14.4	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	53.4	7.8
Cycle Q Clear(g_c), s	19.7	0.0	0.0	5.3	0.0	0.0	0.4	0.0	0.0	0.4	53.4	7.8
Prop In Lane	0.89		0.04	0.84		0.09	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	308	0	0	334	0	0	7	1307	1370	7	2613	1166
V/C Ratio(X)	0.73	0.00	0.00	0.23	0.00	0.00	0.74	0.74	0.75	0.74	0.82	0.24
Avail Cap(c_a), veh/h	380	0	0	405	0	0	106	1307	1370	106	2613	1166
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.54	0.54	0.54	0.34	0.34	0.34
Uniform Delay (d), s/veh	54.1	0.0	0.0	48.5	0.0	0.0	66.9	0.0	0.0	67.2	11.8	5.8
Incr Delay (d2), s/veh	5.6	0.0	0.0	0.3	0.0	0.0	26.6	2.1	2.0	17.8	1.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.0	0.0	0.0	2.3	0.0	0.0	0.2	0.8	0.8	0.2	18.5	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.8	0.0	0.0	48.9	0.0	0.0	93.5	2.1	2.0	85.0	12.8	5.9
LnGrp LOS	E	A	A	D	A	A	F	A	A	F	B	A
Approach Vol, veh/h		226			77			1999			2418	
Approach Delay, s/veh		59.8			48.9			2.3			12.2	
Approach LOS		E			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	103.3		27.2	4.5	103.3		27.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	84.0		29.0	8.0	84.0		29.0
Max Q Clear Time (g_c+I1), s	2.4	55.4		7.3	2.4	2.0		21.7
Green Ext Time (p_c), s	0.0	27.4		0.2	0.0	66.5		0.5

Intersection Summary			
HCM 6th Ctrl Delay			10.9
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	35	45	95	25	20	55	1610	105	25	1895	155
Future Volume (veh/h)	185	35	45	95	25	20	55	1610	105	25	1895	155
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	201	38	8	103	27	4	60	1750	111	27	2060	164
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	297	47	345	117	353	52	76	2274	143	34	2156	169
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.21	0.09	1.00	1.00	0.04	1.00	1.00
Sat Flow, veh/h	1117	211	1551	1343	1587	235	1781	3395	213	1781	3337	262
Grp Volume(v), veh/h	239	0	8	103	0	31	60	908	953	27	1083	1141
Grp Sat Flow(s),veh/h/ln	1328	0	1551	1343	0	1822	1781	1777	1832	1781	1777	1822
Q Serve(g_s), s	21.7	0.0	0.5	6.4	0.0	1.8	4.5	0.0	0.0	2.0	0.0	0.0
Cycle Q Clear(g_c), s	23.6	0.0	0.5	30.0	0.0	1.8	4.5	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.84		1.00	1.00		0.13	1.00		0.12	1.00		0.14
Lane Grp Cap(c), veh/h	344	0	345	117	0	405	76	1190	1227	34	1148	1177
V/C Ratio(X)	0.69	0.00	0.02	0.88	0.00	0.08	0.79	0.76	0.78	0.80	0.94	0.97
Avail Cap(c_a), veh/h	344	0	345	117	0	405	106	1190	1227	106	1148	1177
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.45	0.45	0.45
Uniform Delay (d), s/veh	50.9	0.0	41.0	65.5	0.0	41.6	61.1	0.0	0.0	64.7	0.0	0.0
Incr Delay (d2), s/veh	5.9	0.0	0.0	47.5	0.0	0.1	1.6	0.4	0.5	7.0	8.8	11.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.3	0.0	0.2	5.1	0.0	0.8	1.9	0.1	0.2	1.0	2.8	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.8	0.0	41.1	113.0	0.0	41.7	62.7	0.4	0.5	71.6	8.8	11.7
LnGrp LOS	E	A	D	F	A	D	E	A	A	E	A	B
Approach Vol, veh/h		247			134			1921			2251	
Approach Delay, s/veh		56.3			96.5			2.4			11.0	
Approach LOS		E			F			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	91.2		34.0	6.6	94.4		34.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	84.0		29.0	8.0	84.0		29.0				
Max Q Clear Time (g_c+I1), s	16.5	2.0		32.0	4.0	2.0		25.6				
Green Ext Time (p_c), s	0.0	63.0		0.0	0.0	45.1		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		12.3
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	85	85	190	85	1015	50	695	220	630	1165	40
Future Volume (veh/h)	35	85	85	190	85	1015	50	695	220	630	1165	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.96	0.98		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	92	13	207	92	0	54	755	159	685	1266	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	172	202	264	443		70	871	733	721	2229	74
Arrive On Green	0.13	0.13	0.13	0.07	0.24	0.00	0.04	0.47	0.47	0.42	1.00	1.00
Sat Flow, veh/h	387	1295	1521	1781	1870	1585	1781	1870	1575	3456	3509	116
Grp Volume(v), veh/h	130	0	13	207	92	0	54	755	159	685	641	667
Grp Sat Flow(s),veh/h/ln	1682	0	1521	1781	1870	1585	1781	1870	1575	1728	1777	1849
Q Serve(g_s), s	6.1	0.0	1.0	10.0	5.3	0.0	4.1	48.8	8.1	25.8	0.0	0.0
Cycle Q Clear(g_c), s	9.6	0.0	1.0	10.0	5.3	0.0	4.1	48.8	8.1	25.8	0.0	0.0
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	258	0	202	264	443		70	871	733	721	1128	1174
V/C Ratio(X)	0.50	0.00	0.06	0.78	0.21		0.77	0.87	0.22	0.95	0.57	0.57
Avail Cap(c_a), veh/h	380	0	315	264	582		238	871	733	742	1128	1174
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.88	0.88	0.88	0.24	0.24	0.24
Uniform Delay (d), s/veh	54.7	0.0	51.2	50.0	41.3	0.0	64.3	32.3	21.4	38.7	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.1	14.3	0.2	0.0	5.8	10.1	0.6	7.4	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	0.4	3.2	2.5	0.0	1.9	23.9	3.1	9.6	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.2	0.0	51.3	64.3	41.6	0.0	70.1	42.4	22.0	46.0	0.5	0.5
LnGrp LOS	E	A	D	E	D		E	D	C	D	A	A
Approach Vol, veh/h		143			299	A		968			1993	
Approach Delay, s/veh		55.8			57.3			40.6			16.1	
Approach LOS		E			E			D			B	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.3	89.7	14.0	22.0	32.2	66.9		36.0
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	18.0	62.0	9.0	27.0	29.0	51.0		41.0
Max Q Clear Time (g_c+I1), s	6.1	2.0	12.0	11.6	27.8	50.8		7.3
Green Ext Time (p_c), s	0.0	20.6	0.0	0.4	0.3	0.1		0.3

Intersection Summary			
HCM 6th Ctrl Delay			28.4
HCM 6th LOS			C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	10	920	25	0	835
Future Vol, veh/h	0	10	920	25	0	835
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	1000	27	0	908

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1000	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	295	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	295	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	295	-
HCM Lane V/C Ratio	-	-	0.037	-
HCM Control Delay (s)	-	-	17.7	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1075	0	0	935
Future Vol, veh/h	0	0	1075	0	0	935
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	1168	0	0	1016

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2184	1168	0	0	1168	0
Stage 1	1168	-	-	-	-	-
Stage 2	1016	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	50	235	-	-	598	-
Stage 1	296	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	50	235	-	-	598	-
Mov Cap-2 Maneuver	169	-	-	-	-	-
Stage 1	296	-	-	-	-	-
Stage 2	350	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	-	598	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	0	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	100	25	0	70	0	15	0	0	0	0	40
Future Vol, veh/h	60	100	25	0	70	0	15	0	0	0	0	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	109	27	0	76	0	16	0	0	0	0	43

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	76	0	0	136	0	0	351	329	68	261	342	76
Stage 1	-	-	-	-	-	-	253	253	-	76	76	-
Stage 2	-	-	-	-	-	-	98	76	-	185	266	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1522	-	-	1447	-	-	591	589	982	681	579	985
Stage 1	-	-	-	-	-	-	730	697	-	933	831	-
Stage 2	-	-	-	-	-	-	908	831	-	800	688	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1522	-	-	1447	-	-	547	564	982	659	554	985
Mov Cap-2 Maneuver	-	-	-	-	-	-	547	564	-	659	554	-
Stage 1	-	-	-	-	-	-	699	667	-	893	831	-
Stage 2	-	-	-	-	-	-	868	831	-	766	658	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.4	0	11.8	8.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	547	1522	-	-	1447	-	-	985
HCM Lane V/C Ratio	0.03	0.043	-	-	-	-	-	0.044
HCM Control Delay (s)	11.8	7.5	-	-	0	-	-	8.8
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	15	90	0	20	0	50	0	0	0	0	0
Future Vol, veh/h	0	15	90	0	20	0	50	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	16	98	0	22	0	54	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	22	0	0	114	0	0	87	87	57	30	136	22
Stage 1	-	-	-	-	-	-	65	65	-	22	22	-
Stage 2	-	-	-	-	-	-	22	22	-	8	114	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1593	-	-	1474	-	-	894	803	998	977	754	1055
Stage 1	-	-	-	-	-	-	938	840	-	996	877	-
Stage 2	-	-	-	-	-	-	996	877	-	1012	801	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1593	-	-	1474	-	-	894	803	998	977	754	1055
Mov Cap-2 Maneuver	-	-	-	-	-	-	894	803	-	977	754	-
Stage 1	-	-	-	-	-	-	938	840	-	996	877	-
Stage 2	-	-	-	-	-	-	996	877	-	1012	801	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	9.3	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	894	1593	-	-	1474	-	-	-
HCM Lane V/C Ratio	0.061	-	-	-	-	-	-	-
HCM Control Delay (s)	9.3	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2025 Scenario 2 WE Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	45	345	45	50	20	285	330	40	20	295	90
Future Volume (veh/h)	40	45	345	45	50	20	285	330	40	20	295	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	49	35	49	54	10	310	359	23	22	321	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	187	130	198	255	194	36	397	940	795	29	553	468
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.22	0.50	0.50	0.02	0.30	0.30
Sat Flow, veh/h	548	1031	1567	1303	1532	284	1781	1870	1582	1781	1870	1582
Grp Volume(v), veh/h	92	0	35	49	0	64	310	359	23	22	321	30
Grp Sat Flow(s),veh/h/ln	1579	0	1567	1303	0	1815	1781	1870	1582	1781	1870	1582
Q Serve(g_s), s	1.0	0.0	0.9	1.6	0.0	1.4	7.4	5.3	0.3	0.6	6.6	0.6
Cycle Q Clear(g_c), s	2.4	0.0	0.9	4.0	0.0	1.4	7.4	5.3	0.3	0.6	6.6	0.6
Prop In Lane	0.47		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	317	0	198	255	0	230	397	940	795	29	553	468
V/C Ratio(X)	0.29	0.00	0.18	0.19	0.00	0.28	0.78	0.38	0.03	0.77	0.58	0.06
Avail Cap(c_a), veh/h	954	0	834	784	0	967	1186	3278	2773	593	2656	2247
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.2	0.0	17.6	20.1	0.0	17.8	16.5	6.9	5.7	22.1	13.5	11.4
Incr Delay (d2), s/veh	0.5	0.0	0.4	0.4	0.0	0.7	3.4	0.5	0.0	34.4	2.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.3	0.5	0.0	0.6	2.9	1.5	0.1	0.5	2.5	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.7	0.0	18.0	20.5	0.0	18.5	19.9	7.5	5.7	56.4	15.6	11.5
LnGrp LOS	B	A	B	C	A	B	B	A	A	E	B	B
Approach Vol, veh/h		127			113			692			373	
Approach Delay, s/veh		18.5			19.3			13.0			17.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.7	28.6		10.7	15.0	19.3		10.7
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0
Max Q Clear Time (g_c+I1), s	2.6	7.3		4.4	9.4	8.6		6.0
Green Ext Time (p_c), s	0.0	5.2		0.5	0.9	4.5		0.4

Intersection Summary			
HCM 6th Ctrl Delay			15.4
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	20	210	40	15	5	145	485	25	15	520	60
Future Volume (veh/h)	55	20	210	40	15	5	145	485	25	15	520	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	22	20	43	16	1	158	527	0	16	565	26
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	281	82	226	298	252	16	439	895		425	756	638
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.09	0.48	0.00	0.01	0.40	0.40
Sat Flow, veh/h	959	564	1558	1346	1740	109	1781	1870	1585	1781	1870	1579
Grp Volume(v), veh/h	82	0	20	43	0	17	158	527	0	16	565	26
Grp Sat Flow(s),veh/h/ln	1523	0	1558	1346	0	1849	1781	1870	1585	1781	1870	1579
Q Serve(g_s), s	1.3	0.0	0.5	1.3	0.0	0.3	2.2	9.0	0.0	0.2	11.3	0.4
Cycle Q Clear(g_c), s	2.0	0.0	0.5	3.3	0.0	0.3	2.2	9.0	0.0	0.2	11.3	0.4
Prop In Lane	0.73		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	363	0	226	298	0	268	439	895		425	756	638
V/C Ratio(X)	0.23	0.00	0.09	0.14	0.00	0.06	0.36	0.59		0.04	0.75	0.04
Avail Cap(c_a), veh/h	990	0	887	869	0	1053	893	2173		1012	2173	1835
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.9	0.0	16.3	18.4	0.0	16.2	8.0	8.3	0.0	7.9	11.2	7.9
Incr Delay (d2), s/veh	0.3	0.0	0.2	0.2	0.0	0.1	0.5	0.6	0.0	0.0	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	0.4	0.0	0.1	0.6	2.5	0.0	0.1	3.7	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.2	0.0	16.4	18.6	0.0	16.3	8.5	8.9	0.0	8.0	12.7	7.9
LnGrp LOS	B	A	B	B	A	B	A	A		A	B	A
Approach Vol, veh/h		102			60			685	A		607	
Approach Delay, s/veh		17.0			18.0			8.8			12.3	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	27.0		11.4	8.8	23.7		11.4
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	11.0		4.0	4.2	13.3		5.3
Green Ext Time (p_c), s	0.0	3.7		0.4	0.3	4.1		0.1

Intersection Summary	
HCM 6th Ctrl Delay	11.2
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	30	85	75	30	50	80	575	85	55	685	50
Future Volume (veh/h)	40	30	85	75	30	50	80	575	85	55	685	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	33	21	82	33	3	87	625	47	60	745	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	57	141	90	108	302	256	115	910	771	78	871	738
Arrive On Green	0.03	0.13	0.13	0.06	0.16	0.16	0.06	0.49	0.49	0.04	0.47	0.47
Sat Flow, veh/h	1781	1063	677	1781	1870	1585	1781	1870	1585	1781	1870	1583
Grp Volume(v), veh/h	43	0	54	82	33	3	87	625	47	60	745	25
Grp Sat Flow(s),veh/h/ln	1781	0	1740	1781	1870	1585	1781	1870	1585	1781	1870	1583
Q Serve(g_s), s	1.7	0.0	2.0	3.3	1.1	0.1	3.5	18.6	1.1	2.4	25.6	0.6
Cycle Q Clear(g_c), s	1.7	0.0	2.0	3.3	1.1	0.1	3.5	18.6	1.1	2.4	25.6	0.6
Prop In Lane	1.00		0.39	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	57	0	231	108	302	256	115	910	771	78	871	738
V/C Ratio(X)	0.75	0.00	0.23	0.76	0.11	0.01	0.76	0.69	0.06	0.77	0.86	0.03
Avail Cap(c_a), veh/h	492	0	505	492	543	460	615	1680	1424	615	1680	1422
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.7	0.0	28.1	33.5	25.9	25.5	33.3	14.3	9.8	34.2	17.2	10.5
Incr Delay (d2), s/veh	18.0	0.0	0.5	10.5	0.2	0.0	9.7	0.9	0.0	14.6	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.8	1.7	0.5	0.0	1.7	7.0	0.4	1.3	10.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.8	0.0	28.6	43.9	26.1	25.5	43.0	15.3	9.9	48.8	19.7	10.5
LnGrp LOS	D	A	C	D	C	C	D	B	A	D	B	B
Approach Vol, veh/h		97			118			759			830	
Approach Delay, s/veh		39.3			38.5			18.1			21.5	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	40.2	9.4	14.6	9.7	38.7	7.3	16.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	4.4	20.6	5.3	4.0	5.5	27.6	3.7	3.1
Green Ext Time (p_c), s	0.1	4.9	0.1	0.2	0.2	6.1	0.1	0.1

Intersection Summary		
HCM 6th Ctrl Delay		22.1
HCM 6th LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	10	595	10	0	5	410	685	5	0	800	55
Future Volume (veh/h)	60	10	595	10	0	5	410	685	5	0	800	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	11	0	11	0	1	446	745	5	0	870	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	190	14		204	4	9	510	2749	18	3	1455	647
Arrive On Green	0.08	0.07	0.00	0.08	0.00	0.07	0.29	0.76	0.76	0.00	0.41	0.41
Sat Flow, veh/h	1272	215	1585	1445	60	137	1781	3619	24	1781	3554	1579
Grp Volume(v), veh/h	76	0	0	12	0	0	446	366	384	0	870	20
Grp Sat Flow(s),veh/h/ln	1488	0	1585	1642	0	0	1781	1777	1866	1781	1777	1579
Q Serve(g_s), s	2.7	0.0	0.0	0.0	0.0	0.0	15.0	3.9	3.9	0.0	12.0	0.5
Cycle Q Clear(g_c), s	3.1	0.0	0.0	0.4	0.0	0.0	15.0	3.9	3.9	0.0	12.0	0.5
Prop In Lane	0.86		1.00	0.92		0.08	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	227	0		243	0	0	510	1350	1417	3	1455	647
V/C Ratio(X)	0.33	0.00		0.05	0.00	0.00	0.87	0.27	0.27	0.00	0.60	0.03
Avail Cap(c_a), veh/h	597	0		713	0	0	2010	1949	2047	2010	3898	1732
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	28.5	0.0	0.0	27.2	0.0	0.0	21.4	2.3	2.3	0.0	14.5	11.1
Incr Delay (d2), s/veh	0.9	0.0	0.0	0.1	0.0	0.0	1.9	0.2	0.2	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.0	0.2	0.0	0.0	5.8	0.6	0.6	0.0	4.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.3	0.0	0.0	27.3	0.0	0.0	23.3	2.5	2.5	0.0	15.4	11.2
LnGrp LOS	C	A		C	A	A	C	A	A	A	B	B
Approach Vol, veh/h		76	A		12			1196			890	
Approach Delay, s/veh		29.3			27.3			10.2			15.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	22.0	31.8		9.1	0.0	53.8		9.1				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0				
Max Q Clear Time (g_c+I1), s	17.0	14.0		2.4	0.0	5.9		5.1				
Green Ext Time (p_c), s	1.0	11.7		0.0	0.0	8.4		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		13.1
HCM 6th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	145	15	5	15	105	1040	20	10	1365	65
Future Volume (veh/h)	60	5	145	15	5	15	105	1040	20	10	1365	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	6	16	5	1	114	1130	21	11	1484	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	218	13	140	145	35	5	146	2555	47	15	2282	1016
Arrive On Green	0.10	0.09	0.09	0.10	0.09	0.09	0.08	0.72	0.72	0.01	0.64	0.64
Sat Flow, veh/h	1400	145	1548	689	384	51	1781	3569	66	1781	3554	1581
Grp Volume(v), veh/h	70	0	6	22	0	0	114	563	588	11	1484	42
Grp Sat Flow(s),veh/h/ln	1544	0	1548	1125	0	0	1781	1777	1858	1781	1777	1581
Q Serve(g_s), s	0.0	0.0	0.3	0.1	0.0	0.0	4.7	9.9	9.9	0.5	19.4	0.7
Cycle Q Clear(g_c), s	2.8	0.0	0.3	2.9	0.0	0.0	4.7	9.9	9.9	0.5	19.4	0.7
Prop In Lane	0.93		1.00	0.73		0.05	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	252	0	140	199	0	0	146	1272	1331	15	2282	1016
V/C Ratio(X)	0.28	0.00	0.04	0.11	0.00	0.00	0.78	0.44	0.44	0.75	0.65	0.04
Avail Cap(c_a), veh/h	555	0	472	516	0	0	496	2026	2119	260	3580	1593
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.0	0.0	31.3	31.4	0.0	0.0	34.0	4.5	4.5	37.3	8.3	5.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.4	0.5	0.5	24.8	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.1	0.4	0.0	0.0	2.1	2.5	2.6	0.3	5.8	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.3	0.0	31.4	31.5	0.0	0.0	37.4	5.0	4.9	62.1	9.0	5.0
LnGrp LOS	C	A	C	C	A	A	D	A	A	E	A	A
Approach Vol, veh/h		76			22			1265			1537	
Approach Delay, s/veh		32.2			31.5			7.9			9.2	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.2	53.4		11.8	4.6	59.0		11.8
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	16.7	21.4		4.9	2.5	11.9		4.8
Green Ext Time (p_c), s	0.1	27.1		0.0	0.0	16.9		0.1

Intersection Summary		
HCM 6th Ctrl Delay		9.4
HCM 6th LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	5	180	45	5	35	110	1110	50	30	1440	75
Future Volume (veh/h)	65	5	180	45	5	35	110	1110	50	30	1440	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	71	5	12	49	5	2	120	1207	34	33	1565	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	271	16	228	218	183	73	154	2295	1024	57	2102	938
Arrive On Green	0.16	0.14	0.14	0.14	0.14	0.14	0.09	0.65	0.65	0.03	0.59	0.59
Sat Flow, veh/h	1304	112	1578	1391	1269	508	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	76	0	12	49	0	7	120	1207	34	33	1565	45
Grp Sat Flow(s),veh/h/ln	1416	0	1578	1391	0	1776	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.8	0.0	0.6	2.8	0.0	0.3	5.6	15.4	0.7	1.5	27.1	1.0
Cycle Q Clear(g_c), s	4.1	0.0	0.6	6.9	0.0	0.3	5.6	15.4	0.7	1.5	27.1	1.0
Prop In Lane	0.93		1.00	1.00		0.29	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	304	0	228	218	0	256	154	2295	1024	57	2102	938
V/C Ratio(X)	0.25	0.00	0.05	0.22	0.00	0.03	0.78	0.53	0.03	0.58	0.74	0.05
Avail Cap(c_a), veh/h	504	0	449	414	0	506	444	2908	1297	254	2529	1128
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.2	0.0	31.1	35.7	0.0	31.0	37.7	8.0	5.4	40.3	12.6	7.2
Incr Delay (d2), s/veh	0.4	0.0	0.1	0.5	0.0	0.0	3.3	0.4	0.0	3.4	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.2	1.0	0.0	0.1	2.5	4.9	0.2	0.7	9.5	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.7	0.0	31.2	36.3	0.0	31.0	41.0	8.4	5.4	43.7	14.0	7.3
LnGrp LOS	C	A	C	D	A	C	D	A	A	D	B	A
Approach Vol, veh/h		88			56			1361			1643	
Approach Delay, s/veh		32.5			35.6			11.2			14.4	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.3	55.9		17.2	6.7	60.5		17.2
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	60.0		24.0	12.0	69.0		24.0
Max Q Clear Time (g_c+I1), s	7.6	29.1		8.9	3.5	17.4		6.1
Green Ext Time (p_c), s	0.2	20.8		0.1	0.0	19.1		0.2

Intersection Summary		
HCM 6th Ctrl Delay		13.9
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	5	445	15	5	20	290	1220	15	60	1435	160
Future Volume (veh/h)	250	5	445	15	5	20	290	1220	15	60	1435	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	276	0	270	16	5	7	315	1326	16	65	1560	141
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	452	0	777	49	15	21	437	2260	27	121	2025	1091
Arrive On Green	0.13	0.00	0.12	0.05	0.05	0.02	0.13	0.63	0.61	0.07	0.57	0.57
Sat Flow, veh/h	3563	0	3170	996	311	436	3456	3596	43	1781	3554	1584
Grp Volume(v), veh/h	276	0	270	28	0	0	315	655	687	65	1560	141
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1742	0	0	1728	1777	1863	1781	1777	1584
Q Serve(g_s), s	9.2	0.0	8.8	1.9	0.0	0.0	10.9	27.1	27.1	4.4	42.0	3.8
Cycle Q Clear(g_c), s	9.2	0.0	8.8	1.9	0.0	0.0	10.9	27.1	27.1	4.4	42.0	3.8
Prop In Lane	1.00		1.00	0.57		0.25	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	452	0	777	85	0	0	437	1117	1171	121	2025	1091
V/C Ratio(X)	0.61	0.00	0.35	0.33	0.00	0.00	0.72	0.59	0.59	0.54	0.77	0.13
Avail Cap(c_a), veh/h	970	0	1239	432	0	0	1605	2760	2893	214	4297	2104
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.6	0.0	38.9	57.8	0.0	0.0	52.4	13.6	13.7	56.3	20.6	6.7
Incr Delay (d2), s/veh	0.5	0.0	0.1	0.8	0.0	0.0	0.8	0.7	0.7	1.4	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	3.5	0.9	0.0	0.0	4.8	10.4	10.9	2.0	16.7	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.1	0.0	39.0	58.6	0.0	0.0	53.3	14.3	14.3	57.7	21.5	6.7
LnGrp LOS	D	A	D	E	A	A	D	B	B	E	C	A
Approach Vol, veh/h		546			28			1657			1766	
Approach Delay, s/veh		45.6			58.6			21.7			21.7	
Approach LOS		D			E			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	19.8	75.1		10.1	12.5	82.5		19.8				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0				
Max Q Clear Time (g_c+I1), s	11.2	44.0		3.9	6.4	29.1		11.2				
Green Ext Time (p_c), s	0.9	25.1		0.0	0.0	14.1		1.7				
Intersection Summary												
HCM 6th Ctrl Delay			25.2									
HCM 6th LOS			C									

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	135	5	65	5	1400	90	90	1870	10
Future Volume (veh/h)	5	0	5	135	5	65	5	1400	90	90	1870	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1522	95	98	2033	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2423	151	124	2813	15
Arrive On Green	0.13	0.00	0.12	0.13	0.13	0.12	0.01	0.95	0.94	0.07	0.78	0.77
Sat Flow, veh/h	1144	37	236	1416	858	858	1781	3398	211	1781	3624	20
Grp Volume(v), veh/h	6	0	0	147	0	10	5	792	825	98	996	1048
Grp Sat Flow(s),veh/h/ln	1418	0	0	1416	0	1716	1781	1777	1832	1781	1777	1867
Q Serve(g_s), s	0.0	0.0	0.0	12.3	0.0	0.7	0.4	7.4	7.7	7.0	37.1	37.2
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	7.4	7.7	7.0	37.1	37.2
Prop In Lane	0.83		0.17	1.00		0.50	1.00		0.12	1.00		0.01
Lane Grp Cap(c), veh/h	228	0	0	234	0	215	11	1267	1306	124	1379	1449
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.63	0.63	0.79	0.72	0.72
Avail Cap(c_a), veh/h	313	0	0	319	0	317	151	1267	1306	151	1379	1449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.81	0.81	0.81	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	0.0	0.0	55.4	0.0	50.3	64.2	1.2	1.2	59.5	7.4	7.4
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.7	0.0	0.1	7.9	1.9	1.9	16.4	3.3	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	4.9	0.0	0.3	0.2	1.8	1.9	3.7	12.5	13.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.4	72.2	3.1	3.1	76.0	10.7	10.6
LnGrp LOS	D	A	A	E	A	D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1622			2142	
Approach Delay, s/veh		50.0			57.6			3.3			13.6	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.8	104.9		20.3	13.1	96.7		20.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	82.0		23.0	11.0	82.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	39.2		15.0	9.0	9.7		2.7
Green Ext Time (p_c), s	0.0	34.5		0.3	0.0	33.3		0.0

Intersection Summary			
HCM 6th Ctrl Delay			11.2
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	5	15	65	5	15	15	1335	15	10	1650	265
Future Volume (veh/h)	140	5	15	65	5	15	15	1335	15	10	1650	265
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	152	5	13	71	5	9	16	1451	15	11	1793	213
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	234	6	15	232	18	24	19	2759	29	13	2710	1208
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.01	0.77	0.76	0.01	0.76	0.76
Sat Flow, veh/h	1347	44	115	1347	132	175	1781	3603	37	1781	3554	1584
Grp Volume(v), veh/h	170	0	0	85	0	0	16	715	751	11	1793	213
Grp Sat Flow(s),veh/h/ln	1506	0	0	1654	0	0	1781	1777	1864	1781	1777	1584
Q Serve(g_s), s	8.2	0.0	0.0	0.0	0.0	0.0	1.2	20.5	20.6	0.8	31.4	4.8
Cycle Q Clear(g_c), s	14.1	0.0	0.0	5.9	0.0	0.0	1.2	20.5	20.6	0.8	31.4	4.8
Prop In Lane	0.89		0.08	0.84		0.11	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	255	0	0	273	0	0	19	1360	1427	13	2710	1208
V/C Ratio(X)	0.67	0.00	0.00	0.31	0.00	0.00	0.84	0.53	0.53	0.82	0.66	0.18
Avail Cap(c_a), veh/h	348	0	0	367	0	0	110	1360	1427	110	2710	1208
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.74	0.74	0.74	0.59	0.59	0.59
Uniform Delay (d), s/veh	54.6	0.0	0.0	51.3	0.0	0.0	64.2	6.0	6.0	64.4	7.4	4.2
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.6	0.0	0.0	22.4	1.1	1.0	22.2	0.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	0.0	0.0	2.6	0.0	0.0	0.6	6.8	7.1	0.4	10.2	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.5	0.0	0.0	51.9	0.0	0.0	86.6	7.1	7.0	86.6	8.2	4.4
LnGrp LOS	E	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		170			85			1482			2017	
Approach Delay, s/veh		57.5			51.9			7.9			8.2	
Approach LOS		E			D			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	103.1		21.5	5.0	103.5		21.5				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	83.0		25.0	8.0	83.0		25.0				
Max Q Clear Time (g_c+I1), s	3.2	33.4		7.9	2.8	22.6		16.1				
Green Ext Time (p_c), s	0.0	41.8		0.2	0.0	34.8		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		11.3
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	195	20	50	90	20	20	60	1365	60	15	1655	135
Future Volume (veh/h)	195	20	50	90	20	20	60	1365	60	15	1655	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	212	22	11	98	22	4	65	1484	63	16	1799	143
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	324	28	352	132	343	62	83	2340	99	19	2130	167
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.06	0.90	0.89	0.01	0.85	0.84
Sat Flow, veh/h	1217	126	1579	1373	1539	280	1781	3473	147	1781	3338	262
Grp Volume(v), veh/h	234	0	11	98	0	26	65	757	790	16	946	996
Grp Sat Flow(s),veh/h/ln	1343	0	1579	1373	0	1819	1781	1777	1843	1781	1777	1823
Q Serve(g_s), s	20.3	0.0	0.7	7.2	0.0	1.5	4.7	13.3	13.5	1.2	35.9	39.5
Cycle Q Clear(g_c), s	21.8	0.0	0.7	29.0	0.0	1.5	4.7	13.3	13.5	1.2	35.9	39.5
Prop In Lane	0.91		1.00	1.00		0.15	1.00		0.08	1.00		0.14
Lane Grp Cap(c), veh/h	352	0	352	132	0	406	83	1197	1242	19	1134	1163
V/C Ratio(X)	0.66	0.00	0.03	0.74	0.00	0.06	0.78	0.63	0.64	0.84	0.83	0.86
Avail Cap(c_a), veh/h	352	0	352	132	0	406	110	1197	1242	110	1134	1163
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.67	0.67	0.67
Uniform Delay (d), s/veh	48.4	0.0	39.5	62.2	0.0	39.9	60.3	2.9	2.9	64.0	6.3	6.6
Incr Delay (d2), s/veh	4.6	0.0	0.0	20.3	0.0	0.1	1.8	0.2	0.2	20.7	5.0	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.7	0.0	0.3	4.0	0.0	0.7	2.1	2.5	2.6	0.6	6.6	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.0	0.0	39.5	82.5	0.0	39.9	62.1	3.1	3.1	84.7	11.3	12.3
LnGrp LOS	D	A	D	F	A	D	E	A	A	F	B	B
Approach Vol, veh/h		245			124			1612			1958	
Approach Delay, s/veh		52.4			73.6			5.5			12.4	
Approach LOS		D			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	87.0		33.0	5.4	91.6		33.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	80.0		28.0	8.0	80.0		28.0				
Max Q Clear Time (g_c+I1), s	6.7	41.5		31.0	3.2	15.5		23.8				
Green Ext Time (p_c), s	0.0	30.1		0.0	0.0	29.0		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		14.0
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	65	70	195	90	815	50	595	190	530	1050	75
Future Volume (veh/h)	25	65	70	195	90	815	50	595	190	530	1050	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.94	0.96		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	27	71	10	212	98	0	54	647	120	576	1141	79
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	191	208	361	519		70	823	689	656	1992	138
Arrive On Green	0.14	0.14	0.14	0.11	0.28	0.00	0.04	0.44	0.44	0.13	0.40	0.39
Sat Flow, veh/h	327	1374	1493	1781	1870	1585	1781	1870	1565	3456	3372	233
Grp Volume(v), veh/h	98	0	10	212	98	0	54	647	120	576	601	619
Grp Sat Flow(s),veh/h/ln	1701	0	1493	1781	1870	1585	1781	1870	1565	1728	1777	1828
Q Serve(g_s), s	1.4	0.0	0.8	13.0	5.2	0.0	3.9	38.5	6.0	21.3	34.3	34.4
Cycle Q Clear(g_c), s	6.4	0.0	0.8	13.0	5.2	0.0	3.9	38.5	6.0	21.3	34.3	34.4
Prop In Lane	0.28		1.00	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	272	0	208	361	519		70	823	689	656	1050	1080
V/C Ratio(X)	0.36	0.00	0.05	0.59	0.19		0.77	0.79	0.17	0.88	0.57	0.57
Avail Cap(c_a), veh/h	372	0	299	361	633		329	823	689	957	1050	1080
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.47	0.47	0.47
Uniform Delay (d), s/veh	50.9	0.0	48.5	40.5	35.8	0.0	61.9	31.1	22.1	55.2	26.4	26.5
Incr Delay (d2), s/veh	0.8	0.0	0.1	2.5	0.2	0.0	5.2	6.0	0.4	2.4	1.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.3	6.0	2.4	0.0	1.9	18.3	2.3	9.8	15.6	16.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	0.0	48.6	43.0	36.0	0.0	67.0	37.1	22.5	57.6	27.5	27.5
LnGrp LOS	D	A	D	D	D		E	D	C	E	C	C
Approach Vol, veh/h		108			310	A		821			1796	
Approach Delay, s/veh		51.4			40.7			36.9			37.2	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.1	80.8	18.0	22.1	28.7	61.2		40.1
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	24.0	49.0	13.0	25.0	36.0	37.0		43.0
Max Q Clear Time (g_c+I1), s	15.9	36.4	15.0	8.4	23.3	40.5		7.2
Green Ext Time (p_c), s	0.1	8.1	0.0	0.3	1.4	0.0		0.4

Intersection Summary	
HCM 6th Ctrl Delay	38.0
HCM 6th LOS	D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	10	645	20	0	780
Future Vol, veh/h	0	10	645	20	0	780
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	701	22	0	848

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	701	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	439	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	439	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	439	-
HCM Lane V/C Ratio	-	-	0.025	-
HCM Control Delay (s)	-	-	13.4	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	745	0	0	840
Future Vol, veh/h	0	0	745	0	0	840
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	810	0	0	913

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1723	810	0	0	810	0
Stage 1	810	-	-	-	-	-
Stage 2	913	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	98	380	-	-	816	-
Stage 1	438	-	-	-	-	-
Stage 2	391	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	98	380	-	-	816	-
Mov Cap-2 Maneuver	233	-	-	-	-	-
Stage 1	438	-	-	-	-	-
Stage 2	391	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	-	816	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	0	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	95	20	0	90	0	20	0	0	0	0	45
Future Vol, veh/h	50	95	20	0	90	0	20	0	0	0	0	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	103	22	0	98	0	22	0	0	0	0	49

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	98	0	0	125	0	0	345	320	63	258	331	98
Stage 1	-	-	-	-	-	-	222	222	-	98	98	-
Stage 2	-	-	-	-	-	-	123	98	-	160	233	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1494	-	-	1460	-	-	597	596	989	684	588	957
Stage 1	-	-	-	-	-	-	761	719	-	908	813	-
Stage 2	-	-	-	-	-	-	881	813	-	827	711	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1494	-	-	1460	-	-	551	575	989	665	567	957
Mov Cap-2 Maneuver	-	-	-	-	-	-	551	575	-	665	567	-
Stage 1	-	-	-	-	-	-	734	693	-	875	813	-
Stage 2	-	-	-	-	-	-	836	813	-	797	685	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0	11.8	9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	551	1494	-	-	1460	-	-	957
HCM Lane V/C Ratio	0.039	0.036	-	-	-	-	-	0.051
HCM Control Delay (s)	11.8	7.5	-	-	0	-	-	9
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	20	75	0	25	0	65	0	0	0	0	0
Future Vol, veh/h	0	20	75	0	25	0	65	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	22	82	0	27	0	71	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	27	0	0	104	0	0	90	90	52	38	131	27
Stage 1	-	-	-	-	-	-	63	63	-	27	27	-
Stage 2	-	-	-	-	-	-	27	27	-	11	104	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1586	-	-	1487	-	-	890	800	1005	965	759	1048
Stage 1	-	-	-	-	-	-	941	842	-	990	872	-
Stage 2	-	-	-	-	-	-	990	872	-	1008	809	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1586	-	-	1487	-	-	890	800	1005	965	759	1048
Mov Cap-2 Maneuver	-	-	-	-	-	-	890	800	-	965	759	-
Stage 1	-	-	-	-	-	-	941	842	-	990	872	-
Stage 2	-	-	-	-	-	-	990	872	-	1008	809	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	9.4	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	890	1586	-	-	1487	-	-	-
HCM Lane V/C Ratio	0.079	-	-	-	-	-	-	-
HCM Control Delay (s)	9.4	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2030 Scenario 3 AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	45	315	95	50	20	260	300	120	10	215	30
Future Volume (veh/h)	50	45	315	95	50	20	260	300	120	10	215	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	49	41	103	54	10	283	326	67	11	234	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	235	169	264	325	257	48	371	822	697	15	449	380
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.21	0.44	0.44	0.01	0.24	0.24
Sat Flow, veh/h	614	1006	1571	1298	1532	284	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	103	0	41	103	0	64	283	326	67	11	234	9
Grp Sat Flow(s),veh/h/ln	1620	0	1571	1298	0	1816	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.4	0.0	0.9	3.2	0.0	1.3	6.2	4.9	1.0	0.3	4.5	0.2
Cycle Q Clear(g_c), s	2.1	0.0	0.9	5.3	0.0	1.3	6.2	4.9	1.0	0.3	4.5	0.2
Prop In Lane	0.52		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	404	0	264	325	0	305	371	822	697	15	449	380
V/C Ratio(X)	0.26	0.00	0.16	0.32	0.00	0.21	0.76	0.40	0.10	0.72	0.52	0.02
Avail Cap(c_a), veh/h	1032	0	904	855	0	1046	1282	3545	3004	641	2872	2434
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.3	0.0	14.8	17.6	0.0	15.0	15.5	7.9	6.8	20.6	13.8	12.1
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.6	0.0	0.3	3.3	0.7	0.1	47.0	2.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.3	0.9	0.0	0.5	2.4	1.5	0.3	0.3	1.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.6	0.0	15.1	18.2	0.0	15.3	18.8	8.6	7.0	67.6	15.8	12.2
LnGrp LOS	B	A	B	B	A	B	B	A	A	E	B	B
Approach Vol, veh/h		144			167			676			254	
Approach Delay, s/veh		15.5			17.1			12.7			17.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	24.3		12.0	13.7	16.0		12.0				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.3	6.9		4.1	8.2	6.5		7.3				
Green Ext Time (p_c), s	0.0	5.0		0.6	0.8	3.0		0.6				

Intersection Summary			
HCM 6th Ctrl Delay			14.7
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	190	100	20	15	165	650	20	10	635	65
Future Volume (veh/h)	60	5	190	100	20	15	165	650	20	10	635	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	20	109	22	2	179	707	0	11	690	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	359	23	309	323	337	31	365	981		310	833	701
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.09	0.52	0.00	0.01	0.45	0.45
Sat Flow, veh/h	1215	117	1545	1357	1685	153	1781	1870	1585	1781	1870	1574
Grp Volume(v), veh/h	70	0	20	109	0	24	179	707	0	11	690	31
Grp Sat Flow(s),veh/h/ln	1332	0	1545	1357	0	1838	1781	1870	1585	1781	1870	1574
Q Serve(g_s), s	2.4	0.0	0.6	4.5	0.0	0.6	2.9	17.3	0.0	0.2	19.4	0.7
Cycle Q Clear(g_c), s	3.0	0.0	0.6	7.5	0.0	0.6	2.9	17.3	0.0	0.2	19.4	0.7
Prop In Lane	0.93		1.00	1.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	382	0	309	323	0	367	365	981		310	833	701
V/C Ratio(X)	0.18	0.00	0.06	0.34	0.00	0.07	0.49	0.72		0.04	0.83	0.04
Avail Cap(c_a), veh/h	683	0	645	618	0	767	655	1592		741	1592	1340
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.5	0.0	19.4	23.6	0.0	19.4	11.3	10.9	0.0	10.3	14.6	9.4
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.6	0.0	0.1	1.0	1.0	0.0	0.0	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.2	1.4	0.0	0.3	0.9	5.7	0.0	0.1	7.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	0.0	19.5	24.2	0.0	19.5	12.4	11.9	0.0	10.4	16.8	9.4
LnGrp LOS	C	A	B	C	A	B	B	B		B	B	A
Approach Vol, veh/h		90			133			886	A		732	
Approach Delay, s/veh		20.5			23.3			12.0			16.4	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	37.4		17.0	10.3	32.7		17.0
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	19.3		5.0	4.9	21.4		9.5
Green Ext Time (p_c), s	0.0	5.4		0.4	0.3	5.3		0.3

Intersection Summary	
HCM 6th Ctrl Delay	15.0
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	30	125	135	60	85	60	680	90	55	815	30
Future Volume (veh/h)	40	30	125	135	60	85	60	680	90	55	815	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	33	26	147	65	9	65	739	55	60	886	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	55	110	87	182	348	293	85	987	836	79	980	831
Arrive On Green	0.03	0.11	0.11	0.10	0.19	0.19	0.05	0.53	0.53	0.04	0.52	0.52
Sat Flow, veh/h	1781	961	757	1781	1870	1575	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	43	0	59	147	65	9	65	739	55	60	886	17
Grp Sat Flow(s),veh/h/ln	1781	0	1718	1781	1870	1575	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.3	0.0	3.0	7.6	2.8	0.4	3.4	29.2	1.6	3.2	40.5	0.5
Cycle Q Clear(g_c), s	2.3	0.0	3.0	7.6	2.8	0.4	3.4	29.2	1.6	3.2	40.5	0.5
Prop In Lane	1.00		0.44	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	55	0	197	182	348	293	85	987	836	79	980	831
V/C Ratio(X)	0.78	0.00	0.30	0.81	0.19	0.03	0.76	0.75	0.07	0.76	0.90	0.02
Avail Cap(c_a), veh/h	377	0	381	377	415	350	471	1285	1089	471	1285	1089
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.5	0.0	38.4	41.5	32.5	31.5	44.5	17.4	10.9	44.7	20.4	10.8
Incr Delay (d2), s/veh	20.7	0.0	0.8	8.1	0.3	0.0	13.1	1.8	0.0	14.1	7.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	1.3	3.7	1.3	0.2	1.8	11.8	0.5	1.7	17.9	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.2	0.0	39.3	49.7	32.7	31.6	57.6	19.2	11.0	58.9	27.9	10.8
LnGrp LOS	E	A	D	D	C	C	E	B	B	E	C	B
Approach Vol, veh/h		102			221			859			963	
Approach Delay, s/veh		50.6			43.9			21.6			29.6	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	54.9	14.7	15.8	9.5	54.6	7.9	22.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	5.2	31.2	9.6	5.0	5.4	42.5	4.3	4.8
Green Ext Time (p_c), s	0.1	6.1	0.3	0.2	0.1	7.0	0.1	0.2

Intersection Summary	
HCM 6th Ctrl Delay	28.9
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	10	480	20	5	0	315	825	45	10	1070	15
Future Volume (veh/h)	40	10	480	20	5	0	315	825	45	10	1070	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	11	0	22	5	0	342	897	48	11	1163	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	166	24		167	27	0	396	2477	133	15	1805	805
Arrive On Green	0.08	0.07	0.00	0.08	0.07	0.00	0.22	0.72	0.72	0.01	0.51	0.51
Sat Flow, veh/h	1173	361	1585	1186	413	0	1781	3431	184	1781	3554	1585
Grp Volume(v), veh/h	54	0	0	27	0	0	342	465	480	11	1163	6
Grp Sat Flow(s),veh/h/ln	1534	0	1585	1599	0	0	1781	1777	1837	1781	1777	1585
Q Serve(g_s), s	1.3	0.0	0.0	0.0	0.0	0.0	13.6	7.3	7.3	0.5	17.7	0.1
Cycle Q Clear(g_c), s	2.3	0.0	0.0	1.0	0.0	0.0	13.6	7.3	7.3	0.5	17.7	0.1
Prop In Lane	0.80		1.00	0.81		0.00	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	210	0		217	0	0	396	1283	1326	15	1805	805
V/C Ratio(X)	0.26	0.00		0.12	0.00	0.00	0.86	0.36	0.36	0.75	0.64	0.01
Avail Cap(c_a), veh/h	513	0		615	0	0	1594	1783	1843	1594	3565	1590
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.8	0.0	0.0	32.2	0.0	0.0	27.6	3.9	3.9	36.5	13.3	9.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.3	0.0	0.0	2.2	0.4	0.4	24.6	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	0.5	0.0	0.0	5.7	1.8	1.8	0.3	6.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.4	0.0	0.0	32.5	0.0	0.0	29.9	4.2	4.2	61.1	14.1	9.0
LnGrp LOS	C	A		C	A	A	C	A	A	E	B	A
Approach Vol, veh/h		54	A		27			1287			1180	
Approach Delay, s/veh		33.4			32.5			11.0			14.5	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.4	43.5		9.9	4.6	59.3		9.9
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	66.0	74.0		25.0	66.0	74.0		20.0
Max Q Clear Time (g_c+I1), s	15.6	19.7		3.0	2.5	9.3		4.3
Green Ext Time (p_c), s	0.8	17.8		0.0	0.0	11.9		0.1

Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	0	70	10	5	10	135	1250	20	20	1555	70
Future Volume (veh/h)	35	0	70	10	5	10	135	1250	20	20	1555	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	0	1	11	5	1	147	1359	22	22	1690	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	155	0	69	99	21	3	182	2769	45	26	2438	1087
Arrive On Green	0.06	0.00	0.04	0.06	0.04	0.04	0.10	0.77	0.77	0.01	0.69	0.69
Sat Flow, veh/h	1568	0	1585	626	482	69	1781	3579	58	1781	3554	1585
Grp Volume(v), veh/h	38	0	1	17	0	0	147	674	707	22	1690	49
Grp Sat Flow(s),veh/h/ln	1568	0	1585	1177	0	0	1781	1777	1860	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.1	0.3	0.0	0.0	6.7	11.5	11.5	1.0	23.7	0.8
Cycle Q Clear(g_c), s	1.7	0.0	0.1	2.0	0.0	0.0	6.7	11.5	11.5	1.0	23.7	0.8
Prop In Lane	1.00		1.00	0.65		0.06	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	174	0	69	137	0	0	182	1375	1439	26	2438	1087
V/C Ratio(X)	0.22	0.00	0.01	0.12	0.00	0.00	0.81	0.49	0.49	0.85	0.69	0.05
Avail Cap(c_a), veh/h	502	0	438	494	0	0	449	1835	1921	235	3244	1447
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.4	0.0	38.1	38.5	0.0	0.0	36.6	3.4	3.4	40.9	7.8	4.2
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.2	0.0	0.0	3.2	0.6	0.6	23.6	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.3	0.0	0.0	3.0	2.5	2.7	0.6	7.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.6	0.0	38.1	38.6	0.0	0.0	39.7	4.0	4.0	64.5	8.6	4.3
LnGrp LOS	D	A	D	D	A	A	D	A	A	E	A	A
Approach Vol, veh/h		39			17			1528			1761	
Approach Delay, s/veh		38.6			38.6			7.4			9.2	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.5	62.1		8.6	5.2	69.4		8.6				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	8.7	25.7		4.0	3.0	13.5		3.7				
Green Ext Time (p_c), s	0.1	31.4		0.0	0.0	23.9		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		8.9
HCM 6th LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	35	40	15	50	110	1385	60	30	1490	50
Future Volume (veh/h)	60	5	35	40	15	50	110	1385	60	30	1490	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	1	43	16	1	120	1505	48	33	1620	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	165	11	158	111	174	11	142	2769	1235	44	2572	1147
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.08	0.78	0.78	0.02	0.72	0.72
Sat Flow, veh/h	1207	111	1580	1407	1742	109	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	70	0	1	43	0	17	120	1505	48	33	1620	40
Grp Sat Flow(s),veh/h/ln	1319	0	1580	1407	0	1850	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	7.1	0.0	0.1	4.7	0.0	1.3	10.3	25.2	1.1	2.9	35.9	1.1
Cycle Q Clear(g_c), s	8.4	0.0	0.1	13.0	0.0	1.3	10.3	25.2	1.1	2.9	35.9	1.1
Prop In Lane	0.93		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	176	0	158	111	0	184	142	2769	1235	44	2572	1147
V/C Ratio(X)	0.40	0.00	0.01	0.39	0.00	0.09	0.84	0.54	0.04	0.76	0.63	0.03
Avail Cap(c_a), veh/h	254	0	245	188	0	287	241	2769	1235	241	2572	1147
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.70	0.70	0.70	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.1	0.0	62.9	72.8	0.0	63.4	70.4	6.6	3.9	75.1	10.9	6.1
Incr Delay (d2), s/veh	1.4	0.0	0.0	2.2	0.0	0.2	3.7	0.5	0.0	9.5	1.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	0.0	1.8	0.0	0.6	4.8	8.6	0.3	1.4	13.5	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.5	0.0	62.9	75.0	0.0	63.6	74.1	7.1	3.9	84.7	12.0	6.1
LnGrp LOS	E	A	E	E	A	E	E	A	A	F	B	A
Approach Vol, veh/h		71			60			1673			1693	
Approach Delay, s/veh		68.4			71.8			11.8			13.3	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.2		20.5	7.8	126.8		20.5
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	37.9		15.0	4.9	27.2		10.4
Green Ext Time (p_c), s	0.1	31.6		0.1	0.0	30.5		0.1

Intersection Summary		
HCM 6th Ctrl Delay		14.7
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	10	235	10	10	10	460	1445	15	85	1420	120
Future Volume (veh/h)	150	10	235	10	10	10	460	1445	15	85	1420	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	171	0	67	11	11	3	500	1571	16	92	1543	101
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	312	0	812	54	54	15	617	2330	24	142	1947	992
Arrive On Green	0.09	0.00	0.08	0.07	0.07	0.05	0.18	0.65	0.63	0.08	0.55	0.55
Sat Flow, veh/h	3563	0	3071	785	785	214	3456	3604	37	1781	3554	1580
Grp Volume(v), veh/h	171	0	67	25	0	0	500	774	813	92	1543	101
Grp Sat Flow(s),veh/h/ln	1781	0	1536	1785	0	0	1728	1777	1864	1781	1777	1580
Q Serve(g_s), s	6.3	0.0	2.3	1.8	0.0	0.0	19.0	37.3	37.4	6.9	47.5	3.5
Cycle Q Clear(g_c), s	6.3	0.0	2.3	1.8	0.0	0.0	19.0	37.3	37.4	6.9	47.5	3.5
Prop In Lane	1.00		1.00	0.44		0.12	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	312	0	812	124	0	0	617	1149	1205	142	1947	992
V/C Ratio(X)	0.55	0.00	0.08	0.20	0.00	0.00	0.81	0.67	0.67	0.65	0.79	0.10
Avail Cap(c_a), veh/h	885	0	1307	404	0	0	1465	2520	2643	195	3922	1871
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.8	0.0	38.4	60.3	0.0	0.0	54.0	15.1	15.2	61.1	24.7	10.1
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.8	0.0	0.0	1.0	1.0	0.9	1.9	1.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.9	0.9	0.0	0.0	8.3	14.5	15.2	3.2	19.5	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.4	0.0	38.5	61.1	0.0	0.0	55.0	16.1	16.1	62.9	25.8	10.2
LnGrp LOS	E	A	D	E	A	A	D	B	B	E	C	B
Approach Vol, veh/h		238			25			2087			1736	
Approach Delay, s/veh		54.2			61.1			25.4			26.9	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	28.4	78.9		13.5	14.9	92.5		16.0
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	21.0	49.5		3.8	8.9	39.4		8.3
Green Ext Time (p_c), s	1.4	23.5		0.0	0.0	20.8		0.7

Intersection Summary	
HCM 6th Ctrl Delay	27.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	60	0	45	5	1930	90	35	1615	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1930	90	35	1615	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	2098	96	38	1755	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	177	0	138	11	2732	124	64	2976	8
Arrive On Green	0.09	0.09	0.08	0.09	0.00	0.08	0.01	0.79	0.78	0.04	0.82	0.81
Sat Flow, veh/h	586	899	148	1378	0	1545	1781	3461	157	1781	3635	10
Grp Volume(v), veh/h	11	0	0	65	0	1	5	1069	1125	38	858	902
Grp Sat Flow(s),veh/h/ln	1633	0	0	1378	0	1545	1781	1777	1842	1781	1777	1868
Q Serve(g_s), s	0.0	0.0	0.0	5.3	0.0	0.1	0.4	44.6	46.4	2.9	23.7	23.7
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	44.6	46.4	2.9	23.7	23.7
Prop In Lane	0.45		0.09	1.00		1.00	1.00		0.09	1.00		0.01
Lane Grp Cap(c), veh/h	183	0	0	177	0	138	11	1402	1453	64	1455	1530
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.44	0.76	0.77	0.60	0.59	0.59
Avail Cap(c_a), veh/h	313	0	0	290	0	265	102	1402	1453	102	1455	1530
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.53	0.53	0.53	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.4	0.0	0.0	60.7	0.0	58.5	69.3	7.8	8.0	66.5	4.5	4.5
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	5.3	2.1	2.2	3.3	1.8	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.3	0.0	0.0	0.2	14.5	15.7	1.4	7.2	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	74.7	9.9	10.2	69.8	6.2	6.1
LnGrp LOS	E	A	A	E	A	E	E	A	B	E	A	A
Approach Vol, veh/h		11			66			2199			1798	
Approach Delay, s/veh		58.6			62.0			10.2			7.5	
Approach LOS		E			E			B			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.9	118.6		16.5	9.0	114.5		16.5
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	95.0		23.0	8.0	95.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	25.7		8.1	4.9	48.4		2.8
Green Ext Time (p_c), s	0.0	38.3		0.1	0.0	39.8		0.0

Intersection Summary	
HCM 6th Ctrl Delay	10.0
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	5	5	105	15	15	5	1905	20	10	1435	205
Future Volume (veh/h)	95	5	5	105	15	15	5	1905	20	10	1435	205
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	5	3	114	16	12	5	2071	22	11	1560	166
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	210	7	4	199	20	15	7	2822	30	14	2798	1248
Arrive On Green	0.11	0.11	0.10	0.11	0.11	0.10	0.00	0.78	0.78	0.01	0.79	0.79
Sat Flow, veh/h	1397	68	41	1328	186	140	1781	3602	38	1781	3554	1585
Grp Volume(v), veh/h	111	0	0	142	0	0	5	1020	1073	11	1560	166
Grp Sat Flow(s),veh/h/ln	1506	0	0	1654	0	0	1781	1777	1863	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	1.3	0.0	0.0	0.3	35.0	35.3	0.7	20.0	3.0
Cycle Q Clear(g_c), s	8.3	0.0	0.0	9.6	0.0	0.0	0.3	35.0	35.3	0.7	20.0	3.0
Prop In Lane	0.93		0.03	0.80		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	222	0	0	234	0	0	7	1392	1460	14	2798	1248
V/C Ratio(X)	0.50	0.00	0.00	0.61	0.00	0.00	0.73	0.73	0.74	0.80	0.56	0.13
Avail Cap(c_a), veh/h	432	0	0	453	0	0	119	1392	1460	119	2798	1248
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.59	0.59	0.59	0.79	0.79	0.79
Uniform Delay (d), s/veh	51.4	0.0	0.0	51.9	0.0	0.0	59.7	6.6	6.6	59.4	4.8	3.0
Incr Delay (d2), s/veh	1.7	0.0	0.0	2.5	0.0	0.0	27.6	2.1	2.0	26.4	0.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	0.0	4.3	0.0	0.0	0.2	10.6	11.2	0.4	5.8	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.1	0.0	0.0	54.4	0.0	0.0	87.3	8.7	8.6	85.9	5.5	3.2
LnGrp LOS	D	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		111			142			2098			1737	
Approach Delay, s/veh		53.1			54.4			8.8			5.8	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.5		17.1	4.9	98.0		17.1
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.3	22.0		11.6	2.7	37.3		10.3
Green Ext Time (p_c), s	0.0	34.7		0.5	0.0	28.7		0.3

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	30	20	145	25	35	25	1720	75	10	1470	75
Future Volume (veh/h)	155	30	20	145	25	35	25	1720	75	10	1470	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	168	33	2	158	27	3	27	1870	80	11	1598	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	257	287	17	253	272	30	34	2577	109	13	2516	125
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.04	1.00	1.00	0.01	0.73	0.72
Sat Flow, veh/h	1359	1744	106	1353	1650	183	1781	3473	148	1781	3445	172
Grp Volume(v), veh/h	168	0	35	158	0	30	27	950	1000	11	821	857
Grp Sat Flow(s),veh/h/ln	1359	0	1849	1353	0	1834	1781	1777	1844	1781	1777	1839
Q Serve(g_s), s	16.8	0.0	2.3	15.8	0.0	1.9	2.1	0.0	0.0	0.9	32.4	33.0
Cycle Q Clear(g_c), s	18.7	0.0	2.3	18.0	0.0	1.9	2.1	0.0	0.0	0.9	32.4	33.0
Prop In Lane	1.00		0.06	1.00		0.10	1.00		0.08	1.00		0.09
Lane Grp Cap(c), veh/h	257	0	305	253	0	302	34	1318	1368	13	1298	1343
V/C Ratio(X)	0.65	0.00	0.11	0.63	0.00	0.10	0.79	0.72	0.73	0.83	0.63	0.64
Avail Cap(c_a), veh/h	304	0	370	300	0	367	140	1318	1368	140	1298	1343
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.79	0.79	0.79
Uniform Delay (d), s/veh	57.6	0.0	49.8	57.4	0.0	49.7	67.1	0.0	0.0	69.4	9.5	9.6
Incr Delay (d2), s/veh	3.9	0.0	0.2	3.0	0.0	0.1	1.4	0.3	0.3	29.8	1.9	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.0	1.1	5.7	0.0	0.9	1.0	0.1	0.1	0.5	11.9	12.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.5	0.0	49.9	60.4	0.0	49.8	68.5	0.3	0.3	99.2	11.3	11.4
LnGrp LOS	E	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		203			188			1977			1689	
Approach Delay, s/veh		59.5			58.7			1.2			11.9	
Approach LOS		E			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	106.2		27.1	5.0	107.9		27.1				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	88.0		27.0	11.0	88.0		27.0				
Max Q Clear Time (g_c+I1), s	14.1	35.0		20.0	2.9	2.0		20.7				
Green Ext Time (p_c), s	0.0	30.6		0.4	0.0	53.1		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			11.3									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	85	35	115	65	1130	25	745	165	575	1190	30
Future Volume (veh/h)	10	85	35	115	65	1130	25	745	165	575	1190	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	92	6	125	71	0	27	810	96	625	1293	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	39	176	158	264	401		34	943	796	676	2412	60
Arrive On Green	0.10	0.10	0.10	0.08	0.21	0.00	0.02	0.50	0.50	0.39	1.00	1.00
Sat Flow, veh/h	108	1715	1543	1781	1870	1585	1781	1870	1579	3456	3544	88
Grp Volume(v), veh/h	103	0	6	125	71	0	27	810	96	625	648	677
Grp Sat Flow(s),veh/h/ln	1823	0	1543	1781	1870	1585	1781	1870	1579	1728	1777	1854
Q Serve(g_s), s	1.1	0.0	0.5	8.5	4.3	0.0	2.1	53.0	4.5	24.1	0.0	0.0
Cycle Q Clear(g_c), s	7.4	0.0	0.5	8.5	4.3	0.0	2.1	53.0	4.5	24.1	0.0	0.0
Prop In Lane	0.11		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	215	0	158	264	401		34	943	796	676	1210	1262
V/C Ratio(X)	0.48	0.00	0.04	0.47	0.18		0.79	0.86	0.12	0.92	0.54	0.54
Avail Cap(c_a), veh/h	326	0	254	408	668		178	943	796	839	1210	1262
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.70	0.70	0.70
Uniform Delay (d), s/veh	59.7	0.0	56.6	48.5	44.9	0.0	68.4	30.3	18.3	41.6	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	0.1	1.3	0.2	0.0	11.3	8.1	0.2	9.4	1.2	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.2	3.9	2.1	0.0	1.1	25.3	1.7	9.4	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.3	0.0	56.7	49.8	45.1	0.0	79.7	38.5	18.6	51.1	1.2	1.1
LnGrp LOS	E	A	E	D	D		E	D	B	D	A	A
Approach Vol, veh/h		109			196	A		933			1950	
Approach Delay, s/veh		61.1			48.1			37.6			17.2	
Approach LOS		E			D			D			B	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	99.3	15.7	18.3	31.4	74.6		34.0
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	14.0	63.0	22.0	22.0	34.0	43.0		49.0
Max Q Clear Time (g_c+I1), s	4.1	2.0	10.5	9.4	26.1	55.0		6.3
Green Ext Time (p_c), s	0.0	21.2	0.3	0.3	1.3	0.0		0.3

Intersection Summary	
HCM 6th Ctrl Delay	26.6
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	20	795	15	0	935
Future Vol, veh/h	0	20	795	15	0	935
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	22	864	16	0	1016

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	864	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	354	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	354	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	354	-
HCM Lane V/C Ratio	-	-	0.061	-
HCM Control Delay (s)	-	-	15.8	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	55	30	840	25	15	1065
Future Vol, veh/h	55	30	840	25	15	1065
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	33	913	27	16	1158

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2103	913	0	0	940	0
Stage 1	913	-	-	-	-	-
Stage 2	1190	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 57	331	-	-	729	-
Stage 1	391	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 56	331	-	-	729	-
Mov Cap-2 Maneuver	170	-	-	-	-	-
Stage 1	382	-	-	-	-	-
Stage 2	289	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	30.1	0	0.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	170	331	729	-
HCM Lane V/C Ratio	-	-	0.352	0.099	0.022	-
HCM Control Delay (s)	-	-	37.2	17.1	10.1	-
HCM Lane LOS	-	-	E	C	B	-
HCM 95th %tile Q(veh)	-	-	1.5	0.3	0.1	-

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

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	60	95	0	145	0	75	5	0	0	5	60
Future Vol, veh/h	15	60	95	0	145	0	75	5	0	0	5	60
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	65	103	0	158	0	82	5	0	0	5	65

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	158	0	0	168	0	0	342	307	84	225	358	158
Stage 1	-	-	-	-	-	-	149	149	-	158	158	-
Stage 2	-	-	-	-	-	-	193	158	-	67	200	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1420	-	-	1408	-	-	600	606	959	721	568	887
Stage 1	-	-	-	-	-	-	839	773	-	844	767	-
Stage 2	-	-	-	-	-	-	808	767	-	936	735	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1420	-	-	1408	-	-	547	599	959	710	562	887
Mov Cap-2 Maneuver	-	-	-	-	-	-	547	599	-	710	562	-
Stage 1	-	-	-	-	-	-	830	764	-	835	767	-
Stage 2	-	-	-	-	-	-	743	767	-	919	727	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0	12.8	9.6
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	550	1420	-	-	1408	-	-	849
HCM Lane V/C Ratio	0.158	0.011	-	-	-	-	-	0.083
HCM Control Delay (s)	12.8	7.6	-	-	0	-	-	9.6
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	20	25	0	10	0	85	0	0	0	0	50
Future Vol, veh/h	25	20	25	0	10	0	85	0	0	0	0	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	22	27	0	11	0	92	0	0	0	0	54

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	11	0	0	49	0	0	128	101	25	76	114	11
Stage 1	-	-	-	-	-	-	90	90	-	11	11	-
Stage 2	-	-	-	-	-	-	38	11	-	65	103	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1607	-	-	1557	-	-	839	789	1046	909	776	1070
Stage 1	-	-	-	-	-	-	908	820	-	1009	886	-
Stage 2	-	-	-	-	-	-	977	886	-	938	809	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1607	-	-	1557	-	-	786	776	1046	897	763	1070
Mov Cap-2 Maneuver	-	-	-	-	-	-	786	776	-	897	763	-
Stage 1	-	-	-	-	-	-	893	806	-	992	886	-
Stage 2	-	-	-	-	-	-	927	886	-	922	795	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.6	0	10.2	8.5
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	786	1607	-	-	1557	-	-	1070
HCM Lane V/C Ratio	0.118	0.017	-	-	-	-	-	0.051
HCM Control Delay (s)	10.2	7.3	-	-	0	-	-	8.5
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	20	5	0	70	5	5	0	0	0	0	10
Future Vol, veh/h	15	20	5	0	70	5	5	0	0	0	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	22	5	0	76	5	5	0	0	0	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	81	0	0	27	0	0	141	138	25	136	138	79
Stage 1	-	-	-	-	-	-	57	57	-	79	79	-
Stage 2	-	-	-	-	-	-	84	81	-	57	59	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1517	-	-	1587	-	-	829	753	1051	835	753	981
Stage 1	-	-	-	-	-	-	955	847	-	930	829	-
Stage 2	-	-	-	-	-	-	924	828	-	955	846	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1517	-	-	1587	-	-	813	745	1051	828	745	981
Mov Cap-2 Maneuver	-	-	-	-	-	-	813	745	-	828	745	-
Stage 1	-	-	-	-	-	-	944	838	-	920	829	-
Stage 2	-	-	-	-	-	-	914	828	-	944	837	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.8	0	9.5	8.7
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	813	1517	-	-	1587	-	-	981
HCM Lane V/C Ratio	0.007	0.011	-	-	-	-	-	0.011
HCM Control Delay (s)	9.5	7.4	0	-	0	-	-	8.7
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	10	10	0	35	35	0
Future Vol, veh/h	10	10	0	35	35	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	11	0	38	38	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	22	0	55	17
Stage 1	-	-	-	-	17	-
Stage 2	-	-	-	-	38	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1593	-	953	1062
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	984	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1593	-	953	1062
Mov Cap-2 Maneuver	-	-	-	-	953	-
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	984	-

Approach	EB		WB		NB	
HCM Control Delay, s	0		0		8.9	
HCM LOS					A	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	953	-	-	1593	-
HCM Lane V/C Ratio	0.04	-	-	-	-
HCM Control Delay (s)	8.9	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2030 Scenario 3 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	25	420	65	25	5	425	305	70	10	420	75
Future Volume (veh/h)	55	25	420	65	25	5	425	305	70	10	420	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	27	27	71	27	1	462	332	50	11	457	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	198	72	181	196	205	8	526	1184	1003	15	646	548
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.30	0.63	0.63	0.01	0.35	0.35
Sat Flow, veh/h	914	633	1585	1350	1792	66	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	87	0	27	71	0	28	462	332	50	11	457	25
Grp Sat Flow(s),veh/h/ln	1547	0	1585	1350	0	1858	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.4	0.0	1.0	3.4	0.0	0.9	16.1	5.2	0.8	0.4	13.9	0.7
Cycle Q Clear(g_c), s	3.3	0.0	1.0	6.7	0.0	0.9	16.1	5.2	0.8	0.4	13.9	0.7
Prop In Lane	0.69		1.00	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	270	0	181	196	0	213	526	1184	1003	15	646	548
V/C Ratio(X)	0.32	0.00	0.15	0.36	0.00	0.13	0.88	0.28	0.05	0.74	0.71	0.05
Avail Cap(c_a), veh/h	649	0	581	536	0	681	816	2257	1913	408	1829	1550
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.1	0.0	26.1	30.3	0.0	26.1	21.9	5.4	4.6	32.4	18.5	14.2
Incr Delay (d2), s/veh	0.7	0.0	0.4	1.1	0.0	0.3	7.0	0.3	0.0	52.4	3.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.4	1.1	0.0	0.4	7.1	1.5	0.2	0.4	5.9	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.8	0.0	26.5	31.4	0.0	26.3	28.9	5.6	4.6	84.7	21.6	14.3
LnGrp LOS	C	A	C	C	A	C	C	A	A	F	C	B
Approach Vol, veh/h		114			99			844			493	
Approach Delay, s/veh		27.5			30.0			18.3			22.6	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	47.4		12.5	24.3	28.6		12.5
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0
Max Q Clear Time (g_c+I1), s	2.4	7.2		5.3	18.1	15.9		8.7
Green Ext Time (p_c), s	0.0	5.0		0.5	1.2	6.8		0.2

Intersection Summary			
HCM 6th Ctrl Delay			21.1
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	20	175	55	15	10	225	735	50	25	780	80
Future Volume (veh/h)	75	20	175	55	15	10	225	735	50	25	780	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	22	11	60	16	1	245	799	0	27	848	51
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	246	55	213	209	234	15	359	1126		350	986	832
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.09	0.60	0.00	0.02	0.53	0.53
Sat Flow, veh/h	1092	407	1585	1376	1742	109	1781	1870	1585	1781	1870	1579
Grp Volume(v), veh/h	104	0	11	60	0	17	245	799	0	27	848	51
Grp Sat Flow(s),veh/h/ln	1499	0	1585	1376	0	1851	1781	1870	1585	1781	1870	1579
Q Serve(g_s), s	3.6	0.0	0.4	2.8	0.0	0.5	3.6	19.3	0.0	0.5	25.6	1.0
Cycle Q Clear(g_c), s	4.1	0.0	0.4	6.9	0.0	0.5	3.6	19.3	0.0	0.5	25.6	1.0
Prop In Lane	0.79		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	301	0	213	209	0	249	359	1126		350	986	832
V/C Ratio(X)	0.35	0.00	0.05	0.29	0.00	0.07	0.68	0.71		0.08	0.86	0.06
Avail Cap(c_a), veh/h	668	0	608	551	0	710	604	1463		728	1463	1236
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	0.0	24.6	29.4	0.0	24.6	13.2	9.0	0.0	8.5	13.3	7.5
Incr Delay (d2), s/veh	0.7	0.0	0.1	0.8	0.0	0.1	2.3	1.1	0.0	0.1	3.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.1	0.9	0.0	0.2	1.9	6.1	0.0	0.1	9.5	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.8	0.0	24.7	30.1	0.0	24.8	15.5	10.1	0.0	8.6	16.9	7.6
LnGrp LOS	C	A	C	C	A	C	B	B		A	B	A
Approach Vol, veh/h		115			77			1044	A		926	
Approach Delay, s/veh		26.6			29.0			11.4			16.2	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	45.2		13.8	11.0	40.4		13.8				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0				
Max Q Clear Time (g_c+I1), s	2.5	21.3		6.1	5.6	27.6		8.9				
Green Ext Time (p_c), s	0.0	6.5		0.5	0.5	6.8		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			14.9									
HCM 6th LOS			B									

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	55	100	120	55	105	170	925	190	105	905	75
Future Volume (veh/h)	60	55	100	120	55	105	170	925	190	105	905	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	60	61	130	60	7	185	1005	0	114	984	36
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	83	82	84	153	258	216	207	1109	939	138	1036	877
Arrive On Green	0.05	0.10	0.10	0.09	0.14	0.14	0.12	0.59	0.00	0.08	0.55	0.55
Sat Flow, veh/h	1781	834	847	1781	1870	1561	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	65	0	121	130	60	7	185	1005	0	114	984	36
Grp Sat Flow(s),veh/h/ln	1781	0	1681	1781	1870	1561	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	5.0	0.0	9.6	9.9	3.9	0.5	14.1	65.2	0.0	8.7	68.3	1.4
Cycle Q Clear(g_c), s	5.0	0.0	9.6	9.9	3.9	0.5	14.1	65.2	0.0	8.7	68.3	1.4
Prop In Lane	1.00		0.50	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	83	0	166	153	258	216	207	1109	939	138	1036	877
V/C Ratio(X)	0.78	0.00	0.73	0.85	0.23	0.03	0.90	0.91	0.00	0.83	0.95	0.04
Avail Cap(c_a), veh/h	168	0	232	168	258	216	207	1125	954	207	1125	952
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.0	0.0	60.4	62.1	52.9	51.5	60.1	24.7	0.0	62.7	28.9	14.0
Incr Delay (d2), s/veh	14.5	0.0	6.9	29.5	0.5	0.1	35.5	10.5	0.0	15.5	15.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	4.4	5.8	1.9	0.2	8.4	30.4	0.0	4.5	33.5	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	79.5	0.0	67.3	91.7	53.4	51.5	95.7	35.2	0.0	78.2	44.5	14.1
LnGrp LOS	E	A	E	F	D	D	F	D	A	E	D	B
Approach Vol, veh/h		186			197			1190			1134	
Approach Delay, s/veh		71.5			78.6			44.6			46.9	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.7	86.8	16.9	18.6	21.0	81.4	11.4	24.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	16.0	83.0	13.0	19.0	16.0	83.0	13.0	19.0
Max Q Clear Time (g_c+I1), s	10.7	67.2	11.9	11.6	16.1	70.3	7.0	5.9
Green Ext Time (p_c), s	0.1	7.1	0.0	0.3	0.0	6.1	0.1	0.2

Intersection Summary		
HCM 6th Ctrl Delay		49.9
HCM 6th LOS		D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	5	600	80	10	10	605	1185	10	5	1080	20
Future Volume (veh/h)	95	5	600	80	10	10	605	1185	10	5	1080	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	5	0	87	11	9	658	1288	11	5	1174	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	176	6		168	15	12	689	2876	25	7	1469	655
Arrive On Green	0.09	0.08	0.00	0.09	0.08	0.08	0.39	0.80	0.80	0.00	0.41	0.41
Sat Flow, veh/h	1442	70	1585	1387	175	143	1781	3611	31	1781	3554	1585
Grp Volume(v), veh/h	108	0	0	107	0	0	658	634	665	5	1174	7
Grp Sat Flow(s),veh/h/ln	1512	0	1585	1705	0	0	1781	1777	1865	1781	1777	1585
Q Serve(g_s), s	1.4	0.0	0.0	0.0	0.0	0.0	46.9	14.7	14.7	0.4	37.8	0.3
Cycle Q Clear(g_c), s	8.9	0.0	0.0	7.5	0.0	0.0	46.9	14.7	14.7	0.4	37.8	0.3
Prop In Lane	0.95		1.00	0.81		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	194	0		208	0	0	689	1415	1485	7	1469	655
V/C Ratio(X)	0.56	0.00		0.52	0.00	0.00	0.95	0.45	0.45	0.74	0.80	0.01
Avail Cap(c_a), veh/h	290	0		363	0	0	969	1415	1485	969	1879	838
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.2	0.0	0.0	57.7	0.0	0.0	38.9	4.2	4.2	64.9	33.5	22.6
Incr Delay (d2), s/veh	2.5	0.0	0.0	2.0	0.0	0.0	13.5	0.5	0.5	43.5	2.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.0	3.5	0.0	0.0	22.5	4.4	4.6	0.2	16.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.7	0.0	0.0	59.7	0.0	0.0	52.4	4.7	4.7	108.4	36.4	22.6
LnGrp LOS	E	A		E	A	A	D	A	A	F	D	C
Approach Vol, veh/h		108	A		107			1957			1186	
Approach Delay, s/veh		60.7			59.7			20.7			36.6	
Approach LOS		E			E			C			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	54.5	59.9		16.1	4.5	109.9		16.1
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0
Max Q Clear Time (g_c+I1), s	48.9	39.8		9.5	2.4	16.7		10.9
Green Ext Time (p_c), s	1.7	14.1		0.3	0.0	19.5		0.2

Intersection Summary	
HCM 6th Ctrl Delay	28.8
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	140	15	0	5	135	1760	10	10	1780	60
Future Volume (veh/h)	55	5	140	15	0	5	135	1760	10	10	1780	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	5	16	0	1	147	1913	11	11	1935	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	220	16	170	169	2	7	177	2715	16	14	2339	1042
Arrive On Green	0.12	0.11	0.11	0.12	0.00	0.11	0.10	0.75	0.75	0.01	0.66	0.66
Sat Flow, veh/h	1386	139	1521	927	17	59	1781	3623	21	1781	3554	1584
Grp Volume(v), veh/h	65	0	5	17	0	0	147	937	987	11	1935	41
Grp Sat Flow(s),veh/h/ln	1525	0	1521	1002	0	0	1781	1777	1866	1781	1777	1584
Q Serve(g_s), s	0.0	0.0	0.3	1.1	0.0	0.0	8.7	30.0	30.1	0.7	43.8	1.0
Cycle Q Clear(g_c), s	3.6	0.0	0.3	4.7	0.0	0.0	8.7	30.0	30.1	0.7	43.8	1.0
Prop In Lane	0.92		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	250	0	170	187	0	0	177	1332	1399	14	2339	1042
V/C Ratio(X)	0.26	0.00	0.03	0.09	0.00	0.00	0.83	0.70	0.71	0.79	0.83	0.04
Avail Cap(c_a), veh/h	394	0	327	328	0	0	349	1427	1498	183	2521	1124
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	42.4	45.1	0.0	0.0	47.4	7.1	7.1	53.1	13.7	6.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.8	2.0	1.9	29.6	2.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.1	0.4	0.0	0.0	4.0	9.4	9.9	0.4	15.9	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.6	0.0	42.4	45.1	0.0	0.0	51.2	9.1	9.0	82.7	16.4	6.5
LnGrp LOS	D	A	D	D	A	A	D	A	A	F	B	A
Approach Vol, veh/h		70			17			2071			1987	
Approach Delay, s/veh		43.5			45.1			12.1			16.6	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.6	75.5		17.0	4.8	85.3		17.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	10.7	45.8		6.7	2.7	32.1		5.6				
Green Ext Time (p_c), s	0.1	24.7		0.0	0.0	38.2		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			14.9									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	5	175	70	5	50	125	1730	60	35	1925	105
Future Volume (veh/h)	85	5	175	70	5	50	125	1730	60	35	1925	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	92	5	44	76	5	2	136	1880	48	38	2092	92
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	222	10	215	138	174	70	157	2644	1178	49	2428	1083
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.09	0.74	0.74	0.03	0.68	0.68
Sat Flow, veh/h	1305	71	1564	1344	1265	506	1781	3554	1584	1781	3554	1585
Grp Volume(v), veh/h	97	0	44	76	0	7	136	1880	48	38	2092	92
Grp Sat Flow(s),veh/h/ln	1376	0	1564	1344	0	1771	1781	1777	1584	1781	1777	1585
Q Serve(g_s), s	10.5	0.0	4.1	9.2	0.0	0.6	12.4	47.4	1.3	3.5	74.8	3.2
Cycle Q Clear(g_c), s	11.0	0.0	4.1	20.2	0.0	0.6	12.4	47.4	1.3	3.5	74.8	3.2
Prop In Lane	0.95		1.00	1.00		0.29	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	240	0	215	138	0	244	157	2644	1178	49	2428	1083
V/C Ratio(X)	0.40	0.00	0.20	0.55	0.00	0.03	0.86	0.71	0.04	0.77	0.86	0.08
Avail Cap(c_a), veh/h	251	0	228	149	0	258	281	2644	1178	108	2428	1083
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.57	0.57	0.57	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.9	0.0	63.1	75.5	0.0	61.6	74.2	11.5	5.6	79.7	20.1	8.8
Incr Delay (d2), s/veh	1.1	0.0	0.5	3.6	0.0	0.0	3.1	0.9	0.0	9.3	4.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	1.7	3.3	0.0	0.3	5.8	17.6	0.4	1.7	30.5	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.0	0.0	63.6	79.1	0.0	61.7	77.4	12.4	5.6	89.0	24.5	8.9
LnGrp LOS	E	A	E	E	A	E	E	B	A	F	C	A
Approach Vol, veh/h		141			83			2064			2222	
Approach Delay, s/veh		66.0			77.7			16.5			24.9	
Approach LOS		E			E			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.6	118.7		27.7	8.5	128.8		27.7				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	26.0	100.0		24.0	10.0	116.0		24.0				
Max Q Clear Time (g_c+I1), s	14.4	76.8		22.2	5.5	49.4		13.0				
Green Ext Time (p_c), s	0.2	20.8		0.0	0.0	43.4		0.3				

Intersection Summary			
HCM 6th Ctrl Delay			23.3
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	390	5	740	15	0	5	500	1690	10	80	1890	200
Future Volume (veh/h)	390	5	740	15	0	5	500	1690	10	80	1890	200
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.95	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	428	0	643	16	0	1	543	1837	11	87	2054	184
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	451	0	914	59	0	4	579	2618	16	99	2172	1163
Arrive On Green	0.13	0.00	0.12	0.04	0.00	0.02	0.17	0.72	0.72	0.06	0.61	0.61
Sat Flow, veh/h	3563	0	3118	1659	0	104	3456	3622	22	1781	3554	1585
Grp Volume(v), veh/h	428	0	643	17	0	0	543	900	948	87	2054	184
Grp Sat Flow(s),veh/h/ln	1781	0	1559	1762	0	0	1728	1777	1866	1781	1777	1585
Q Serve(g_s), s	32.0	0.0	33.0	2.5	0.0	0.0	41.7	76.5	76.8	13.0	143.1	9.4
Cycle Q Clear(g_c), s	32.0	0.0	33.0	2.5	0.0	0.0	41.7	76.5	76.8	13.0	143.1	9.4
Prop In Lane	1.00		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	451	0	914	62	0	0	579	1284	1349	99	2172	1163
V/C Ratio(X)	0.95	0.00	0.70	0.27	0.00	0.00	0.94	0.70	0.70	0.87	0.95	0.16
Avail Cap(c_a), veh/h	451	0	914	177	0	0	579	1310	1376	99	2222	1186
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	116.5	0.0	85.2	126.3	0.0	0.0	110.4	20.9	21.0	125.9	48.1	10.8
Incr Delay (d2), s/veh	29.5	0.0	2.1	0.9	0.0	0.0	22.9	1.8	1.8	51.0	9.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.1	0.0	20.6	1.2	0.0	0.0	20.9	32.7	34.5	7.6	65.9	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	146.0	0.0	87.3	127.2	0.0	0.0	133.3	22.8	22.7	176.9	57.5	10.8
LnGrp LOS	F	A	F	F	A	A	F	C	C	F	E	B
Approach Vol, veh/h		1071			17			2391			2325	
Approach Delay, s/veh		110.7			127.2			47.9			58.3	
Approach LOS		F			F			D			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	49.0	168.2		13.5	19.0	198.2		38.0
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	43.0	166.0		24.0	13.0	196.0		31.0
Max Q Clear Time (g_c+I1), s	43.7	145.1		4.5	15.0	78.8		35.0
Green Ext Time (p_c), s	0.0	17.1		0.0	0.0	31.3		0.0

Intersection Summary	
HCM 6th Ctrl Delay	63.9
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	5	90	5	65	10	2155	90	90	2600	5
Future Volume (veh/h)	10	0	5	90	5	65	10	2155	90	90	2600	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	2342	96	98	2826	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	155	2	10	176	95	57	22	2653	108	122	2978	5
Arrive On Green	0.09	0.00	0.08	0.09	0.09	0.08	0.02	1.00	1.00	0.07	0.82	0.81
Sat Flow, veh/h	1239	24	115	1416	1095	657	1781	3480	142	1781	3640	6
Grp Volume(v), veh/h	12	0	0	98	0	8	11	1188	1250	98	1379	1452
Grp Sat Flow(s),veh/h/ln	1378	0	0	1416	0	1752	1781	1777	1845	1781	1777	1869
Q Serve(g_s), s	0.9	0.0	0.0	7.9	0.0	0.6	0.9	0.0	0.0	7.9	91.4	91.7
Cycle Q Clear(g_c), s	1.5	0.0	0.0	9.4	0.0	0.6	0.9	0.0	0.0	7.9	91.4	91.7
Prop In Lane	0.92		0.08	1.00		0.38	1.00		0.08	1.00		0.00
Lane Grp Cap(c), veh/h	167	0	0	176	0	152	22	1354	1406	122	1454	1529
V/C Ratio(X)	0.07	0.00	0.00	0.56	0.00	0.05	0.50	0.88	0.89	0.80	0.95	0.95
Avail Cap(c_a), veh/h	279	0	0	288	0	290	111	1354	1406	172	1454	1529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.36	0.36	0.36	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.3	0.0	0.0	64.6	0.0	60.9	70.9	0.0	0.0	66.6	10.7	10.7
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.7	0.0	0.1	2.3	3.2	3.5	11.2	14.2	13.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	3.7	0.0	0.3	0.4	1.2	1.3	3.9	31.7	33.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.5	0.0	0.0	67.4	0.0	61.1	73.2	3.2	3.5	77.8	24.9	24.5
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	C	C
Approach Vol, veh/h		12			106			2449			2929	
Approach Delay, s/veh		61.5			66.9			3.7			26.4	
Approach LOS		E			E			A			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	122.6		16.6	13.9	114.5		16.6				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	9.0	99.0		23.0	14.0	94.0		23.0				
Max Q Clear Time (g_c+I1), s	2.9	93.7		11.4	9.9	2.0		3.5				
Green Ext Time (p_c), s	0.0	5.3		0.2	0.1	79.8		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			17.1									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	195	15	10	60	5	10	5	2065	20	5	2230	340
Future Volume (veh/h)	195	15	10	60	5	10	5	2065	20	5	2230	340
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	212	16	9	65	5	7	5	2245	22	5	2424	303
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	284	18	10	292	23	27	7	2652	26	7	2614	1166
Arrive On Green	0.18	0.18	0.17	0.18	0.18	0.17	0.01	1.00	1.00	0.00	0.74	0.74
Sat Flow, veh/h	1332	101	57	1385	130	152	1781	3606	35	1781	3554	1585
Grp Volume(v), veh/h	237	0	0	77	0	0	5	1104	1163	5	2424	303
Grp Sat Flow(s),veh/h/ln	1489	0	0	1667	0	0	1781	1777	1864	1781	1777	1585
Q Serve(g_s), s	16.8	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	82.3	9.1
Cycle Q Clear(g_c), s	22.4	0.0	0.0	5.6	0.0	0.0	0.4	0.0	0.0	0.4	82.3	9.1
Prop In Lane	0.89		0.04	0.84		0.09	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	312	0	0	342	0	0	7	1307	1371	7	2614	1166
V/C Ratio(X)	0.76	0.00	0.00	0.22	0.00	0.00	0.74	0.84	0.85	0.74	0.93	0.26
Avail Cap(c_a), veh/h	353	0	0	384	0	0	98	1307	1371	98	2614	1166
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.42	0.42	0.42	0.13	0.13	0.13
Uniform Delay (d), s/veh	57.9	0.0	0.0	51.3	0.0	0.0	71.9	0.0	0.0	72.2	15.9	6.3
Incr Delay (d2), s/veh	8.2	0.0	0.0	0.3	0.0	0.0	22.0	3.0	2.9	7.6	1.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.3	0.0	0.0	2.5	0.0	0.0	0.2	1.1	1.1	0.2	29.2	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.1	0.0	0.0	51.7	0.0	0.0	93.9	3.0	2.9	79.8	17.0	6.3
LnGrp LOS	E	A	A	D	A	A	F	A	A	E	B	A
Approach Vol, veh/h		237			77			2272			2732	
Approach Delay, s/veh		66.1			51.7			3.2			16.0	
Approach LOS		E			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.5	110.7		29.8	4.5	110.7		29.8				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	94.0		29.0	8.0	94.0		29.0				
Max Q Clear Time (g_c+I1), s	2.4	84.3		7.6	2.4	2.0		24.4				
Green Ext Time (p_c), s	0.0	9.7		0.2	0.0	83.3		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			13.3
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	35	45	95	25	20	55	1845	105	30	2155	160
Future Volume (veh/h)	190	35	45	95	25	20	55	1845	105	30	2155	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.97	0.98		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	207	38	14	103	27	2	60	2005	111	33	2342	170
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	254	214	79	235	284	21	74	2494	137	42	2388	171
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.16	0.08	1.00	1.00	0.05	1.00	1.00
Sat Flow, veh/h	1344	1292	476	1319	1716	127	1781	3425	188	1781	3362	241
Grp Volume(v), veh/h	207	0	52	103	0	29	60	1031	1085	33	1224	1288
Grp Sat Flow(s),veh/h/ln	1344	0	1768	1319	0	1843	1781	1777	1836	1781	1777	1826
Q Serve(g_s), s	22.1	0.0	3.7	10.6	0.0	1.9	4.8	0.0	0.0	2.7	0.0	0.0
Cycle Q Clear(g_c), s	24.0	0.0	3.7	14.2	0.0	1.9	4.8	0.0	0.0	2.7	0.0	0.0
Prop In Lane	1.00		0.27	1.00		0.07	1.00		0.10	1.00		0.13
Lane Grp Cap(c), veh/h	254	0	293	235	0	305	74	1294	1337	42	1262	1297
V/C Ratio(X)	0.81	0.00	0.18	0.44	0.00	0.10	0.81	0.80	0.81	0.78	0.97	0.99
Avail Cap(c_a), veh/h	254	0	293	235	0	305	74	1294	1337	74	1262	1297
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.24	0.24	0.24
Uniform Delay (d), s/veh	61.6	0.0	52.0	58.1	0.0	51.3	66.0	0.0	0.0	68.7	0.0	0.0
Incr Delay (d2), s/veh	18.1	0.0	0.3	1.3	0.0	0.1	5.9	0.5	0.5	2.9	7.2	10.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.0	0.0	1.7	3.7	0.0	0.9	2.2	0.2	0.2	1.2	2.5	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	79.7	0.0	52.3	59.4	0.0	51.5	71.9	0.5	0.5	71.6	7.2	10.7
LnGrp LOS	E	A	D	E	A	D	E	A	A	E	A	B
Approach Vol, veh/h		259			132			2176			2545	
Approach Delay, s/veh		74.2			57.7			2.5			9.8	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	107.0		28.0	7.4	109.6		28.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	6.0	102.0		23.0	6.0	102.0		23.0
Max Q Clear Time (g_c+I1), s	6.8	2.0		16.2	4.7	2.0		26.0
Green Ext Time (p_c), s	0.0	87.3		0.2	0.0	66.1		0.0

Intersection Summary			
HCM 6th Ctrl Delay			11.2
HCM 6th LOS			B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	85	85	190	85	1060	50	865	220	650	1390	40
Future Volume (veh/h)	35	85	85	190	85	1060	50	865	220	650	1390	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.96	0.98		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	92	9	207	92	0	54	940	164	707	1511	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	82	165	194	317	498		69	814	685	747	2163	59
Arrive On Green	0.13	0.13	0.13	0.11	0.27	0.00	0.04	0.43	0.43	0.43	1.00	1.00
Sat Flow, veh/h	393	1285	1518	1781	1870	1585	1781	1870	1574	3456	3534	96
Grp Volume(v), veh/h	130	0	9	207	92	0	54	940	164	707	759	793
Grp Sat Flow(s),veh/h/ln	1678	0	1518	1781	1870	1585	1781	1870	1574	1728	1777	1853
Q Serve(g_s), s	7.1	0.0	0.8	14.3	5.5	0.0	4.4	63.1	9.5	28.5	0.0	0.0
Cycle Q Clear(g_c), s	10.4	0.0	0.8	14.3	5.5	0.0	4.4	63.1	9.5	28.5	0.0	0.0
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	247	0	194	317	498		69	814	685	747	1088	1134
V/C Ratio(X)	0.53	0.00	0.05	0.65	0.18		0.78	1.16	0.24	0.95	0.70	0.70
Avail Cap(c_a), veh/h	308	0	251	317	568		123	814	685	810	1088	1134
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.88	0.88	0.88	0.11	0.11	0.11
Uniform Delay (d), s/veh	59.5	0.0	55.4	46.5	41.1	0.0	69.1	41.0	25.8	40.3	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.1	4.7	0.2	0.0	6.0	82.2	0.7	3.2	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	0.3	6.8	2.6	0.0	2.1	46.9	3.7	10.3	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.2	0.0	55.5	51.2	41.3	0.0	75.1	123.2	26.6	43.5	0.4	0.4
LnGrp LOS	E	A	E	D	D		E	F	C	D	A	A
Approach Vol, veh/h		139			299	A		1158			2259	
Approach Delay, s/veh		60.9			48.1			107.3			13.9	
Approach LOS		E			D			F			B	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.7	92.8	20.0	22.6	35.4	67.1		42.6
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	10.0	78.0	15.0	23.0	34.0	54.0		43.0
Max Q Clear Time (g_c+I1), s	16.4	2.0	16.3	12.4	30.5	65.1		7.5
Green Ext Time (p_c), s	0.0	31.0	0.0	0.3	0.9	0.0		0.3

Intersection Summary			
HCM 6th Ctrl Delay			46.3
HCM 6th LOS			D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	15	1060	30	0	1015
Future Vol, veh/h	0	15	1060	30	0	1015
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	1152	33	0	1103

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1152	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	241	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	241	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	241	-
HCM Lane V/C Ratio	-	-	0.068	-
HCM Control Delay (s)	-	-	21	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	30	1230	70	40	1100
Future Vol, veh/h	50	30	1230	70	40	1100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	33	1337	76	43	1196

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2619	1337	0	0	1413	0
Stage 1	1337	-	-	-	-	-
Stage 2	1282	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 27	187	-	-	482	-
Stage 1	245	-	-	-	-	-
Stage 2	260	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 25	187	-	-	482	-
Mov Cap-2 Maneuver	112	-	-	-	-	-
Stage 1	223	-	-	-	-	-
Stage 2	260	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	50.8	0	0.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	112	187	482	-
HCM Lane V/C Ratio	-	-	0.485	0.174	0.09	-
HCM Control Delay (s)	-	-	64.3	28.3	13.2	-
HCM Lane LOS	-	-	F	D	B	-
HCM 95th %tile Q(veh)	-	-	2.2	0.6	0.3	-

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

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	140	160	5	105	0	140	15	5	0	5	35
Future Vol, veh/h	45	140	160	5	105	0	140	15	5	0	5	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	152	174	5	114	0	152	16	5	0	5	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	114	0	0	326	0	0	483	461	163	306	548	114
Stage 1	-	-	-	-	-	-	337	337	-	124	124	-
Stage 2	-	-	-	-	-	-	146	124	-	182	424	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1474	-	-	1232	-	-	480	497	854	635	443	938
Stage 1	-	-	-	-	-	-	652	640	-	880	793	-
Stage 2	-	-	-	-	-	-	856	793	-	803	586	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1474	-	-	1232	-	-	443	479	854	598	427	938
Mov Cap-2 Maneuver	-	-	-	-	-	-	443	479	-	598	427	-
Stage 1	-	-	-	-	-	-	630	619	-	851	790	-
Stage 2	-	-	-	-	-	-	812	790	-	751	567	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.4	17.8	9.7
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	453	1474	-	-	1232	-	-	816
HCM Lane V/C Ratio	0.384	0.033	-	-	0.004	-	-	0.053
HCM Control Delay (s)	17.8	7.5	-	-	7.9	-	-	9.7
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	1.8	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	15	75	0	20	0	45	10	0	0	5	45
Future Vol, veh/h	55	15	75	0	20	0	45	10	0	0	5	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	60	16	82	0	22	0	49	11	0	0	5	49

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	22	0	0	98	0	0	226	199	49	156	240	22
Stage 1	-	-	-	-	-	-	177	177	-	22	22	-
Stage 2	-	-	-	-	-	-	49	22	-	134	218	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1593	-	-	1494	-	-	720	696	1009	803	661	1055
Stage 1	-	-	-	-	-	-	808	752	-	996	877	-
Stage 2	-	-	-	-	-	-	964	877	-	856	722	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1593	-	-	1494	-	-	662	670	1009	770	636	1055
Mov Cap-2 Maneuver	-	-	-	-	-	-	662	670	-	770	636	-
Stage 1	-	-	-	-	-	-	777	723	-	958	877	-
Stage 2	-	-	-	-	-	-	914	877	-	811	695	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.8	0	11	8.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	663	1593	-	-	1494	-	-	990
HCM Lane V/C Ratio	0.09	0.038	-	-	-	-	-	0.055
HCM Control Delay (s)	11	7.3	-	-	0	-	-	8.8
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.2

Intersection												
Int Delay, s/veh	3.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	25	70	15	0	40	5	20	0	0	15	0	25
Future Vol, veh/h	25	70	15	0	40	5	20	0	0	15	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	76	16	0	43	5	22	0	0	16	0	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	48	0	0	92	0	0	197	186	84	184	192	46
Stage 1	-	-	-	-	-	-	138	138	-	46	46	-
Stage 2	-	-	-	-	-	-	59	48	-	138	146	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1559	-	-	1503	-	-	762	708	975	777	703	1023
Stage 1	-	-	-	-	-	-	865	782	-	968	857	-
Stage 2	-	-	-	-	-	-	953	855	-	865	776	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1559	-	-	1503	-	-	732	695	975	766	690	1023
Mov Cap-2 Maneuver	-	-	-	-	-	-	732	695	-	766	690	-
Stage 1	-	-	-	-	-	-	849	768	-	951	857	-
Stage 2	-	-	-	-	-	-	928	855	-	849	762	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0	10.1	9.2
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	732	1559	-	-	1503	-	-	909
HCM Lane V/C Ratio	0.03	0.017	-	-	-	-	-	0.048
HCM Control Delay (s)	10.1	7.4	0	-	0	-	-	9.2
HCM Lane LOS	B	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	45	40	0	25	25	0
Future Vol, veh/h	45	40	0	25	25	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	49	43	0	27	27	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	92	0	98	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	27	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1503	-	901	991
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	996	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1503	-	901	991
Mov Cap-2 Maneuver	-	-	-	-	901	-
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	996	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	901	-	-	1503	-
HCM Lane V/C Ratio	0.03	-	-	-	-
HCM Control Delay (s)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2030 Scenario 3 WE Peak

HCM 6th Signalized Intersection Summary
1: Napilihau Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	45	385	50	50	20	320	435	40	20	400	90
Future Volume (veh/h)	40	45	385	50	50	20	320	435	40	20	400	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	49	31	54	54	10	348	473	26	22	435	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	161	127	192	219	187	35	423	1073	908	28	658	557
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.24	0.57	0.57	0.02	0.35	0.35
Sat Flow, veh/h	541	1036	1566	1307	1532	284	1781	1870	1582	1781	1870	1583
Grp Volume(v), veh/h	92	0	31	54	0	64	348	473	26	22	435	33
Grp Sat Flow(s),veh/h/ln	1577	0	1566	1307	0	1815	1781	1870	1582	1781	1870	1583
Q Serve(g_s), s	1.2	0.0	1.0	2.2	0.0	1.8	10.3	8.0	0.4	0.7	10.9	0.8
Cycle Q Clear(g_c), s	3.0	0.0	1.0	5.2	0.0	1.8	10.3	8.0	0.4	0.7	10.9	0.8
Prop In Lane	0.47		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	288	0	192	219	0	222	423	1073	908	28	658	557
V/C Ratio(X)	0.32	0.00	0.16	0.25	0.00	0.29	0.82	0.44	0.03	0.79	0.66	0.06
Avail Cap(c_a), veh/h	775	0	677	625	0	785	963	2663	2253	482	2158	1826
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.6	0.0	21.8	25.1	0.0	22.1	20.0	6.7	5.1	27.2	15.2	11.9
Incr Delay (d2), s/veh	0.6	0.0	0.4	0.6	0.0	0.7	4.1	0.6	0.0	38.3	2.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.4	0.7	0.0	0.8	4.2	2.4	0.1	0.6	4.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.2	0.0	22.2	25.7	0.0	22.9	24.1	7.4	5.2	65.6	17.6	12.0
LnGrp LOS	C	A	C	C	A	C	C	A	A	E	B	B
Approach Vol, veh/h		123			118			847			490	
Approach Delay, s/veh		23.0			24.1			14.2			19.4	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	37.8		11.8	18.2	25.5		11.8				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.7	10.0		5.0	12.3	12.9		7.2				
Green Ext Time (p_c), s	0.0	7.3		0.5	1.0	6.5		0.4				

Intersection Summary	
HCM 6th Ctrl Delay	17.2
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	20	240	50	15	5	170	630	35	15	670	60
Future Volume (veh/h)	55	20	240	50	15	5	170	630	35	15	670	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	22	19	54	16	1	185	685	0	16	728	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	253	76	219	260	245	15	388	1031		375	892	754
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.09	0.55	0.00	0.01	0.48	0.48
Sat Flow, veh/h	978	538	1557	1347	1740	109	1781	1870	1585	1781	1870	1580
Grp Volume(v), veh/h	82	0	19	54	0	17	185	685	0	16	728	29
Grp Sat Flow(s),veh/h/ln	1516	0	1557	1347	0	1848	1781	1870	1585	1781	1870	1580
Q Serve(g_s), s	1.8	0.0	0.6	2.0	0.0	0.4	2.6	14.0	0.0	0.3	18.0	0.5
Cycle Q Clear(g_c), s	2.5	0.0	0.6	4.6	0.0	0.4	2.6	14.0	0.0	0.3	18.0	0.5
Prop In Lane	0.73		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	329	0	219	260	0	260	388	1031		375	892	754
V/C Ratio(X)	0.25	0.00	0.09	0.21	0.00	0.07	0.48	0.66		0.04	0.82	0.04
Avail Cap(c_a), veh/h	805	0	720	694	0	855	729	1766		848	1766	1492
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.0	0.0	20.2	23.1	0.0	20.1	9.8	8.6	0.0	8.1	12.1	7.5
Incr Delay (d2), s/veh	0.4	0.0	0.2	0.4	0.0	0.1	0.9	0.7	0.0	0.0	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.2	0.6	0.0	0.2	0.7	4.1	0.0	0.1	6.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.4	0.0	20.4	23.5	0.0	20.2	10.7	9.3	0.0	8.1	14.0	7.6
LnGrp LOS	C	A	C	C	A	C	B	A		A	B	A
Approach Vol, veh/h		101			71			870	A		773	
Approach Delay, s/veh		21.2			22.7			9.6			13.6	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.6	35.8		12.6	9.7	31.8		12.6
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.3	16.0		4.5	4.6	20.0		6.6
Green Ext Time (p_c), s	0.0	5.3		0.4	0.3	5.7		0.2

Intersection Summary	
HCM 6th Ctrl Delay	12.5
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	65	90	170	70	140	85	665	220	130	795	50
Future Volume (veh/h)	40	65	90	170	70	140	85	665	220	130	795	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	71	62	185	76	20	92	723	167	141	864	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	55	95	83	220	367	311	119	890	755	175	949	804
Arrive On Green	0.03	0.10	0.10	0.12	0.20	0.20	0.07	0.48	0.48	0.10	0.51	0.51
Sat Flow, veh/h	1781	914	798	1781	1870	1585	1781	1870	1585	1781	1870	1583
Grp Volume(v), veh/h	43	0	133	185	76	20	92	723	167	141	864	25
Grp Sat Flow(s),veh/h/ln	1781	0	1713	1781	1870	1585	1781	1870	1585	1781	1870	1583
Q Serve(g_s), s	2.4	0.0	7.6	10.2	3.4	1.0	5.1	33.3	6.2	7.8	42.6	0.8
Cycle Q Clear(g_c), s	2.4	0.0	7.6	10.2	3.4	1.0	5.1	33.3	6.2	7.8	42.6	0.8
Prop In Lane	1.00		0.47	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	55	0	178	220	367	311	119	890	755	175	949	804
V/C Ratio(X)	0.78	0.00	0.75	0.84	0.21	0.06	0.77	0.81	0.22	0.81	0.91	0.03
Avail Cap(c_a), veh/h	353	0	357	353	389	330	442	1206	1022	442	1206	1021
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.5	0.0	43.9	43.2	34.0	33.0	46.3	22.6	15.5	44.5	22.7	12.4
Incr Delay (d2), s/veh	20.4	0.0	6.2	9.6	0.3	0.1	10.0	3.1	0.1	8.4	8.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	3.5	5.1	1.6	0.4	2.6	14.4	2.2	3.8	19.5	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.9	0.0	50.1	52.8	34.2	33.1	56.3	25.7	15.6	52.9	31.5	12.4
LnGrp LOS	E	A	D	D	C	C	E	C	B	D	C	B
Approach Vol, veh/h		176			281			982			1030	
Approach Delay, s/veh		54.7			46.4			26.9			34.0	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.9	53.0	17.5	15.5	11.7	56.2	8.1	24.8
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	9.8	35.3	12.2	9.6	7.1	44.6	4.4	5.4
Green Ext Time (p_c), s	0.3	6.2	0.3	0.5	0.2	6.5	0.1	0.3

Intersection Summary		
HCM 6th Ctrl Delay		34.0
HCM 6th LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	10	595	10	0	5	410	940	5	0	1040	65
Future Volume (veh/h)	75	10	595	10	0	5	410	940	5	0	1040	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	11	0	11	0	1	446	1022	5	0	1130	34
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	183	14		197	3	11	494	2870	14	2	1661	739
Arrive On Green	0.09	0.08	0.00	0.09	0.00	0.08	0.28	0.79	0.79	0.00	0.47	0.47
Sat Flow, veh/h	1302	175	1585	1464	40	137	1781	3626	18	1781	3554	1580
Grp Volume(v), veh/h	93	0	0	12	0	0	446	501	526	0	1130	34
Grp Sat Flow(s),veh/h/ln	1476	0	1585	1641	0	0	1781	1777	1867	1781	1777	1580
Q Serve(g_s), s	4.6	0.0	0.0	0.0	0.0	0.0	20.6	7.0	7.0	0.0	21.2	1.0
Cycle Q Clear(g_c), s	5.2	0.0	0.0	0.5	0.0	0.0	20.6	7.0	7.0	0.0	21.2	1.0
Prop In Lane	0.88		1.00	0.92		0.08	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	214	0		230	0	0	494	1407	1478	2	1661	739
V/C Ratio(X)	0.43	0.00		0.05	0.00	0.00	0.90	0.36	0.36	0.00	0.68	0.05
Avail Cap(c_a), veh/h	440	0		534	0	0	1484	1439	1512	1484	2878	1279
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.0	0.0	0.0	35.9	0.0	0.0	29.7	2.6	2.6	0.0	17.7	12.3
Incr Delay (d2), s/veh	1.4	0.0	0.0	0.1	0.0	0.0	2.6	0.3	0.3	0.0	1.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.0	0.2	0.0	0.0	8.7	1.4	1.5	0.0	8.1	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.4	0.0	0.0	36.0	0.0	0.0	32.3	2.9	2.9	0.0	18.8	12.4
LnGrp LOS	D	A		D	A	A	C	A	A	A	B	B
Approach Vol, veh/h		93	A		12			1473			1164	
Approach Delay, s/veh		39.4			36.0			11.8			18.6	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	27.6	45.8		11.8	0.0	73.4		11.8				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0				
Max Q Clear Time (g_c+I1), s	22.6	23.2		2.5	0.0	9.0		7.2				
Green Ext Time (p_c), s	1.0	16.7		0.0	0.0	13.5		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			15.7									
HCM 6th LOS			B									
Notes												

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	5	145	15	5	20	105	1300	20	10	1615	70
Future Volume (veh/h)	65	5	145	15	5	20	105	1300	20	10	1615	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	71	5	5	16	5	1	114	1413	22	11	1755	48
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	207	12	141	127	31	4	144	2677	42	14	2398	1067
Arrive On Green	0.10	0.09	0.09	0.10	0.09	0.09	0.08	0.75	0.75	0.01	0.67	0.67
Sat Flow, veh/h	1435	129	1549	649	345	47	1781	3581	56	1781	3554	1582
Grp Volume(v), veh/h	76	0	5	22	0	0	114	701	734	11	1755	48
Grp Sat Flow(s),veh/h/ln	1564	0	1549	1041	0	0	1781	1777	1860	1781	1777	1582
Q Serve(g_s), s	0.0	0.0	0.3	0.3	0.0	0.0	5.7	15.0	15.0	0.6	29.0	0.9
Cycle Q Clear(g_c), s	3.7	0.0	0.3	4.0	0.0	0.0	5.7	15.0	15.0	0.6	29.0	0.9
Prop In Lane	0.93		1.00	0.73		0.05	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	236	0	141	174	0	0	144	1328	1391	14	2398	1067
V/C Ratio(X)	0.32	0.00	0.04	0.13	0.00	0.00	0.79	0.53	0.53	0.77	0.73	0.04
Avail Cap(c_a), veh/h	463	0	390	412	0	0	410	1674	1752	215	2958	1317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.9	0.0	37.8	38.5	0.0	0.0	41.2	4.8	4.8	45.2	9.5	5.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.1	0.0	0.0	3.7	0.7	0.7	27.1	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.1	0.5	0.0	0.0	2.6	4.1	4.3	0.4	9.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.2	0.0	37.9	38.6	0.0	0.0	44.9	5.5	5.5	72.3	10.7	5.0
LnGrp LOS	D	A	D	D	A	A	D	A	A	E	B	A
Approach Vol, veh/h		81			22			1549			1814	
Approach Delay, s/veh		39.1			38.6			8.4			10.9	
Approach LOS		D			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.4	66.6		13.3	4.7	73.2		13.3				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	7.7	31.0		6.0	2.6	17.0		5.7				
Green Ext Time (p_c), s	0.1	30.6		0.0	0.0	25.5		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			10.6
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	180	45	5	40	110	1350	50	35	1675	85
Future Volume (veh/h)	75	5	180	45	5	40	110	1350	50	35	1675	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	11	49	5	3	120	1467	34	38	1821	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	252	13	213	186	148	89	152	2372	1058	60	2189	976
Arrive On Green	0.15	0.14	0.14	0.14	0.14	0.14	0.09	0.67	0.67	0.03	0.62	0.62
Sat Flow, veh/h	1304	97	1578	1392	1093	656	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	87	0	11	49	0	8	120	1467	34	38	1821	54
Grp Sat Flow(s),veh/h/ln	1400	0	1578	1392	0	1749	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.0	0.0	0.6	3.1	0.0	0.4	6.1	21.4	0.7	1.9	37.0	1.2
Cycle Q Clear(g_c), s	5.3	0.0	0.6	8.4	0.0	0.4	6.1	21.4	0.7	1.9	37.0	1.2
Prop In Lane	0.94		1.00	1.00		0.38	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	281	0	213	186	0	236	152	2372	1058	60	2189	976
V/C Ratio(X)	0.31	0.00	0.05	0.26	0.00	0.03	0.79	0.62	0.03	0.63	0.83	0.06
Avail Cap(c_a), veh/h	461	0	413	362	0	458	408	2674	1193	233	2325	1037
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.2	0.0	34.5	40.5	0.0	34.5	41.1	8.6	5.2	43.7	13.9	7.0
Incr Delay (d2), s/veh	0.6	0.0	0.1	0.7	0.0	0.1	3.4	0.6	0.0	4.0	3.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.2	1.1	0.0	0.2	2.7	6.9	0.2	0.9	13.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.9	0.0	34.6	41.2	0.0	34.5	44.5	9.3	5.2	47.7	16.9	7.1
LnGrp LOS	D	A	C	D	A	C	D	A	A	D	B	A
Approach Vol, veh/h		98			57			1621			1913	
Approach Delay, s/veh		36.6			40.3			11.8			17.2	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.8	62.5		17.4	7.1	67.2		17.4
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	60.0		24.0	12.0	69.0		24.0
Max Q Clear Time (g_c+I1), s	8.1	39.0		10.4	3.9	23.4		7.3
Green Ext Time (p_c), s	0.2	17.5		0.1	0.0	24.2		0.3

Intersection Summary			
HCM 6th Ctrl Delay			15.7
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	345	5	585	15	5	20	445	1360	15	60	1570	245
Future Volume (veh/h)	345	5	585	15	5	20	445	1360	15	60	1570	245
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	379	0	436	16	5	7	484	1478	16	65	1707	221
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	521	0	967	36	11	16	566	2443	26	101	2030	1128
Arrive On Green	0.15	0.00	0.14	0.04	0.04	0.02	0.16	0.68	0.67	0.06	0.57	0.57
Sat Flow, veh/h	3563	0	3170	996	311	436	3456	3601	39	1781	3554	1584
Grp Volume(v), veh/h	379	0	436	28	0	0	484	729	765	65	1707	221
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1742	0	0	1728	1777	1863	1781	1777	1584
Q Serve(g_s), s	19.6	0.0	21.4	3.0	0.0	0.0	26.3	43.2	43.3	6.9	76.6	9.0
Cycle Q Clear(g_c), s	19.6	0.0	21.4	3.0	0.0	0.0	26.3	43.2	43.3	6.9	76.6	9.0
Prop In Lane	1.00		1.00	0.57		0.25	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	521	0	967	63	0	0	566	1205	1264	101	2030	1128
V/C Ratio(X)	0.73	0.00	0.45	0.45	0.00	0.00	0.85	0.60	0.61	0.64	0.84	0.20
Avail Cap(c_a), veh/h	627	0	1061	280	0	0	1038	1785	1872	138	2778	1462
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	78.8	0.0	54.1	91.6	0.0	0.0	78.5	16.9	17.0	89.2	34.2	9.3
Incr Delay (d2), s/veh	2.5	0.0	0.1	1.8	0.0	0.0	1.5	0.7	0.7	2.6	2.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.3	0.0	8.8	1.4	0.0	0.0	11.9	17.7	18.6	3.3	33.3	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	81.2	0.0	54.2	93.4	0.0	0.0	80.0	17.6	17.6	91.8	36.3	9.4
LnGrp LOS	F	A	D	F	A	A	E	B	B	F	D	A
Approach Vol, veh/h		815			28			1978			1993	
Approach Delay, s/veh		66.8			93.4			32.9			35.1	
Approach LOS		E			F			C			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	35.6	114.3		10.9	14.9	135.0		32.2				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0				
Max Q Clear Time (g_c+I1), s	28.3	78.6		5.0	8.9	45.3		23.4				
Green Ext Time (p_c), s	1.3	29.7		0.0	0.0	17.9		1.8				

Intersection Summary		
HCM 6th Ctrl Delay		39.9
HCM 6th LOS		D

Notes
User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	135	5	70	5	1700	90	95	2155	10
Future Volume (veh/h)	5	0	5	135	5	70	5	1700	90	95	2155	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1848	95	103	2342	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2443	125	129	2816	13
Arrive On Green	0.13	0.00	0.12	0.13	0.13	0.12	0.01	0.94	0.93	0.07	0.78	0.77
Sat Flow, veh/h	1144	37	236	1416	858	858	1781	3440	175	1781	3627	17
Grp Volume(v), veh/h	6	0	0	147	0	10	5	947	996	103	1146	1207
Grp Sat Flow(s),veh/h/ln	1418	0	0	1416	0	1716	1781	1777	1839	1781	1777	1867
Q Serve(g_s), s	0.0	0.0	0.0	12.3	0.0	0.7	0.4	13.2	14.2	7.4	52.9	53.1
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	13.2	14.2	7.4	52.9	53.1
Prop In Lane	0.83		0.17	1.00		0.50	1.00		0.10	1.00		0.01
Lane Grp Cap(c), veh/h	228	0	0	234	0	215	11	1262	1306	129	1379	1450
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.75	0.76	0.80	0.83	0.83
Avail Cap(c_a), veh/h	313	0	0	319	0	317	151	1262	1306	151	1379	1450
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	0.0	0.0	55.4	0.0	50.3	64.2	1.4	1.5	59.3	9.2	9.2
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.7	0.0	0.1	6.6	2.8	2.9	19.0	6.0	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	4.9	0.0	0.3	0.2	2.5	2.6	4.0	18.3	19.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.4	70.8	4.2	4.4	78.3	15.1	14.9
LnGrp LOS	D	A	A	E	A	D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1948			2456	
Approach Delay, s/veh		50.0			57.6			4.5			17.7	
Approach LOS		D			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.8	104.9		20.3	13.4	96.3		20.3				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	82.0		23.0	11.0	82.0		23.0				
Max Q Clear Time (g_c+I1), s	2.4	55.1		15.0	9.4	16.2		2.7				
Green Ext Time (p_c), s	0.0	25.2		0.3	0.0	44.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			13.5									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	5	15	65	5	15	15	1620	15	10	1910	280
Future Volume (veh/h)	150	5	15	65	5	15	15	1620	15	10	1910	280
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	163	5	14	71	5	9	16	1761	16	11	2076	234
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	244	6	16	244	19	25	19	2733	25	13	2680	1195
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.01	0.76	0.75	0.01	0.75	0.75
Sat Flow, veh/h	1344	41	115	1352	130	176	1781	3609	33	1781	3554	1584
Grp Volume(v), veh/h	182	0	0	85	0	0	16	866	911	11	2076	234
Grp Sat Flow(s),veh/h/ln	1501	0	0	1658	0	0	1781	1777	1864	1781	1777	1584
Q Serve(g_s), s	9.4	0.0	0.0	0.0	0.0	0.0	1.2	30.0	30.1	0.8	44.9	5.5
Cycle Q Clear(g_c), s	15.2	0.0	0.0	5.8	0.0	0.0	1.2	30.0	30.1	0.8	44.9	5.5
Prop In Lane	0.90		0.08	0.84		0.11	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	267	0	0	288	0	0	19	1346	1412	13	2680	1195
V/C Ratio(X)	0.68	0.00	0.00	0.30	0.00	0.00	0.84	0.64	0.65	0.82	0.77	0.20
Avail Cap(c_a), veh/h	348	0	0	370	0	0	110	1346	1412	110	2680	1195
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.57	0.57	0.57	0.41	0.41	0.41
Uniform Delay (d), s/veh	54.0	0.0	0.0	50.3	0.0	0.0	64.2	7.5	7.5	64.4	9.4	4.6
Incr Delay (d2), s/veh	3.6	0.0	0.0	0.6	0.0	0.0	18.1	1.4	1.3	16.3	0.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.0	0.0	2.6	0.0	0.0	0.6	10.1	10.6	0.4	14.8	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.6	0.0	0.0	50.9	0.0	0.0	82.3	8.8	8.8	80.7	10.4	4.8
LnGrp LOS	E	A	A	D	A	A	F	A	A	F	B	A
Approach Vol, veh/h		182			85			1793			2321	
Approach Delay, s/veh		57.6			50.9			9.5			10.1	
Approach LOS		E			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	102.0		22.6	5.0	102.5		22.6				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	83.0		25.0	8.0	83.0		25.0				
Max Q Clear Time (g_c+I1), s	3.2	46.9		7.8	2.8	32.1		17.2				
Green Ext Time (p_c), s	0.0	33.9		0.2	0.0	39.9		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		12.6
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	20	50	90	20	20	60	1635	60	15	1910	140
Future Volume (veh/h)	210	20	50	90	20	20	60	1635	60	15	1910	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	228	22	7	98	22	2	65	1777	63	16	2076	148
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	313	268	85	308	333	30	83	2450	86	19	2236	157
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.19	0.06	0.93	0.92	0.01	0.88	0.87
Sat Flow, veh/h	1381	1358	432	1375	1688	153	1781	3501	123	1781	3367	237
Grp Volume(v), veh/h	228	0	29	98	0	24	65	898	942	16	1083	1141
Grp Sat Flow(s),veh/h/ln	1381	0	1790	1375	0	1842	1781	1777	1847	1781	1777	1827
Q Serve(g_s), s	20.9	0.0	1.7	8.1	0.0	1.4	4.7	13.9	14.4	1.2	49.1	56.1
Cycle Q Clear(g_c), s	22.3	0.0	1.7	9.9	0.0	1.4	4.7	13.9	14.4	1.2	49.1	56.1
Prop In Lane	1.00		0.24	1.00		0.08	1.00		0.07	1.00		0.13
Lane Grp Cap(c), veh/h	313	0	353	308	0	363	83	1243	1293	19	1180	1213
V/C Ratio(X)	0.73	0.00	0.08	0.32	0.00	0.07	0.78	0.72	0.73	0.84	0.92	0.94
Avail Cap(c_a), veh/h	349	0	399	344	0	411	110	1243	1293	110	1180	1213
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.50	0.50	0.50
Uniform Delay (d), s/veh	51.5	0.0	42.6	46.6	0.0	42.5	60.3	1.8	1.9	64.0	5.4	5.9
Incr Delay (d2), s/veh	6.7	0.0	0.1	0.6	0.0	0.1	1.8	0.3	0.3	16.2	7.2	8.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.9	0.0	0.8	2.9	0.0	0.6	2.1	1.9	2.0	0.6	6.7	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.2	0.0	42.7	47.2	0.0	42.6	62.1	2.2	2.2	80.2	12.6	14.7
LnGrp LOS	E	A	D	D	A	D	E	A	A	F	B	B
Approach Vol, veh/h		257			122			1905			2240	
Approach Delay, s/veh		56.4			46.3			4.2			14.1	
Approach LOS		E			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	90.3		29.6	5.4	95.0		29.6				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	80.0		28.0	8.0	80.0		28.0				
Max Q Clear Time (g_c+I1), s	6.7	58.1		11.9	3.2	16.4		24.3				
Green Ext Time (p_c), s	0.0	20.3		0.4	0.0	39.8		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		13.2
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	65	70	195	90	875	50	790	190	555	1260	80
Future Volume (veh/h)	25	65	70	195	90	875	50	790	190	555	1260	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.94	0.96		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	27	71	8	212	98	0	54	859	150	603	1370	84
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	191	207	293	447		70	906	759	638	2141	131
Arrive On Green	0.14	0.14	0.14	0.07	0.24	0.00	0.04	0.48	0.48	0.25	0.84	0.83
Sat Flow, veh/h	327	1374	1493	1781	1870	1585	1781	1870	1567	3456	3401	208
Grp Volume(v), veh/h	98	0	8	212	98	0	54	859	150	603	714	740
Grp Sat Flow(s),veh/h/ln	1701	0	1493	1781	1870	1585	1781	1870	1567	1728	1777	1833
Q Serve(g_s), s	1.4	0.0	0.6	9.0	5.5	0.0	3.9	57.0	7.1	22.3	18.3	18.6
Cycle Q Clear(g_c), s	6.4	0.0	0.6	9.0	5.5	0.0	3.9	57.0	7.1	22.3	18.3	18.6
Prop In Lane	0.28		1.00	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	272	0	207	293	447		70	906	759	638	1118	1153
V/C Ratio(X)	0.36	0.00	0.04	0.72	0.22		0.77	0.95	0.20	0.95	0.64	0.64
Avail Cap(c_a), veh/h	334	0	264	293	518		329	906	759	638	1118	1153
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.24	0.24	0.24
Uniform Delay (d), s/veh	50.9	0.0	48.5	47.8	39.7	0.0	61.9	32.0	19.1	48.4	5.4	5.5
Incr Delay (d2), s/veh	0.8	0.0	0.1	8.5	0.2	0.0	5.2	16.8	0.5	7.9	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.2	3.0	2.6	0.0	1.9	28.9	2.7	9.8	4.1	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	0.0	48.5	56.3	40.0	0.0	67.0	48.8	19.6	56.3	6.1	6.1
LnGrp LOS	D	A	D	E	D		E	D	B	E	A	A
Approach Vol, veh/h		106			310	A		1063			2057	
Approach Delay, s/veh		51.4			51.1			45.6			20.8	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.1	85.8	13.0	22.1	28.0	66.9		35.1
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	24.0	57.0	8.0	22.0	24.0	57.0		35.0
Max Q Clear Time (g_c+I1), s	15.9	20.6	11.0	8.4	24.3	59.0		7.5
Green Ext Time (p_c), s	0.1	20.0	0.0	0.3	0.0	0.0		0.3

Intersection Summary	
HCM 6th Ctrl Delay	31.9
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	20	815	35	0	970
Future Vol, veh/h	0	20	815	35	0	970
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	22	886	38	0	1054

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	886	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	343	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	343	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	343	-
HCM Lane V/C Ratio	-	-	0.063	-
HCM Control Delay (s)	-	-	16.2	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	80	50	935	90	50	1010
Future Vol, veh/h	80	50	935	90	50	1010
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	54	1016	98	54	1098

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2222	1016	0	0	1114	0
Stage 1	1016	-	-	-	-	-
Stage 2	1206	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 48	289	-	-	627	-
Stage 1	350	-	-	-	-	-
Stage 2	283	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 44	289	-	-	627	-
Mov Cap-2 Maneuver	141	-	-	-	-	-
Stage 1	320	-	-	-	-	-
Stage 2	283	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	47.7	0	0.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	141	289	627	-
HCM Lane V/C Ratio	-	-	0.617	0.188	0.087	-
HCM Control Delay (s)	-	-	64.8	20.3	11.3	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	3.3	0.7	0.3	-

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

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	155	210	0	140	0	195	0	0	0	0	45
Future Vol, veh/h	50	155	210	0	140	0	195	0	0	0	0	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	168	228	0	152	0	212	0	0	0	0	49

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	152	0	0	396	0	0	567	542	198	344	656	152
Stage 1	-	-	-	-	-	-	390	390	-	152	152	-
Stage 2	-	-	-	-	-	-	177	152	-	192	504	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1428	-	-	1161	-	-	420	447	811	598	384	894
Stage 1	-	-	-	-	-	-	606	607	-	850	771	-
Stage 2	-	-	-	-	-	-	824	771	-	792	540	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1428	-	-	1161	-	-	386	430	811	581	369	894
Mov Cap-2 Maneuver	-	-	-	-	-	-	386	430	-	581	369	-
Stage 1	-	-	-	-	-	-	583	584	-	818	771	-
Stage 2	-	-	-	-	-	-	779	771	-	762	519	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0	25.1	9.3
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	386	1428	-	-	1161	-	-	894
HCM Lane V/C Ratio	0.549	0.038	-	-	-	-	-	0.055
HCM Control Delay (s)	25.1	7.6	-	-	0	-	-	9.3
HCM Lane LOS	D	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	3.2	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	20	75	0	25	0	65	0	0	0	0	55
Future Vol, veh/h	60	20	75	0	25	0	65	0	0	0	0	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	22	82	0	27	0	71	0	0	0	0	60

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	27	0	0	104	0	0	250	220	52	168	261	27
Stage 1	-	-	-	-	-	-	193	193	-	27	27	-
Stage 2	-	-	-	-	-	-	57	27	-	141	234	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1586	-	-	1487	-	-	693	678	1005	788	643	1048
Stage 1	-	-	-	-	-	-	791	740	-	990	872	-
Stage 2	-	-	-	-	-	-	954	872	-	848	711	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1586	-	-	1487	-	-	633	650	1005	764	617	1048
Mov Cap-2 Maneuver	-	-	-	-	-	-	633	650	-	764	617	-
Stage 1	-	-	-	-	-	-	759	710	-	949	872	-
Stage 2	-	-	-	-	-	-	900	872	-	813	682	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.9	0	11.4	8.6
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	633	1586	-	-	1487	-	-	1048
HCM Lane V/C Ratio	0.112	0.041	-	-	-	-	-	0.057
HCM Control Delay (s)	11.4	7.4	-	-	0	-	-	8.6
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	65	40	0	55	0	45	0	0	0	0	30
Future Vol, veh/h	35	65	40	0	55	0	45	0	0	0	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	71	43	0	60	0	49	0	0	0	0	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	60	0	0	114	0	0	246	229	93	229	250	60
Stage 1	-	-	-	-	-	-	169	169	-	60	60	-
Stage 2	-	-	-	-	-	-	77	60	-	169	190	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1544	-	-	1475	-	-	708	671	964	726	653	1005
Stage 1	-	-	-	-	-	-	833	759	-	951	845	-
Stage 2	-	-	-	-	-	-	932	845	-	833	743	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1544	-	-	1475	-	-	671	654	964	711	636	1005
Mov Cap-2 Maneuver	-	-	-	-	-	-	671	654	-	711	636	-
Stage 1	-	-	-	-	-	-	811	739	-	926	845	-
Stage 2	-	-	-	-	-	-	902	845	-	811	724	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0	10.8	8.7
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	671	1544	-	-	1475	-	-	1005
HCM Lane V/C Ratio	0.073	0.025	-	-	-	-	-	0.032
HCM Control Delay (s)	10.8	7.4	0	-	0	-	-	8.7
HCM Lane LOS	B	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.1

Intersection						
Int Delay, s/veh	2.1					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	35	35	0	30	30	0
Future Vol, veh/h	35	35	0	30	30	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	38	0	33	33	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	76	0	90	57
Stage 1	-	-	-	-	57	-
Stage 2	-	-	-	-	33	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1523	-	910	1009
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	989	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1523	-	910	1009
Mov Cap-2 Maneuver	-	-	-	-	910	-
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	989	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	910	-	-	1523	-
HCM Lane V/C Ratio	0.036	-	-	-	-
HCM Control Delay (s)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2035 Scenario 4 AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	45	315	95	50	20	260	295	120	10	215	30
Future Volume (veh/h)	50	45	315	95	50	20	260	295	120	10	215	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	49	41	103	54	10	283	321	67	11	234	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	235	169	264	325	257	48	371	822	697	15	449	380
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.21	0.44	0.44	0.01	0.24	0.24
Sat Flow, veh/h	614	1006	1571	1298	1532	284	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	103	0	41	103	0	64	283	321	67	11	234	9
Grp Sat Flow(s),veh/h/ln	1620	0	1571	1298	0	1816	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.4	0.0	0.9	3.2	0.0	1.3	6.2	4.8	1.0	0.3	4.5	0.2
Cycle Q Clear(g_c), s	2.1	0.0	0.9	5.3	0.0	1.3	6.2	4.8	1.0	0.3	4.5	0.2
Prop In Lane	0.52		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	404	0	264	325	0	305	371	822	697	15	449	380
V/C Ratio(X)	0.26	0.00	0.16	0.32	0.00	0.21	0.76	0.39	0.10	0.72	0.52	0.02
Avail Cap(c_a), veh/h	1032	0	904	855	0	1046	1282	3545	3004	641	2872	2434
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.3	0.0	14.8	17.6	0.0	15.0	15.5	7.9	6.8	20.6	13.8	12.1
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.6	0.0	0.3	3.3	0.6	0.1	47.0	2.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.3	0.9	0.0	0.5	2.4	1.5	0.3	0.3	1.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.6	0.0	15.1	18.2	0.0	15.3	18.8	8.5	7.0	67.6	15.8	12.2
LnGrp LOS	B	A	B	B	A	B	B	A	A	E	B	B
Approach Vol, veh/h		144			167			671			254	
Approach Delay, s/veh		15.5			17.1			12.7			17.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	24.3		12.0	13.7	16.0		12.0				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.3	6.8		4.1	8.2	6.5		7.3				
Green Ext Time (p_c), s	0.0	4.9		0.6	0.8	3.0		0.6				

Intersection Summary			
HCM 6th Ctrl Delay			14.7
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	190	100	20	15	165	650	20	10	645	65
Future Volume (veh/h)	60	5	190	100	20	15	165	650	20	10	645	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	5	19	109	22	2	179	707	0	11	701	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	356	23	308	321	336	31	361	989		313	843	709
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.09	0.53	0.00	0.01	0.45	0.45
Sat Flow, veh/h	1214	117	1545	1358	1685	153	1781	1870	1585	1781	1870	1574
Grp Volume(v), veh/h	70	0	19	109	0	24	179	707	0	11	701	31
Grp Sat Flow(s),veh/h/ln	1332	0	1545	1358	0	1838	1781	1870	1585	1781	1870	1574
Q Serve(g_s), s	2.4	0.0	0.6	4.5	0.0	0.6	2.9	17.4	0.0	0.2	20.0	0.7
Cycle Q Clear(g_c), s	3.1	0.0	0.6	7.6	0.0	0.6	2.9	17.4	0.0	0.2	20.0	0.7
Prop In Lane	0.93		1.00	1.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	380	0	308	321	0	366	361	989		313	843	709
V/C Ratio(X)	0.18	0.00	0.06	0.34	0.00	0.07	0.50	0.71		0.04	0.83	0.04
Avail Cap(c_a), veh/h	673	0	636	609	0	757	646	1571		738	1571	1323
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.8	0.0	19.7	23.9	0.0	19.7	11.5	10.8	0.0	10.3	14.7	9.3
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.6	0.0	0.1	1.1	1.0	0.0	0.0	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.2	1.4	0.0	0.3	0.9	5.7	0.0	0.1	7.4	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.1	0.0	19.8	24.5	0.0	19.8	12.6	11.8	0.0	10.3	16.9	9.4
LnGrp LOS	C	A	B	C	A	B	B	B		B	B	A
Approach Vol, veh/h		89			133			886	A		743	
Approach Delay, s/veh		20.8			23.7			12.0			16.5	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	38.1		17.1	10.3	33.4		17.1
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	19.4		5.1	4.9	22.0		9.6
Green Ext Time (p_c), s	0.0	5.4		0.4	0.3	5.4		0.3

Intersection Summary		
HCM 6th Ctrl Delay		15.0
HCM 6th LOS		B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	30	125	225	60	200	60	570	200	185	700	30
Future Volume (veh/h)	40	30	125	225	60	200	60	570	200	185	700	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	33	26	245	65	33	65	620	131	201	761	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	55	110	87	282	453	382	85	712	604	240	875	742
Arrive On Green	0.03	0.11	0.11	0.16	0.24	0.24	0.05	0.38	0.38	0.13	0.47	0.47
Sat Flow, veh/h	1781	961	757	1781	1870	1577	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	43	0	59	245	65	33	65	620	131	201	761	15
Grp Sat Flow(s),veh/h/ln	1781	0	1718	1781	1870	1577	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.3	0.0	3.0	12.7	2.6	1.5	3.4	29.1	5.3	10.4	34.6	0.5
Cycle Q Clear(g_c), s	2.3	0.0	3.0	12.7	2.6	1.5	3.4	29.1	5.3	10.4	34.6	0.5
Prop In Lane	1.00		0.44	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	55	0	197	282	453	382	85	712	604	240	875	742
V/C Ratio(X)	0.78	0.00	0.30	0.87	0.14	0.09	0.76	0.87	0.22	0.84	0.87	0.02
Avail Cap(c_a), veh/h	376	0	381	376	453	382	470	1282	1087	470	1282	1087
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.6	0.0	38.5	38.9	28.2	27.8	44.6	27.2	19.8	40.0	22.6	13.5
Incr Delay (d2), s/veh	20.7	0.0	0.8	15.1	0.1	0.1	13.1	3.5	0.2	7.5	4.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	1.3	6.7	1.2	0.6	1.8	12.9	1.9	5.0	15.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.3	0.0	39.3	54.1	28.3	27.9	57.7	30.6	20.0	47.5	27.2	13.6
LnGrp LOS	E	A	D	D	C	C	E	C	B	D	C	B
Approach Vol, veh/h		102			343			816			977	
Approach Delay, s/veh		50.7			46.7			31.1			31.2	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.8	41.1	20.0	15.9	9.5	49.4	7.9	28.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	12.4	31.1	14.7	5.0	5.4	36.6	4.3	4.6
Green Ext Time (p_c), s	0.4	5.0	0.3	0.2	0.1	6.0	0.1	0.3

Intersection Summary	
HCM 6th Ctrl Delay	34.4
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	10	480	20	5	0	315	825	45	15	1045	15
Future Volume (veh/h)	45	10	480	20	5	0	315	825	45	15	1045	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	49	11	0	22	5	0	342	897	48	16	1136	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	175	21		173	28	0	397	2444	131	20	1781	794
Arrive On Green	0.08	0.07	0.00	0.08	0.07	0.00	0.22	0.71	0.71	0.01	0.50	0.50
Sat Flow, veh/h	1225	299	1585	1198	414	0	1781	3431	184	1781	3554	1585
Grp Volume(v), veh/h	60	0	0	27	0	0	342	465	480	16	1136	6
Grp Sat Flow(s),veh/h/ln	1524	0	1585	1612	0	0	1781	1777	1837	1781	1777	1585
Q Serve(g_s), s	1.6	0.0	0.0	0.0	0.0	0.0	13.4	7.4	7.4	0.6	17.0	0.1
Cycle Q Clear(g_c), s	2.6	0.0	0.0	1.0	0.0	0.0	13.4	7.4	7.4	0.6	17.0	0.1
Prop In Lane	0.82		1.00	0.81		0.00	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	216	0		223	0	0	397	1266	1309	20	1781	794
V/C Ratio(X)	0.28	0.00		0.12	0.00	0.00	0.86	0.37	0.37	0.79	0.64	0.01
Avail Cap(c_a), veh/h	501	0		629	0	0	1626	1843	1905	1626	3685	1644
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.1	0.0	0.0	31.4	0.0	0.0	27.0	4.0	4.0	35.7	13.2	9.0
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.2	0.0	0.0	2.2	0.4	0.4	21.5	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	0.4	0.0	0.0	5.5	1.8	1.9	0.4	6.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.8	0.0	0.0	31.7	0.0	0.0	29.2	4.4	4.4	57.2	14.0	9.0
LnGrp LOS	C	A		C	A	A	C	A	A	E	B	A
Approach Vol, veh/h		60	A		27			1287			1158	
Approach Delay, s/veh		32.8			31.7			11.0			14.6	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.1	42.2		10.0	4.8	57.5		10.0
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	66.0	75.0		25.0	66.0	75.0		19.0
Max Q Clear Time (g_c+I1), s	15.4	19.0		3.0	2.6	9.4		4.6
Green Ext Time (p_c), s	0.8	17.3		0.0	0.0	11.9		0.1

Intersection Summary		
HCM 6th Ctrl Delay		13.4
HCM 6th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	0	70	10	5	10	135	1260	20	20	1535	75
Future Volume (veh/h)	35	0	70	10	5	10	135	1260	20	20	1535	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	0	1	11	5	1	147	1370	22	22	1668	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	156	0	70	100	21	3	183	2761	44	26	2429	1083
Arrive On Green	0.06	0.00	0.04	0.06	0.04	0.04	0.10	0.77	0.77	0.01	0.68	0.68
Sat Flow, veh/h	1567	0	1585	629	481	69	1781	3579	57	1781	3554	1585
Grp Volume(v), veh/h	38	0	1	17	0	0	147	680	712	22	1668	54
Grp Sat Flow(s),veh/h/ln	1567	0	1585	1179	0	0	1781	1777	1860	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	0.3	0.0	0.0	6.6	11.6	11.7	1.0	23.0	0.9
Cycle Q Clear(g_c), s	1.7	0.0	0.0	2.0	0.0	0.0	6.6	11.6	11.7	1.0	23.0	0.9
Prop In Lane	1.00		1.00	0.65		0.06	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	175	0	70	138	0	0	183	1371	1435	26	2429	1083
V/C Ratio(X)	0.22	0.00	0.01	0.12	0.00	0.00	0.81	0.50	0.50	0.85	0.69	0.05
Avail Cap(c_a), veh/h	508	0	443	500	0	0	455	1858	1945	238	3284	1465
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.9	0.0	37.6	38.0	0.0	0.0	36.1	3.5	3.5	40.4	7.8	4.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.2	0.6	0.6	23.7	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.3	0.0	0.0	2.9	2.6	2.7	0.6	6.7	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.1	0.0	37.6	38.1	0.0	0.0	39.3	4.1	4.1	64.2	8.5	4.3
LnGrp LOS	D	A	D	D	A	A	D	A	A	E	A	A
Approach Vol, veh/h		39			17			1539			1744	
Approach Delay, s/veh		38.1			38.1			7.4			9.1	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.4	61.2		8.6	5.2	68.4		8.6				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	8.6	25.0		4.0	3.0	13.7		3.7				
Green Ext Time (p_c), s	0.1	31.2		0.0	0.0	24.3		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		8.8
HCM 6th LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	5	35	40	15	55	110	1380	60	35	1465	50
Future Volume (veh/h)	65	5	35	40	15	55	110	1380	60	35	1465	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	71	5	1	43	16	1	120	1500	48	38	1592	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	171	11	164	110	181	11	142	2743	1223	49	2558	1141
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.08	0.77	0.77	0.03	0.72	0.72
Sat Flow, veh/h	1218	102	1580	1407	1742	109	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	76	0	1	43	0	17	120	1500	48	38	1592	40
Grp Sat Flow(s),veh/h/ln	1320	0	1580	1407	0	1850	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	7.8	0.0	0.1	4.7	0.0	1.3	10.3	25.8	1.1	3.3	35.2	1.1
Cycle Q Clear(g_c), s	9.0	0.0	0.1	13.7	0.0	1.3	10.3	25.8	1.1	3.3	35.2	1.1
Prop In Lane	0.93		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	182	0	164	110	0	192	142	2743	1223	49	2558	1141
V/C Ratio(X)	0.42	0.00	0.01	0.39	0.00	0.09	0.84	0.55	0.04	0.77	0.62	0.04
Avail Cap(c_a), veh/h	254	0	245	182	0	287	241	2743	1223	241	2558	1141
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.8	0.0	62.3	72.8	0.0	62.8	70.4	7.0	4.2	74.9	11.0	6.2
Incr Delay (d2), s/veh	1.5	0.0	0.0	2.2	0.0	0.2	3.7	0.6	0.0	9.1	1.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.0	1.8	0.0	0.6	4.8	8.9	0.3	1.6	13.3	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.3	0.0	62.3	75.1	0.0	63.0	74.1	7.5	4.2	84.0	12.2	6.3
LnGrp LOS	E	A	E	E	A	E	E	A	A	F	B	A
Approach Vol, veh/h		77			60			1668			1670	
Approach Delay, s/veh		68.3			71.6			12.2			13.7	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	117.6		21.1	8.3	125.6		21.1
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	37.2		15.7	5.3	27.8		11.0
Green Ext Time (p_c), s	0.1	31.0		0.1	0.0	30.3		0.2

Intersection Summary			
HCM 6th Ctrl Delay			15.2
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	10	235	10	10	15	460	1435	15	90	1375	130
Future Volume (veh/h)	160	10	235	10	10	15	460	1435	15	90	1375	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	182	0	68	11	11	6	500	1560	16	98	1495	107
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	328	0	829	50	50	27	621	2273	23	149	1901	979
Arrive On Green	0.09	0.00	0.08	0.07	0.07	0.05	0.18	0.63	0.62	0.08	0.54	0.54
Sat Flow, veh/h	3563	0	3076	690	690	376	3456	3604	37	1781	3554	1580
Grp Volume(v), veh/h	182	0	68	28	0	0	500	769	807	98	1495	107
Grp Sat Flow(s),veh/h/ln	1781	0	1538	1755	0	0	1728	1777	1864	1781	1777	1580
Q Serve(g_s), s	6.5	0.0	2.2	2.0	0.0	0.0	18.4	37.3	37.4	7.1	44.7	3.7
Cycle Q Clear(g_c), s	6.5	0.0	2.2	2.0	0.0	0.0	18.4	37.3	37.4	7.1	44.7	3.7
Prop In Lane	1.00		1.00	0.39		0.21	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	328	0	829	127	0	0	621	1121	1175	149	1901	979
V/C Ratio(X)	0.56	0.00	0.08	0.22	0.00	0.00	0.81	0.69	0.69	0.66	0.79	0.11
Avail Cap(c_a), veh/h	915	0	1336	411	0	0	1514	2603	2731	202	4053	1935
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.5	0.0	36.7	58.2	0.0	0.0	52.1	15.9	15.9	58.8	24.7	10.3
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.9	0.0	0.0	1.0	1.1	1.0	1.8	1.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.8	0.9	0.0	0.0	8.0	14.5	15.3	3.2	18.3	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	36.7	59.0	0.0	0.0	53.0	17.0	17.0	60.6	25.8	10.4
LnGrp LOS	E	A	D	E	A	A	D	B	B	E	C	B
Approach Vol, veh/h		250			28			2076			1700	
Approach Delay, s/veh		52.3			59.0			25.7			26.8	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	27.8	74.8		13.6	15.1	87.5		16.2
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	20.4	46.7		4.0	9.1	39.4		8.5
Green Ext Time (p_c), s	1.4	22.1		0.1	0.1	20.4		0.7

Intersection Summary	
HCM 6th Ctrl Delay	28.0
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	60	0	45	5	1930	90	35	1570	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1930	90	35	1570	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.98		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	2098	96	38	1707	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	177	0	138	11	2732	124	64	2975	9
Arrive On Green	0.09	0.09	0.08	0.09	0.00	0.08	0.01	0.79	0.78	0.04	0.82	0.81
Sat Flow, veh/h	586	899	148	1378	0	1545	1781	3461	157	1781	3635	11
Grp Volume(v), veh/h	11	0	0	65	0	1	5	1069	1125	38	834	878
Grp Sat Flow(s),veh/h/ln	1633	0	0	1378	0	1545	1781	1777	1842	1781	1777	1868
Q Serve(g_s), s	0.0	0.0	0.0	5.3	0.0	0.1	0.4	44.6	46.4	2.9	22.5	22.5
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	44.6	46.4	2.9	22.5	22.5
Prop In Lane	0.45		0.09	1.00		1.00	1.00		0.09	1.00		0.01
Lane Grp Cap(c), veh/h	183	0	0	177	0	138	11	1402	1453	64	1455	1530
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.44	0.76	0.77	0.60	0.57	0.57
Avail Cap(c_a), veh/h	313	0	0	290	0	265	102	1402	1453	102	1455	1530
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.53	0.53	0.53	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.4	0.0	0.0	60.7	0.0	58.5	69.3	7.8	8.0	66.5	4.3	4.3
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	5.3	2.1	2.2	3.3	1.7	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.3	0.0	0.0	0.2	14.5	15.7	1.4	6.9	7.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	74.7	9.9	10.2	69.8	6.0	5.9
LnGrp LOS	E	A	A	E	A	E	E	A	B	E	A	A
Approach Vol, veh/h		11			66			2199			1750	
Approach Delay, s/veh		58.6			62.0			10.2			7.3	
Approach LOS		E			E			B			A	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	4.9	118.6	16.5	9.0	114.5	16.5
Change Period (Y+Rc), s	4.0	5.0	5.0	4.0	5.0	5.0
Max Green Setting (Gmax), s	8.0	95.0	23.0	8.0	95.0	23.0
Max Q Clear Time (g_c+I1), s	2.4	24.5	8.1	4.9	48.4	2.8
Green Ext Time (p_c), s	0.0	36.6	0.1	0.0	39.8	0.0

Intersection Summary	
HCM 6th Ctrl Delay	10.0
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	5	5	105	15	20	5	1900	20	10	1380	215
Future Volume (veh/h)	95	5	5	105	15	20	5	1900	20	10	1380	215
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	5	3	114	16	15	5	2065	22	11	1500	171
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	210	7	4	198	20	19	7	2816	30	14	2792	1245
Arrive On Green	0.11	0.11	0.10	0.11	0.11	0.10	0.00	0.78	0.77	0.01	0.79	0.79
Sat Flow, veh/h	1378	67	40	1302	183	171	1781	3602	38	1781	3554	1585
Grp Volume(v), veh/h	111	0	0	145	0	0	5	1017	1070	11	1500	171
Grp Sat Flow(s),veh/h/ln	1485	0	0	1656	0	0	1781	1777	1863	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	0.0	1.4	0.0	0.0	0.3	35.0	35.4	0.7	18.8	3.1
Cycle Q Clear(g_c), s	8.4	0.0	0.0	9.8	0.0	0.0	0.3	35.0	35.4	0.7	18.8	3.1
Prop In Lane	0.93		0.03	0.79		0.10	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	222	0	0	237	0	0	7	1389	1457	14	2792	1245
V/C Ratio(X)	0.50	0.00	0.00	0.61	0.00	0.00	0.73	0.73	0.73	0.80	0.54	0.14
Avail Cap(c_a), veh/h	429	0	0	453	0	0	119	1389	1457	119	2792	1245
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.59	0.59	0.59	0.80	0.80	0.80
Uniform Delay (d), s/veh	51.2	0.0	0.0	51.8	0.0	0.0	59.7	6.7	6.7	59.4	4.8	3.1
Incr Delay (d2), s/veh	1.7	0.0	0.0	2.6	0.0	0.0	27.6	2.1	2.0	26.7	0.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	0.0	4.4	0.0	0.0	0.2	10.7	11.3	0.4	5.5	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.0	0.0	0.0	54.3	0.0	0.0	87.3	8.7	8.7	86.2	5.4	3.3
LnGrp LOS	D	A	A	D	A	A	F	A	A	F	A	A
Approach Vol, veh/h		111			145			2092			1682	
Approach Delay, s/veh		53.0			54.3			8.9			5.7	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.3		17.3	4.9	97.8		17.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.3	20.8		11.8	2.7	37.4		10.4
Green Ext Time (p_c), s	0.0	34.2		0.5	0.0	28.7		0.3

Intersection Summary		
HCM 6th Ctrl Delay		10.4
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	30	20	145	25	35	25	1705	75	10	1415	80
Future Volume (veh/h)	160	30	20	145	25	35	25	1705	75	10	1415	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	33	4	158	27	3	27	1853	80	11	1538	85
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	258	271	33	252	273	30	34	2573	110	13	2498	137
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.16	0.04	1.00	1.00	0.01	0.73	0.72
Sat Flow, veh/h	1359	1633	198	1351	1650	183	1781	3472	149	1781	3425	188
Grp Volume(v), veh/h	174	0	37	158	0	30	27	942	991	11	795	828
Grp Sat Flow(s),veh/h/ln	1359	0	1831	1351	0	1834	1781	1777	1844	1781	1777	1836
Q Serve(g_s), s	17.4	0.0	2.4	15.8	0.0	1.9	2.1	0.0	0.0	0.9	30.7	31.2
Cycle Q Clear(g_c), s	19.4	0.0	2.4	18.2	0.0	1.9	2.1	0.0	0.0	0.9	30.7	31.2
Prop In Lane	1.00		0.11	1.00		0.10	1.00		0.08	1.00		0.10
Lane Grp Cap(c), veh/h	258	0	303	252	0	304	34	1317	1366	13	1296	1340
V/C Ratio(X)	0.68	0.00	0.12	0.63	0.00	0.10	0.79	0.72	0.73	0.83	0.61	0.62
Avail Cap(c_a), veh/h	304	0	366	298	0	367	140	1317	1366	140	1296	1340
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.81	0.81	0.81
Uniform Delay (d), s/veh	57.8	0.0	49.7	57.5	0.0	49.6	67.1	0.0	0.0	69.4	9.3	9.4
Incr Delay (d2), s/veh	4.6	0.0	0.2	3.1	0.0	0.1	1.4	0.3	0.3	30.4	1.8	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	0.0	1.1	5.7	0.0	0.9	1.0	0.1	0.1	0.5	11.3	11.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.4	0.0	49.9	60.6	0.0	49.7	68.5	0.3	0.3	99.8	11.0	11.1
LnGrp LOS	E	A	D	E	A	D	E	A	A	F	B	B
Approach Vol, veh/h		211			188			1960			1634	
Approach Delay, s/veh		60.2			58.8			1.2			11.7	
Approach LOS		E			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	106.1		27.2	5.0	107.8		27.2				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	88.0		27.0	11.0	88.0		27.0				
Max Q Clear Time (g_c+I1), s	4.1	33.2		20.2	2.9	2.0		21.4				
Green Ext Time (p_c), s	0.0	29.5		0.4	0.0	52.1		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			11.3									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	85	35	115	65	1110	25	730	165	530	1170	30
Future Volume (veh/h)	10	85	35	115	65	1110	25	730	165	530	1170	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	92	6	125	71	0	27	793	97	576	1272	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	39	176	158	264	401		34	968	817	630	2411	61
Arrive On Green	0.10	0.10	0.10	0.08	0.21	0.00	0.02	0.52	0.52	0.36	1.00	1.00
Sat Flow, veh/h	108	1715	1543	1781	1870	1585	1781	1870	1579	3456	3542	89
Grp Volume(v), veh/h	103	0	6	125	71	0	27	793	97	576	638	666
Grp Sat Flow(s),veh/h/ln	1823	0	1543	1781	1870	1585	1781	1870	1579	1728	1777	1854
Q Serve(g_s), s	1.1	0.0	0.5	8.5	4.3	0.0	2.1	49.7	4.4	22.2	0.0	0.0
Cycle Q Clear(g_c), s	7.4	0.0	0.5	8.5	4.3	0.0	2.1	49.7	4.4	22.2	0.0	0.0
Prop In Lane	0.11		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	215	0	158	264	401		34	968	817	630	1210	1262
V/C Ratio(X)	0.48	0.00	0.04	0.47	0.18		0.79	0.82	0.12	0.91	0.53	0.53
Avail Cap(c_a), veh/h	326	0	254	408	668		178	968	817	839	1210	1262
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.72	0.72	0.72
Uniform Delay (d), s/veh	59.7	0.0	56.6	48.5	44.9	0.0	68.4	28.3	17.3	43.5	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	0.1	1.3	0.2	0.0	11.3	6.2	0.2	7.8	1.2	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.2	3.9	2.1	0.0	1.1	23.2	1.7	8.7	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.3	0.0	56.7	49.8	45.1	0.0	79.7	34.4	17.6	51.2	1.2	1.1
LnGrp LOS	E	A	E	D	D		E	C	B	D	A	A
Approach Vol, veh/h		109			196	A		917			1880	
Approach Delay, s/veh		61.1			48.1			34.0			16.5	
Approach LOS		E			D			C			B	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	99.3	15.7	18.3	29.5	76.5		34.0				
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	14.0	63.0	22.0	22.0	34.0	43.0		49.0				
Max Q Clear Time (g_c+I1), s	4.1	2.0	10.5	9.4	24.2	51.7		6.3				
Green Ext Time (p_c), s	0.0	20.6	0.3	0.3	1.3	0.0		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		25.2
HCM 6th LOS		C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.2					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	20	805	15	0	955
Future Vol, veh/h	0	20	805	15	0	955
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	22	875	16	0	1038

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	875	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	349	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	349	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	349	-
HCM Lane V/C Ratio	-	-	0.062	-
HCM Control Delay (s)	-	-	16	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	25	850	25	15	1050
Future Vol, veh/h	50	25	850	25	15	1050
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	27	924	27	16	1141

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2097	924	0	0	951	0
Stage 1	924	-	-	-	-	-
Stage 2	1173	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	57	327	-	-	722	-
Stage 1	387	-	-	-	-	-
Stage 2	294	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	56	327	-	-	722	-
Mov Cap-2 Maneuver	171	-	-	-	-	-
Stage 1	378	-	-	-	-	-
Stage 2	294	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	29.4	0	0.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	171	327	722	-
HCM Lane V/C Ratio	-	-	0.318	0.083	0.023	-
HCM Control Delay (s)	-	-	35.6	17	10.1	-
HCM Lane LOS	-	-	E	C	B	-
HCM 95th %tile Q(veh)	-	-	1.3	0.3	0.1	-

Intersection	
Int Delay, s/veh	12.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	60	340	10	135	0	300	5	5	0	10	55
Future Vol, veh/h	15	60	340	10	135	0	300	5	5	0	10	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	65	370	11	147	0	326	5	5	0	11	60

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	147	0	0	435	0	0	487	451	218	236	636	147
Stage 1	-	-	-	-	-	-	282	282	-	169	169	-
Stage 2	-	-	-	-	-	-	205	169	-	67	467	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.1	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1434	-	-	1123	-	-	492	503	787	708	395	899
Stage 1	-	-	-	-	-	-	702	677	-	832	758	-
Stage 2	-	-	-	-	-	-	796	758	-	936	561	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1434	-	-	1123	-	-	442	492	787	686	387	899
Mov Cap-2 Maneuver	-	-	-	-	-	-	442	492	-	686	387	-
Stage 1	-	-	-	-	-	-	694	670	-	823	750	-
Stage 2	-	-	-	-	-	-	725	750	-	912	555	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.6	34	10.3
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	446	1434	-	-	1123	-	-	747
HCM Lane V/C Ratio	0.756	0.011	-	-	0.01	-	-	0.095
HCM Control Delay (s)	34	7.5	-	-	8.2	-	-	10.3
HCM Lane LOS	D	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	6.3	0	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	20	25	0	10	0	90	0	0	0	0	55
Future Vol, veh/h	25	20	25	0	10	0	90	0	0	0	0	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	22	27	0	11	0	98	0	0	0	0	60

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	11	0	0	49	0	0	131	101	25	76	114	11
Stage 1	-	-	-	-	-	-	90	90	-	11	11	-
Stage 2	-	-	-	-	-	-	41	11	-	65	103	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1607	-	-	1557	-	-	835	789	1046	909	776	1070
Stage 1	-	-	-	-	-	-	908	820	-	1009	886	-
Stage 2	-	-	-	-	-	-	973	886	-	938	809	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1607	-	-	1557	-	-	778	776	1046	897	763	1070
Mov Cap-2 Maneuver	-	-	-	-	-	-	778	776	-	897	763	-
Stage 1	-	-	-	-	-	-	893	806	-	992	886	-
Stage 2	-	-	-	-	-	-	919	886	-	922	795	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.6	0	10.3	8.6
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	778	1607	-	-	1557	-	-	1070
HCM Lane V/C Ratio	0.126	0.017	-	-	-	-	-	0.056
HCM Control Delay (s)	10.3	7.3	-	-	0	-	-	8.6
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	20	5	0	60	10	5	0	0	5	0	10
Future Vol, veh/h	15	20	5	0	60	10	5	0	0	5	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	22	5	0	65	11	5	0	0	5	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	76	0	0	27	0	0	133	133	25	128	130	71
Stage 1	-	-	-	-	-	-	57	57	-	71	71	-
Stage 2	-	-	-	-	-	-	76	76	-	57	59	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1523	-	-	1587	-	-	839	758	1051	845	761	991
Stage 1	-	-	-	-	-	-	955	847	-	939	836	-
Stage 2	-	-	-	-	-	-	933	832	-	955	846	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1523	-	-	1587	-	-	823	750	1051	838	753	991
Mov Cap-2 Maneuver	-	-	-	-	-	-	823	750	-	838	753	-
Stage 1	-	-	-	-	-	-	944	838	-	929	836	-
Stage 2	-	-	-	-	-	-	923	832	-	944	837	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.8	0	9.4	8.9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	823	1523	-	-	1587	-	-	934
HCM Lane V/C Ratio	0.007	0.011	-	-	-	-	-	0.017
HCM Control Delay (s)	9.4	7.4	0	-	0	-	-	8.9
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Intersection						
Int Delay, s/veh	3.6					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	10	10	0	40	40	0
Future Vol, veh/h	10	10	0	40	40	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	11	0	43	43	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	22	0	60	17
Stage 1	-	-	-	-	17	-
Stage 2	-	-	-	-	43	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1593	-	947	1062
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	979	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1593	-	947	1062
Mov Cap-2 Maneuver	-	-	-	-	947	-
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	979	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	947	-	-	1593	-
HCM Lane V/C Ratio	0.046	-	-	-	-
HCM Control Delay (s)	9	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2035 Scenario 4 PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	25	420	65	25	5	425	310	70	10	425	75
Future Volume (veh/h)	55	25	420	65	25	5	425	310	70	10	425	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	27	27	71	27	1	462	337	50	11	462	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	197	72	182	195	205	8	526	1187	1006	15	651	552
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.30	0.63	0.63	0.01	0.35	0.35
Sat Flow, veh/h	915	631	1585	1350	1792	66	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	87	0	27	71	0	28	462	337	50	11	462	25
Grp Sat Flow(s),veh/h/ln	1546	0	1585	1350	0	1858	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.5	0.0	1.0	3.4	0.0	0.9	16.3	5.3	0.8	0.4	14.1	0.7
Cycle Q Clear(g_c), s	3.4	0.0	1.0	6.8	0.0	0.9	16.3	5.3	0.8	0.4	14.1	0.7
Prop In Lane	0.69		1.00	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	269	0	182	195	0	213	526	1187	1006	15	651	552
V/C Ratio(X)	0.32	0.00	0.15	0.36	0.00	0.13	0.88	0.28	0.05	0.74	0.71	0.05
Avail Cap(c_a), veh/h	643	0	576	531	0	675	809	2237	1896	405	1812	1536
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.3	0.0	26.3	30.6	0.0	26.3	22.2	5.4	4.5	32.7	18.6	14.3
Incr Delay (d2), s/veh	0.7	0.0	0.4	1.1	0.0	0.3	7.2	0.3	0.0	52.5	3.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.4	1.2	0.0	0.4	7.2	1.6	0.2	0.4	6.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.0	0.0	26.7	31.7	0.0	26.6	29.3	5.6	4.6	85.2	21.7	14.3
LnGrp LOS	C	A	C	C	A	C	C	A	A	F	C	B
Approach Vol, veh/h		114			99			849			498	
Approach Delay, s/veh		27.7			30.2			18.5			22.7	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	47.9		12.6	24.5	29.0		12.6
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0
Max Q Clear Time (g_c+I1), s	2.4	7.3		5.4	18.3	16.1		8.8
Green Ext Time (p_c), s	0.0	5.0		0.5	1.2	6.9		0.2

Intersection Summary			
HCM 6th Ctrl Delay			21.3
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	20	175	55	15	10	225	745	50	25	790	80
Future Volume (veh/h)	75	20	175	55	15	10	225	745	50	25	790	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	22	11	60	16	1	245	810	0	27	859	52
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	244	55	213	207	234	15	355	1133		346	995	840
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.09	0.61	0.00	0.02	0.53	0.53
Sat Flow, veh/h	1093	406	1585	1376	1742	109	1781	1870	1585	1781	1870	1579
Grp Volume(v), veh/h	104	0	11	60	0	17	245	810	0	27	859	52
Grp Sat Flow(s),veh/h/ln	1499	0	1585	1376	0	1851	1781	1870	1585	1781	1870	1579
Q Serve(g_s), s	3.6	0.0	0.4	2.8	0.0	0.5	3.7	19.9	0.0	0.5	26.3	1.1
Cycle Q Clear(g_c), s	4.2	0.0	0.4	7.0	0.0	0.5	3.7	19.9	0.0	0.5	26.3	1.1
Prop In Lane	0.79		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	299	0	213	207	0	249	355	1133		346	995	840
V/C Ratio(X)	0.35	0.00	0.05	0.29	0.00	0.07	0.69	0.71		0.08	0.86	0.06
Avail Cap(c_a), veh/h	659	0	600	542	0	700	595	1443		718	1443	1218
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.5	0.0	24.9	29.8	0.0	25.0	13.5	9.1	0.0	8.6	13.4	7.5
Incr Delay (d2), s/veh	0.7	0.0	0.1	0.8	0.0	0.1	2.4	1.2	0.0	0.1	3.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.2	0.9	0.0	0.2	2.0	6.3	0.0	0.1	9.8	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.2	0.0	25.0	30.6	0.0	25.1	15.9	10.3	0.0	8.7	17.3	7.5
LnGrp LOS	C	A	C	C	A	C	B	B		A	B	A
Approach Vol, veh/h		115			77			1055	A		938	
Approach Delay, s/veh		27.0			29.4			11.6			16.5	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.2	46.0		13.9	11.1	41.1		13.9
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.5	21.9		6.2	5.7	28.3		9.0
Green Ext Time (p_c), s	0.0	6.6		0.5	0.5	6.9		0.2

Intersection Summary			
HCM 6th Ctrl Delay			15.2
HCM 6th LOS			B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	55	100	145	55	135	170	910	210	135	895	75
Future Volume (veh/h)	60	55	100	145	55	135	170	910	210	135	895	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	60	68	158	60	14	185	989	183	147	973	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	84	78	88	184	290	243	198	1054	893	170	1024	867
Arrive On Green	0.05	0.10	0.10	0.10	0.16	0.16	0.11	0.56	0.56	0.10	0.55	0.55
Sat Flow, veh/h	1781	784	888	1781	1870	1564	1781	1870	1585	1781	1870	1582
Grp Volume(v), veh/h	65	0	128	158	60	14	185	989	183	147	973	44
Grp Sat Flow(s),veh/h/ln	1781	0	1672	1781	1870	1564	1781	1870	1585	1781	1870	1582
Q Serve(g_s), s	5.2	0.0	10.8	12.6	4.0	1.1	14.8	70.6	8.2	11.7	70.6	1.9
Cycle Q Clear(g_c), s	5.2	0.0	10.8	12.6	4.0	1.1	14.8	70.6	8.2	11.7	70.6	1.9
Prop In Lane	1.00		0.53	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	84	0	165	184	290	243	198	1054	893	170	1024	867
V/C Ratio(X)	0.77	0.00	0.77	0.86	0.21	0.06	0.94	0.94	0.20	0.87	0.95	0.05
Avail Cap(c_a), veh/h	371	0	209	371	290	243	198	1130	957	185	1117	945
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.9	0.0	63.3	63.5	53.1	51.9	63.5	29.1	15.5	64.3	30.7	15.2
Incr Delay (d2), s/veh	14.0	0.0	13.0	10.9	0.3	0.1	45.8	13.9	0.1	30.6	15.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	5.2	6.3	1.9	0.4	9.2	34.2	3.0	6.7	34.9	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	81.9	0.0	76.3	74.4	53.5	52.0	109.3	43.0	15.6	94.9	46.4	15.2
LnGrp LOS	F	A	E	E	D	D	F	D	B	F	D	B
Approach Vol, veh/h		193			232			1357			1164	
Approach Delay, s/veh		78.2			67.6			48.4			51.3	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.7	86.2	19.9	19.3	21.0	83.9	11.8	27.4
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.0	87.0	30.0	18.0	16.0	86.0	30.0	18.0
Max Q Clear Time (g_c+I1), s	13.7	72.6	14.6	12.8	16.8	72.6	7.2	6.0
Green Ext Time (p_c), s	0.0	7.1	0.4	0.3	0.0	6.3	0.1	0.2

Intersection Summary	
HCM 6th Ctrl Delay	53.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	5	600	80	10	10	605	1190	10	5	1095	25
Future Volume (veh/h)	100	5	600	80	10	10	605	1190	10	5	1095	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	109	5	0	87	11	9	658	1293	11	5	1190	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	182	6		174	16	13	690	2861	24	7	1454	648
Arrive On Green	0.10	0.09	0.00	0.10	0.09	0.09	0.39	0.79	0.79	0.00	0.41	0.41
Sat Flow, veh/h	1441	66	1585	1390	176	144	1781	3611	31	1781	3554	1585
Grp Volume(v), veh/h	114	0	0	107	0	0	658	636	668	5	1190	7
Grp Sat Flow(s),veh/h/ln	1507	0	1585	1709	0	0	1781	1777	1865	1781	1777	1585
Q Serve(g_s), s	1.9	0.0	0.0	0.0	0.0	0.0	46.9	15.1	15.1	0.4	38.9	0.3
Cycle Q Clear(g_c), s	9.4	0.0	0.0	7.5	0.0	0.0	46.9	15.1	15.1	0.4	38.9	0.3
Prop In Lane	0.96		1.00	0.81		0.08	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	199	0		215	0	0	690	1408	1478	7	1454	648
V/C Ratio(X)	0.57	0.00		0.50	0.00	0.00	0.95	0.45	0.45	0.74	0.82	0.01
Avail Cap(c_a), veh/h	289	0		364	0	0	1036	1408	1478	968	1740	776
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.0	0.0	0.0	57.3	0.0	0.0	38.9	4.4	4.4	65.0	34.3	22.9
Incr Delay (d2), s/veh	2.6	0.0	0.0	1.8	0.0	0.0	11.5	0.5	0.5	43.5	3.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	0.0	3.5	0.0	0.0	22.2	4.6	4.8	0.2	17.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.6	0.0	0.0	59.0	0.0	0.0	50.4	4.9	4.9	108.6	37.8	22.9
LnGrp LOS	E	A		E	A	A	D	A	A	F	D	C
Approach Vol, veh/h		114	A		107			1962			1202	
Approach Delay, s/veh		60.6			59.0			20.1			38.1	
Approach LOS		E			E			C			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	54.6	59.5		16.6	4.5	109.6		16.6
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	76.0	64.0		25.0	71.0	69.0		20.0
Max Q Clear Time (g_c+I1), s	48.9	40.9		9.5	2.4	17.1		11.4
Green Ext Time (p_c), s	1.7	12.6		0.3	0.0	19.6		0.2

Intersection Summary		
HCM 6th Ctrl Delay		29.1
HCM 6th LOS		C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	140	15	0	5	135	1780	10	10	1810	60
Future Volume (veh/h)	55	5	140	15	0	5	135	1780	10	10	1810	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	5	16	0	1	147	1935	11	11	1967	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	219	16	170	168	2	7	176	2721	15	14	2345	1045
Arrive On Green	0.12	0.11	0.11	0.12	0.00	0.11	0.10	0.75	0.75	0.01	0.66	0.66
Sat Flow, veh/h	1386	139	1521	925	17	59	1781	3623	21	1781	3554	1584
Grp Volume(v), veh/h	65	0	5	17	0	0	147	948	998	11	1967	41
Grp Sat Flow(s),veh/h/ln	1526	0	1521	1001	0	0	1781	1777	1867	1781	1777	1584
Q Serve(g_s), s	0.0	0.0	0.3	1.1	0.0	0.0	8.8	30.8	30.9	0.7	45.6	1.0
Cycle Q Clear(g_c), s	3.7	0.0	0.3	4.8	0.0	0.0	8.8	30.8	30.9	0.7	45.6	1.0
Prop In Lane	0.92		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	248	0	170	186	0	0	176	1335	1402	14	2345	1045
V/C Ratio(X)	0.26	0.00	0.03	0.09	0.00	0.00	0.83	0.71	0.71	0.79	0.84	0.04
Avail Cap(c_a), veh/h	390	0	324	324	0	0	346	1413	1485	181	2498	1113
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.9	0.0	42.8	45.5	0.0	0.0	47.8	7.2	7.2	53.6	14.0	6.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.9	2.1	2.0	29.8	3.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.1	0.4	0.0	0.0	4.0	9.7	10.2	0.4	16.6	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.1	0.0	42.8	45.6	0.0	0.0	51.7	9.3	9.2	83.3	17.0	6.5
LnGrp LOS	D	A	D	D	A	A	D	A	A	F	B	A
Approach Vol, veh/h		70			17			2093			2019	
Approach Delay, s/veh		44.0			45.6			12.2			17.1	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.7	76.3		17.1	4.8	86.2		17.1				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	10.8	47.6		6.8	2.7	32.9		5.7				
Green Ext Time (p_c), s	0.1	23.8		0.0	0.0	38.4		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			15.2
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	5	175	70	5	50	125	1745	60	35	1955	110
Future Volume (veh/h)	85	5	175	70	5	50	125	1745	60	35	1955	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	92	5	44	76	5	2	136	1897	48	38	2125	97
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	222	10	215	138	174	70	157	2644	1178	49	2428	1083
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.09	0.74	0.74	0.03	0.68	0.68
Sat Flow, veh/h	1305	71	1564	1344	1265	506	1781	3554	1584	1781	3554	1585
Grp Volume(v), veh/h	97	0	44	76	0	7	136	1897	48	38	2125	97
Grp Sat Flow(s),veh/h/ln	1376	0	1564	1344	0	1771	1781	1777	1584	1781	1777	1585
Q Serve(g_s), s	10.5	0.0	4.1	9.2	0.0	0.6	12.4	48.4	1.3	3.5	77.8	3.4
Cycle Q Clear(g_c), s	11.0	0.0	4.1	20.2	0.0	0.6	12.4	48.4	1.3	3.5	77.8	3.4
Prop In Lane	0.95		1.00	1.00		0.29	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	240	0	215	138	0	244	157	2644	1178	49	2428	1083
V/C Ratio(X)	0.40	0.00	0.20	0.55	0.00	0.03	0.86	0.72	0.04	0.77	0.88	0.09
Avail Cap(c_a), veh/h	251	0	228	149	0	258	281	2644	1178	108	2428	1083
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.57	0.57	0.57	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.9	0.0	63.1	75.5	0.0	61.6	74.2	11.6	5.6	79.7	20.6	8.8
Incr Delay (d2), s/veh	1.1	0.0	0.5	3.6	0.0	0.0	3.1	1.0	0.0	9.3	4.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	1.7	3.3	0.0	0.3	5.8	17.9	0.4	1.7	31.8	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.0	0.0	63.6	79.1	0.0	61.7	77.4	12.6	5.6	89.0	25.4	9.0
LnGrp LOS	E	A	E	E	A	E	E	B	A	F	C	A
Approach Vol, veh/h		141			83			2081			2260	
Approach Delay, s/veh		66.0			77.7			16.6			25.8	
Approach LOS		E			E			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.6	118.7		27.7	8.5	128.8		27.7
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	26.0	100.0		24.0	10.0	116.0		24.0
Max Q Clear Time (g_c+I1), s	14.4	79.8		22.2	5.5	50.4		13.0
Green Ext Time (p_c), s	0.2	18.5		0.0	0.0	43.5		0.3

Intersection Summary	
HCM 6th Ctrl Delay	23.8
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	390	5	740	15	0	5	500	1705	10	80	1915	205
Future Volume (veh/h)	390	5	740	15	0	5	500	1705	10	80	1915	205
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.93	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	428	0	670	16	0	1	543	1853	11	87	2082	191
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	450	0	919	40	0	2	585	2641	16	112	2213	1181
Arrive On Green	0.13	0.00	0.12	0.02	0.00	0.01	0.17	0.73	0.72	0.06	0.62	0.62
Sat Flow, veh/h	3563	0	3118	1657	0	104	3456	3622	21	1781	3554	1585
Grp Volume(v), veh/h	428	0	670	17	0	0	543	908	956	87	2082	191
Grp Sat Flow(s),veh/h/ln	1781	0	1559	1760	0	0	1728	1777	1866	1781	1777	1585
Q Serve(g_s), s	33.1	0.0	34.0	2.6	0.0	0.0	42.9	78.5	78.8	13.3	148.0	9.7
Cycle Q Clear(g_c), s	33.1	0.0	34.0	2.6	0.0	0.0	42.9	78.5	78.8	13.3	148.0	9.7
Prop In Lane	1.00		1.00	0.94		0.06	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	450	0	919	42	0	0	585	1296	1361	112	2213	1181
V/C Ratio(X)	0.95	0.00	0.73	0.40	0.00	0.00	0.93	0.70	0.70	0.78	0.94	0.16
Avail Cap(c_a), veh/h	450	0	919	152	0	0	586	1296	1361	173	2281	1212
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	120.3	0.0	88.5	133.5	0.0	0.0	113.5	20.8	20.8	128.0	47.6	10.2
Incr Delay (d2), s/veh	30.1	0.0	2.6	2.3	0.0	0.0	20.9	1.9	1.8	4.5	8.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.6	0.0	22.4	1.3	0.0	0.0	21.3	33.7	35.4	6.5	67.9	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	150.5	0.0	91.1	135.7	0.0	0.0	134.4	22.7	22.6	132.5	56.2	10.3
LnGrp LOS	F	A	F	F	A	A	F	C	C	F	E	B
Approach Vol, veh/h		1098			17			2407			2360	
Approach Delay, s/veh		114.2			135.7			47.9			55.3	
Approach LOS		F			F			D			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	51.0	176.7		10.7	21.4	206.2		39.0				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	45.0	176.0		21.0	25.0	196.0		32.0				
Max Q Clear Time (g_c+I1), s	44.9	150.0		4.6	15.3	80.8		36.0				
Green Ext Time (p_c), s	0.0	20.7		0.0	0.1	32.1		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			63.5									
HCM 6th LOS			E									

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	5	90	5	65	10	2180	90	90	2640	5
Future Volume (veh/h)	10	0	5	90	5	65	10	2180	90	90	2640	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	2370	96	98	2870	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	155	2	10	176	95	57	22	2654	107	122	2978	5
Arrive On Green	0.09	0.00	0.08	0.09	0.09	0.08	0.02	1.00	1.00	0.07	0.82	0.81
Sat Flow, veh/h	1239	24	115	1416	1095	657	1781	3482	140	1781	3640	6
Grp Volume(v), veh/h	12	0	0	98	0	8	11	1201	1265	98	1401	1474
Grp Sat Flow(s),veh/h/ln	1378	0	0	1416	0	1752	1781	1777	1845	1781	1777	1869
Q Serve(g_s), s	0.9	0.0	0.0	7.9	0.0	0.6	0.9	0.0	0.0	7.9	98.1	98.4
Cycle Q Clear(g_c), s	1.5	0.0	0.0	9.4	0.0	0.6	0.9	0.0	0.0	7.9	98.1	98.4
Prop In Lane	0.92		0.08	1.00		0.38	1.00		0.08	1.00		0.00
Lane Grp Cap(c), veh/h	167	0	0	176	0	152	22	1354	1406	122	1454	1530
V/C Ratio(X)	0.07	0.00	0.00	0.56	0.00	0.05	0.50	0.89	0.90	0.80	0.96	0.96
Avail Cap(c_a), veh/h	279	0	0	288	0	290	61	1354	1406	184	1454	1530
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.35	0.35	0.35	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.3	0.0	0.0	64.6	0.0	60.9	70.9	0.0	0.0	66.6	11.3	11.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.7	0.0	0.1	2.3	3.4	3.7	7.7	16.3	15.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	3.7	0.0	0.3	0.4	1.3	1.4	3.8	34.5	36.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.5	0.0	0.0	67.4	0.0	61.1	73.1	3.4	3.7	74.3	27.7	27.2
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	C	C
Approach Vol, veh/h		12			106			2477			2973	
Approach Delay, s/veh		61.5			66.9			3.9			29.0	
Approach LOS		E			E			A			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	122.6		16.6	13.9	114.5		16.6				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	103.0		23.0	15.0	93.0		23.0				
Max Q Clear Time (g_c+I1), s	2.9	100.4		11.4	9.9	2.0		3.5				
Green Ext Time (p_c), s	0.0	2.6		0.2	0.1	80.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			18.6									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	195	15	10	60	5	10	5	2080	20	5	2255	345
Future Volume (veh/h)	195	15	10	60	5	10	5	2080	20	5	2255	345
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	212	16	9	65	5	7	5	2261	22	5	2451	308
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	284	18	10	292	23	27	7	2652	26	7	2614	1166
Arrive On Green	0.18	0.18	0.17	0.18	0.18	0.17	0.01	0.98	0.97	0.00	0.74	0.74
Sat Flow, veh/h	1332	101	57	1385	130	152	1781	3606	35	1781	3554	1585
Grp Volume(v), veh/h	237	0	0	77	0	0	5	1112	1171	5	2451	308
Grp Sat Flow(s),veh/h/ln	1489	0	0	1667	0	0	1781	1777	1864	1781	1777	1585
Q Serve(g_s), s	16.8	0.0	0.0	0.0	0.0	0.0	0.4	11.7	12.1	0.4	85.2	9.2
Cycle Q Clear(g_c), s	22.4	0.0	0.0	5.6	0.0	0.0	0.4	11.7	12.1	0.4	85.2	9.2
Prop In Lane	0.89		0.04	0.84		0.09	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	312	0	0	342	0	0	7	1307	1371	7	2614	1166
V/C Ratio(X)	0.76	0.00	0.00	0.22	0.00	0.00	0.74	0.85	0.85	0.74	0.94	0.26
Avail Cap(c_a), veh/h	353	0	0	384	0	0	98	1307	1371	98	2614	1166
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.42	0.42	0.42	0.10	0.10	0.10
Uniform Delay (d), s/veh	57.9	0.0	0.0	51.3	0.0	0.0	72.1	0.5	0.5	72.2	16.3	6.3
Incr Delay (d2), s/veh	8.2	0.0	0.0	0.3	0.0	0.0	22.0	3.2	3.1	5.9	1.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.3	0.0	0.0	2.5	0.0	0.0	0.2	1.9	1.9	0.2	30.2	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.1	0.0	0.0	51.7	0.0	0.0	94.1	3.7	3.6	78.1	17.3	6.3
LnGrp LOS	E	A	A	D	A	A	F	A	A	E	B	A
Approach Vol, veh/h		237			77			2288			2764	
Approach Delay, s/veh		66.1			51.7			3.9			16.2	
Approach LOS		E			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.5	110.7		29.8	4.5	110.7		29.8				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	94.0		29.0	8.0	94.0		29.0				
Max Q Clear Time (g_c+I1), s	2.4	87.2		7.6	2.4	14.1		24.4				
Green Ext Time (p_c), s	0.0	6.7		0.2	0.0	73.6		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			13.7
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	35	45	95	25	20	55	1860	105	30	2180	160
Future Volume (veh/h)	190	35	45	95	25	20	55	1860	105	30	2180	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.97	0.97		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	207	38	14	103	27	1	60	2022	111	33	2370	170
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	245	205	75	225	284	11	74	2519	137	42	2414	171
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.15	0.08	1.00	1.00	0.05	1.00	1.00
Sat Flow, veh/h	1344	1291	476	1317	1790	66	1781	3427	186	1781	3365	238
Grp Volume(v), veh/h	207	0	52	103	0	28	60	1039	1094	33	1237	1303
Grp Sat Flow(s),veh/h/ln	1344	0	1767	1317	0	1856	1781	1777	1837	1781	1777	1827
Q Serve(g_s), s	21.1	0.0	3.7	10.7	0.0	1.9	4.8	0.0	0.0	2.7	0.0	0.0
Cycle Q Clear(g_c), s	23.0	0.0	3.7	14.4	0.0	1.9	4.8	0.0	0.0	2.7	0.0	0.0
Prop In Lane	1.00		0.27	1.00		0.04	1.00		0.10	1.00		0.13
Lane Grp Cap(c), veh/h	245	0	280	225	0	294	74	1306	1350	42	1274	1310
V/C Ratio(X)	0.84	0.00	0.19	0.46	0.00	0.10	0.81	0.80	0.81	0.78	0.97	0.99
Avail Cap(c_a), veh/h	245	0	280	225	0	294	74	1306	1350	74	1274	1310
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.22	0.22	0.22
Uniform Delay (d), s/veh	62.5	0.0	52.9	59.1	0.0	52.1	66.0	0.0	0.0	68.7	0.0	0.0
Incr Delay (d2), s/veh	22.5	0.0	0.3	1.5	0.0	0.1	5.9	0.5	0.5	2.7	6.8	10.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.3	0.0	1.7	3.7	0.0	0.9	2.2	0.2	0.2	1.2	2.4	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	85.0	0.0	53.2	60.6	0.0	52.3	71.9	0.5	0.5	71.4	6.8	10.4
LnGrp LOS	F	A	D	E	A	D	E	A	A	E	A	B
Approach Vol, veh/h		259			131			2193			2573	
Approach Delay, s/veh		78.7			58.8			2.4			9.5	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	108.0		27.0	7.4	110.6		27.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	6.0	103.0		22.0	6.0	103.0		22.0				
Max Q Clear Time (g_c+I1), s	6.8	2.0		16.4	4.7	2.0		25.0				
Green Ext Time (p_c), s	0.0	89.1		0.2	0.0	67.6		0.0				

Intersection Summary			
HCM 6th Ctrl Delay			11.2
HCM 6th LOS			B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	85	85	190	85	1050	50	865	220	640	1405	40
Future Volume (veh/h)	35	85	85	190	85	1050	50	865	220	640	1405	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.96	0.98		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	92	9	207	92	0	54	940	165	696	1527	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	82	165	195	305	485		69	835	703	731	2187	60
Arrive On Green	0.13	0.13	0.13	0.10	0.26	0.00	0.04	0.45	0.45	0.42	1.00	1.00
Sat Flow, veh/h	393	1285	1518	1781	1870	1585	1781	1870	1574	3456	3532	97
Grp Volume(v), veh/h	130	0	9	207	92	0	54	940	165	696	767	802
Grp Sat Flow(s),veh/h/ln	1678	0	1518	1781	1870	1585	1781	1870	1574	1728	1777	1852
Q Serve(g_s), s	7.1	0.0	0.8	14.4	5.6	0.0	4.4	64.7	9.4	28.2	0.0	0.0
Cycle Q Clear(g_c), s	10.4	0.0	0.8	14.4	5.6	0.0	4.4	64.7	9.4	28.2	0.0	0.0
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	247	0	195	305	485		69	835	703	731	1100	1147
V/C Ratio(X)	0.53	0.00	0.05	0.68	0.19		0.78	1.13	0.23	0.95	0.70	0.70
Avail Cap(c_a), veh/h	320	0	262	305	568		123	835	703	763	1100	1147
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.88	0.88	0.88	0.10	0.10	0.10
Uniform Delay (d), s/veh	59.5	0.0	55.4	47.3	41.8	0.0	69.1	40.1	24.8	41.1	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.1	5.9	0.2	0.0	6.0	70.3	0.7	3.5	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	0.3	7.0	2.7	0.0	2.1	45.2	3.7	10.3	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.2	0.0	55.5	53.3	42.0	0.0	75.1	110.4	25.5	44.6	0.4	0.4
LnGrp LOS	E	A	E	D	D		E	F	C	D	A	A
Approach Vol, veh/h		139			299	A		1159			2265	
Approach Delay, s/veh		60.9			49.8			96.7			14.0	
Approach LOS		E			D			F			B	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.7	93.8	19.0	22.6	34.7	68.7		41.6
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	10.0	78.0	14.0	24.0	32.0	56.0		43.0
Max Q Clear Time (g_c+I1), s	6.4	2.0	16.4	12.4	30.2	66.7		7.6
Green Ext Time (p_c), s	0.0	31.7	0.0	0.4	0.5	0.0		0.3

Intersection Summary		
HCM 6th Ctrl Delay		43.3
HCM 6th LOS		D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	15	1075	30	0	1030
Future Vol, veh/h	0	15	1075	30	0	1030
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	1168	33	0	1120

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1168	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	235	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	235	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.5	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	235	-
HCM Lane V/C Ratio	-	-	0.069	-
HCM Control Delay (s)	-	-	21.5	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	30	1240	65	35	1115
Future Vol, veh/h	50	30	1240	65	35	1115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	33	1348	71	38	1212

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2636	1348	0	0	1419	0
Stage 1	1348	-	-	-	-	-
Stage 2	1288	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 26	185	-	-	480	-
Stage 1	242	-	-	-	-	-
Stage 2	259	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 24	185	-	-	480	-
Mov Cap-2 Maneuver	112	-	-	-	-	-
Stage 1	223	-	-	-	-	-
Stage 2	259	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	50.9	0	0.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	112	185	480	-
HCM Lane V/C Ratio	-	-	0.485	0.176	0.079	-
HCM Control Delay (s)	-	-	64.3	28.6	13.1	-
HCM Lane LOS	-	-	F	D	B	-
HCM 95th %tile Q(veh)	-	-	2.2	0.6	0.3	-

Notes

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

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	135	215	5	105	0	200	20	5	0	10	35
Future Vol, veh/h	45	135	215	5	105	0	200	20	5	0	10	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	147	234	5	114	0	217	22	5	0	11	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	114	0	0	381	0	0	511	486	191	307	603	114
Stage 1	-	-	-	-	-	-	362	362	-	124	124	-
Stage 2	-	-	-	-	-	-	149	124	-	183	479	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1474	-	-	1176	-	-	459	481	819	634	412	938
Stage 1	-	-	-	-	-	-	630	624	-	880	793	-
Stage 2	-	-	-	-	-	-	853	793	-	802	554	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1474	-	-	1176	-	-	419	463	819	590	397	938
Mov Cap-2 Maneuver	-	-	-	-	-	-	419	463	-	590	397	-
Stage 1	-	-	-	-	-	-	609	603	-	851	790	-
Stage 2	-	-	-	-	-	-	804	790	-	742	536	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.4	24.1	10.4
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	427	1474	-	-	1176	-	-	720
HCM Lane V/C Ratio	0.573	0.033	-	-	0.005	-	-	0.068
HCM Control Delay (s)	24.1	7.5	-	-	8.1	-	-	10.4
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	3.5	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	15	75	0	20	0	50	10	0	0	5	45
Future Vol, veh/h	60	15	75	0	20	0	50	10	0	0	5	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	16	82	0	22	0	54	11	0	0	5	49

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	22	0	0	98	0	0	236	209	49	166	250	22
Stage 1	-	-	-	-	-	-	187	187	-	22	22	-
Stage 2	-	-	-	-	-	-	49	22	-	144	228	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1593	-	-	1494	-	-	708	687	1009	790	652	1055
Stage 1	-	-	-	-	-	-	797	745	-	996	877	-
Stage 2	-	-	-	-	-	-	964	877	-	845	715	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1593	-	-	1494	-	-	650	659	1009	756	625	1055
Mov Cap-2 Maneuver	-	-	-	-	-	-	650	659	-	756	625	-
Stage 1	-	-	-	-	-	-	764	714	-	955	877	-
Stage 2	-	-	-	-	-	-	914	877	-	798	686	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.9	0	11.1	8.9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	651	1593	-	-	1494	-	-	987
HCM Lane V/C Ratio	0.1	0.041	-	-	-	-	-	0.055
HCM Control Delay (s)	11.1	7.4	-	-	0	-	-	8.9
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	65	15	0	40	10	20	0	0	20	0	25
Future Vol, veh/h	25	65	15	0	40	10	20	0	0	20	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	71	16	0	43	11	22	0	0	22	0	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	54	0	0	87	0	0	195	187	79	182	190	49
Stage 1	-	-	-	-	-	-	133	133	-	49	49	-
Stage 2	-	-	-	-	-	-	62	54	-	133	141	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1551	-	-	1509	-	-	764	708	981	779	705	1020
Stage 1	-	-	-	-	-	-	870	786	-	964	854	-
Stage 2	-	-	-	-	-	-	949	850	-	870	780	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1551	-	-	1509	-	-	733	695	981	768	692	1020
Mov Cap-2 Maneuver	-	-	-	-	-	-	733	695	-	768	692	-
Stage 1	-	-	-	-	-	-	854	772	-	947	854	-
Stage 2	-	-	-	-	-	-	924	850	-	854	766	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0	10.1	9.3
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	733	1551	-	-	1509	-	-	890
HCM Lane V/C Ratio	0.03	0.018	-	-	-	-	-	0.055
HCM Control Delay (s)	10.1	7.4	0	-	0	-	-	9.3
HCM Lane LOS	B	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.2

Intersection						
Int Delay, s/veh	1.7					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	45	40	0	25	25	0
Future Vol, veh/h	45	40	0	25	25	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	49	43	0	27	27	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	92	0	98	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	27	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1503	-	901	991
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	996	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1503	-	901	991
Mov Cap-2 Maneuver	-	-	-	-	901	-
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	996	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	901	-	-	1503	-
HCM Lane V/C Ratio	0.03	-	-	-	-
HCM Control Delay (s)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2035 Scenario 4 WE Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	45	385	50	50	20	320	440	40	20	410	90
Future Volume (veh/h)	40	45	385	50	50	20	320	440	40	20	410	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	49	31	54	54	10	348	478	26	22	446	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	127	192	217	187	35	422	1082	915	28	668	565
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.24	0.58	0.58	0.02	0.36	0.36
Sat Flow, veh/h	541	1037	1566	1307	1532	284	1781	1870	1582	1781	1870	1583
Grp Volume(v), veh/h	92	0	31	54	0	64	348	478	26	22	446	33
Grp Sat Flow(s),veh/h/ln	1578	0	1566	1307	0	1815	1781	1870	1582	1781	1870	1583
Q Serve(g_s), s	1.2	0.0	1.0	2.3	0.0	1.8	10.5	8.2	0.4	0.7	11.4	0.8
Cycle Q Clear(g_c), s	3.0	0.0	1.0	5.3	0.0	1.8	10.5	8.2	0.4	0.7	11.4	0.8
Prop In Lane	0.47		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	287	0	192	217	0	222	422	1082	915	28	668	565
V/C Ratio(X)	0.32	0.00	0.16	0.25	0.00	0.29	0.83	0.44	0.03	0.80	0.67	0.06
Avail Cap(c_a), veh/h	762	0	666	613	0	772	947	2619	2216	474	2122	1796
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.0	0.0	22.2	25.5	0.0	22.5	20.4	6.7	5.1	27.7	15.3	11.9
Incr Delay (d2), s/veh	0.6	0.0	0.4	0.6	0.0	0.7	4.1	0.6	0.0	38.7	2.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.4	0.7	0.0	0.8	4.3	2.4	0.1	0.6	4.5	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	0.0	22.6	26.1	0.0	23.2	24.6	7.3	5.1	66.4	17.8	12.0
LnGrp LOS	C	A	C	C	A	C	C	A	A	E	B	B
Approach Vol, veh/h		123			118			852			501	
Approach Delay, s/veh		23.4			24.6			14.3			19.5	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	38.6		11.9	18.4	26.2		11.9				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0				
Max Q Clear Time (g_c+I1), s	2.7	10.2		5.0	12.5	13.4		7.3				
Green Ext Time (p_c), s	0.0	7.4		0.5	1.0	6.7		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			17.4									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	20	240	50	15	5	170	640	35	15	680	60
Future Volume (veh/h)	55	20	240	50	15	5	170	640	35	15	680	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	22	19	54	16	1	185	696	0	16	739	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	251	75	219	258	245	15	384	1039		371	901	761
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.09	0.56	0.00	0.01	0.48	0.48
Sat Flow, veh/h	979	536	1557	1347	1740	109	1781	1870	1585	1781	1870	1580
Grp Volume(v), veh/h	82	0	19	54	0	17	185	696	0	16	739	30
Grp Sat Flow(s),veh/h/ln	1515	0	1557	1347	0	1848	1781	1870	1585	1781	1870	1580
Q Serve(g_s), s	1.8	0.0	0.6	2.1	0.0	0.4	2.6	14.4	0.0	0.3	18.5	0.5
Cycle Q Clear(g_c), s	2.6	0.0	0.6	4.6	0.0	0.4	2.6	14.4	0.0	0.3	18.5	0.5
Prop In Lane	0.73		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	327	0	219	258	0	260	384	1039		371	901	761
V/C Ratio(X)	0.25	0.00	0.09	0.21	0.00	0.07	0.48	0.67		0.04	0.82	0.04
Avail Cap(c_a), veh/h	794	0	711	683	0	844	720	1742		838	1742	1472
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.3	0.0	20.5	23.4	0.0	20.4	10.0	8.6	0.0	8.1	12.1	7.5
Incr Delay (d2), s/veh	0.4	0.0	0.2	0.4	0.0	0.1	0.9	0.8	0.0	0.0	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.2	0.7	0.0	0.2	0.7	4.3	0.0	0.1	6.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.7	0.0	20.6	23.8	0.0	20.5	10.9	9.4	0.0	8.1	14.1	7.5
LnGrp LOS	C	A	C	C	A	C	B	A		A	B	A
Approach Vol, veh/h		101			71			881	A		785	
Approach Delay, s/veh		21.5			23.0			9.7			13.7	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.6	36.4		12.7	9.7	32.4		12.7
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.3	16.4		4.6	4.6	20.5		6.6
Green Ext Time (p_c), s	0.0	5.4		0.4	0.3	5.9		0.2

Intersection Summary			
HCM 6th Ctrl Delay			12.6
HCM 6th LOS			B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	65	90	170	70	140	85	675	220	130	810	50
Future Volume (veh/h)	40	65	90	170	70	140	85	675	220	130	810	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	71	62	185	76	20	92	734	169	141	880	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	55	94	82	219	365	309	119	902	765	175	961	813
Arrive On Green	0.03	0.10	0.10	0.12	0.20	0.20	0.07	0.48	0.48	0.10	0.51	0.51
Sat Flow, veh/h	1781	914	798	1781	1870	1585	1781	1870	1585	1781	1870	1584
Grp Volume(v), veh/h	43	0	133	185	76	20	92	734	169	141	880	25
Grp Sat Flow(s),veh/h/ln	1781	0	1713	1781	1870	1585	1781	1870	1585	1781	1870	1584
Q Serve(g_s), s	2.5	0.0	7.8	10.5	3.5	1.1	5.3	34.6	6.4	8.0	44.7	0.8
Cycle Q Clear(g_c), s	2.5	0.0	7.8	10.5	3.5	1.1	5.3	34.6	6.4	8.0	44.7	0.8
Prop In Lane	1.00		0.47	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	55	0	176	219	365	309	119	902	765	175	961	813
V/C Ratio(X)	0.78	0.00	0.75	0.84	0.21	0.06	0.77	0.81	0.22	0.81	0.92	0.03
Avail Cap(c_a), veh/h	345	0	348	345	380	322	431	1176	997	431	1176	996
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.7	0.0	45.1	44.3	34.9	33.9	47.5	22.8	15.5	45.7	23.1	12.4
Incr Delay (d2), s/veh	20.3	0.0	6.4	10.5	0.3	0.1	10.1	3.4	0.1	8.5	9.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	3.6	5.2	1.6	0.4	2.6	15.1	2.3	3.9	20.7	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.0	0.0	51.5	54.9	35.2	34.0	57.6	26.2	15.6	54.2	32.9	12.4
LnGrp LOS	E	A	D	D	D	C	E	C	B	D	C	B
Approach Vol, veh/h		176			281			995			1046	
Approach Delay, s/veh		56.0			48.1			27.3			35.3	
Approach LOS		E			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.1	54.9	17.7	15.6	11.9	58.1	8.2	25.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	10.0	36.6	12.5	9.8	7.3	46.7	4.5	5.5
Green Ext Time (p_c), s	0.3	6.3	0.3	0.5	0.2	6.4	0.1	0.3

Intersection Summary	
HCM 6th Ctrl Delay	35.0
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	10	595	10	0	5	410	955	5	0	1060	65
Future Volume (veh/h)	75	10	595	10	0	5	410	955	5	0	1060	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	11	0	11	0	1	446	1038	5	0	1152	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	181	14		195	3	11	493	2881	14	2	1677	746
Arrive On Green	0.09	0.08	0.00	0.09	0.00	0.08	0.28	0.79	0.79	0.00	0.47	0.47
Sat Flow, veh/h	1302	175	1585	1462	39	136	1781	3627	17	1781	3554	1580
Grp Volume(v), veh/h	93	0	0	12	0	0	446	509	534	0	1152	35
Grp Sat Flow(s),veh/h/ln	1477	0	1585	1638	0	0	1781	1777	1867	1781	1777	1580
Q Serve(g_s), s	4.7	0.0	0.0	0.0	0.0	0.0	21.0	7.2	7.2	0.0	22.1	1.0
Cycle Q Clear(g_c), s	5.3	0.0	0.0	0.5	0.0	0.0	21.0	7.2	7.2	0.0	22.1	1.0
Prop In Lane	0.88		1.00	0.92		0.08	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	212	0		228	0	0	493	1412	1483	2	1677	746
V/C Ratio(X)	0.44	0.00		0.05	0.00	0.00	0.91	0.36	0.36	0.00	0.69	0.05
Avail Cap(c_a), veh/h	430	0		522	0	0	1452	1412	1483	1452	2816	1252
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.9	0.0	0.0	36.7	0.0	0.0	30.4	2.6	2.6	0.0	18.0	12.4
Incr Delay (d2), s/veh	1.4	0.0	0.0	0.1	0.0	0.0	2.6	0.3	0.3	0.0	1.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	0.0	0.2	0.0	0.0	8.9	1.4	1.5	0.0	8.5	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.3	0.0	0.0	36.8	0.0	0.0	33.0	2.9	2.9	0.0	19.0	12.5
LnGrp LOS	D	A		D	A	A	C	A	A	A	B	B
Approach Vol, veh/h		93	A		12			1489			1187	
Approach Delay, s/veh		40.3			36.8			11.9			18.8	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	28.1	47.1		11.9	0.0	75.2		11.9				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	71.0	69.0		25.0	71.0	69.0		20.0				
Max Q Clear Time (g_c+I1), s	23.0	24.1		2.5	0.0	9.2		7.3				
Green Ext Time (p_c), s	1.0	17.0		0.0	0.0	13.8		0.2				

Intersection Summary			
HCM 6th Ctrl Delay			15.9
HCM 6th LOS			B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	5	145	15	5	20	105	1320	20	10	1645	70
Future Volume (veh/h)	65	5	145	15	5	20	105	1320	20	10	1645	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	71	5	5	16	5	1	114	1435	22	11	1788	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	206	12	141	126	31	4	144	2688	41	14	2408	1072
Arrive On Green	0.10	0.09	0.09	0.10	0.09	0.09	0.08	0.75	0.75	0.01	0.68	0.68
Sat Flow, veh/h	1436	129	1548	647	342	47	1781	3582	55	1781	3554	1582
Grp Volume(v), veh/h	76	0	5	22	0	0	114	711	746	11	1788	49
Grp Sat Flow(s),veh/h/ln	1565	0	1548	1036	0	0	1781	1777	1860	1781	1777	1582
Q Serve(g_s), s	0.0	0.0	0.3	0.4	0.0	0.0	5.8	15.5	15.5	0.6	30.3	1.0
Cycle Q Clear(g_c), s	3.8	0.0	0.3	4.1	0.0	0.0	5.8	15.5	15.5	0.6	30.3	1.0
Prop In Lane	0.93		1.00	0.73		0.05	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	234	0	141	172	0	0	144	1333	1396	14	2408	1072
V/C Ratio(X)	0.32	0.00	0.04	0.13	0.00	0.00	0.79	0.53	0.53	0.77	0.74	0.05
Avail Cap(c_a), veh/h	455	0	383	404	0	0	403	1645	1722	211	2907	1294
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.7	0.0	38.5	39.3	0.0	0.0	42.0	4.8	4.8	46.0	9.7	5.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.1	0.0	0.0	3.7	0.7	0.7	27.3	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.1	0.5	0.0	0.0	2.7	4.2	4.4	0.4	9.8	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.9	0.0	38.6	39.4	0.0	0.0	45.7	5.5	5.5	73.3	11.0	5.0
LnGrp LOS	D	A	D	D	A	A	D	A	A	E	B	A
Approach Vol, veh/h		81			22			1571			1848	
Approach Delay, s/veh		39.9			39.4			8.4			11.2	
Approach LOS		D			D			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.5	68.0		13.5	4.7	74.7		13.5				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	21.0	76.0		23.0	11.0	86.0		23.0				
Max Q Clear Time (g_c+I1), s	17.8	32.3		6.1	2.6	17.5		5.8				
Green Ext Time (p_c), s	0.1	30.6		0.0	0.0	26.3		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			10.8									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	5	180	45	5	40	110	1370	50	35	1705	85
Future Volume (veh/h)	75	5	180	45	5	40	110	1370	50	35	1705	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	5	11	49	5	3	120	1489	34	38	1853	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	251	13	212	184	147	88	152	2379	1061	60	2196	979
Arrive On Green	0.15	0.13	0.13	0.13	0.13	0.13	0.09	0.67	0.67	0.03	0.62	0.62
Sat Flow, veh/h	1304	97	1578	1392	1093	656	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	87	0	11	49	0	8	120	1489	34	38	1853	54
Grp Sat Flow(s),veh/h/ln	1400	0	1578	1392	0	1749	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.0	0.0	0.6	3.1	0.0	0.4	6.1	22.0	0.7	1.9	38.4	1.2
Cycle Q Clear(g_c), s	5.4	0.0	0.6	8.5	0.0	0.4	6.1	22.0	0.7	1.9	38.4	1.2
Prop In Lane	0.94		1.00	1.00		0.38	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	279	0	212	184	0	235	152	2379	1061	60	2196	979
V/C Ratio(X)	0.31	0.00	0.05	0.27	0.00	0.03	0.79	0.63	0.03	0.63	0.84	0.06
Avail Cap(c_a), veh/h	458	0	410	359	0	455	405	2656	1185	232	2310	1030
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.6	0.0	34.8	40.8	0.0	34.8	41.4	8.7	5.2	44.0	14.1	7.0
Incr Delay (d2), s/veh	0.6	0.0	0.1	0.8	0.0	0.1	3.4	0.7	0.0	4.0	3.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.2	1.1	0.0	0.2	2.8	7.1	0.2	0.9	14.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.2	0.0	34.9	41.6	0.0	34.8	44.8	9.3	5.2	48.1	17.4	7.0
LnGrp LOS	D	A	C	D	A	C	D	A	A	D	B	A
Approach Vol, veh/h		98			57			1643			1945	
Approach Delay, s/veh		36.9			40.6			11.8			17.7	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.9	63.0		17.4	7.1	67.8		17.4
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	60.0		24.0	12.0	69.0		24.0
Max Q Clear Time (g_c+I1), s	8.1	40.4		10.5	3.9	24.0		7.4
Green Ext Time (p_c), s	0.2	16.6		0.1	0.0	24.6		0.3

Intersection Summary		
HCM 6th Ctrl Delay		16.0
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	345	5	585	15	5	20	445	1385	15	60	1600	245
Future Volume (veh/h)	345	5	585	15	5	20	445	1385	15	60	1600	245
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	379	0	433	16	5	7	484	1505	16	65	1739	225
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	514	0	958	35	11	15	564	2464	26	100	2050	1135
Arrive On Green	0.14	0.00	0.14	0.04	0.04	0.02	0.16	0.68	0.67	0.06	0.58	0.58
Sat Flow, veh/h	3563	0	3170	996	311	436	3456	3602	38	1781	3554	1584
Grp Volume(v), veh/h	379	0	433	28	0	0	484	742	779	65	1739	225
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1742	0	0	1728	1777	1863	1781	1777	1584
Q Serve(g_s), s	20.3	0.0	22.0	3.1	0.0	0.0	27.2	45.1	45.3	7.1	80.8	9.4
Cycle Q Clear(g_c), s	20.3	0.0	22.0	3.1	0.0	0.0	27.2	45.1	45.3	7.1	80.8	9.4
Prop In Lane	1.00		1.00	0.57		0.25	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	514	0	958	62	0	0	564	1215	1275	100	2050	1135
V/C Ratio(X)	0.74	0.00	0.45	0.45	0.00	0.00	0.86	0.61	0.61	0.65	0.85	0.20
Avail Cap(c_a), veh/h	608	0	1042	271	0	0	1006	1730	1814	134	2693	1421
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	81.6	0.0	56.2	94.6	0.0	0.0	81.1	17.1	17.1	92.1	34.9	9.4
Incr Delay (d2), s/veh	3.0	0.0	0.1	1.9	0.0	0.0	1.5	0.7	0.7	2.7	2.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.7	0.0	9.0	1.5	0.0	0.0	12.3	18.6	19.5	3.4	35.3	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	84.6	0.0	56.3	96.5	0.0	0.0	82.7	17.8	17.8	94.8	37.4	9.5
LnGrp LOS	F	A	E	F	A	A	F	B	B	F	D	A
Approach Vol, veh/h		812			28			2005			2029	
Approach Delay, s/veh		69.5			96.5			33.5			36.1	
Approach LOS		E			F			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	36.5	118.9		11.1	15.1	140.3		32.7				
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0				
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0				
Max Q Clear Time (g_c+I1), s	22.3	82.8		5.1	9.1	47.3		24.0				
Green Ext Time (p_c), s	1.3	30.1		0.0	0.0	18.7		1.7				
Intersection Summary												
HCM 6th Ctrl Delay			40.9									
HCM 6th LOS			D									
Notes												

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	135	5	70	5	1730	90	95	2195	10
Future Volume (veh/h)	5	0	5	135	5	70	5	1730	90	95	2195	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1880	95	103	2386	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2446	123	129	2816	13
Arrive On Green	0.13	0.00	0.12	0.13	0.13	0.12	0.01	0.94	0.93	0.07	0.78	0.77
Sat Flow, veh/h	1144	37	236	1416	858	858	1781	3444	173	1781	3627	17
Grp Volume(v), veh/h	6	0	0	147	0	10	5	962	1013	103	1168	1229
Grp Sat Flow(s),veh/h/ln	1418	0	0	1416	0	1716	1781	1777	1839	1781	1777	1867
Q Serve(g_s), s	0.0	0.0	0.0	12.3	0.0	0.7	0.4	14.0	15.1	7.4	55.8	56.0
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	14.0	15.1	7.4	55.8	56.0
Prop In Lane	0.83		0.17	1.00		0.50	1.00		0.09	1.00		0.01
Lane Grp Cap(c), veh/h	228	0	0	234	0	215	11	1262	1306	129	1379	1450
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.76	0.78	0.80	0.85	0.85
Avail Cap(c_a), veh/h	313	0	0	319	0	317	151	1262	1306	151	1379	1450
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.65	0.65	0.65	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	0.0	0.0	55.4	0.0	50.3	64.2	1.4	1.5	59.3	9.5	9.5
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.7	0.0	0.1	6.4	2.9	3.0	19.0	6.6	6.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	4.9	0.0	0.3	0.2	2.5	2.7	4.0	19.5	20.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.4	70.6	4.3	4.5	78.3	16.1	15.9
LnGrp LOS	D	A	A	E	A	D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1980			2500	
Approach Delay, s/veh		50.0			57.6			4.6			18.5	
Approach LOS		D			E			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.8	104.9		20.3	13.4	96.3		20.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	82.0		23.0	11.0	82.0		23.0
Max Q Clear Time (g_c+I1), s	2.4	58.0		15.0	9.4	17.1		2.7
Green Ext Time (p_c), s	0.0	22.8		0.3	0.0	45.4		0.0

Intersection Summary	
HCM 6th Ctrl Delay	13.9
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	5	15	65	5	15	15	1650	15	10	1945	280
Future Volume (veh/h)	150	5	15	65	5	15	15	1650	15	10	1945	280
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	163	5	14	71	5	9	16	1793	16	11	2114	236
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	244	6	16	244	19	25	19	2733	24	13	2680	1195
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.01	0.76	0.75	0.01	0.75	0.75
Sat Flow, veh/h	1344	41	115	1352	130	176	1781	3609	32	1781	3554	1584
Grp Volume(v), veh/h	182	0	0	85	0	0	16	882	927	11	2114	236
Grp Sat Flow(s),veh/h/ln	1501	0	0	1658	0	0	1781	1777	1865	1781	1777	1584
Q Serve(g_s), s	9.4	0.0	0.0	0.0	0.0	0.0	1.2	31.1	31.2	0.8	46.9	5.6
Cycle Q Clear(g_c), s	15.2	0.0	0.0	5.8	0.0	0.0	1.2	31.1	31.2	0.8	46.9	5.6
Prop In Lane	0.90		0.08	0.84		0.11	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	267	0	0	288	0	0	19	1346	1412	13	2680	1195
V/C Ratio(X)	0.68	0.00	0.00	0.30	0.00	0.00	0.84	0.66	0.66	0.82	0.79	0.20
Avail Cap(c_a), veh/h	348	0	0	370	0	0	110	1346	1412	110	2680	1195
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.55	0.55	0.55	0.38	0.38	0.38
Uniform Delay (d), s/veh	54.0	0.0	0.0	50.3	0.0	0.0	64.2	7.6	7.6	64.4	9.7	4.6
Incr Delay (d2), s/veh	3.6	0.0	0.0	0.6	0.0	0.0	17.6	1.4	1.3	15.3	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.0	0.0	2.6	0.0	0.0	0.6	10.4	11.0	0.4	15.4	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.6	0.0	0.0	50.9	0.0	0.0	81.8	9.0	9.0	79.7	10.6	4.8
LnGrp LOS	E	A	A	D	A	A	F	A	A	E	B	A
Approach Vol, veh/h		182			85			1825			2361	
Approach Delay, s/veh		57.6			50.9			9.6			10.4	
Approach LOS		E			D			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	102.0		22.6	5.0	102.5		22.6				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	83.0		25.0	8.0	83.0		25.0				
Max Q Clear Time (g_c+I1), s	3.2	48.9		7.8	2.8	33.2		17.2				
Green Ext Time (p_c), s	0.0	32.3		0.2	0.0	39.9		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			12.8									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	20	50	90	20	20	60	1670	60	15	1950	140
Future Volume (veh/h)	210	20	50	90	20	20	60	1670	60	15	1950	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	228	22	7	98	22	2	65	1815	63	16	2120	148
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	313	268	85	308	333	30	83	2452	85	19	2239	154
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.19	0.06	0.93	0.92	0.01	0.88	0.87
Sat Flow, veh/h	1381	1358	432	1375	1688	153	1781	3504	121	1781	3372	233
Grp Volume(v), veh/h	228	0	29	98	0	24	65	916	962	16	1105	1163
Grp Sat Flow(s),veh/h/ln	1381	0	1790	1375	0	1842	1781	1777	1848	1781	1777	1828
Q Serve(g_s), s	20.9	0.0	1.7	8.1	0.0	1.4	4.7	14.8	15.4	1.2	54.7	63.1
Cycle Q Clear(g_c), s	22.3	0.0	1.7	9.9	0.0	1.4	4.7	14.8	15.4	1.2	54.7	63.1
Prop In Lane	1.00		0.24	1.00		0.08	1.00		0.07	1.00		0.13
Lane Grp Cap(c), veh/h	313	0	353	308	0	363	83	1243	1293	19	1180	1214
V/C Ratio(X)	0.73	0.00	0.08	0.32	0.00	0.07	0.78	0.74	0.74	0.84	0.94	0.96
Avail Cap(c_a), veh/h	349	0	399	344	0	411	110	1243	1293	110	1180	1214
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.09	0.09	0.09	0.47	0.47	0.47
Uniform Delay (d), s/veh	51.5	0.0	42.6	46.6	0.0	42.5	60.3	1.9	1.9	64.0	5.8	6.3
Incr Delay (d2), s/veh	6.7	0.0	0.1	0.6	0.0	0.1	1.8	0.4	0.4	15.4	8.2	10.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.9	0.0	0.8	2.9	0.0	0.6	2.1	2.0	2.1	0.6	7.1	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.2	0.0	42.7	47.2	0.0	42.6	62.1	2.2	2.3	79.4	14.0	16.6
LnGrp LOS	E	A	D	D	A	D	E	A	A	E	B	B
Approach Vol, veh/h		257			122			1943			2284	
Approach Delay, s/veh		56.4			46.3			4.2			15.8	
Approach LOS		E			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	90.3		29.6	5.4	95.0		29.6				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	8.0	80.0		28.0	8.0	80.0		28.0				
Max Q Clear Time (g_c+I1), s	6.7	65.1		11.9	3.2	17.4		24.3				
Green Ext Time (p_c), s	0.0	14.2		0.4	0.0	40.8		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			14.0
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	65	70	195	90	875	50	805	190	555	1285	80
Future Volume (veh/h)	25	65	70	195	90	875	50	805	190	555	1285	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.94	0.96		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	27	71	8	212	98	0	54	875	149	603	1397	84
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	191	207	307	461		70	891	747	638	2118	127
Arrive On Green	0.14	0.14	0.14	0.08	0.25	0.00	0.04	0.48	0.48	0.25	0.83	0.82
Sat Flow, veh/h	327	1374	1493	1781	1870	1585	1781	1870	1567	3456	3406	204
Grp Volume(v), veh/h	98	0	8	212	98	0	54	875	149	603	727	754
Grp Sat Flow(s),veh/h/ln	1701	0	1493	1781	1870	1585	1781	1870	1567	1728	1777	1833
Q Serve(g_s), s	1.4	0.0	0.6	10.0	5.4	0.0	3.9	59.8	7.2	22.3	20.2	20.5
Cycle Q Clear(g_c), s	6.4	0.0	0.6	10.0	5.4	0.0	3.9	59.8	7.2	22.3	20.2	20.5
Prop In Lane	0.28		1.00	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	272	0	207	307	461		70	891	747	638	1105	1140
V/C Ratio(X)	0.36	0.00	0.04	0.69	0.21		0.77	0.98	0.20	0.95	0.66	0.66
Avail Cap(c_a), veh/h	334	0	264	307	532		329	891	747	638	1105	1140
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.79	0.79	0.79	0.20	0.20	0.20
Uniform Delay (d), s/veh	50.9	0.0	48.5	46.1	38.9	0.0	61.9	33.5	19.7	48.4	6.0	6.1
Incr Delay (d2), s/veh	0.8	0.0	0.1	6.5	0.2	0.0	5.2	22.8	0.5	6.8	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.2	2.3	2.6	0.0	1.9	31.6	2.7	9.7	4.5	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	0.0	48.5	52.6	39.2	0.0	67.0	56.3	20.2	55.2	6.6	6.7
LnGrp LOS	D	A	D	D	D		E	E	C	E	A	A
Approach Vol, veh/h		106			310	A		1078			2084	
Approach Delay, s/veh		51.4			48.3			51.8			20.7	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.1	84.8	14.0	22.1	28.0	65.9		36.1
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	24.0	56.0	9.0	22.0	24.0	56.0		36.0
Max Q Clear Time (g_c+I1), s	15.9	22.5	12.0	8.4	24.3	61.8		7.4
Green Ext Time (p_c), s	0.1	19.5	0.0	0.3	0.0	0.0		0.3

Intersection Summary	
HCM 6th Ctrl Delay	33.4
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.2					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	20	830	35	0	985
Future Vol, veh/h	0	20	830	35	0	985
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	22	902	38	0	1071

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	902	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	336	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	336	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.5	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	336	-
HCM Lane V/C Ratio	-	-	0.065	-
HCM Control Delay (s)	-	-	16.5	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	80	50	950	90	50	1030
Future Vol, veh/h	80	50	950	90	50	1030
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	54	1033	98	54	1120

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2261	1033	0	0	1131	0
Stage 1	1033	-	-	-	-	-
Stage 2	1228	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 45	282	-	-	618	-
Stage 1	343	-	-	-	-	-
Stage 2	277	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 41	282	-	-	618	-
Mov Cap-2 Maneuver	137	-	-	-	-	-
Stage 1	313	-	-	-	-	-
Stage 2	277	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	50.2	0	0.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	137	282	618	-
HCM Lane V/C Ratio	-	-	0.635	0.193	0.088	-
HCM Control Delay (s)	-	-	68.5	20.8	11.4	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	3.4	0.7	0.3	-

Notes

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

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	155	210	0	140	0	195	0	0	0	0	45
Future Vol, veh/h	50	155	210	0	140	0	195	0	0	0	0	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	168	228	0	152	0	212	0	0	0	0	49

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	152	0	0	396	0	0	567	542	198	344	656	152
Stage 1	-	-	-	-	-	-	390	390	-	152	152	-
Stage 2	-	-	-	-	-	-	177	152	-	192	504	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1428	-	-	1161	-	-	420	447	811	598	384	894
Stage 1	-	-	-	-	-	-	606	607	-	850	771	-
Stage 2	-	-	-	-	-	-	824	771	-	792	540	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1428	-	-	1161	-	-	386	430	811	581	369	894
Mov Cap-2 Maneuver	-	-	-	-	-	-	386	430	-	581	369	-
Stage 1	-	-	-	-	-	-	583	584	-	818	771	-
Stage 2	-	-	-	-	-	-	779	771	-	762	519	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0	25.1	9.3
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	386	1428	-	-	1161	-	-	894
HCM Lane V/C Ratio	0.549	0.038	-	-	-	-	-	0.055
HCM Control Delay (s)	25.1	7.6	-	-	0	-	-	9.3
HCM Lane LOS	D	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	3.2	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	20	75	0	25	0	65	0	0	0	0	55
Future Vol, veh/h	60	20	75	0	25	0	65	0	0	0	0	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	22	82	0	27	0	71	0	0	0	0	60

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	27	0	0	104	0	0	250	220	52	168	261	27
Stage 1	-	-	-	-	-	-	193	193	-	27	27	-
Stage 2	-	-	-	-	-	-	57	27	-	141	234	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1586	-	-	1487	-	-	693	678	1005	788	643	1048
Stage 1	-	-	-	-	-	-	791	740	-	990	872	-
Stage 2	-	-	-	-	-	-	954	872	-	848	711	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1586	-	-	1487	-	-	633	650	1005	764	617	1048
Mov Cap-2 Maneuver	-	-	-	-	-	-	633	650	-	764	617	-
Stage 1	-	-	-	-	-	-	759	710	-	949	872	-
Stage 2	-	-	-	-	-	-	900	872	-	813	682	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.9	0	11.4	8.6
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	633	1586	-	-	1487	-	-	1048
HCM Lane V/C Ratio	0.112	0.041	-	-	-	-	-	0.057
HCM Control Delay (s)	11.4	7.4	-	-	0	-	-	8.6
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	65	40	0	55	0	45	0	0	0	0	30
Future Vol, veh/h	35	65	40	0	55	0	45	0	0	0	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	71	43	0	60	0	49	0	0	0	0	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	60	0	0	114	0	0	246	229	93	229	250	60
Stage 1	-	-	-	-	-	-	169	169	-	60	60	-
Stage 2	-	-	-	-	-	-	77	60	-	169	190	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1544	-	-	1475	-	-	708	671	964	726	653	1005
Stage 1	-	-	-	-	-	-	833	759	-	951	845	-
Stage 2	-	-	-	-	-	-	932	845	-	833	743	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1544	-	-	1475	-	-	671	654	964	711	636	1005
Mov Cap-2 Maneuver	-	-	-	-	-	-	671	654	-	711	636	-
Stage 1	-	-	-	-	-	-	811	739	-	926	845	-
Stage 2	-	-	-	-	-	-	902	845	-	811	724	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0	10.8	8.7
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	671	1544	-	-	1475	-	-	1005
HCM Lane V/C Ratio	0.073	0.025	-	-	-	-	-	0.032
HCM Control Delay (s)	10.8	7.4	0	-	0	-	-	8.7
HCM Lane LOS	B	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	35	35	0	30	30	0
Future Vol, veh/h	35	35	0	30	30	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	38	0	33	33	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	76	0	90	57
Stage 1	-	-	-	-	57	-
Stage 2	-	-	-	-	33	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1523	-	910	1009
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	989	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1523	-	910	1009
Mov Cap-2 Maneuver	-	-	-	-	910	-
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	989	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	910	-	-	1523	-
HCM Lane V/C Ratio	0.036	-	-	-	-
HCM Control Delay (s)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX D

ROADWAY IMPROVEMENTS PLAN

Appendix D: Roadway Improvements Summary

Buildout Year	Project Scenario	Intersection	Roadway Improvement
ROADWAY IMPROVEMENTS WITHOUT PULELEHUA			
Planned Roadway Improvements (Without Project)		Honoapiilani Highway/ Napilihau Street	- Construct an exclusive right-turn lane on the northbound Honoapiilani Highway approach. - Construct an exclusive left-turn lane and shared through/right-turn lane on the westbound Napilihau Street approach.
Base Year 2022 (Without Project)	--	Honoapiilani Highway/ Kaanapali Parkway/ Halelo Street	- Construct an additional eastbound left-turn lane, resulting in a dedicated left-turn lane, shared left-turn/through lane and two (2) dedicated right-turn lanes.
Base Year 2025 (Without Project)	--	--	- No roadway improvements recommended.
Base Year 2030 (Without Project)	--	Honoapiilani Highway/ Kapunakea Street	- Consider restriping to provide exclusive eastbound left-turn lane and shared through/right-turn lane.
Base Year 2035 (Without Project)	--	--	- No roadway improvements recommended.

Appendix D: Roadway Improvements Summary cont'd

Buildout Year	Project Scenario	Intersection	Roadway Improvement
ROADWAY IMPROVEMENTS WITH PULELEHUA			
Future Year 2022 (With Project)	Scenario 1	Honoapiilani Highway/ Project Retail Area North RIRO Access [1]	- Northbound right-turn lane → Provide a new right-turn with at least a 100 feet of storage space.
Future Year 2025 (With Project)	Scenario 2	Akahele Street/Road A and Road C	- Consider installing left-turn storage lanes along Akahele Street at Road A and Road C.
Future Year 2030 (With Project)	Scenario 3	Honoapiilani Highway/ Akahele Street [1]	- Optimize signal timing plan. - Northbound left-turn lane → Lengthen lane to provide at least 250 feet of storage space. - Westbound left-turn lane → Lengthen lane to provide at least 200 feet of storage space.
		Honoapiilani Highway/ Road J (Project South Access) [1]	- Consider provide a median refuge lane along Honoapiilani Highway for westbound left-turn vehicles. - Northbound right-turn lane → Provide a new right-turn with at least a 100 feet of storage space. - Southhbound left-turn lane → Provide a new left-turn with at least a 100 feet of storage space. - Westbound left-turn lane → Provide a new right-turn with at least a 100 feet of storage space. - Monitor the intersection to determine if or when a traffic signal is warranted at the intersection.
Future Year 2035 (With Project)	Scenario 4	Honoapiilani Highway/ Akahele Street [1]	- Optimize signal timing plan. - Northbound left-turn lane → Lengthen lane to provide at least 275 feet of storage space. - Southhbound left-turn lane → Lengthen lane to provide at least 250 feet of storage space. - Westbound left-turn lane → Lengthen lane to provide at least 250 feet of storage space.

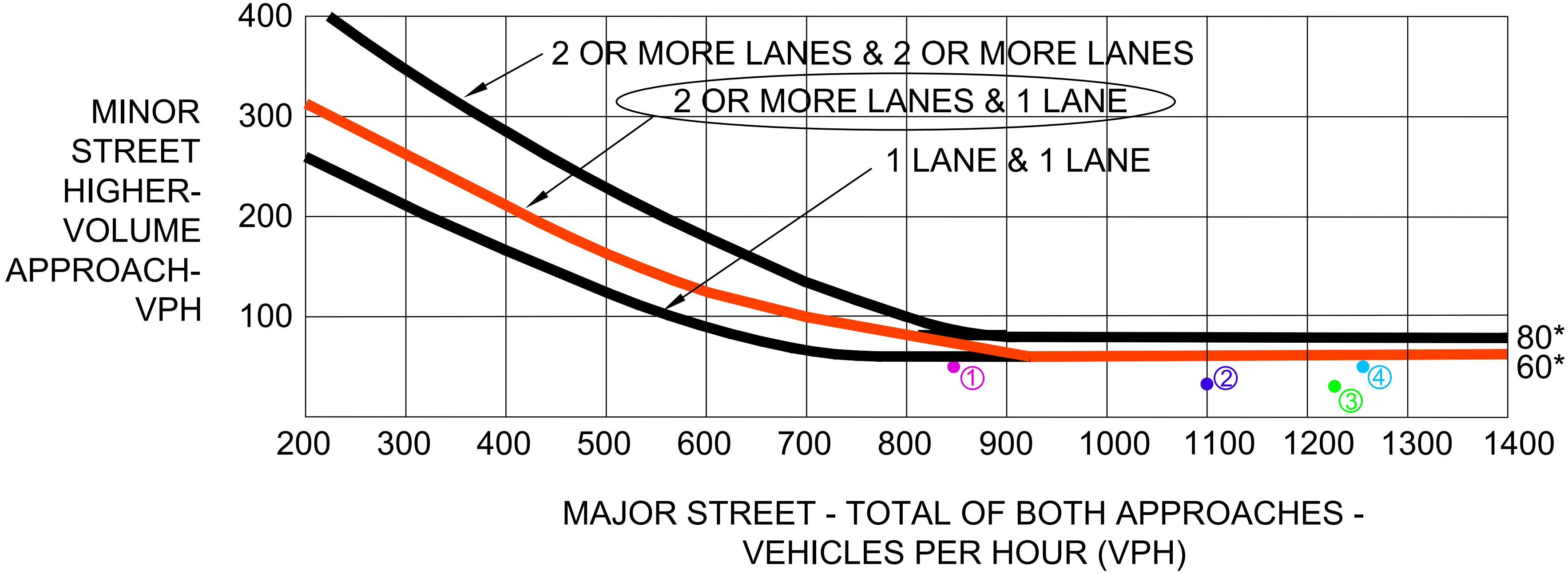
Notes:

1. Right-turn and left-turn lane lengths show required minimum storage space only. Additional taper length and/or deceleration length to be provided/verified upon intersection design. Based on AASHTO Green Book, 425 feet is recommended to accommodate full deceleration length with a design speed of 50 mph.

APPENDIX E

SIGNAL WARRANT

Warrant 2, Four-Hour Vehicular Volume (70% Factor)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

① (7:15 AM to 8:15 PM), (845, 50)
② (1:45 PM to 2:45 PM), (1099, 31)
③ (2:45 PM to 3:45 PM), (1227, 29)
④ (3:45 PM to 4:45 PM), (1255, 50)

PULELEHUA	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE
	FUTURE YEAR 2035 FOUR HOUR TRAFFIC SIGNAL WARRANT FOR HONOAPIILANI HIGHWAY/ROAD J INTERSECTION	E.1

EXHIBIT N-1

Agreement for Water Delivery (Pulelehua) between Maui Land & Pineapple Company, Inc. and Maui Oceanview LP dated June 3, 2016

AGREEMENT FOR WATER DELIVERY
(PULELEHUA)

THIS AGREEMENT ("Agreement") is made and entered into on this 3rd day of June, 2016, by and between **MAUI LAND & PINEAPPLE COMPANY, INC.**, a Hawaii corporation, whose address is 200 Village Drive, Kapalua, Hawaii 96761, hereinafter called "MLP", and **MAUI OCEANVIEW LP**, a Delaware limited partnership, whose address is 2525 McKinney Avenue, Suite B, Dallas, Texas 75201, hereinafter called "Developer".

RECITALS:

A. MLP is the owner and operator of the "Honolua Ditch" surface water collection, transmission and delivery system (the "Water System") that provides non-potable water for use in the businesses and operations of MLP and for use by others pursuant to agreements that MLP has entered into with such others.

B. Developer is the owner of certain unimproved parcels of land located in Lahaina, Maui, Hawaii, described as Lots 1 and 2 of the Mahinahina Mauka Subdivision (currently TMK Nos. (2) 4-3-1-82 & -83, respectively), which will be the site of the proposed Pulelehua development, a planned, mixed-use community (the "Project").

C. MLP is the owner of the land located at Mahinahina 1, 2, 3 and 4, Kaanapali, Lahaina, Island and County of Maui, State of Hawaii, identified by Tax Map Key No. (2) 4-3-001-084, being Lot 3 of the Mahinahina Mauka Subdivision ("Lot 3"), which contains a water reservoir that has the capacity to store approximately five million gallons of water ("Reservoir 17"), and Tax Map Key No. (2) 4-4-002-016 (the "Reservoir 140 Lot"), which are more described in Exhibit A together with all improvements located thereon (collectively, the "Reservoirs").

D. The parties desire to enter into this Agreement to set forth the terms and conditions upon which MLP will (1) provide non-potable water from its Water System to supply the Project and (2) convey the Reservoirs and the real property relating to the Reservoirs and the Water Well to Developer, subject to the terms herein.

NOW, THEREFORE, in consideration of the above and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties agree as follows:

1. **Private Water System Easement**. On or about the date of this Agreement, MLP and Developer are entering into that certain Grant of Pulelehua Private Water System Easement (the "Grant"). The Grant provides for, among other things, the granting of easements over and across Lot 3 and the Reservoir 140 Lot for Developer to construct a Water Treatment Plant, Water Well, Reservoir Facilities, Transmission Facilities and Electric Lines (as such terms are defined in the Grant) in connection with the transmission of water from the Water System to the Reservoirs and the Project. All capitalized terms used but not defined herein shall have the meanings ascribed to such terms in the Grant.

2. **Options to Purchase Real Property, Reservoirs and Water Well**. MLP hereby grants to Developer a ten (10) year option (each an "Option" and collectively the "Options") to purchase from MLP, at no cost, the following: (a) the Reservoir 140 Lot, together with the reservoir and any improvements thereon (but excluding the portions of the Honolua Ditch located within Reservoir Lot 140, for which MLP will reserve a perpetual easement in a form reasonably agreed upon by MLP and Developer) ; (b) Reservoir 17, together with up to five (5) acres surrounding Reservoir 17 (hereinafter referred to as the "Reservoir 17 Lot"), the location and acreage of the Reservoir 17 Lot to be reasonably agreed upon between MLP and Developer (provided Developer shall be responsible for any and all costs associated with subdividing the Reservoir 17 Lot, including any permits needed in connection with such subdivision and the construction of Developer's Water Treatment Plant); and (c) up to one-half (1/2) an acre of Lot 3 to construct the Water Well and all necessary water infrastructure and water lines to service the Project, such ½ acre site to be at an elevation of at least 1,200 feet above sea level and in close proximity to Developer's Water Treatment Plant at a location reasonably agreed upon between MLP and Developer (provided Developer shall be responsible for any and all costs and permits associated with subdividing the well lot). Developer may exercise any of the Options, whether individually or simultaneously, granted in this Section 2 by providing MLP with written notice of Developer's election to exercise such Option. MLP shall convey the properties to Developer or its designee by limited warranty deed and free of any monetary liens or other encumbrances that would impair use of the properties for the purposes contemplated by this Agreement, but subject to all other encumbrances of record. The rights of Developer with respect to the Options shall terminate on the date that is ten (10) years from the date of this Agreement.

3. **Delivery of Water**. Subject to the terms and conditions herein, MLP agrees to deliver non-potable water from the Water System to Developer. MLP will make such water available for Developer to draw from the existing Honolua Ditch water transport channel at the location of Developer's water treatments facilities adjacent to the ditch. Developer shall be entitled to draw from the ditch non-potable water in such amounts as needed to meet the potable and non-potable water demands of the Project of up to 0.750 Million Gallons Per Day ("MGD"). Water delivered pursuant to this Agreement shall be used for the Project only and may not be transmitted to or used on any lands other than the parcels identified in Exhibit A, provided that Developer may elect to provide water that Developer is entitled to draw under this Agreement to the County of Maui Department of Water Supply ("DWS") in exchange for DWS service to the Project.

4. **Treatment and Use**. Water that Developer draws pursuant to this Agreement may not be used for potable water purposes unless Developer at its expense first filters and treats the water until it meets all state and federal drinking water laws, regulations and standards. Developer's water service to the Project shall at all times comply with applicable laws and regulations. Developer shall not use water from the Water System to serve owners or occupants of the Project until Developer receives certification for such service from the Public Utilities Commission of the State of Hawaii ("PUC") (i.e., a Certificate of Public Convenience and Necessity). Developer agrees to implement reasonable measures in the development of the Project to mitigate demand for water from the Water System, such as imposing restrictive covenants and rules to prohibit excessive water use, requiring landscaping with drought-tolerant lawns and plantings, and use of alternative water sources for irrigation where feasible.

5. **Use Priorities**. Developer acknowledges and agrees that MLP: (a) shall have the right to provide water from MLP's Water System to DWS and others for production of potable water ("Potable Uses"); provided, however, with respect to Potable Uses, the parties acknowledge and agree that (i) as of the date of this Agreement, the only parties that MLP has contracted with and granted the right to produce potable water from MLP's Water System are DWS and Developer, (ii) MLP shall provide notice to Developer if MLP enters into an agreement with any other party with respect to Potable Uses; provided, however, DWS and Developer shall have priority over any other party, whether now or in the future for so long as this Agreement is in effect, claiming any right to Potable Uses, and (iii) despite using the Water System for Potable Uses and Current Non-Potable Uses (as defined in Section 5(b) below), Developer shall have priority over any other party (except for DWS), whether now or in the future for so long as this Agreement is in effect, claiming any right to use MLP's Water System for potable and non-potable water; (b) shall have the right to continue to provide water for non-potable use to Kapalua Water Company and other existing non-potable users (the "Current Non-Potable Uses"); and (c) shall have the right to provide additional non-potable water to existing and new non-potable users pursuant to other water purchase agreements that MLP may enter into from time to time (collectively the "New Non-Potable Uses"). In the event of drought or other conditions that may reduce the water available to MLP below the amount required for MLP to meet its various potable and non-potable demands, commitments and requirements, the parties agree that MLP shall allocate its water resources as follows: first, to satisfy all Potable Uses, including Potable Uses at the Project, in the priority of their respective water delivery agreements, which reflect DWS and Developer having priority of any other party with respect to Potable Uses; second, to satisfy Current Non-Potable Uses; provided, however, that if there is insufficient water to satisfy all Current Non-Potable Uses, MLP shall have the right to reduce the amount of water delivered for non-potable use, provided that the delivery of water for all other Current Non-Potable Uses shall be similarly reduced in a nondiscriminatory manner based upon each Current Non-Potable Use's respective non-potable water usage over the preceding twelve months; and third, to the extent available, to satisfy the New Non-Potable Uses.

6. **Water Delivery Charges**. MLP will deliver such water through the Water System and the Project will accept delivery of such water at the delivery location and in the quantities above specified (or such lesser quantities that may be specified by Developer from time to time) and will pay for the same at the initial rate of $310.00 per million gallons (i.e., $0.310 per thousand gallons) plus the Hawaii general excise tax thereon, payable monthly in arrears (or such other time periods as may be mutually agreed upon by the parties in writing). On each anniversary of the date of this Agreement, the rate then in effect shall be increased by a percentage equal to the percentage increase over the preceding twelve months in the Consumer Price Index for All Urban Consumers (CPI-U) for Honolulu published by the U.S. Department of Labor – Bureau of Labor Statistics (1982-84=100) ("CPI"); provided that if such index is discontinued MLP shall have the right to reasonably designate an alternative index of inflation. MLP reserves the right at any time to adjust the rate in effect from time to time to be commensurate with any material increase in MLP's costs in operating and maintaining the Water System, provided that (1) MLP shall provide Developer with no less than thirty (30) days notice of such rate adjustment which notice shall include reasonably detailed information supporting such increase, (2) such an increase shall be permitted only to the extent that the increases in MLP's costs in operating and maintaining the Water System exceed the increases in the rate based on CPI as provided in the preceding sentence, and (3) the increase in the rate shall reflect a

proportionate allocation of the cost increase among all users, such that Developer does not disproportionately bear the impact of cost increases. The cost of any repairs or replacements performed for or on behalf of MLP in operating and maintaining the Water System which are classified as capital improvements under generally accepted accounting principles shall be amortized over the useful life of the improvement. To the extent MLP passes such capital improvement costs to the users of the Water System, in any particular calendar year, MLP shall only be allowed to pass along the amortized portion of the capital improvement attributable to such calendar year in accordance with the terms and requirements of subsections (1) through (3) hereinabove. Developer shall pay to MLP together with each payment required hereunder which is subject to the State of Hawaii general excise tax on gross income, as it may be amended from time to time, or any successor or similar tax, an amount which, when added to such payment (currently 4.166% of each such payment), shall yield to MLP, after deduction of all such tax payable by MLP with respect to all such payments, a net amount equal to that which MLP would have realized from such payments had no such tax been imposed.

7. **Water Meters**. Developer shall, at its own expense, install and maintain suitable gauges or meters at accessible locations to accurately measure all water taken by Developer from the Water System. Such gauges or meter shall be subject to MLP's reasonable approval, such approval to not be unreasonably withheld, conditioned or delayed, and representatives of MLP shall have access to such gauges or meters at all reasonable times for the purpose of reading and checking the same.

8. **This Agreement is Non-Expiring; Abandonment**. This Agreement shall remain in effect until terminated by mutual agreement of the parties, provided that this Agreement may be terminated by MLP if, following the date on which Developer's Water Treatment Plant is placed in service, Developer voluntarily stops drawing material quantities of water from the Water System for use at the Project for two (2) consecutive years and Developer does not resume drawing material quantities within six (6) months of the date that Developer receives notice from MLP of MLP's intent to terminate this Agreement pursuant to the terms herein. Furthermore, this Agreement may be terminated by Developer if, following the date on which Developer's Water Treatment Plan is placed in service, Developer notifies MLP that Developer no longer requires material quantities of water from the Water System. For purposes of this Section 8, "material quantities" is defined as 36,000,000 gallons in any given calendar year. *[Drafting note: this figure is based on approximately 100,000 gallons per day, which is a small fraction of Pulelehua's total estimated usage at build-out of 750,000 gpd.]*

9. **MLP's Warranties, Representations & Covenants**. MLP warrants and represents to Developer (a) that MLP is the owner in fee simple or holds recorded easements for all of the lands underlying the portions of the Water System necessary to deliver water to the Reservoirs and the Project pursuant to this Agreement, (b) that MLP currently holds, and will use commercially reasonable efforts to at all times maintain, all permits and approvals required by law for the operation of the Water System, including those required by the Commission on Water Resource Management of the State of Hawaii ("CWRM") and the County of Maui, which efforts will be comparable to the efforts used by MLP to manage, repair and maintain the Water System for all other users, (c) that MLP will at all times exercise commercially reasonable efforts to manage, repair and maintain the Water System in condition adequate for the reliable delivery of water to the Reservoirs and the Project in accordance with this Agreement, and (d) that the Water

System will not be relocated during the term of this Agreement. Except as set forth throughout this Agreement, MLP makes no warranties, express or implied, as to water quality available to Developer, or any other warranties.

10. **Force Majeure**. Developer and MLP agree and understand that their ability to perform their respective obligations under this Agreement are made expressly subject to earthquake, hurricanes, drought, landslides, tunnel or ditch collapse or other natural disasters or events which render MLP's Water System temporarily or permanently inoperable, actions of CWRM, the PUC or other federal, state and county governments or agencies thereof, including without limitation enactment or enforcement of laws or governmental regulations, strikes, lock-outs, unavailability of labor or materials, wars, insurrections, rebellions, civil disorder, declaration of national emergencies, acts of God, or other causes beyond MLP's and/or Developer's respective control (collectively "*force majeure*"). Neither party shall have any liability for failure or inability to perform its obligations hereunder to the extent such failure or inability is caused by any such a *force majeure* cause or event. Developer further acknowledges and agrees that if the Water System is substantially damaged or destroyed by natural disasters, tunnel collapse or ditch collapse or similar *force majeure* events there is no assurance that it is possible to rebuild the Water System and MLP shall not be obligated to undertake such rebuilding unless all necessary governmental approvals are issued and adequate funding of such work is first committed by governmental agencies, users of the Water System, lenders and any other available sources.

11. **PUC Commitments**. If this Agreement and/or the services provided hereunder (including without limitation the provision of water to the Project) shall at any time be determined by the PUC to require regulation and/or certification (i.e., a Certificate of Public Convenience and Necessity) by the PUC, then MLP at its sole cost and expense, shall use its reasonable best efforts and diligence to obtain such certification or other authorization from the PUC that would allow MLP (or such other entity as may be assigned or designated by MLP) to continue to provide water and/or said services to the Project pursuant to the terms of this Agreement. As part of said proceeding requesting such certification or authorization, MLP agrees to request PUC approval of a tariffed rate or rates for the services covered under this Agreement at the lower of either (1) the rate in effect under this Agreement at that time, or (2) rate(s) designed to (a) recover the then current operating expenses of the water operations, (b) a reasonable reserve for capital repairs and maintenance, and (c) a reasonable return of investment on any applicable rate base. During the pendency of such proceedings, MLP agrees, unless ordered otherwise by PUC or court order, that MLP (or its designated entity) will continue to provide water to the Project in the amount specified in this Agreement and on all of the other terms and conditions set forth in this Agreement. Notwithstanding the above, Developer agrees and acknowledges that the rate(s) that may ultimately be approved by the PUC and at which Developer will be obligated to pay may be different than the rate(s) proposed as part of that proceeding, and that said rate(s) as may ultimately be approved by the PUC and at which Developer will be obligated to pay may change from time to time by order or approval of the PUC.

12. **Condemnation**. This Agreement does not confer on Developer any right, title or interest in the Water System, which remains the sole property of MLP. If the Water System or any part thereof shall be taken or condemned by any authority having the power of

eminent domain, Developer shall have no claim to compensation for the taking of the Water System but Developer shall be entitled to seek compensation and damages from the condemning authority for the loss of Developer's rights and interests under this Agreement, including inverse condemnation damages arising from the diminution in value of the Project from the loss of rights to obtain water from the Water System.

13. **Indemnity**. Developer shall defend and indemnify MLP to the maximum extent permitted by law against any suit or claim brought, or loss suffered or liability incurred by MLP, including all reasonable fees and litigation costs and expenses, arising out of any claim for personal injury (including death) or damage to or the loss of property, resulting from the use of the Water System by Developer and the end recipients at the Project, or consumption of water at the Project, in connection with water delivered pursuant to this Agreement.

14. **Defaults and Remedies**. If a party fails to perform any of the terms, covenants and agreements contained herein, if such failure continues for a period of thirty (30) days after written notice, then the non-defaulting party shall be entitled to all remedies available to it at law or equity, including by way of example and not in limitation thereof, the right to sue such person for specific performance, injunctive relief and/or monetary damages, including without limitation, reasonable attorneys' fees, costs and expenses.

15. **Attorneys Fees**. Should any party hereto employ an attorney for the purpose of enforcing or construing this Agreement, or any judgment based on this Agreement, in any legal proceeding whatsoever, including insolvency, bankruptcy, arbitration, declaratory relief or other litigation, the prevailing party shall be entitled to receive from the other party or parties thereto reimbursement for all reasonable attorneys' fees and all costs, whether incurred at the trial or appellate level, including but not limited to service of process, filing fees, court and court reporter costs, investigative costs, expert witness fees and the cost of any bonds, whether taxable or not, and such reimbursement shall be included in any judgment, decree or final order issued in that proceeding. The "prevailing party" means the party in whose favor a judgment, decree, or final order is rendered.

16. **Notices**. All communications hereunder will be in writing and shall be deemed duly communicated when delivered in person, sent by facsimile transmission, sent by email, or four (4) days after being sent by certified or registered mail, postage prepaid, addressed to:

if to MLP, to:

Maui Land & Pineapple Company, Inc.
200 Village Road
Lahaina, HI 96761
Attention: Tim T. Esaki
Email: tesaki@mlpmaui.com
Telephone: (808) 665-5480
Facsimile: (808) 665-0641

with a copy to:

Cades Schutte LLP
444 Hana Highway Suite 204
Kahului, Hawaii 96732
Attention: Rick Kiefer
Email: rkiefer@cades.com
Telephone: (808) 871-9700
Facsimile: (808) 871-6017

if to Developer, to:

Maui Oceanview LP
2525 McKinney Avenue, Suite B
Dallas, Texas 75201
Attention: Paul Cheng
Email: paulc@chenginvestments.com
Telephone: (214) 415-8868
Facsimile: (214) 731-9600

with a copy to:

Kessler Collins, P.C.
2100 Ross Avenue, Suite 750
Dallas, Texas 75201
Attention: Anthony J. Barbieri
Email: ajb@kesslercollins.com
Telephone: (214) 379-0733
Facsimile: (214) 373-4714

17. **Assignment**. Developer may assign this Agreement, in whole or in part, without MLP's consent (a) in connection with the transfer by Developer of the Project, (b) to a corporation, limited liability company, partnership or other entity wholly owned by, or in common control with Developer, or (c) to a private water company formed or engaged by Developer to provide PUC-regulated water service to the Project. Otherwise Developer may not assign any rights hereunder without the prior written consent of MLP, which consent may be withheld in MLP's sole discretion.

18. **Binding Effect**. This Agreement shall be binding on, and shall inure to the benefit of, the parties and their successors and permitted assigns.

19. **Counterparts**. This Agreement may be executed in any number of counterparts, each of which so executed shall be deemed an original; such counterparts shall together constitute but one agreement. A facsimile copy of a signature shall constitute an original signature for purposes of the execution of this Agreement.

20. **Amendment**. No modification, waiver, amendment, discharge or change of this Agreement shall be valid unless the same is in writing and signed by the party against which the enforcement of such modification, waiver, amendment, discharge or change is or may be sought.

[SIGNATURES FOLLOW]

DATED: ___________________________, 2016.

MAUI LAND & PINEAPPLE COMPANY, INC.

By ___________________________
Name: Tim T. Esaki
Its: Chief Financial Officer

MLP

MAUI OCEANVIEW LP,
a Delaware limited partnership

By: Maui Oceanview GP Inc.,
a Texas corporation,
its sole general partner

By ___________________________
Name:
Its:

Developer

DATED: ___________________________, 2016.

MAUI LAND & PINEAPPLE COMPANY, INC.

By ____________________________________
Name:
Its:

MLP

MAUI OCEANVIEW LP,
a Delaware limited partnership

By: Maui Oceanview GP Inc.,
a Texas corporation,
its sole general partner

By ____________________________________
Name: Paul Cheng
Its: President

Developer

EXHIBIT A

Location and Description of Reservoirs

TMK (2) 4-3-001-084

All of that certain parcel of land (being portion(s) of the land(s) described in and covered by Royal Patent Grant Number 1166 to D. Baldwin, J. F. Pogue and S.E. Bishop, Royal Patent Number 415, Land Commission Award Number 75 to Charles Cockett, Royal Patent Number 1663, Land Commission Award Number 5524, Apana 1 to L. Konia, Royal Patent Number 4919, Land Commission Award Number 3925-M, Apana 2 to Lili, Royal Patent Number 4587, Land Commission Award Number 3925-G, Apana 2 to Apolo, Land Commission Award Number 10813, Apana 2 to L. Palina, Royal Patent Number 7945, Land Commission Award Number 3925-H, Apana 4 to Kaaha, Royal Patent Number 5037, Land Commission Award Number 9065, Apana 1 to Kuoioi, and Royal Patent Number 6231, Land Commission Award Number 3925-I, Apana 6 to Pala, also being all of Royal Patent Number 4698, Land Commission Award Number 4268, Apana 2 and 4 to Koiku, Royal Patent Number 5037, Land Commission Award Number 9065, Apana 3 to Kuoioi, and Land Commission Award Number 10,813, Apana 1 to L. Palina) situate, lying and being Alaeloa 1 and 2, Mailepai, Kahana, Mahinahina 1, 2, 3, and 4, Kaanapali, District of Lahaina, Island and County of Maui, State of Hawaii, being LOT 3 of the "MAHINAHINA MAUKA SUBDIVISION", as referenced on Subdivision Map dated September 15, 2009, last revised April 23, 2010 and approved by the Director of Public Works, County of Maui on May 12, 2010 (Subdivision File No. 4.955), bearing Tax Key designation (2) 4-3-001-084 and containing an area of 1,434.795 acres, more or less.

TMK (2) 4-4-002-016

-PARCEL FIRST:-

All of that certain parcel of land (being portion(s) of the land(s) described in and covered by Land Patent Grant Number 9269 to Pioneer Mill Company, Limited) situate, lying and being at Honokowai, District of Kaanapali, Island and County of Maui, State of Hawaii, being RESERVOIR SITE ON NORTH SIDE OF HONOKOWAI GULCH AND ON WEST SIDE OF HONOKOHAU DITCH RIGHT-OF-WAY and thus bounded and described as follows:

Beginning at the southeast corner of this lot, on the north side of Honokowai Gulch and on the west side of Honokohau Ditch Right-of-Way (40 feet wide), said corner being by true azimuths and distance 349° 33' 30" 87.13 feet from the Pioneer Mill Company's Triangulation Station "NORTH SIPHON", the coordinates of said triangulation station referred to Government Survey Triangulation Station "PUU KOLII" being 5364.0 feet north and 2432.9 feet west, as shown on Government Survey Registered Map No. 2534, and running by true azimuths:

1. 109° 27' 488.00 feet along the north side of Honokowai Gulch;

2. 186° 08' 707.00 feet along government land;

3. 198° 20' 288.00 feet along same;

4. 230° 08' 339.00 feet along same to the west side of Honokohau Ditch Right-of-Way (40 feet

wide);

5. 343° 31' 263.70 feet along the west side of Honokohau Ditch Right-of-Way (40 feet wide);

6. 323° 34' 265.85 feet along same;

7. 71° 50' 359.60 feet along same;

8. 350° 19' 187.65 feet along same;

9. 330° 50' 315.25 feet along same;

10. 5° 16' 261.50 feet along same to the point of beginning and containing an area of 9.88 acres, more or less.

-PARCEL SECOND:-

All of that certain parcel of land (being portion(s) of the land(s) described in and covered by Land Patent Grant Number 9269 to Pioneer Mill Company, Limited) situate, lying and being at Honokowai, District of Kaanapali, Island and County of Maui, State of Hawaii, being RIGHT-OF-WAY FOR OUTLET DITCH FROM RESERVOIR SITE TO HONOKOWAI-MAHINAHINA 4 BOUNDARY, BEING A STRIP OF LAND 20-FEET WIDE, extending 10 feet on each side of the center line and thus bounded and described as follows:

Beginning at a point on the west boundary of Reservoir Site, said point being 230° 08' 50.6 feet from the northwest corner of same, the coordinates of which is referred to Government Survey Triangulation Station "PUU KOLII" being 6392.64 feet north and 2691.17 feet west, as shown on Government Survey Triangulation Map No. 2534, and running by true azimuths:

1. 114° 50' 50.07 feet;

2. Thence along a curve to the right with a radius of 100 feet, the direct azimuth and distance being:

   126° 17' 39.7 feet;

3. 137° 44' 120.69 feet;

4. Thence along a curve to the left with a radius of 100 feet, the direct azimuth and distance being:

   132° 25' 18.53 feet;

5. 127° 06' 124.65 feet;

6. Thence along a curve to the right with a radius of 100 feet, the direct azimuth and distance being:

136° 23' 30" 32.29 feet;

7. 145° 41' 68.18 feet;

8. Thence along a curve to the right with a radius of 100 feet, the direct azimuth and distance being:

164° 08' 63.30 feet;

9. 182° 35' 194.58 feet;

10. Thence along a curve to the right with a radius of 200 feet, the direct azimuth and distance being:

184° 28' 30" 13.20 feet;

11. 186° 22' 156.12 feet;

12. Thence along a curve to the right with a radius of 400 feet, the direct azimuth and distance being:

198° 21' 166.10 feet;

13. 210° 20' 103.72 feet;

14. Thence along a curve to the right with a radius of 200 feet, the direct azimuth and distance being:

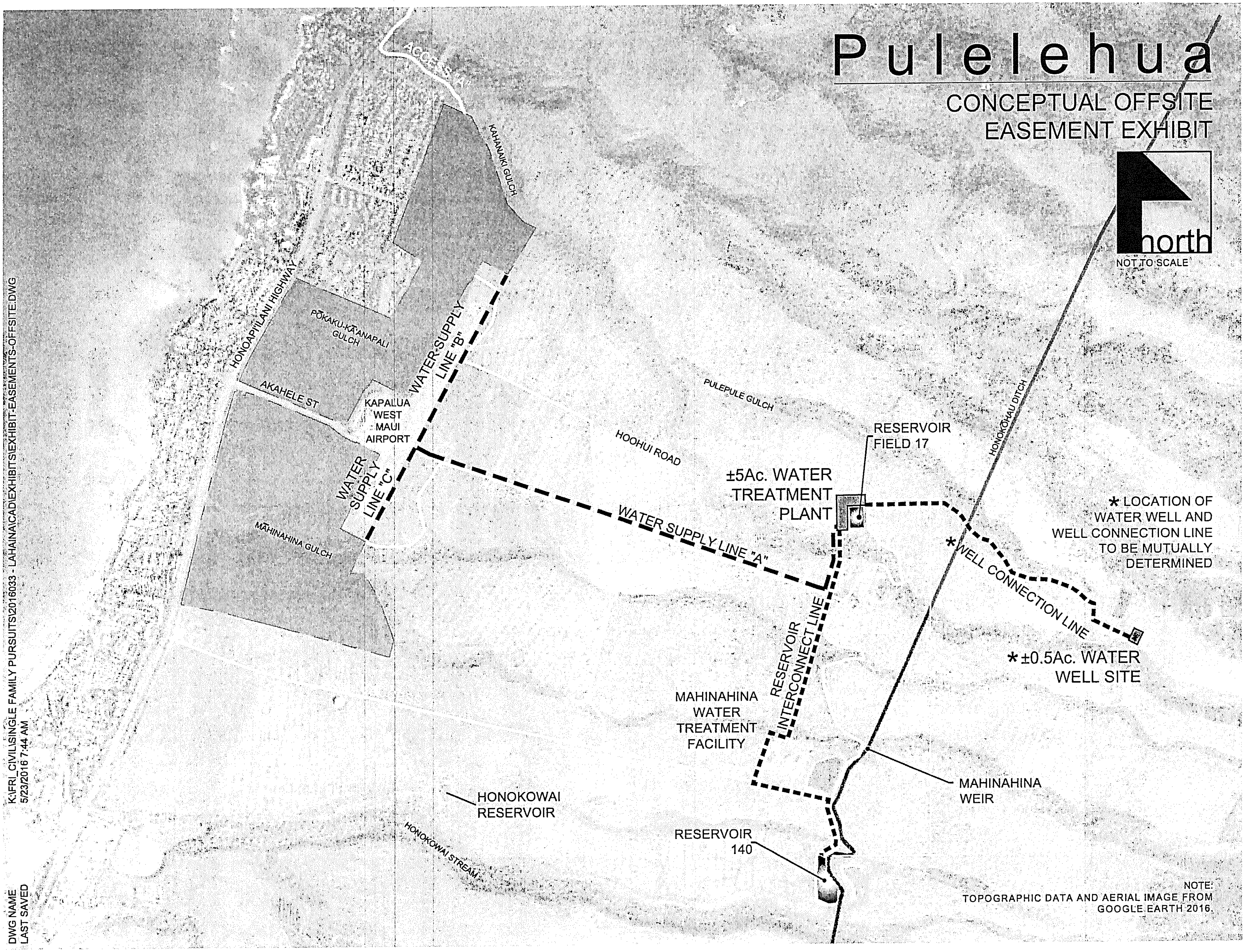
214° 27' 30" 28.78 feet;

15. 218° 35' 77.64 feet;

16. Thence along a curve to the right with a radius of 100 feet, the direct azimuth and distance being:

242° 37' 30" 81.48 feet;

17. 266° 40' 27.05 feet, more or less, to Honokowai-Mahinahina 4 boundary and containing an area of 0.63 acre, more or less.



Pulelehua
CONCEPTUAL OFFSITE EASEMENT EXHIBIT
north
NOT TO SCALE
ACCESS "A"
KAHANAIKI GULCH
HONOAPI'ILANI HIGHWAY
PŌKAKU-KĀ'ANAPALI GULCH
AKAHELE ST
KAPALUA WEST MAUI AIRPORT
WATER SUPPLY LINE "B"
WATER SUPPLY LINE "C"
MĀHINAHINA GULCH
PULEPULE GULCH
HOOHUI ROAD
WATER SUPPLY LINE "A"
RESERVOIR FIELD 17
±5Ac. WATER TREATMENT PLANT
HONOKŌHAU DITCH
* LOCATION OF WATER WELL AND WELL CONNECTION LINE TO BE MUTUALLY DETERMINED
* WELL CONNECTION LINE
* ±0.5Ac. WATER WELL SITE
RESERVOIR INTERCONNECT LINE
MAHINAHINA WATER TREATMENT FACILITY
MAHINAHINA WEIR
HONOKOWAI RESERVOIR
HONOKOWAI STREAM
RESERVOIR 140
NOTE: TOPOGRAPHIC DATA AND AERIAL IMAGE FROM GOOGLE EARTH 2016.
DWG NAME K:\FRI_CIVIL\SINGLE FAMILY PURSUITS\2016033 - LAHAINA\CAD\EXHIBITS\EXHIBIT-EASEMENTS-OFFSITE.DWG
LAST SAVED 5/23/2016 7:44 AM

EXHIBIT N-2

First Amendment to Water Delivery Agreement (Pulelehua) between Maui Land & Pineapple Company, Inc. and Maui Oceanview LP dated September 1, 2017

FIRST AMENDMENT TO
AGREEMENT FOR WATER DELIVERY
(Pulelehua)

This First Amendment to Agreement for Water Delivery (this "Amendment"), dated September 1st, 2017, is made and entered into by and between **MAUI LAND & PINEAPPLE COMPANY, INC.**, a Hawaii corporation ("MLP"), and **MAUI OCEANVIEW LP**, a Delaware limited partnership ("MO"). MLP and MO are hereinafter collectively referred to as the "Parties".

RECITALS:

A. MLP and MO made and entered into that certain Agreement for Water Delivery (Pulelehua) on June 3, 2016 (the "Original Agreement", with the Original Agreement and this Amendment being collectively hereinafter referred to as the "Agreement"), for the delivery of non-potable water from MLP's Water System to MO's Project, as more fully described in the Original Agreement.

B. The Parties mutually desire to amend the Original Agreement, as set forth herein, and are executing and delivering this Amendment for such purpose.

NOW, THEREFORE, the Parties, in consideration of the terms and conditions contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, hereby agree as follows:

1. Recitals; Defined Terms. The foregoing recitals are true and correct and are hereby incorporated into this Amendment for all purposes. Any capitalized term used in this Amendment and not defined herein shall have the meaning assigned to such term in the Original Agreement.

2. Delivery of Water. The third sentence in Section 3 of the Original Agreement is hereby amended to change "0.750" to "1.000".

3. Full Force and Effect. The Original Agreement, as amended by this Amendment, is ratified and shall remain in full force and effect. Except as specifically amended or modified by this Amendment, all other terms, conditions, and obligations set forth in the Original Agreement shall remain in effect and unchanged.

4. Binding Effect. This Amendment shall be binding upon and inure to the benefit of the Parties and their respective successors and permitted assigns.

5. Counterparts. This Amendment may be executed in any number of counterparts, each of which so executed shall be deemed an original; such counterparts shall together constitute but one agreement. A facsimile copy of a signature shall constitute an original signature for purposes of the execution of this Amendment.

6. Amendment. No modification, waiver, amendment, discharge or change of this Amendment or the Agreement shall be valid unless the same is in writing and signed by the Parties.

[Signature Pages Follow]

IN WITNESS WHEREOF, the Parties are executing this Amendment as of the date first written above.

MLP

MAUI LAND & PINEAPPLE COMPANY, INC.

By: ______________________________
Tim T. Esaki, Chief Financial Officer

MAUI OCEANVIEW LP,
a Texas limited partnership

By: Maui Oceanview GP Inc.,
a Texas corporation,
its sole general partner

By: ______________________________
Paul Cheng, President

EXHIBIT O-1

UPDATED CBRE Market Study, Economic Impact Analysis. And Public Fiscal Assessment Of The Proposed Pulelehua 900-Unit Multi-Use Project

MARKET STUDY, ECONOMIC IMPACT ANALYSIS, AND PUBLIC FISCAL ASSESSMENT OF THE PROPOSED PULELEHUA 900-UNIT MIXED-USE PROJECT

Mauka of Honoapiilani Highway at Napili-Honokowai,
West Maui, Lahaina, Hawaii 96761
CBRE, Inc. File No. 17-251LA-3983

Paul Cheng
MAUI OCEANVIEW LP
16610 N. Dallas Parkway, Suite 1600
Dallas, Texas 75248

www.cbre.com/valuation

CBRE

CBRE

1003 Bishop Street, Suite 1800
Honolulu, HI 96813

T 808-521-1200
F 808-541-5155

www.cbre.com

April 11,2019

Paul Cheng
Maui Oceanview LP
16610 N. Dallas Parkway, Suite 1600
Dallas, Texas 75248

RE: Market Study, Economic Impact Analysis, and Public Cost Benefit Assessment of the Proposed Pulelehua 900-Unit Mixed-Use Project Mauka of Honoapiilani Highway to Napili-Honokowai, West Maui, Lahaina, HI 96761 Tax Map Key (2) 4-3-1-82 (por) & 83 (por)

Dear Mr. Cheng:

At your request, we have completed a series of market and econometric analyses associated with the proposed 900-unit Pulelehua master-planned project which encompasses some 310 acres stretching mauka from Honoapiilani Highway in the Napili-Honokowai area of West Maui adjacent to and makai of the Kapalua West Maui Airport (JHM).

As currently envisioned, the project will contain 800 rental apartments (520 "market-priced" and 280 "workforce" units), 100 single family homesites (including one bulk acreage estate lot), along with 70,186 square feet neighborhood-serving commercial/retail space. The apartments will be used for long-term, full-time residential use only (no transient rentals), with the workforce units priced according to Maui County affordable rental guidelines. The homesites will be sold at market prices for with the finished houses to be built by the lot purchaser.

All basic entitlements are in place for project with only minor County approvals remaining. The project is within a larger holding which may (or may not) support future development. Pulelehua could also potentially contain up to 300 "Ohana" (accessory dwelling) units which are not addressed in our study.

The apartments and lots/homes will be competitive within the general, under-supplied West Maui residential market attracting a wide spectrum of both full-time resident households and non-resident second home purchasers. Pulelehua will have significant regional and island-wide economic and public fiscal impacts.

The apartments will be sited on some 83 gross acres developed in a series of neighborhoods in the central and southerly portions of the larger holding. There will be two single family subdivisions at the northerly and southerly edges of the project comprising some 48 gross acres. Retail and a limited number of live/work units will be located in four pods totaling 27 acres in the central area of the community together, one of which fronts Honoapiilani Highway. The remainder of the site will be parks, open space and buffers areas (124 acres) and the estate lot. The project will contain pathways, greenbelts, common elements and have a low-profile and low-density appearance, as shown in the following master plan.

Our studies analyzed the regional market for additional single family and apartment residential product and the economic and fiscal impacts associated with Pulelehua development in support of its revised-entitlement processes. We acknowledge this summary report may be incorporated into supplementary Environmental Assessment/ Environmental Impact Statement(s) and other land use petition submittals.

We note, The Hallstrom Group, Inc. (prior to becoming affiliated with CBRE, Inc.) completed a similar series of studies in 2004-2005 for the "Pulelehua Community", then-owned by Maui Land & Pineapple, under a meaningfully different, larger and more complex master plan which included single family homes and light industrial/business uses. Though significantly evolved and revised, our models for this assignment are generally similar with the prior study albeit within a briefer document. While the Maui market and economy has moved through significant cycles since 2005, the demand for reasonably-priced rental units has continued to increase unabated with minimal additions to supply.

The publication date of this revised report is April 11, 2019, reflecting evolutions in the master plan (notably inclusion of the single family subdivisions) since issuance of prior May 23, 2018 document, which contained revisions resulting from the review of our original November 14, 2017 document by State and County agencies. We have not updated any of the market data, time-frames or pertinent conclusions from the prior studies; however, given the continuing post-recession upcycle of the Maui residential real estate sector, strength of the general island economy, and chronic shortfall of residential product (particularly "affordable" units), the positive context of the market has been sustained over the past 17 months.

Within this revised report, all tables and conclusions continue to reflect the original 13+ year timeframe from the mid-2017 through year-end 2030.

Our study was primarily comprised of three elements:

1. **Market Study.** We completed an overview of the Maui/West Maui economy and the regional residential market, focusing on resident households (workforce/affordable and market-priced), and forecast demographic and land use trends over the next 14 years as the project is developed and absorbed (2017 through 2030).

   We have quantified the demand for long-term residential rental apartments and single family lots/homes, identified existing and proposed competing supply, determined the appropriateness of the property to support the proposed project; and estimated subject inventory absorption over time under prevailing market and affordable-pricing constraints.

   The commercial/retail use and floor space is analyzed as a supporting component of the subject community within a "neighborhood" demand context and not on a region-wide basis.

2. **Economic Impact Analysis.** We analyzed the socio-economic impacts arising from the development of Pulelehua using a micro-econometric model depicting the project from ground-breaking through construction build-out, full absorption and "stabilization". The flow of direct capital investment, creation of jobs/wages during construction and stabilized operations/use, projection of resident population, household earnings and their on- and off-site expenditures, total Maui economic benefits, and other aspects of impact in the community were quantified. The results of our analysis are compared with the application of the Hawaii Inter-County Input-Output Study economic model multipliers to the project.

   We also completed a Phase II secondary impact overview addressing the effect the proposed development would have on the property values of nearby holdings, whether it is compatible with surrounding uses, and other market-based issues typically raised by County agencies as part of a major land use re-classification.

3. **Public Fiscal (Cost/Benefit) Assessment.** We calculated the "new" fiscal impacts project development and "operation" would have on the State and County purses by forecasting the tax revenues (primary and secondary) created via the construction of Pulelehua, the on-going operation of the apartment complex and commercial businesses, maintenance and renovation of the single family homes, the household income and spending of its resident population, and other on and off-site economic activity generated versus the additional governmental costs incurred to support the population of the project. While the overall impacts are presented, our specific concern is only for the "new"/additional

benefits and costs to the State and County, not merely that which is being moved from one location on Maui to another, which is effectively an off-set.

The pertinent results from our studies are presented in the following brief report, which opens with an Executive Summary describing our salient conclusions. The remainder of the document is comprised of a series of minimal discussion and introduction of addenda exhibits containing the tabular presentation of our data, analysis, and modeling for each aspect of the assignment.

No units will be permitted to be used as short-term rentals (STRs) pursuant to Chapter 19.65, Maui County Code (MCC), sometimes also referred to as transient vacation rentals (TVRs). It is possible there may be an up to 300 additional Accessory Dwelling Units (ADUs), or "Ohana units" within the development, which may or may not be built and/or be added to the inventory. These units have some entitlements and would raise the total unit count at Pulelehua from 900 to 1,200 units. Again, these units are only an indefinite possibility at present and are not included in our analysis.

The purpose of study was to provide current market data, subject product absorption estimates, economic and fiscal modeling, and an analysis of probable impacts on the Maui community resulting from the build-out of the proposed multifamily development in support of the on-going entitlement process of the Pulelehua community.

As part of our investigation and analysis we have:

- inspected the subject property and its environs;
- researched the West Maui residential real property market sector;
- completed a survey of the West Maui long-term residential rental sector;
- interviewed brokers and knowledgeable parties active in the regional economy and property development;
- reviewed federal, state and county materials, statistics, policies and publications;
- reviewed governmental land use designations, entitlements and policies in the region;
- identified existing and proposed competitive/comparable West Maui developments and their attributes;
- accessed on-line databases; and,
- compiled materials from published and private sources, and our files.

There were no extraordinary assumptions

All conclusions presented herein are subject to the identified limiting conditions, assumptions, and certification of CBRE/Hallstrom Team, in addition to any others specifically set forth in the text.

We appreciate the opportunity to be of service to Maui Oceanview LP regarding this highly-needed, sustainable, workforce, rental apartment and single family housing project. Please contact us if further discussion or detail is required.

Respectfully submitted,

CBRE - VALUATION & ADVISORY SERVICES

Tom W. Holliday

Tom Holliday, CRE, FRICS
Director

Phone: (808) 541-5120
Fax: (808) 541-5155
Email: Tom.Holliday@cbre.com

Certification

We certify to the best of our knowledge and belief:

1. The statements of fact contained in this report are true and correct.
2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions and are our personal, impartial and unbiased professional analyses, opinions, and conclusions.
3. We have no present or prospective interest in or bias with respect to the property that is the subject of this report and have no personal interest in or bias with respect to the parties involved with this assignment.
4. Our engagement in this assignment was not contingent upon developing or reporting predetermined results.
5. Our compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.
6. This assignment is not an appraisal nor is it intended to convey any form of valuation opinion regarding the subject property or its proposed development. Any monetary-based data/figures are for economic and public fiscal modeling only.
7. Tom Holliday has made a personal inspection of the property that is the subject of this report.
8. Benjamin Holliday provided significant assistance to the persons signing this report. Tom Holliday as a member of The Hallstrom Group, Inc., and now CBRE/Hallstrom Team has completed studies and appraisals of the subject property, and provided consulting services, dating back to the 1990s.

Tom W. Holliday

Tom Holliday, CRE, FRICS
Director

Phone: (808) 541-5120
Fax: (808) 541-5155
Email: Tom.Holliday@cbre.com

Table of Contents

EXECUTIVE SUMMARY

INTRODUCTION

The Pulelehua master planning area is comprised of approximately 310 acres of currently vacant, undeveloped, feral lands extending inland from the Honoapiilani Highway in the Napili-Honokowai area of West Maui between Kaanapali and Kapalua Towns. Situated in the Kahana ahupua'a, adjacent to and makai of the Kapalua West Maui Airport (JHM), the site is located within the 20-mile long West Maui coastal corridor stretching from Ukumehame to Honolua Bay. The West Maui region has experienced significant development over the last for decades driven by visitor-oriented resort and urban investment and resident housing demands.

The irregular shaped holding stretches from the Honoapiilani Highway at about the 70-foot elevation level upslope approximately 0.5 miles to the 280-foot elevation of the westerly flank of West Maui Mountains. The property offers panoramic ocean and mountain views, has a desirable warm, arid climate, and is less than a quarter mile from the shoreline.

Development in the West Maui corridor has been focused along the shoreline (which is effectively built-out), anchored by Lahaina Town, and the Kaanapali and Kapalua destination resorts. there are several major proposed projects in the mauka areas of the corridor, most to the north of Lahaina.

The Pulelehua property is currently classified as:

- State Land Use (SLU) - "Urban District";
- Maui Island Plan – Within Urban Growth Boundary, Kaanapali Planned Growth Area, and Outside Special Protection Areas;
- West Maui Community Plan (WMCP) – "West Mau Project District 5"; and,
- County of Maui zoning -"West Maui Project District 5".

The Pulelehua site has been in the master planning process for several decades, originally by the Maui Land & Pineapple Company who envisioned a major moderate-density, mixed-use community with a wide variety of residential, commercial, light industrial/business and other use types. Some entitlements were achieved over the years, most notably in 2006-07, but it failed to achieve fruition due to general economic issues, costs of infrastructure, and other concerns. Multifamily residential rental apartment uses as proposed are permissible under the in-place zoning and no further major land use approvals will be required to construct the 900-units in the master plan which are the subject of this study (800 apartment units and 100 single family homes) Further county permitting would be necessary for the possible 300 Additional Dwelling/ "Ohana" Units discussed by the developer but excluded from this study.

The current maximum master plan build-out design calls for:

- 800 long-term residential rental apartments; 520 of which will be rented at "market rate" and 280 of which will be "workforce" apartment units with rents calculated as being "affordable" to resident households with incomes ranging from 60 percent (or less) of the Maui median household income up to those with incomes up to 140 percent of median.

- 100 market-priced single family lots, including one estate lot, upon which the purchasers would construct custom homes (although small blocks of lots may be sold in bulk to local builders).
- 70,000-square-feet of neighborhood-oriented commercial/retail floor area.
- 124 acres of parks/common areas/open space and buffers.
- Community wide exclusive portable water system and a state of the art water treatment system.
- No units will be permitted to be used as short-term rental homes (STRHs) pursuant to Chapter 19.65, Maui County Code (MCC), sometimes also referred to as transient vacation rentals (TVRs).
- Up to 300 Accessory Dwelling ("Ohana") Units could potentially be built within the project and larger holding; however, their construction is indeterminant and they are not included in our analysis.

The favorable characteristics of the site include mauka and makai views, proximity to the shoreline, desirable climate, location in an established high-demand market area, easy access onto a major regional thoroughfare (Honoapiilani Highway), and is nearby shopping and dining opportunities in Kapalua, Kahana, Kaanapali and Lahaina.

Assuming sufficient market demand, Pulelehua will transform a vacant acreage holding having limited agricultural use potentials and nominal current regional economic benefit, into an asset providing needed rental and for sale housing opportunities (particularly workforce/affordable rental apartments), producing hundreds of "worker years" of construction, retail and community association employment and wages, attracting significant new capital investment, and stimulating regional business activity through the spending of the project resident households. This activity will in turn create employment and business opportunities for Maui residents and an expanded tax base for the state and county.

The CBRE/Hallstrom Team assignment was to analyze the proposed Pulelehua project from a real estate market perspective and to identify and quantify probable market and economic impacts associated with the development considering competitive, regional, prevailing and forecast trends to answer four basic study questions:

1. Is there sufficient demand to absorb the 900 rental apartments and single family lots/homes of the subject project during a reasonable exposure period given competing developments and projected statewide/regional market and economic trends?
2. Will the subject be an appropriate use of the underlying site relative to market needs, standard land planning objectives, accepted design characteristics, and the area environs?
3. What will be the general/specific and direct/indirect economic impacts on Maui resulting from the undertaking of the subject development via capital investment, employment, wages, business operations, population, property values and other economic activity related to the real property asset?
4. What will be the net, new effect on the state and county "public purse" from the project in in the form of increased tax/fee receipts?

These issues were addressed through a comprehensive research and inquiry process utilizing data from market investigation, governmental agencies, various Hawaii-based media, industry spokespersons/sources, on-line databases, published public and private documents, and our files.

The pertinent results of our study are highlighted in the following summary report which contains minimal narrative, focusing on tabular data and other materials contributing to our conclusions. The presentation is divided into six sections:

1. Primary Study Conclusions
2. The Subject Property and Proposed Project
3. Market Study of the West Maui Corridor Residential Market
4. Appropriateness of the Subject for Residential Use and Absorption Estimates
5. Analysis of the Economic Impacts of the Proposed Development
6. Assessment of the Net, New Public Fiscal Benefits Associated with the Project

The primary source information regarding the subject used in our study were:

- Maps, master plans, unit counts, density estimates, infrastructure and vertical cost estimates, and background materials provided by Maui Oceanview LP, PWS Architects Inc., and other members of the planning team;
- Resident population and housing projections, proposed development and other maps, community plan materials, and other data from the County of Maui Planning Department and State of Hawaii Office of Planning;
- The United States 2010 Census and subsequent (2011-2015) interim updates;
- Sales and listing data from the Maui Island Board of Realtors and Hawaii Information Service; and,
- Data from published and on-line sources and from our files.

The Pulelehua site and environs have been visited/viewed by our firm on many occasions.

We note that the locational terms “Lahaina District”, "West Maui" and the "Ukemehame-Kapalua Corridor" are used interchangeably throughout the report.

Our *Market Study* time-frame which serves as a basis for subject absorption projections extends approximately 13+ years from mid-2017 through 2030, as it is anticipated all the Pulelehua rental apartments will be built and absorbed by then. General demand for resident housing in West Maui is quantified during this period, existing, planned competitive supply is identified, the appropriateness of the site for the proposed project is analyzed, and absorption is estimated using several market-based methods.

Our *Economic Impact Analysis* and *Public Fiscal Assessment* study forecast period extends over 9 years from 2018 through 2026, with the units taking seven years to be completed and absorbed (2020 through 2026), commencing with initial site work and infrastructure emplacement in 2019, through construction and leasing of the last units in 2026. This time frame effectively depicts the life-span of the project from ground-breaking, through build-out, and its eventual functional "stabilization". We recognize the speed at which homes are built on the 100 single family lots is beyond the control the master developer, and may extend for years (or decades) past our projection period; however, as we use constant dollars in our models, the capital investment, economic impacts, and stabilized operation total the same regardless of the length of build-out.

Primary and direct secondary capital/economic outcomes from the development of Pulelehua are quantified in periodic segments (from 2017-2020, 2021-2025 and for 2026), the resident population in the community is estimated, and the resultant new taxes and spending flowing to/from the County and State are estimated.

We have also tested our econometric model outcomes against the 2012 Hawaii Inter-County Input-Output Study (approved August 2016) multipliers and formulae.

It is noted, the model is not specifically time-sensitive as it is expressed in constant 2017 dollars and should the project timeline move several years in either direction from our estimate we would not anticipate major changes to our stated conclusions.

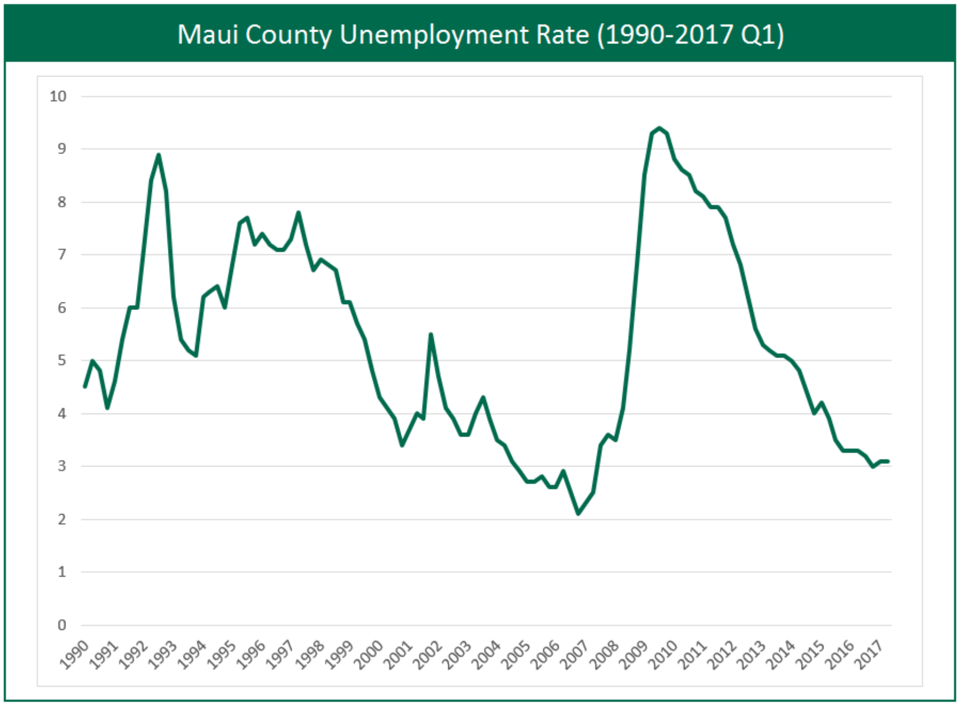
PRIMARY STUDY CONCLUSIONS

Based on our analysis of the subject property, its environs, and envisioned development we have reached the following conclusions as of the Third Quarter of 2017 regarding the probable market standing and economic impacts of the proposed Pulelehua Project.

We note all the larger tables which have been excerpted into the text are presented full-size in the addenda for easier reading.

Market Study

- The State of Hawaii has steadily rebounded from the 2008-09 recession and associated down-cycle in the real estate market and is now within an extended-term favorable economic period featuring gradually and consistently strengthening property sectors. Sales activity, volume, and prices have all shown meaningful recovery throughout Maui and in the West Maui Corridor; in many cases showing near to full recovery to the levels achieved during the 2004-07 peak market years. Expectations are for continuing economic expansion within the current up-cycle during 2017-18 (and into the mid-term) resulting in increasing demand for real estate inventory and continuing barriers to increased new development.
- Among the favorable economic indicators and trends on Maui the unemployment rate has dropped to a current level of about 3.0 percent (approaching effective full employment) from a high of 9.1 percent during the depths of the recession; median household income has grown at a rate approaching two percent compounded annually since 2012; there has been major positive absorption of retail and industrial space since the beginning of 2016; increasing velocity of commercial space development; and, tourism is continually achieving all-time records year-after-year with total visitor days and spending growing at compounded annual rates above five percent and nine percent respectively since 2009.



- The Maui residential real estate market has also shown post-recession recovery and growth. Island-wide the single family residential, condominium and vacant lot sectors are experiencing the highest level of sales activity since 2004-07 (totaling more than 2,500 transactions combined in 2016), and median prices on Maui are at their highest since 2007-08, with average prices during the first three quarters of 2017 for single family homes reaching $700,000 and condominium units at $449,000, up more than 9% and 4% respectively from year-end 2016. West Maui has shown similar trending. General indicators point to up-cycle conditions with increasing demand, sales velocity, and prices in the context of limited supply additions.

- West Maui is one of the two centers of the island's tourism industry, and along with South Maui, has evolved into a primary region for economic activity and employment; attracting significant development and capital investment over the past four-plus decades. This trend is anticipated to continue over the long-term, increasing in cumulative attraction as the economy further strengthens. An expanding, increasingly diversified market; highly desirable climate; an emergence of critical mass; and, the availability of well-located development lands, undergird the favorable outlook.

- The University of Hawaii Economic Research Organization (UHERO) *Forecast Project County Forecast* (May 2017) forecasts slowing but continuing annual percentile growth over the next two years for Maui County for five of the six projected factors (with on-going instability in Japanese visitor arrivals, a minor component of Maui tourism). The UHERO Maui forecasts are shown below.

COUNTY MAJOR ECONOMIC INDICATORS YEAR-OVER-YEAR % CHANGE	2014	2015	2016	2017	2018	2019
MAUI						
Visitor Arrivals	2.3	5.0	4.1	2.2	1.3	0.7
U.S. Visitor Arrivals	2.2	7.0	5.4	2.8	1.1	0.5
Japan Visitor Arrivals	-24.8	0.4	-9.7	-1.8	-1.9	-0.1
Other Visitor Arrivals	6.7	-0.7	1.2	0.8	2.4	1.6
Payroll Jobs	2.2	2.6	1.7	1.3	0.9	0.9
Real Personal Income	4.3	5.0	3.2	2.0	1.8	1.7

- Though not issued on a County-basis, the most recent State of Hawaii Department of Business, Economic Development & Tourism (DBEDT) *Quarterly Outlook for the Economy* (3rd Quarter 2017) statewide forecasts show continuing gains in all 12 categories through 2020. The projections are more optimistic than their prior forecasts, and have been gaining upward momentum for the past several years.

ACTUAL AND FORECAST OF KEY ECONOMIC INDICATORS FOR HAWAII: 2015 TO 2020

	2015	2016	2017	2018	2019	2020
Economic Indicators	Actual		Forecast			
Total population (thousands)	1,425	1,429	1,436	1,447	1,459	1,470
Visitor arrivals (thousands) [1]	8,680	8,941	9,231	9,359	9,496	9,636
Visitor days (thousands) [1]	78,620	80,383	83,127	84,114	85,386	86,682
Visitor expenditures (million dollars) [1]	15,111	15,748	16,778	17,139	17,751	18,384
Honolulu CPI-U (1982-84=100)	260.2	265.3	271.9	278.2	284.6	291.1
Personal income (million dollars)	69,129	72,100	74,623	77,160	79,707	82,337
Real personal income (millions of 2009$) [2]	53,212	54,382	55,307	56,136	56,922	57,719
Non-agricultural wage & salary jobs (thousands)	638.6	647.6	654.1	660.0	666.6	671.9
Civilian unemployment rate [3]	3.6	3.0	2.9	3.1	3.2	3.4
Gross domestic product (million dollars)	80,599	83,917	86,570	89,427	92,289	95,242
Real gross domestic product (millions of 2009$)	71,714	73,252	74,305	75,419	76,475	77,469
Gross domestic product deflator (2009=100)	112.4	114.6	116.5	118.6	120.7	122.9

- We conclude the Maui economy continues in its recovery, regaining virtually all "lost" ground during the recession, is at or approaching peak indicator levels, and the overall near to mid-term outlook is favorable.

- There were some 25,530 residents in the West Maui (Lahaina District) as of the mid-2017, and projections of the resident population by 2030 (our market study time-frame) based on County and State forecasts range from circa 30,831 to 36,058, as shown below:

Scenario	1st QTR 2017	Projected West Maui Resident Population 2020	2025	2030
One: Minimum Based on Maui County General Plan 2030 Projection Series Percentile Periodic Growth				
Resident Population	**25,530**	**26,857**	**28,851**	**30,831**
Average Annual Change		1.6%	1.5%	1.4%
Two: Maximum Based on Maui County General Plan 2030 Projection Series Absolute Growth to 2030 Figures				
Resident Population	**25,530**	**27,956**	**31,693**	**36,058**
Average Annual Change		2.6%	2.6%	2.6%

- There are an estimated 13,625 single and multifamily housing units in West Maui of which some 4,740 (or 34.8 percent) are used for vacation rentals. It is anticipated this percentage of total units will generally decline over the long-term as more residential-oriented units are constructed in the expanding communities, the existing resorts are built-out, and the County further limits short-term rental homes (STRHs)/transient vacation units (TVUs) outside the designated resort areas.

- Of the 8,885 housing units available for standard non-vacation residential use in the Lahaina District, approximately 20 percent are owned by non-residents as second/vacation homes. This buyer demographic has grown over the past two decades and is now represented in virtually every market-priced project; particularly new development. The percentage of this segment is anticipated to increase to between 26 percent and 30 percent by 2030.

- The current average West Maui resident household size is about 2.85 persons and is forecast to decline in coming decades due to evolving family/household trends and an increasingly diverse mix of unit types within new developments. By 2030, the average household size in the study area is anticipated to lower to between 2.71 persons to 2.74 persons.

- The median prices for residential product in the Lahaina District, which includes many smaller, older houses in addition to upscale resort-residential inventory, during 2016 was at $760,000 for single family homes, $485,573 for condominium units and at $999,500 for vacant land transactions. All indicators showed meaningful appreciation during 2016 and have increased by 43 percent to 55 percent since prices reached a recessionary nadir in 2010-11. Median prices are anticipated to increase into the long-term as thousands of higher priced new units manifesting the higher costs of land, construction, impact fees and entitlement, are added to the inventory, and appreciation (though cyclical) continues. The table below summarizes median prices for selected West Maui communities for the first nine-months of 2017.

Median Housing Prices and Rents in Selected West Maui Communities (Through September 2017)	Lahaina	Napili-Honokowai	Kaanapali
Single Family Median Price	$1,334,500	$1,700,000	$847,500
Multi-Family Average Price	$482,500	$922,000	$425,000
Median Rent (Year-End 2015)	$1,245	$1,434	$2,344

- We estimate the demand for new residential (non-TVR) units in the West Maui region through 2030 will total between 5,728 and 8,941 units, with a mid-point of 7,335. Single family homes and lots will comprise about 64 percent of the total area demand and multifamily/apartment units the remaining 36 percent; which is as much a function of inventory proposed to be built as market preference.

- We estimate approximately 49.8 percent of the demand for finished resident housing units (single and multifamily) in South Maui over the next 13-plus years will be for units priced to be sold or leased to households having an income at less than 140 percent of median Maui standards; or within the range meeting County workforce/affordability criteria. The remaining 50.2 percent of demand will be for units priced at "market" levels, affordable to households with incomes above the 140 percent of median Maui threshold. In 2017, the median household income for a family of four on Maui (outside of Hana) is $81,500.

- There are nine major apartment complexes remaining in West Maui serving households with incomes from 80 percent of the Maui median to market levels comprising some 1,086 total units ranging in size from 308 square foot (living area) studios to 1,357 square foot 3 bedroom units. 99 percent are currently occupied at monthly rents ranging from $1,195 (studio) to $3,500 (3B). Numerous other projects that were originally built to be rental apartments have been converted to for sale condominium units or are now used as Transient Vacation Rentals (TVRs). Each project has a wait list for households interested in tenancy and all management confirmed available apartment are "always" re-leased upon vacant.

- Additionally, there are 576 units in 6 low income designated (LIHTC) projects with rents set at prices affordable to households earning 60 percent of less of the Maui median; all are currently occupied with long-wait lists. Together, dedicated apartment complexes comprise 1,662 rental units or some 22.4 percent of the Lahaina District resident housing inventory.

- Our survey of the West Maui residential rental market from late September through early November 2017 identified 48 units of various type offered for long-term rent, with asking rents ranging from $1,272 to $5,373 per month, averaging $3,391; with about half including some/all utilities and half no utilities. Virtually all units listed for rents were successfully leased in the month of their offering, particularly those priced at $3,000 per month or less, and according to apartment complex managers and rental agents demand for residential rentals in West Maui is very high (and increasing) and far outstrips available supply. The results of our survey are summarized in the following table. We note that there is some overlap in rents between affordable and market levels when moving above the 120 percent median household income level.

Unit Type	Number of Units
Apartment	14
Condo	15
House	19
Grand Total	**48**

Unit Type	Average Rent
Apartment	$2,750.07
Condo	$3,722.13
House	$4,055.16
Grand Total	**$3,570.44**

Beds	Average (Rent)
Studio	$1,272.50
1	$2,403.57
2	$2,939.07
3	$3,746.18
4	$5,373.33
Grand Total	**$3,391.09**

- Excluding Pulelehua, there are 7,566 total proposed residential units in existing and planned West Maui projects according to the County Planning Department; with some 62 percent of the inventory being single family and 38 percent multifamily/apartment. However, with many of the projects are "on-hold", require additional entitlements (only 2,066 are considered approved), lack access to sufficient supporting infrastructure, and/or the ownerships are under financial duress. Further, some 2,560 (34 percent) of the total proposed units in the region will be in the Kaanapali and Kapalua Resorts and could potentially be TVRs or short-term rentals which will not contribute to the West Maui residential housing supply. We consider it unlikely that a significant portion of the proposed units will be manifest by 2030, with only 60 to 80 percent of the fully and partially-entitled units having a reasonable chance of being built over the projection period.

- The subject property is a competitive location for the proposed Pulelehua development regarding access, views, topography, shape, size, proximity to commercial and support facilities, lack of incompatible nearby uses, County planning guidelines and objectives, climate, and ability to provide quality lifestyle opportunities for resident Maui households. It will have the attributes necessary to be competitive in the workforce housing rental and market-priced rental unit sectors, and will capture a reasonable market share during its offering period.

- Based on application of the Gross Demand, Residual Demand and Market Share (or Capture Rate) methods and their correlation we estimate the 900 proposed apartments and single family lots of Pulelehua will require about seven years to be fully absorbed following commencement of pre-leasing (project year 2) with full absorption by project year 9. It is anticipated the 280 workforce (affordably-priced) rental apartments will be absorbed via a lottery/waiting list as quickly as they are offered to the market and the 620 market-priced units and lots would be quickly leased-up/sold as they are completed.

- Cumulatively, this absorption estimate represents only about 31.2 percent of total regional residential demand during their offering period; which we consider to be a moderate and readily achievable shares of the larger West Maui market which could be enlarged if some proposed projects fail to reach fruition. Our concluded absorption forecasts for the Pulelehua inventory are shown below along with the commercial component of the project.

PROJECTED BUILD-OUT AND ABSORPTION OF PULELEHUA PROJECT

Year	Residential Component							
	Workforce Rentals		Market Rentals		Market Single Family Homes (1)		Total Inventory	
Project	Annually	Cumulative	Annually	Cumulative	Annually	Cumulative	Annually	Cumulative
1 & 2	Final approvals/entitlements achieved in Year 1, initial grading/site work and infrastructure emplacement commences and is completed in Year 2. Vertical construction begins in Year 2 with unit reservations/lottery begining commensurately. First product completed and available for occupancy in Year 3.							
3	40	40	75	75	15	15	130	130
4	40	80	75	150	15	30	130	260
5	40	120	75	225	15	45	130	390
6	40	160	75	300	15	60	130	520
7	40	200	75	375	15	75	130	650
8	40	240	75	450	15	90	130	780
9	40	**280**	70	**520**	10	**100**	120	**900**

Commercial Component

Gross Leaseable Area in Square Feet	Project Year Built	Years to Absorb
50,000	3	2
20,186	5	1
70,186		**3**

(1) Includes one "Estate Lot" of 45 acres.

Economic Impact Analysis

We have constructed a model depicting the economic impact of the Pulelehua project on the Maui and Statewide community during its "lifespan" from anticipated ground-breaking in 2019, through build-out and absorption in 2026, and stabilized "operations" (commercial/retail businesses, common element management and maintenance) thereafter. The entire model effectively runs from 2019 to 2026.

It is presented in three periods, and two summary columns:

1. 2017 to 2020, or from the study date, through entitlements (2018), infrastructure work, initial vertical construction, and pre-leasing/pre-sales (2019), and initial apartment and home occupancy (2020).

2. 2021 to 2025, construction of apartments and homes continues throughout period and first phase of commercial space is occupied and in operation (2021), followed by second phase in 2022.
3. 2026, the project is built-out and absorbed and all components are in full-operation by end of year.
4. Totals During Build-Out, presents the cumulative total numbers/amounts during the 2019 through 2026 build-out timeframe.
5. Stabilized Annually, the number/amount of permanent, pertinent indicators on a stabilized basis going-forward following project build-out.

The developer intends to build the project in three phases each with a mix of market and workforce/affordable apartments and selection of homesites.

The model builds on the absorption estimates and data contained in our market study. All estimated amounts are in constant 2017 dollars. We note, that even if the timing of development or absorption moves substantially from our projections it does not change the resultant outcomes or indicators as the use of constant dollars removes time as a determinant variable. The purpose of the model is to illustrate how capital, jobs, wages, population and business activity will flow over time for planning and budgeting purposes apart from and present value considerations.

- The development of the Pulelehua project will bring in an estimated $324.2 million of new, direct capital investment with significant unquantified indirect expenditures into the island's real estate market and generate $966.3 million in total economic activity islandwide during its build-out and stabilization over a 9-year period (forecast from circa 2018 to 2026). It will contribute some $74.8 million in annual economic activity on a stabilized basis thereafter.
- The construction of the Pulelehua infrastructure and finished apartment units, will directly create an estimated 1,516 "worker-years" of employment (the equivalent of 52 work weeks at 40 hours per week) in the construction trades, support and supply businesses during build-out, averaging about 189 worker years annually, with an estimated $110.3 million in wages (averaging about $13.8 million per year).
- The commercial/retail businesses, apartment rental company, and community management and landscape/maintenance of the 70,000 square feet of commercial space and 800 apartment units will create 982 worker-years of employment from 2020 through 2026 and associated wages of $33.4 million. Once stabilized these project components will create demand for 228 permanent FTE positions with annual wages of $7.8 million.
- Associated secondary/off-site employment during the overall development and absorption time-frame will total 654 worker-years with wages of $42.0 million and a stabilized FTE job-count of 76 with total wages of $4.1 million per year.
- During build-out the 898 households containing 2,380 residents at Pulelehua will have aggregate incomes of $334.6 million (2020-2026) and will stabilize at $81.2 million annually thereafter.

- Discretionary expenditures into Maui businesses by the Pulelehua population will be some $167.3 million during build-out and average $40.9 million per year on a stabilized basis. We note this will not all necessarily be new income and spending for Maui as many of the households would merely be located elsewhere on the island if Pulelehua wasn't constructed.

- We estimate that about one-half (50%) of the resident households in the project will be comprised of new/in-migrating Maui residents. Their household income and spending will be "new" to Maui and not just redirected from elsewhere on the island. These 1,190 persons will have cumulative household incomes of some $167.3 million during build-out and $40.9 million annually on a stabilized basis. Their discretionary income will total $83.7 million from 2020 through 2026, and stabilize at $20.4 million per year.

- The on-going commercial/retail, apartment rental, and management and maintenance activity in the community will total $642.1 million during the 2020-2026 projection period and average $74.8 million per year on a stabilized basis. The base impact to the Maui from 2018 through 2026 will be $966.3 million and average $74.8 million annually thereafter.

- Application of the Hawaii Inter-County Input-Output Model macro multipliers depicting direct, indirect and induced economic impacts arising from development of Pulelehua result in significantly higher economic out-flow indicators for every item than those from our direct, subject-specific micro model.

Secondary Impacts

Pulelehua will have nominal to minor impacts on the socio-economic aspects of the surrounding community that relate to real estate issues.

- The project site is adjacent to the airport zone and vacant lands to mauka and southerly. existing low density residential development to the northwest, and suburban residential and visitor development makai across Honoapiilani Highway; none of which will be impacted by the subject except in a positive manner by increasing potential patronage of business along Lower Honoapiilani Road.

- Property values throughout West Maui are largely driven by external, cyclical economic factors within an existing (and expanding) cumulative mass, not any single new project. Pulelehua will not in itself drive regional market values or real property assessments of nearby real estate.

- It is not expected there will be in-migration to Maui as a direct result of the project. It is intended solely to provide housing opportunities for families and individuals who are already part of the existing island population base.

Public Fiscal Benefits

Public fiscal (or cost/benefit) impacts are typically estimated on a per capita basis founded on a conservative assumption that each new person added to the Maui community is "responsible for" a similar tax cost/obligation as every other person on the island.

Our analytical focus is on "new" or additional fiscal benefits (incoming tax dollars) to the State and County arising from the development of Pulelehua not those monies/costs which are merely flowing from elsewhere on the island.

In-migration to Maui accounts for about 50 to 60 percent of the total net increase in resident population figures. We estimate that about half (50%) of Pulelehua residents and households will be in-migrating during the absorption period. These individuals represent "new" impacts to the economy and the public purse. Their household income and spending creates new tax dollars for the State, while their presence on the island creates new per capita spending obligations for the State and County.

Our focus is on these "new" to Maui 1,190 individuals and 450 households.

The 1,190 full-time residents within the subject project which are not in-migrants are the product of "natural growth" of existing Maui households or relocating from elsewhere on the island. As such, their government fiscal impacts (tax revenues and services costs) are already in-place and factored into existing County and State budgets.

Their household income and spending and the tax dollars they create are already being earned, spent and taxed. While their public costs, such as schools, parks, emergency and social services and capital expenditures are already being expensed in governmental budgets. Neither their taxes-generated or government-costs are "new" or additions to Maui and the State, they are assumed to already be flowing through the Maui economy and government coffers and would continue to do so at the same level regardless of the development of Pulelehua.

The "new" tax benefits flowing from Pulelehua include Real Property Taxes to Maui County; the General Excise Taxes and Income Taxes to the State from construction worker wages, the new Maui households, the commercial/retail businesses and their employees, the apartment rental operation, and community association management and maintenance (and their employees).

- The County of Maui will realize "new" Real Property Taxes ($9.8 million), traffic impact fees ($6 million), and other secondary receipts and development fee totaling $33.8 million during the 9-year building and initial residency projection period (2018-2026), and $6.1 million annually on a stabilized basis thereafter.
- The State of Hawaii will receive "new" Gross Excise and Income taxes, secondary revenues, and school impact fees of $89.0 million during the 2018-2026 modeling period, and $9.4 million per year thereafter.
- The County of Maui will incur "new" additional per capita public costs of $15.2 million during build-out and $4.1 million annually on a stabilized basis in 2027 and beyond.
- The State of Hawaii will incur "new" additional per capita public costs of $36.6 million during build-out and $9.9 million annually on a stabilized basis in 2027 and beyond.
- The net public benefit to Maui from Pulelehua, beyond the provision of critical workforce and market rental opportunities in West Maui, will be $18.6 million during construction and absorption and $1.9 million per year as stabilized.
- The net public benefit to the State of Hawaii from Pulelehua will be $52.5 million during construction and absorption and a loss of $540,000 per year as stabilized.

- The major economic impacts and public fiscal conclusions are summarized on the following table. The column on the left summarizes the cumulative impacts during the construction and build-out period (2018-2026) covering infrastructure emplacement, unit construction and ramp-up to stabilization, and the right-hand column the annual impacts after full-absorption/stabilization.

SUMMARY COMPARISON OF MAJOR ECONOMIC IMPACTS AND PUBLIC FISCAL COSTS/BENEFITS
All Amounts Expressed in Constant, Uninflated 2017 Dollars

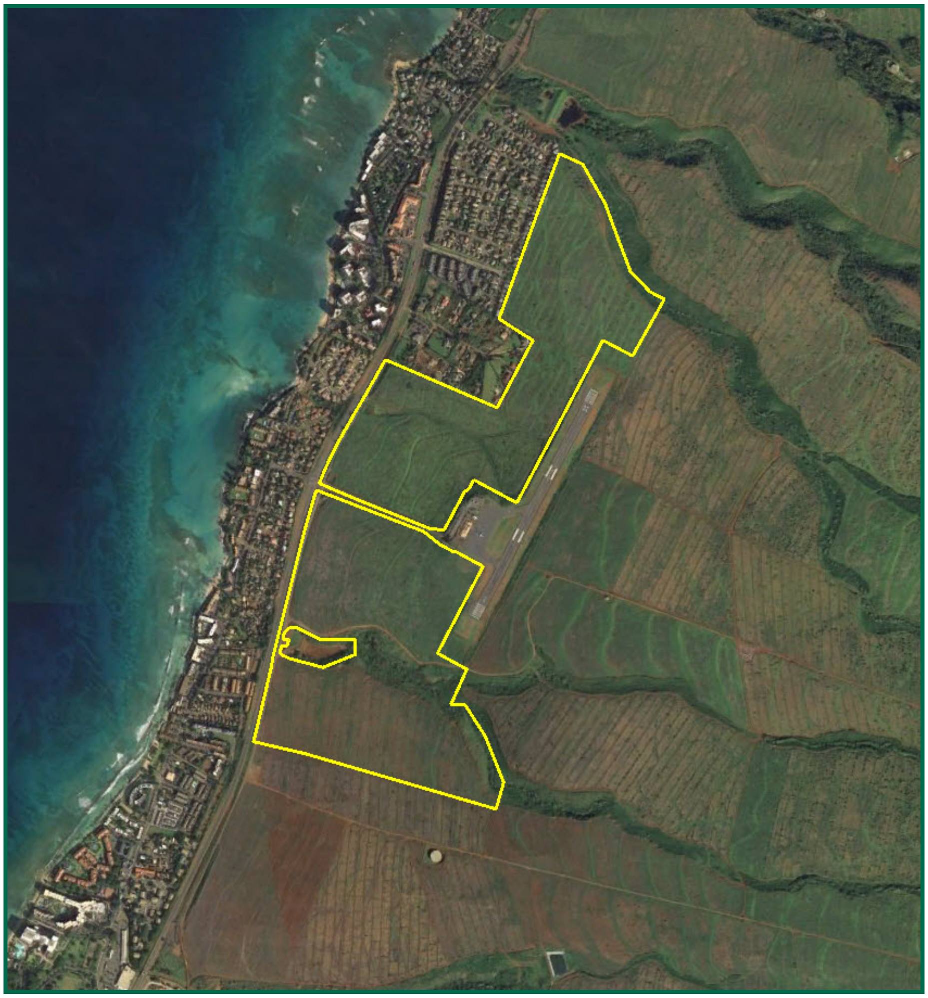
Model Item	Cumulative During Build-Out Period	Stabilized Annually Thereafter
Direct Capital Investment	$324,166,667	
Local Contractor's Profits	$32,416,667	
Local Supplier's Profits	$12,966,667	
Worker Years of Jobs	3,274	304
Employee Wages	$185,798,050	$11,930,880
Total Resident Population		2,380
New Inmigrating Maui Residents		1,190
Resident Household Income	$334,608,098	$81,748,890
New Maui Resident Household Income	$167,304,049	$40,874,445
Resident Discretionary Expenditures	$167,304,049	$40,874,445
New Maui Resident Discretionary Income	$83,652,025	$20,437,222
Total Operating/Business Activity Gross Receipts	$642,111,000	$74,760,000
Outside Patronage Expenditures	$96,065,625	$6,825,000
Total Maui "Base" Economic Impact	$966,277,667	$74,760,000
INCLUDES ONLY THOSE TAXES WHICH ARE "NEW" TO MAUI		
County of Maui Gross New Tax Receipts	$33,817,504	$6,059,888
State of Hawaii Gross New Tax Receipts	$89,048,090	$9,409,814
County of Maui New Expenditures	$15,223,392	$4,141,414
State of Hawaii New Expenditures	$36,574,328	$9,949,781
County of Maui Net New Profits/(Expenses)	$18,594,112	$1,918,474
State of Hawaii Net New Profits/(Expenses)	$52,473,762	($539,967)

Source: CBRE/Hallstrom Team

The Subject Property and Proposed Project

LOCATION AND MASTER PLAN

The irregular shaped 310-acre Pulelehua property is generally surrounded by vacant land to the south and mauka (apart from the West Maui Airport), with two single family subdivisions and vacant land northerly, and Honoapiilani and suburban development to makai, as shown in the aerial below.



The closest existing developments are the Kahananui and Kahana Ridge residential subdivisions situated adjacent to the property on the mauka side of Honoapiilani Highway, and residential and resort development makai of Honoapiilani Highway.

Situated on the western slope of the West Maui Mountains, the site has a moderately-sloping, generally consistent topography, stretching from about the 70-foot elevation level upslope approximately 0.5 miles to the 280-foot elevation. The property offers panoramic ocean and mountain views, has a desirable warm, arid climate, and is less than a quarter mile from the shoreline.

The climate in the area is highly desirable; dry, warm, and subject to lesser intensity trade winds. It has direct access onto the region's main thoroughfare (Honoapiilani Highway), and proximity to the commercial and employment centers of Kapalua, Kaanapali and Lahaina.

The property is located about 30 miles from the Kahului Airport and is proximate to shops, beaches, and visitor-oriented uses. There are many operating businesses in the near-vicinity providing employment opportunities. Honoapiilani Highway allows direct high-speed access into Central and South Maui.

The current master plan for Pulelehua, containing 800 apartment units and 100 single family homes, for a total of 900 units, is shown below

CBRE

The project is summarized as follows; however, via agreements with the County there will be 280 workforce housing units, this is equivalent to 31.1% of the total unit count and 45% of the market unit count; far exceeding the 25% of market unit threshold in County ordinance. There will be 280 workforce/affordable apartment units, 520 market-priced apartment units and 100 market-priced single family house lots.

Pulelehua
Entitled and Owned Property Rights Recap
January 2019

Total Land					**304 Acres**	
Apartments				**Units**	**Total**	
	Market Rate			**460**		
	Market Rate Live Work apartments			**60**		
	Workforce regular apartments			**270**		
	Workforce Live Work apartments			**10**		
	Total				**800**	**Units**
SF Lots		**Wide**	**Depth**	**Lots**		
	North Lots	**65**	**130-150**	**43**		
	Central Lots	**65**	**130-150**	**27**		
	South Lots	**65**	**130-150**	**14**		
	Scenic Lots	**80**	**150-180**	**15**		
	Total				**99**	**Lots**
Estate Lot	**1**	**45**	**Acres**		**1**	
Retail		**NRSF**				
	North	**NA**	Uphill			
	Akahele	**NA**	Main intersection			
	South	**NA**	Southern Pod by Park			
					70,186	**NRSF**
Regional Sports Park		**Multi Sport**			**10 Acres**	
Elementary School		**Site Dedicated within our Property**				
Utilities						
	Sewer Plant					
	Water Plant					
	Water Tanks					
Water Rights		**from aqueduct uphill**			**1,000,000**	**Ga/Day**
Reservoirs			**Ga Storage**			
	Small Reservoir		**2,000,000**			
	Large Reservoir		**6,000,000**			
	Easements to Utility Plants					
Solar	**Likely to have free Solar Facility at half of Market Rate Electricity**					

There is the potential for another 300-accessory dwelling/Ohana units which are pending county approval. We have not included these units in our study, but note there would be sufficient demand in the market to absorb them in a reasonable time post-2026. Transient Vacation Units (TVRs) use will not be permitted in the project.

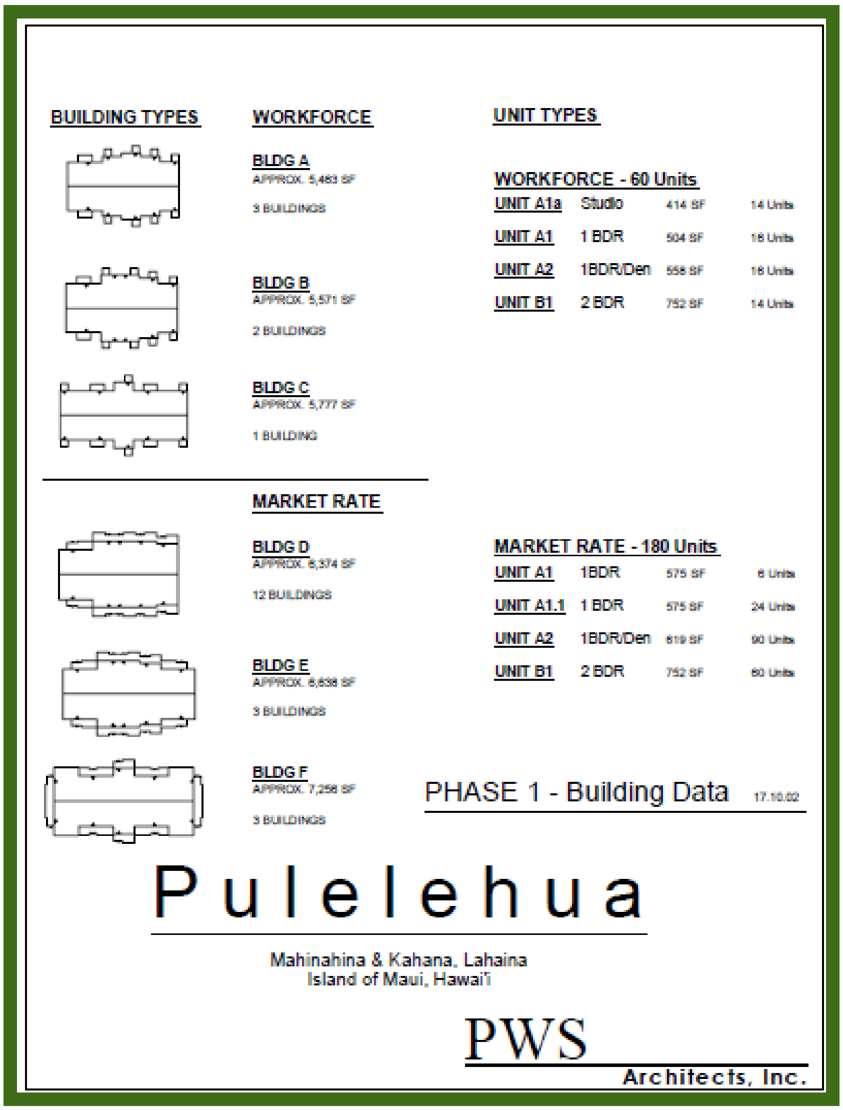
BUILDING AND UNIT TYPES

The buildings will be of multi-plex design, single-story wooden structures with gabled roofs, and exterior patio elements, as shown on the renderings below.

The phasing and unit-mix in the three increments are currently proposed as shown below.

Pulelehua Development Rights Schedule January 2019 Apartments																
	Rental Apartments															
	WorkForce					Market Rate									Total Units	Total SF
	Regular Work Force			Live Work Workforce		Market Rate					Market Rate Live Work					
	A1a	A1	B1	W1	W1.1	A1a	A1.1	A2	B1	B2	W1	W1.1	W2	W2.1		
SF	414	504	752	900	900	575	575	619	752	975	900	900	1120	900		
Ph 1	36	36	18			14	14	72	36	14					240	
Ph 2	44	44	22	5	5	14	16	80	44	16	24	24	6	6	350	
Ph 3	28	28	14			12	12	64	40	12					210	
Total Units	108	108	54	5	5	40	42	216	120	42	24	24	6	6	800	
Total SF	44,712	54,432	40,608	4,500	4,500	23,000	24,150	133,704	90,240	40,950	21,600	21,600	6,720	5,400		516,116

Further description of building types, sizes and lay-outs for the Phase I units were provided by the architect as shown. It is assumed the remaining phases will be similar in scope, scale and building/unit mix and types.



The project will meet and surpass Maui County Workforce Housing obligations (MCC 2.96) calling for the equivalent of 25 percent of the market-priced housing units being additionally built and offered at "affordable" rents established by the County and the US Department of Housing and Urban Development (HUD). Under the current master plan, Pulelehua will have workforce/affordable units equivalent to 45 percent of the market-priced units.

The rents for the designated workforce units will be affordable (no more than 30 percent of total income) to households making from 60 percent to 140 percent of the median Maui household income, according to agreements reached with the County.

We note, that market rents begin to become "affordable" for households with incomes at some 120% of the median Maui income level.

From a market perspective, the proposed master plan embodies the range of characteristics necessary to provide desirable, competitive workforce and market rental housing in the Lahaina District. It will offer affordable and reasonable market rents within a comprehensive, sustainable project in a moderate density urban environment.

We conclude the proposed Pulelehua master plan, unit types and unit mix are an appropriate use of the underlying site and will become readily established in the regional market and able to capture a reasonable share of expressed demand within the qualifying workforce and market-level resident long-term rental and for sale household segments.

The West Maui District Residential Market

REGIONAL OVERVIEW

The subject property is within the West Maui district, which encompasses many of Maui's popular residential and visitor destination areas, including the Lahaina, Kaanapali, Honokowai, Mahinahina, Kahana, Napili and Kapalua neighborhoods. During the past three decades, the oceanfront corridor stretching from Ukumehame to Kapalua has been transformed from a sleepy port-village surrounded by sugar cane fields to one of the world's most successful vacation locales in the country and is one of Hawaii's strongest neighbor island tourist centers. The region offers excellent sandy beaches, a consistent warm and generally arid climate, excellent aquatic conditions for swimming, diving, sailing, and fishing; and multiple onshore attractions such as golf, tennis, shopping, dining, entertainment, and outdoor activities.

Once Hawaii's capital and port of call for whaling ships, Lahaina serves as the commercial center of West Maui. Many small shops line Front Street through Lahaina Town, offering goods and services geared toward the visitor industry. Points of historic interest such as the Baldwin Missionary House, Pioneer Sugar Mill, and the restored sailing vessel, Carthaginian II, are abundant in this town.

Two of Maui's major resort areas are in the Lahaina District, Kaanapali and Kapalua, which are located approximately three and eight miles north of Lahaina, respectively. Each offers beautiful white sand beaches; luxurious hotels, timeshares, condominiums and residences; upscale retail, dining and entertainment; and, a range of recreational activities including golf, tennis and ocean sports. The makai corridor between the two resorts is effectively built-out with a collection of visitor and second-home oriented oceanfront and near-shoreline boutique hotels, condominiums and resort residential developments, with some neighborhood commercial centers. West Maui is second only to Waikiki in total visitors and visitor expenditures annually.

MARKET STUDY DEMAND ANALYSIS

The tables containing the market study model components summarized in this section and excerpted into the brief narrative are presented full-size in Addenda Exhibit A. Significant explanatory and source data is contained in their footnotes.

All the tabular inserts throughout the report are included on the tables within the addenda exhibits for easier viewing.

Our projection models in the following market study extend from the study date (late 2017) through the year 2030, a period of just over 13 years. This encompasses the entire Pulelehua entitlement, development and absorption period, which our analysis indicates will run from 2018 through 2026.

Residential development in West Maui has been focused in three areas of the District:

1. Lahaina Town – A historic Hawaiian village which was capital of the Kingdom of Hawaii from 1820 through 1845, and center of the whaling industry, that has now evolved into the urban and resident housing center of West Maui, the only "city" in the region. There are an estimated 12,500 residents in the community which has reasonable potential for further expansion within the identified Urban Growth Boundary encompassing the town, particularly via the proposed Kahoma and Leialii projects.

2. Kaanapali and Kapalua Resorts – Two destination resort communities initially developed in the 1960s and 70s, they now have respective full-time resident populations of some 1,400 and 400 persons. Both are nearing full build-out of their original master planning areas and proposing major mauka expansions. The majority of "housing units" built to date (primarily multi-family) are used for STHRs/TVUs and not considered part the resident housing inventory.

3. Coastal Corridor – The coastal corridor between the two resorts, identified as the Napili-Honokowai CDP has a resident population of some 7,400 persons. The majority of shoreline multifamily units in the area are used for STRHs/TVUs. Three major projects are proposed for the corridor, both stretching mauka from Honoapiilani Highway, The Department of Hawaiian Home Lands (DHHL) Honokowai development, the Kaanapali 2020 lands, and the Pulelehua master planned community.

Population and Household Size

The tables below summarize the resident population, housing stock and selected housing characteristics of the major Census Designated Places (CDP) and census tracts comprising the West Maui community for 2011 through 2015, and based on the 2010 census and zip codes.

SELECTED WEST MAUI CENSUS DATA FOR PERIOD 2011 THROUGH 2015

	Lahaina CDP	Kaanapali CDP	Launiupoko CDP	Napili-Honokowai CDP
Owner-Occupied (Percent of Total Units)	50.1%	82.8%	59.7%	40.6%
Renter-Occupied (Percent of Total Units)	49.9%	17.2%	40.3%	56.9%
Average Household Size Owner-Occupied Unit	3.74	2.18	2.75	2.45
Average Household Size Renter-Occupied Unit	3.21	2.42	2.32	2.35
Average Monthly Rent (1)	$1,245	$2,344	$2,667	$1,434
Percent of Rental Households Which Pay more than 35% of Income as Rent	44.4%	41.3%	39.4%	48.6%

(1) Gross figure. Average during years 2011 through 2015.

Source: CBRE/Hallstrom Team

WEST MAUI RESIDENT POPULATION, HOUSING UNITS AND HOUSEHOLD SIZES									
Data Set	Resident Population	Total Housing Units Used by Residents	Average Resident Household Size		Total Units in Housing Inventory Including Second-Homes		Percent of Total Units Which Are Second-Homes	
Maui County (2010 Census)	158,834	53,131	2.99		71,722		34.99%	
Zip Code 96761 (2010 Census)	22,156	7,759	2.86		11,928		34.95%	
By Major Census Designated Places (2010 Census)								
Kapalua CDP	353	163	2.17		1,015		83.94%	
Napili-Honokowai CDP	7,261	2,942	2.47		4,284		31.33%	
Mahinahina CDP	880	317	2.78		360		11.94%	
Kaanapali CDP	1,045	465	2.25		1,806		74.25%	
Lahaina CDP	11,704	3,535	3.31		4,049		12.69%	
Laniupoko CDP	588	216	2.72		287		24.74%	
Olowalu CDP	80	35	2.29		40		12.50%	
Totals	21,831	7,638	2.86		11,801		35.28%	
By West Maui Census Tract Data (2017 FFIEC Report Using 2010 Census Data) (1)								
314.02	3,046	864	3.53		1,030		16.12%	
314.04	3,339	1,227	2.72		1,699		27.78%	
314.05	5,762	1,326	4.35		1,449		8.49%	
315.01	2,323	759	3.06		1,655		54.14%	
315.02	4,522	2,020	2.24		3,261		38.06%	
315.03	2,436	1,094	2.23		2,574		57.50%	
320.00	866	413	2.10		938		55.97%	
Totals	22,294	7,703	2.89	(1)	12,606	(2)	38.89%	(2)

(1) Does not account for vacant residential units, so average household size figure is overstated by about .5 persons.
(2) Includes vacant residential units resulting in totals being overstated.

Source: US Census, The Hallstrom Team/CBRE

The estimated current average household size in the Lahaina District is about 2.85 persons; marginally below County-wide levels at 2.97 persons

It is anticipated to continue dropping over the coming 13-plus years to about 2.71 to 2.74 persons by 2030 as family/household demographic dynamics continue to change (nationwide) and new development changes the traditional mix of unit types in the area

Our population projections for West Maui are shown below. They are based on historic growth coupled with the Maui General Plan 2030 forecasts and two trending scenarios.

Projected West Maui Resident Population				
Scenario	3rd QTR 2017	2020	2025	2030
One: Minimum Based on Maui County General Plan 2030 Projection Series Percentile Periodic Growth				
Resident Population	**25,530**	**26,857**	**28,851**	**30,831**
Two: Maximum Based on Maui County General Plan 2030 Projection Series Absolute Growth to 2030 Figures				
Resident Population	**25,530**	**27,956**	**31,693**	**36,058**

Quantification of Housing Unit Latent and Projected Demand

The balance between demand and supply in West Maui has been consistently out of balance for decades, with a continually large latent unmet housing unit need, highlighted by periods of high-demand and appreciation during up-cycles (as is currently being experienced) with little overhanging supply even during recessions. This condition is exacerbated by the relatively large numbers of non-resident second/vacation home purchasers which flood the market, consuming an ever-increasing percentage of the residential inventory (particularly in newer developments).

Based on our calculations we estimate there is a current latent (unmet) demand for some 2,200 residential housing units in West Maui, a combination of full-time resident household needs, non-resident second/vacation home interest, and providing for a minimal vacancy rate in the market. Much of the unmet resident household demand is for additional workforce/affordable housing opportunities.

Acknowledging the long-term trend towards smaller households, the impact of non-resident purchasers (moving from 20 percent to between 26 and 30 percent by 2030), and a vacancy allowance of three percent to achieve a stable market, we have quantified the total demand for new housing inventory in West Maui at from 5,728 to 8,941 units between late-2017 and the end of 2030, with a mid-point of 7,335 units. Our calculations are shown below.

QUANTIFICATION OF HOUSING UNIT DEMAND FOR WEST MAUI 2017 TO 2030 EXCLUDING TRANSIENT VACATION UNITS

Scenario	3rd QTR 2017	Projected West Maui Resident Population 2020	2025	2030	Additional Units Required by 2030
One: Minimum Based on Maui County General Plan 2030 Projection Series Percentile Periodic Growth					
Resident Population	**25,530**	**26,857**	**28,851**	**30,831**	
Average Annual Change		1.6%	1.5%	1.4%	
Average Household Size	2.85	2.82	2.78	2.74	
Total Resident Units Required	8,958	9,524	10,378	11,252	
Vacancy Allowance (3 % of resident unit demand)	269	286	311	338	
Non-Resident Purchaser Allowance (2)	1,845	2,158	2,565	3,013	
TOTAL MARKET UNIT DEMAND	**11,072**	**11,967**	**13,255**	**14,603**	**5,728**
Two: Maximum Based on Maui County General Plan 2030 Projection Series Absolute Growth to 2030 Figures					
Resident Population	**25,530**	**27,956**	**31,693**	**36,058**	
Average Annual Change		2.6%	2.6%	2.6%	
Average Household Size	2.85	2.81	2.76	2.71	
Total Resident Units Required	8,958	9,949	11,483	13,306	
Vacancy Allowance (3 % of resident unit demand)	269	298	344	399	
Non-Resident Purchaser Allowance (2)	1,845	2,357	3,075	4,111	
TOTAL MARKET UNIT DEMAND	**11,072**	**12,604**	**14,902**	**17,816**	**8,941**

As of mid-2017, there are an estimated 13,625 total "residential" units in West Maui of which some 4,740 (34.7 percent) are used for vacation rentals (virtually all in the resorts or along the shoreline) with the remaining 8,885 (65.3 percent) available for full-time resident and second home owners/users. Approximately 20 percent of these latter units (1,777 units) are non-resident/second homes and 80 percent (7,108 are owned/used by full-time resident households.

Housing Unit Demand by Type

Today, about 60 percent of the “true” residential inventory (non-STRH/TVU) in the study area is single family and 40 percent multifamily. These figures are anticipated to change moderately in coming decades as shown, with multifamily/apartments comprising a growing share of the market.

DIVISION OF PROJECTED DEMAND BY UNIT TYPE FOR HOUSING UNITS IN THE WEST MAUI STUDY AREA 2017 TO 2030

	Projection Period			Total
	2017 to 2020	2021 to 2025	2026 to 2030	Demand 2017-2030
1. Using Minimum Demand Projections				
Single Family Homes & Lots	929	1,326	1,386	3,642
Percent of Total	61%	64%	65%	64%
Multifamily Units	**594**	**746**	**746**	**2,086**
Percent of Total	**39%**	**36%**	**35%**	**36%**
Total	**1,523**	**2,072**	**2,133**	**5,728**
	100%	100%	100%	100%
2. Using Maximum Projections				
Single Family Homes & Lots	1,317	1,973	2,404	5,695
Percent of Total	61%	64%	65%	64%
Multifamily Units	**842**	**1,110**	**1,294**	**3,247**
Percent of Total	**39%**	**36%**	**35%**	**36%**
Total	**2,160**	**3,083**	**3,698**	**8,941**
	100%	100%	100%	100%

It is expected that while the division in product type will continue to favor single family homes/lots, condominium units will marginally increase based on the planned unit mix in proposed regional developments as a percentage of the total market as available entitled, serviced multifamily building sites in the resorts and existing urban areas outpace single family subdivision. Within the universe of major in-development and proposed regional master planned projects (excluding Pulelehua), from committed/entitled to those needing further approvals, single family product will comprise 62 percent of the total inventory and condominiums/apartments some 38 percent, as summarized below.

PROPOSED MAJOR WEST MAUI DEVELOPMENTS WITH ENTITLEMTN STATUS AND UNIT COUNTS Excluding Proposed Pululehua Community	Single Family Lots and Homes	Multi-Family Units	Total Residential Units
Committed (Entitled)			
Sub-Total	**1,116**	**950**	**2,066**
Percent of Total	54.0%	46.0%	100.0%
Maui Island Plan & Community Plan (Partly Entitled)			
Sub-Total	**875**	**930**	**1,805**
Percent of Total	48.5%	51.5%	100.0%
Maui Island Plan Only			
Wainee Residential Community	360	360	720
Sub-Total	**2,695**	**990**	**3,685**
Percent of Total	73.1%	26.9%	100.0%
WEST MAUI TOTAL	**4,686**	**2,870**	**7,556**
Percent of Total	62.0%	38.0%	100.0%

Housing Unit Demand by Price/Rent

The County of Maui Department of Housing and Human Concerns, Housing Division has estimated the 2017 workforce/affordable pricing guidelines for "for sale" multifamily units as shown below.

ISLAND OF MAUI (EXCEPT HANA) WORKFORCE/AFFORDABLE SALES PRICE GUIDELINES FOR 2017

Prepared by:
HOUSING DIVISION
DEPARTMENT OF HOUSING AND HUMAN CONCERNS (DHHC)
COUNTY OF MAUI
Effective: **April 21, 2017**

2017
AFFORDABLE SALES PRICE GUIDELINES
MAUI (EXCEPT HANA)
MULTI-FAMILY

		Percent of Median Income											
		Very Low 50% & Below	Low Income (51% to 80%)			Below Moderate (81% to 100%)		Moderate (101% to 120%)		Above Moderate (121% to 140%)		Gap Income (141% to 160%)	
Prevailing Int. Rate	No. of Bedroom	50% $37,050	60% $44,460	70% $51,870	80% $59,280	90% $66,690	100% $74,100	110% $81,510	120% $88,920	130% $96,330	140% $103,740	150% $111,150	160% $118,560
4.000%	1	$128,660	$154,420	$180,110	$205,870	$231,560	$257,320	$283,080	$308,770	$334,530	$360,220	$385,980	$411,740
	2	$156,230	$187,510	$218,705	$249,985	$281,180	$312,460	$343,740	$374,935	$406,215	$437,410	$468,690	$499,970
	3	$183,800	$220,600	$257,300	$294,100	$330,800	$367,600	$404,400	$441,100	$477,900	$514,600	$551,400	$588,200
	4	$211,370	$253,690	$295,895	$338,215	$380,420	$422,740	$465,060	$507,265	$549,585	$591,790	$634,110	$676,430

Maximum affordable sales price is based on the following factors:
$74,100 Median family income as established by the U.S. Department of Housing and Urban Development (HUD).
30 Number of years for a fixed-rate mortgage loan with no discount points
30% Percentage of gross monthly income for housing expenses (principle and interest payment only)
5% Percentage of the purchase price for downpayment.

Note #1: As of June 6, 2017 the Bank of Hawaii 30 year fixed rate mortgage had an effective APR of 3.591% for a standard home loan (below $636,000), with 20% down payment and 1.25% in points. Rates by other lenders ranged from 3.7% APR to 4.1% APR tending towards 4.0%.

Note #2: Although not listed among the factors establishing affordable sales prices, Maui County requires a set-aside of 3.0% of gross income for multi-family purchasers to account for project maintenance fees. Hence the lower affordable prices for similar size units (bedrooms) in similar income categories relative to single family homes.

Source: County of Maui Department of Housing and Human Concerns, Housing Division

They have also established workforce/affordable rental unit guidelines for 2017 by family size, unit size and percentage of median household income as shown following.

ISLAND OF MAUI (EXCEPT HANA) WORKFORCE/AFFORDABLE RENTAL LIMITS GUIDELINES FOR 2017

Prepared by:
HOUSING DIVISION
DEPARTMENT OF HOUSING AND HUMAN CONCERNS (DHHC)
COUNTY OF MAUI

Effective: April 21, 2017

2017
INCOME LIMITS & AFFORDABLE RENT GUIDELINES
MAUI (EXCEPT HANA)

INCOME LIMITS FOR RENTAL UNITS (BY FAMILY SIZE & PERCENTAGE OF MEDIAN FAMILY INCOME)

% of Median	1 PERSON 0.7	2 PERSON 0.8	3 PERSON 0.9	4 PERSON 1.0	5 PERSON 1.08	6 PERSON 1.16	7 PERSON 1.24	8 PERSON 1.32
10%	$5,190	$5,930	$6,670	$7,410	$8,000	$8,600	$9,190	$9,780
20%	$10,370	$11,860	$13,340	$14,820	$16,010	$17,190	$18,380	$19,560
30%	$15,560	$17,780	$20,010	$22,230	$24,010	$25,790	$27,570	$29,340
40%	$20,750	$23,710	$26,680	$29,640	$32,010	$34,380	$36,750	$39,120
50%	$25,940	$29,640	$33,350	$37,050	$40,010	$42,980	$45,940	$48,910
60%	$31,120	$35,570	$40,010	$44,460	$48,020	$51,570	$55,130	$58,690
70%	$36,310	$41,500	$46,680	$51,870	$56,020	$60,170	$64,320	$68,470
80%	$41,500	$47,420	$53,350	$59,280	$64,020	$68,760	$73,510	$78,250
90%	$46,680	$53,350	$60,020	$66,690	$72,030	$77,360	$82,700	$88,030
100%	$51,870	$59,280	$66,690	$74,100	$80,030	$85,960	$91,880	$97,810
110%	$57,060	$65,210	$73,360	$81,510	$88,030	$94,550	$101,070	$107,590
120%	$62,240	$71,140	$80,030	$88,920	$96,030	$103,150	$110,260	$117,370
130%	$67,430	$77,060	$86,700	$96,330	$104,040	$111,740	$119,450	$127,160
140%	$72,620	$82,990	$93,370	$103,740	$112,040	$120,340	$128,640	$136,940

AFFORDABLE RENT GUIDELINES (BY UNIT SIZE & PERCENTAGE OF MEDIAN FAMILY INCOME)

% of Median	UNIT SIZE (NO. OF BEDROOMS)					
	0	1	2	3	4	5
10%	$130	$139	$167	$193	$215	$237
20%	$259	$278	$334	$385	$430	$474
30%	$389	$417	$500	$578	$645	$711
40%	$519	$556	$667	$771	$860	$948
50%	$649	$695	$834	$963	$1,075	$1,186
60%	$778	$834	$1,000	$1,156	$1,289	$1,423
70%	$908	$973	$1,167	$1,349	$1,504	$1,660
80%	$1,038	$1,112	$1,334	$1,541	$1,719	$1,897
90%	$1,167	$1,250	$1,501	$1,734	$1,934	$2,134
100%	$1,297	$1,389	$1,667	$1,927	$2,149	$2,371
110%	$1,427	$1,528	$1,834	$2,119	$2,364	$2,608
120%	$1,556	$1,667	$2,001	$2,312	$2,579	$2,845
130%	$1,686	$1,806	$2,168	$2,505	$2,794	$3,083
140%	$1,816	$1,945	$2,334	$2,697	$3,009	$3,320

Note: Affordable rents are based on 30% of gross monthly income. Affordable rents include utilities.

Source: County of Maui Department of Housing and Human Concerns, Housing Division

Using housing affordability calculations and historic trends in the relationship between West Maui residential pricing and household income level, we have estimated the range in unit selling prices best fitting the forecast demand for new units in the region through 2030. New housing units in the West Maui Corridor will need to be priced at (in 2017 dollars and current prevailing interest rates) as shown below. The table also is insightful for rental pricing demand purposes.

STRIATED PROJECTIONS OF HOUSING UNIT DEMAND BY PRICE
IN WEST MAUI STUDY AREA 2017 TO 2030
Expressed in Constant 2017 Dollars

Period	Household Income as a % of Median Income (1)	Projection Period 2017 to 2020	2021 to 2025	2026 to 2030	Total Demand 2017-2030
1. Minimum Demand Forecasts					
Less Than $365,000	80% or Less	426	539	512	1,477
Percent of Total Demand		28.00%	26.00%	24.00%	25.79%
$365,000 to $640,000	81% to 140%	366	497	512	1,375
Percent of Total Demand		24.00%	24.00%	24.00%	24.00%
$640,000 to $1,500,000	Above 140%	396	580	640	1,616
Percent of Total Demand		26.00%	28.00%	30.00%	28.21%
Over $1,500,000	Above 140%	335	477	512	1,324
Percent of Total Demand		22.00%	23.00%	24.00%	23.11%
Total Market Demand		1,523	2,072	2,133	5,728
		100.00%	101.00%	102.00%	101.11%
2. Maximum Demand Forecasts					
Less Than $365,000	80% or Less	605	802	888	2,294
Percent of Total Demand		28.00%	26.00%	24.00%	25.66%
$365,000 to $640,000	81% to 140%	518	740	888	2,146
Percent of Total Demand		24.00%	24.00%	24.00%	24.00%
$640,000 to $1,500,000	Above 140%	562	832	1,036	2,429
Percent of Total Demand		26.00%	27.00%	28.00%	27.17%
Over $1,500,000	Above 140%	475	709	888	2,072
Percent of Total Demand		22.00%	23.00%	24.00%	23.17%
Total Market Demand		2,160	3,083	3,698	8,941
		100.00%	100.00%	100.00%	100.00%

- 26 percent would need to meet affordability guidelines for a household of four earning 80 percent of the County median household income ("Low Income");
- 24 percent would need to be considered affordable to households earning from 81 percent to 140 percent of median County income ("Below Moderate" to "Gap Income" categories);
- 50 percent would be for households with incomes above 140 percent of the Maui median (“Market” level).

Through September 2017, the average sales prices for residential inventory in selected West Maui neighborhoods as reported by the Maui Board of Realtors Multiple Listing Service (which may not include all original unit sales) were as listed below, alongside average monthly rents for those areas as compiled by the US Census for year-end 2015.

Median Housing Prices and Rents in Selected West Maui Communities (Through September 2017)	Lahaina	Napili-Honokowai	Kaanapali
Single Family Median Price	$1,334,500	$1,700,000	$847,500
Multi-Family Average Price	$482,500	$922,000	$425,000
Median Rent (Year-End 2015)	$1,245	$1,434	$2,344

The MLS sales data for Maui, West Maui, and selected West Maui communities are shown on the following tables and graphs. Sales data is considered insightful for estimating demand for and pricing of rental units (both single family and condominium/apartments).

YEAR-END MEDIAN SALES PRICE FOR MAUI AND SELECT WEST MAUI AREAS FROM MULTIPLE LISTING SERVICE DATABASE 2010 THROUGH ANNUIALIZED 2017

Location and Property Type	2010	2011	2012	2013	2014	2015	2016	Annualized September 2017
Overall Maui								
Single Family	$460,000	$432,500	$470,000	$530,000	$570,000	$580,000	$636,750	$700,000
% Change	*-7.65%*	*-5.98%*	*8.67%*	*12.77%*	*7.55%*	*1.75%*	*9.78%*	*9.93%*
Condominium	$377,500	$310,000	$358,995	$373,000	$415,000	$410,000	$429,000	$449,000
% Change	*-16.11%*	*-17.88%*	*15.80%*	*3.90%*	*11.26%*	*-1.20%*	*4.63%*	*4.66%*
Lahaina								
Single Family	$501,900	$518,550	$512,500	$606,250	$775,000	$700,000	$760,000	$1,334,500
% Change	*-22.78%*	*3.32%*	*-1.17%*	*18.29%*	*27.84%*	*-9.68%*	*8.57%*	*75.59%*
Condominium	$378,583	$337,205	$365,100	$352,500	$420,000	$440,000	$485,573	$482,500
% Change	*-5.12%*	*-10.93%*	*8.27%*	*-3.45%*	*19.15%*	*4.76%*	*10.36%*	*-0.63%*
Kaanapali								
Single Family	$965,000	$1,100,000	$1,230,000	$1,172,500	$1,600,000	$1,785,000	$1,597,500	$1,700,000
% Change	*-33.33%*	*13.99%*	*11.82%*	*-4.67%*	*36.46%*	*11.56%*	*-10.50%*	*6.42%*
Condominium	$823,250	$646,700	$499,900	$782,950	$850,000	$992,500	$1,022,500	$922,000
% Change	*-15.56%*	*-21.45%*	*-22.70%*	*56.62%*	*8.56%*	*16.76%*	*3.02%*	*-9.83%*
Napili/Kahana/Honokowai								
Single Family	$660,000	$605,000	$632,000	$799,000	$750,000	$881,000	$875,000	$847,500
% Change	*-12.58%*	*-8.33%*	*4.46%*	*26.42%*	*-6.13%*	*17.47%*	*-0.68%*	*-3.14%*
Condominium	$310,000	$259,000	$299,000	$382,500	$399,000	$400,000	$407,500	$425,000
% Change	*-15.65%*	*-16.45%*	*15.44%*	*27.93%*	*4.31%*	*0.25%*	*1.87%*	*4.29%*

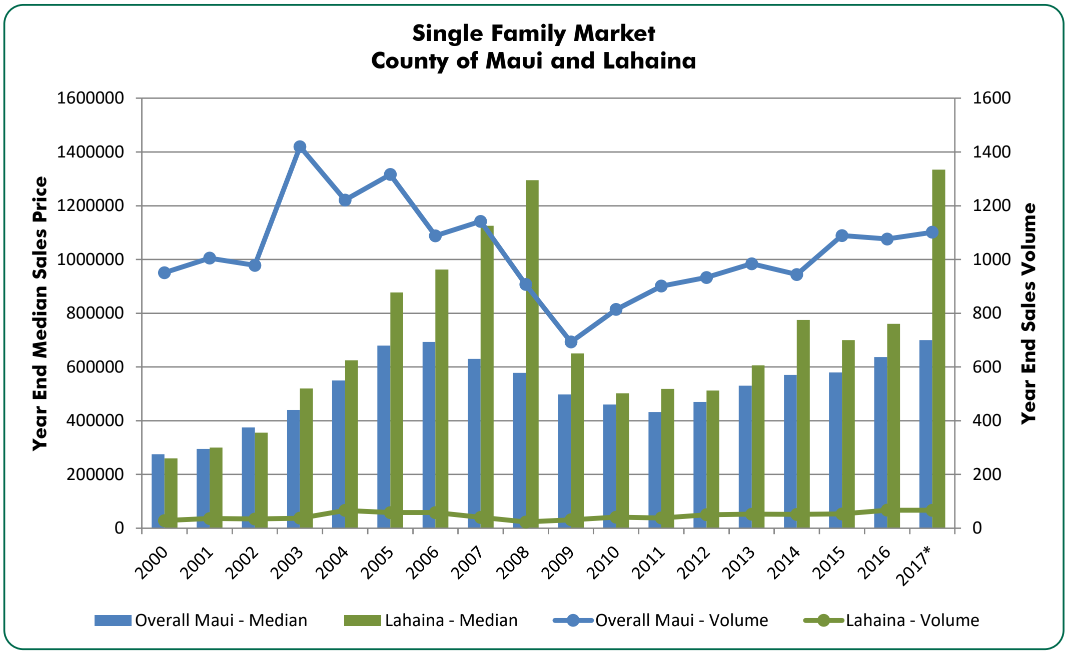
Source: Maui Multiple Listing Service and CBRE/Hallstrom Team.

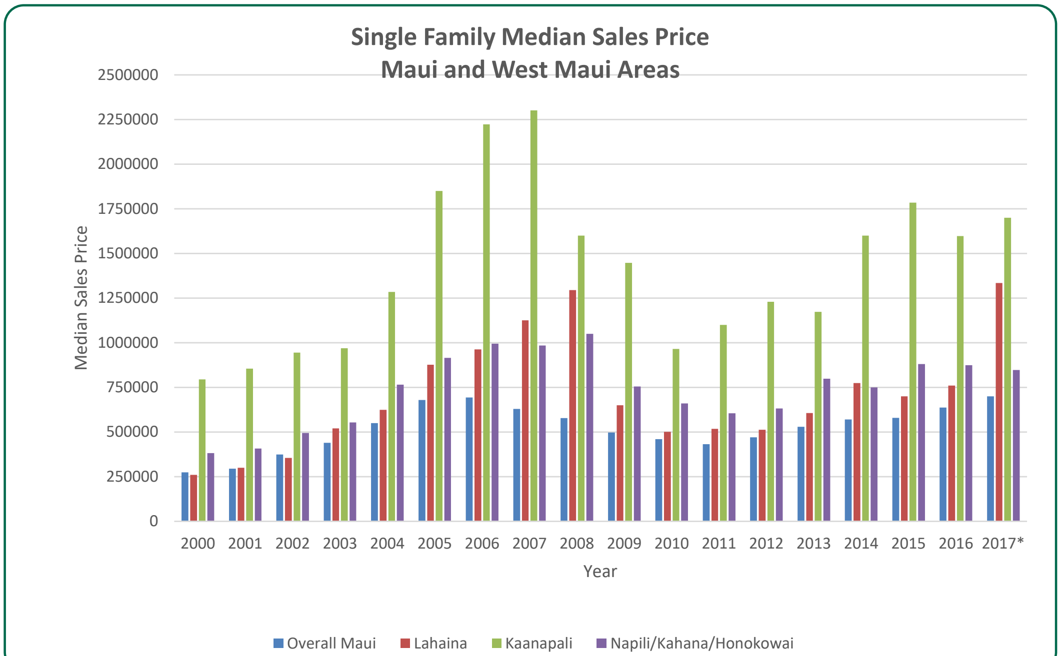
YEAR-END NUMBER OF SALES FOR MAUI AND SELECT WEST MAUI AREAS FROM MULTIPLE LISTING SERVICE DATABASE 2010 THROUGH ANNUALIZED 2017

Property Type	2010	2011	2012	2013	2014	2015	2016	Annualized September 2017
Overall Maui								
Single Family	814	901	933	984	944	1,089	1,076	1,101
% Change	*17.46%*	*10.69%*	*3.55%*	*5.47%*	*-4.07%*	*15.36%*	*-1.19%*	*2.35%*
Condominium	1,147	1,157	1,248	1,333	1,203	1,199	1,232	1,399
% Change	*38.86%*	*0.87%*	*7.87%*	*6.81%*	*-9.75%*	*-0.33%*	*2.75%*	*13.53%*
Lahaina								
Single Family	41	38	50	52	51	53	67	67
% Change	*32.26%*	*-7.32%*	*31.58%*	*4.00%*	*-1.92%*	*3.92%*	*26.42%*	*-0.50%*
Condominium	64	83	80	85	72	103	68	83
% Change	*16.36%*	*29.69%*	*-3.61%*	*6.25%*	*-15.29%*	*43.06%*	*-33.98%*	*21.57%*
Kaanapali								
Single Family	21	35	23	22	27	22	22	24
% Change	*50.00%*	*66.67%*	*-34.29%*	*-4.35%*	*22.73%*	*-18.52%*	*0.00%*	*9.09%*
Condominium	237	122	160	160	151	102	119	91
% Change	*22.80%*	*-48.52%*	*31.15%*	*0.00%*	*-5.62%*	*-32.45%*	*16.67%*	*-23.81%*
Napili/Kahana/Honokowai								
Single Family	27	42	45	35	34	30	40	45
% Change	*12.50%*	*55.56%*	*7.14%*	*-22.22%*	*-2.86%*	*-11.76%*	*33.33%*	*13.33%*
Condominium	173	213	233	215	209	197	266	247
% Change	*80.21%*	*23.12%*	*9.39%*	*-7.73%*	*-2.79%*	*-5.74%*	*35.03%*	*-7.27%*

Source: Maui Multiple Listing Service and CBRE/Hallstrom Team.

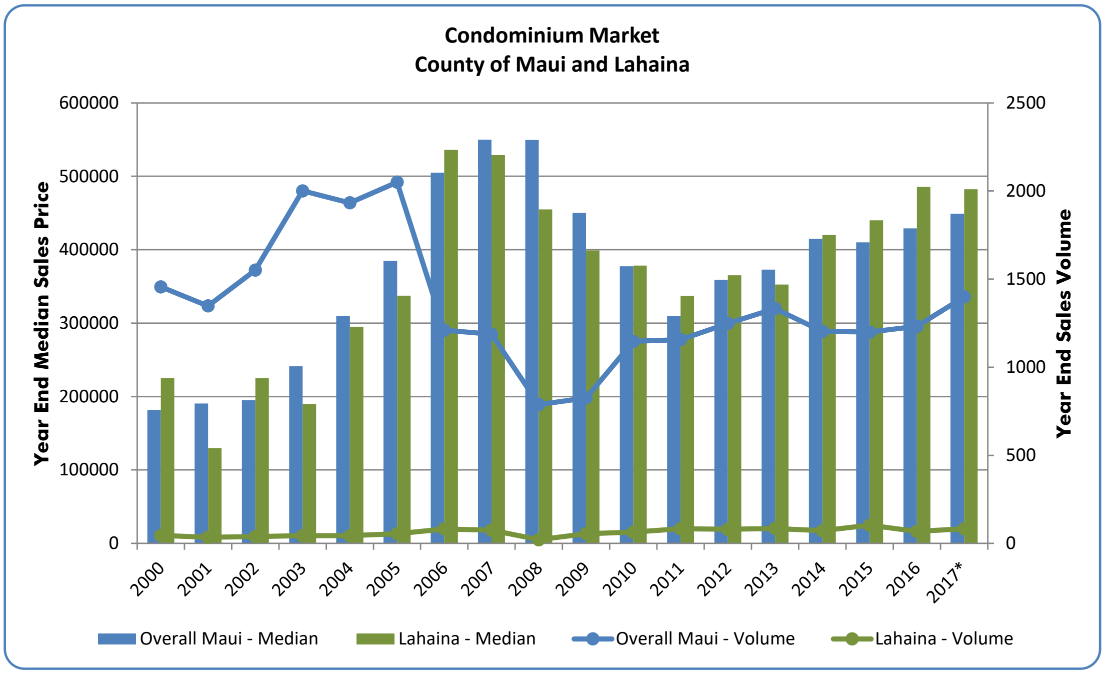
GRAPHS OF MAUI MULTIPLE LISTING SERVICE SINGLE FAMILY SALES FOR MAUI AND SELECTED WEST MAUI AREAS

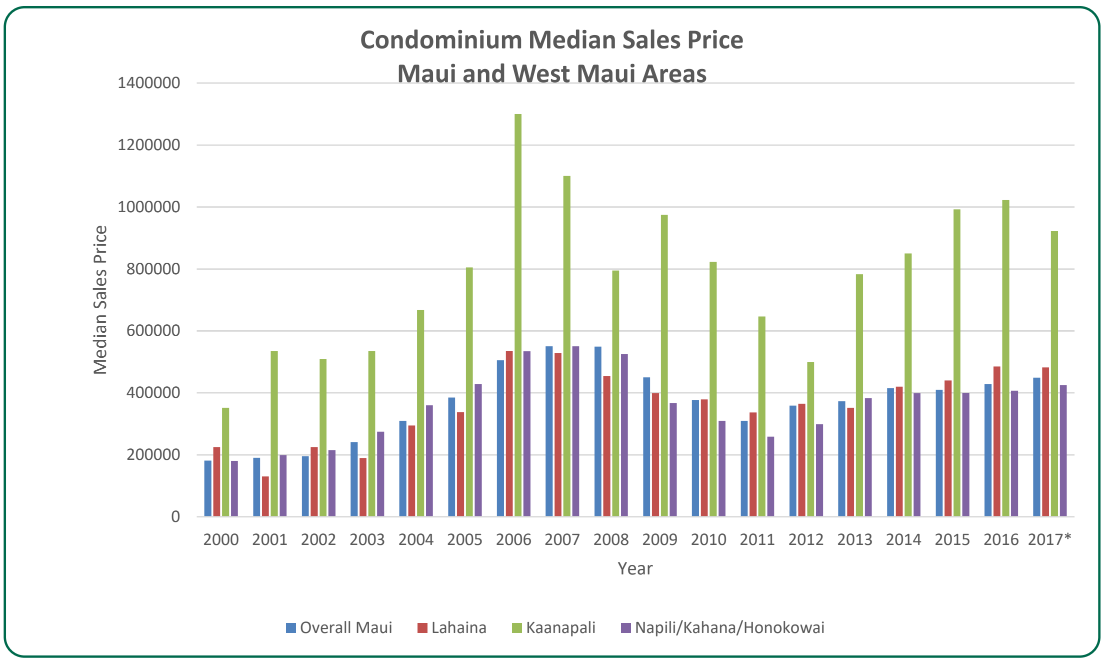




Source: Maui Multiple Listing Service and CBRE/Hallstrom Team.

GRAPHS OF MAUI MULTIPLE LISTING SERVICE CONDOMINIUM UNIT SALES FOR MAUI AND SELECTED WEST MAUI AREAS





Source: Maui Multiple Listing Service and CBRE/Hallstrom Team.

WEST MAUI RENTAL APARTMENT SECTOR

There are currently nine major mixed-income and market rental apartment projects in West Maui with a total of 1,086 units, as summarized in the following table. 99 percent of the units are currently occupied with the manager of Sunset Terrace expecting full-occupancy to be achieved as the vacant units are renovated and placed back into the available inventory.

All the projects have waiting lists and assert that units are invariably re-leased within a month of their vacancy and subsequent listing.

SUMMARY OF COMPARABLE MIXED-INCOME AND MARKET APARTMENT RENTALS

Property Name	Location	Occupancy	No. of Units	Year Built
Kahana Manor	4310 Lower Honoapiilani Rd	100%	105	1981
Leinani Apartments	3750 Lower Honoapiilani Rd	100%	30	1970
Sunset Terrace Apartments	3626 Lower Honoapiilani Rd	97%	288	1987
Coconut Inn	181 Hui Road F	100%	46	1977
Napili Ridge	120 Hui Road	100%	130	1972
Maui Lani Terrace	3740 Lower Honoapiilani Rd	100%	159	1989
Opukea at Lahaina	Limahana Circle	100%	114	2009
Napili Villas	Hanawai St.	100%	184	2002
Lahaina Town Luxury Apartments	134 Wahie Ln	100%	30	1968
Totals		**99%**	**1,086**	

Compiled by CBRE/Hallstrom Team

There are six income-restricted (LIHTC) rental apartment projects in West Maui. They are 100 percent occupied and have extensive waiting lists.

WEST MAUI LIHTC APARTMENT RENTAL PROPERTIES - INCOME RESTRICTED			
Name	**Affordable Units**	**Percent of Median Income Rental Basis**	**Percent Occupied**
Front Street Apartment	142	60%	100%
Honokowai Villa	56	30%/60%	100%
Honokowai Kauhale	184	60%	100%
Komohana	20	60%	100%
Lahaina Surf	112	60%	100%
Weinberg Court Apartments	62	60%	100%
Total	**576**		**100%**

Compiled by CBRE/Hallstrom Team

The unit mix (by bedrooms), living area size in square feet and monthly rental rates (total and per square foot) for selected major mixed-income and market projects are as shown below.

SUMMARY OF UNIT TYPES, SIZES AND RENTS IN PRIMARY WEST MAUI APARTMENT PROJECTS				
Comparable Project	Unit Type	Size	Rental Rates $/Mo.	$/SF
Studio Units				
Lahaina Town Luxury Apartments	Studio/1BA	308	$1,195	$3.88
Sunset Terrace	Studio/1BA	444	$1,570	$3.54
One Bedroom Units				
Kahana Manor	1BD/1BA	675	$1,625	$2.41
Leinani Apartments	1BD/1BA	560	$1,600	$2.86
Sunset Terrace Apartments	1BD/1BA	618	$1,825	$2.95
Coconut Inn	1BD/1BA	631	$1,850	$2.93
Napili Ridge	1BD/1BA	564	$1,700	$3.01
Maui Lani Terrace	1BD/1BA	530	$1,900	$3.58
Coconut Inn	1BD/1BA	499	$1,700	$3.41
Two Bedroom Units				
Kahana Manor	2BD/2BA	975	$2,200	$2.26
Opukea at Lahaina	2BD/2BA	1250	$2,900	$2.32
Napili Villas	2BD/2BA	854	$2,400	$2.81
Maui Lani Terrace	2BD/1BA	705	$2,100	$2.98
Leinani Apartments	2BD/2BA	780	$2,350	$3.01
Sunset Terrace Apartments	2BR/2BA	796	$2,395	$3.01
Three Bedroom Units				
Opukea at Lahaina	3BD/2BA	1357	$3,500	$2.58
Napili Villas	3BD/2.5BA	1236	$3,100	$2.51
Napili Villas	3BD/2BA	1165	$3,000	$2.58
Compiled by CBRE/Hallstrom Team				

We completed a survey of the West Maui residential rental market from late September through early November 2017 and identified 48 units of various type offered for long-term rent. Asking rents ranged from $1,272 to $5,373 per month, averaging $3,391; with about half including some/all utilities and half no utilities. The advertised units are summarized on the following table.

LAHAINA DISTRICT LONG-TERM RESIDENTIAL RENTAL UNIT SURVEY SEPTEMBER 29 THROUGH NOVEMBER 3, 2017

Source	Address	Type	Bed	Bath	Sq Ft	Listing Price (Rent)	Utilities Included	Date
Realtor	6 Poinciana Pl, Lahaina, HI 96761	Condo	4	2.5		$4,787		9/29/2017
Zillow	861 Kale St,Lahaina, HI 96761	House	4	2	2648	$3,500		9/29/2017
Desination Maui	1660 Limahana Circle - Opukea F108, F108, Lahaina, HI 96761	Condo	3	2	1332	$3,500	Water, Trash, Electric, Cable, Internet	9/29/2017
Craiglist	Kahana Ridge Dr, Lahaina, HI 96761	Apartment	3	2.5		$3,950		9/29/2017
Zillow	25 Heather Ln APT 131,Lahaina, HI 96761	Apartment	2	2	960	$2,400	Utilities included except Electric	9/29/2017
Zillow	3626 Lower Honoapiilani Rd, Lahaina, HI 96761	Apartment	2	1	796	$2,395		9/29/2017
Zillow	50 Puu Anoano St APT 1602,Lahaina, HI 96761	Apartment	2	2		$3,646	Rent+Utilities (PV electric System for Water and Heater)	9/29/2017
Zillow	500 Kapalua Dr,Lahaina, HI 96761	House	2	2	1344	$3,500		9/29/2017
Craiglist		Apartment	2	2		$2,650		9/29/2017
Zillow	3627 Lower Honoapiilani Rd, Lahaina, HI 96761	Apartment	1	1	618	$1,825		9/29/2017
Zillow	3740 Lower Honoapiilani Rd APT A304,Lahaina, HI 96761	Apartment	1	1	530	$1,900	Water & Trash	9/29/2017
Zillow	4909 Lower Honoapiilani Rd # E3E,	Apartment	1	1	700	$2,300		9/29/2017
Zillow	3628 Lower Honoapiilani Rd, Lahaina, HI 96761	Apartment	0	1	444	$1,545		9/29/2017
Craiglist		House	4	3.5	3600	$5,700		10/1/2017
Craiglist	16 Plumeria Place, Lahaina, HI 96761	House	3	2	1830	$4,400		10/1/2017
Craiglist	15 E Kuu Aku Lane, Lahaina, HI 96761	Condo	2	2.5	1282	$4,700		10/1/2017
Craiglist	3788 Lower Honoapiilani Rd, Lahaina, HI 96761	Condo	2	2		$3,200	High Speed Internet, Cable, Electricity up to $150	10/1/2017
Craiglist	Ainakea Rd	House	3	1	800	$2,795		10/4/2017
Craiglist		Condo	3	2		$3,000		10/4/2017
Trulia	300 Aalii Way, Lahaina, HI 96761	House	4	3.5	3800	$6,953		10/11/2017
Zillow	146 Kahana Nui Rd, Lahaina, HI 96761	House	3	2.5		$3,950		10/11/2017
Trulia	16 Polohina Ln #4, Lahaina, HI 96761	Apartment	3	2		$2,800		10/11/2017
Zillow	1660 Limahana Circle Opukea F108, Lahaina, HI 96761	Condo	3	2	1332	$3,500	Water, Trash, Electric, Cable, Internet	10/11/2017
Zillow	31 E Ku U Aku Ln, Lahaina, HI 96761	Condo	3	2	1165	$4,000	All utilities except electricity	10/11/2017
Zillow	3530 Lower Honoaopiilani Rd, Lahaina, HI 96761	House	3	2	1088	$2,800		10/11/2017
Zillow	486 Wainee St, Lahaina, HI 96761	House	3	2	1194	$3,750		10/11/2017
Zillow	500 Bay Dr #23, Lahaina, HI 96761	House	1	1.5		$3,600		10/11/2017
ApartmentFinder	877 Anupuni Loop, Lahaina, HI 96761	House	5	4		$12,000	Yard, Trash, Pool, Spa Maintenance	10/13/2017
ApartmentFinder	102 Woodrose PL, Lahaina, HI 96761	Apartment	3	3		$6,700	Trash, Pool, Spa Maintenance	10/13/2017
ApartmentFinder	43 Polohina Ln, Lahaina, HI 96761	Apartment	3	2		$2,890	All utilities except electric and cable	10/13/2017
ApartmentFinder	4955 Honowai St, Lahaina, HI 96761	House	2	1.5	767	$2,600		10/13/2017
Craiglist		House	2	2		$2,700		10/13/2017
Craiglist		House	1	1	520	$2,100	Utilities Included	10/13/2017
Craiglist		Apartment	0	1		$1,000	Electricity, Water	10/13/2017
Craiglist	36 Puu Hale, Lahaina, HI 96761	Condo	4	3.5	3650	$5,800	Solar Panel	10/18/2017
Trulia	15 Wailau Pl, Lahaina, HI 96761	House	3	2	1937	$6,900		10/18/2017
Craiglist	206 Front Street, Lahaina, HI 96761	House	2	1	900	$2,100		10/18/2017
Craiglist	Mahinahina St & Uli Pl, Lahiana, HI 96761	House	2	1	1600	$3,200	Water, Trash	10/18/2017
Craiglist		House	2	1	750	$2,300	All utilites except water, trash, electricity	10/18/2017
Zillow	36 Puu Hale St,Lahaina, HI 96761	Condo	4	3.5	3650	$5,500	No Utilities+Solar Panels	10/27/2017
Zillow	45 E Kuu Aku Ln UNIT 314,Lahaina, HI 96761	Condo	3	2	1165	$2,950	All utilities except electric and cable	10/27/2017
Zillow	31 E Kuu Aku Ln # 13,Lahaina, HI 96761	Condo	3	2	1165	$3,300	All utilites except cable, electric, internet	10/27/2017
Zillow	25 Heather Ln APT 114,Lahaina, HI 96761	Apartment	3	2		$2,500		10/30/2017
Zillow	3788 Lower Honoapiilani Rd APT D101,Lahaina, HI 96761	Condo	2	2	1100	$2,400		10/30/2017
Zillow	Lower Honoapiilani RdLahaina, HI 96761	Condo	1	1	768	$2,900	Electricity, Water, Sewer, and Cable	11/2/2017
Zillow	4064 Lower Honoapiilani Rd,Lahaina, HI 96761	House	1	1.5	1750	$2,200	Cable+Internet	11/3/2017
Hotpad	Hui Road F, Lahaina, HI 96761	Condo	2	1	1080	$2,300		11/3/2017
Zillow	4365 Lower Honoapiilani Rd # 201,Lahaina, HI 96761	Condo	2	2	1141	$3,995		11/3/2017

Source: As Cited andCBRE/Hallstrom Team

Virtually all units listed for rents were successfully leased in the month of their offering, particularly those priced at $3,000 per month or less, and according to apartment complex managers and rental agents demand for residential rentals in West Maui is very high (and increasing) and far outstrips available supply. The results of our survey are displayed graphically in the following chart. We note that there is some overlap in rents between affordable and market levels when moving above the 120 percent median household income level.

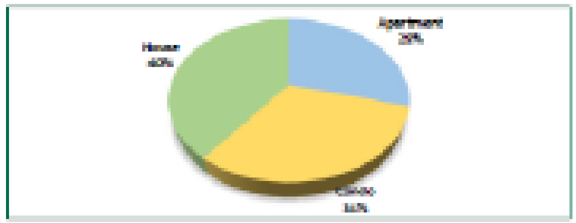
GRAPHS OF WEST MAUI LONG-TERM RESIDENTAL RENTAL UNIT SURVEY

Unit Type	Number of Units
Apartment	14
Condo	15
House	19
Grand Total	48

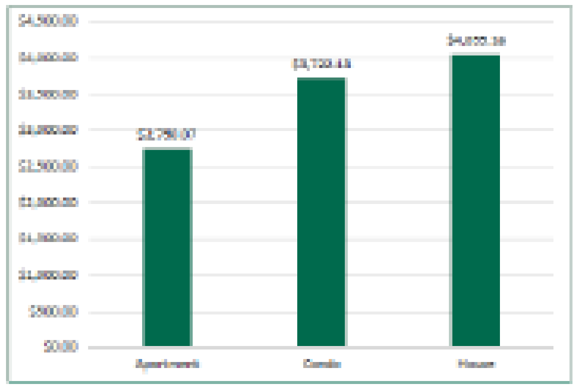
Unit Type	Average Rent
Apartment	$2,790.07
Condo	$3,722.13
House	$4,055.16
Grand Total	$3,570.44

Beds	Average (Rent)
Studio	$1,272.50
1	$2,403.57
2	$2,939.07
3	$3,746.18
4	$5,373.33
Grand Total	$3,391.09

RESIDENTIAL SUPPLY IN STUDY AREA BY TYPE



AVERAGE ASKING RENT BY TYPE



Average Asking Rent by Bedroom Total

Source: As Cited andCBRE/Hallstrom Team

CBRE

MARKET STUDY SUPPLY ANALYSIS

There are numerous residential projects entitled, proposed, or announced in West Maui which could total some 7,556 units upon full build-out, as shown below., excluding those at Pulelehua.

PROPOSED MAJOR WEST MAUI RESIDENTIAL PROJECTS BY ENTITLEMENT STATUS
Excluding Proposed Pululehua Community

	Single Family Lots and Homes	Multi-Family Units	Total Residential Units
Committed (Entitled)			
Kahoma Resident Housing (Under-Construction)	68	0	68
Kahoma Village PD4 (Under-Construction)	101	102	203
Kai A Ulu Affordable Homes (Under-Construction)	33	0	33
Kapalua Mauka Residential	690	0	690
Pailolo Place	0	42	42
Pukuolii Villages	292	648	940
Wailele Ridge (Under-Construction)	0	158	158
Sub-Total	**1,116**	**950**	**2,066**
Percent of Total	54.0%	46.0%	100.0%
Maui Island Plan & Community Plan (Partly Entitled)			
Kaanapali Lower North Honokowai	275	330	605
Lealii HHFDC Community	600	600	1,200
Sub-Total	**875**	**930**	**1,805**
Percent of Total	48.5%	51.5%	100.0%
Maui Island Plan Only			
Kaanapali Lower East Honokowai	225	0	225
Kaanapalai Lower South Honokowai	410	630	1,040
Makila (Includes Polanui Gardens)	200	0	200
Olowalu	1,500	0	1,500
Wainee Residential Community	360	360	720
Sub-Total	**2,695**	**990**	**3,685**
Percent of Total	73.1%	26.9%	100.0%
WEST MAUI TOTAL	4,686	2,870	7,556
Percent of Total	62.0%	38.0%	100.0%

Source: Long Range Planning Division, Department of Planning, County of Maui, "Kapalua North Lahaina" & "South Lahaina Ukumehame" Development Project Maps, May 2016.

CBRE

However, many of the projects are currently on-hold or have indefinite timelines. Several are under financial duress and will not be moving forward during the near to mid-term.

Other considerations include:

- Not all the unapproved units will successfully gain necessary entitlements.
- Many development sites currently lack water and/or other critical service systems and may never obtain them, or will require decades for regional systems to extend/expand to service their property.
- Master planned projects, particularly larger proposed communities, are often not built out to maximum densities.

Due to the uncertainty of these major projects and their current lack of inertia precise quantification of probable additions to supply during the 2017 to 2030 projection period is problematic. We believe at best no more than 60 percent to 80 percent of the committed/entitled and partially-entitled units will be built by 2030; which will be insufficient to meet the projected regional housing demand needs.

The table below summarizes major projects under-construction on Maui as of late-2017. All of those offering workforce/affordable or low market-priced units are being quickly absorbed, often through a series of fully-subscribed lotteries.

NEW MAJOR UNDER-CONSTRUCTION MAUI RESIDENTIAL PROJECTS

Project Name	Number of Units: Multi Family	Number of Units: Single Family	Number of Units: Total	Unit Size in Sq. Ft.: Multifamily	Unit Size in Sq. Ft.: Single Family	Sales Prices: Multifamily	Sales Prices: Single Family	Comments
West Maui								
Kalama Village	102	101	203	1,000 to 1,223	1,043 to 2,194	Starting at $275,000	Up to $750,000	Infrastructure complete, homes under-construction, applications being accepted.
Wailele Ridge	158	0	158	500 to 1,600	N/A	$404,900 to $939,900	N/A	Construction began 4/16 with 20 of 38 units offered reserved.
Central Maui								
Kamanai at Kehalani	24	0	24	1,425 to 1,465	N/A	$475,000 to $506,000	N/A	Phase 4 of 122-unit project, all units reserved, all prior phases sold-out
Parkways at Maui Lani	0	120	120	N/A	1,385 to 2,404	N/A	Starting at mid-$500,000s	Later phases of 2013 project. 65 homes reserved.
Alohilani at Kehalani	0	88	88	N/A	1,502 to 1,736	N/A	$619,000 to $641,000	Construction underway, 66 homes reserved by year-end 2016
South Maui								
Hokulani Golf Villas	0	152	152	N/A	1,800 to 2,500	N/A	$966,000 to $1,295,000	Later phases of 2009 project. 33 homes sold from 2014-2016.
Cove Beach Villas	32	0	32	896 to 948	N/A	$499,900 to $599,900	N/A	17 units reserved or held by developer
Keala O Wailea	70	0	70	1,241 to 1,312	N/A	$888,900 to $1,019,000	N/A	Construction began early 2016. 6 of 17 units offered sold.

Compiled by CBRE/Hallstrom Team

Appropriateness of the Subject Property for Residential Use and Absorption Estimates

The tables containing the absorption projection models summarized in this section are also presented in Addenda Exhibit B.

APPROPRIATENESS OF THE SUBJECT SITE FOR THE PROPOSED DEVELOPMENT

Considering the quantified market support for the proposed subject residential development, the next step in analysis is to assess whether the site and concept are appropriate from a market perspective, are in concert with macro demand trends, and forecast the probable standing of the Pulelehua inventory therein. These insights determine the competitiveness and resulting probable market shares for the residential components of the project.

The master plan for the subject project is consistent with modern urban planning objectives for workforce/affordable and market-level priced multifamily/apartment development and will provide a competitive environment for the 900 units proposed (800 apartments and 100 single family homes). Among the features we consider most relevant relative to maximizing market acceptance:

The location of the project is highly desirable, with a superior climate, makai view panoramas, and proximity to beaches, recreational amenities, public facilities and supporting commercial services. The easy access onto Honoapiilani Highway is a valued commodity among residents, as will be the unique opportunity to lease affordable and lower market-priced rental units in a master planned community.

The parks, open spaces and greenbelts are integrated into the design maximizing the desirable frontages and views for the finished units.

The single story, relatively small, multi-plex apartment buildings and one and two-story homes will minimize the visual footprint of the project from off-site and provide residents with an atypical (and highly desirable) low-intensity environment for an apartment complex.

The master plan is an appropriate use of the subject property from a market demand and economic acceptance perspective based on a variety of criteria, including:

- It will convert a currently non-productive, feral agricultural land holding into a comprehensively-designed sustainable development which will help in meeting future residential needs in the region, while providing a meaningful economic stimulus to the island.
- It is within and consistent with the West Maui urban node. And, it will provide a desirable transition from the intense Highway-frontage areas to the lower intensity residential products which will eventually be developed upslope.
- The master plan is well suited for the climate of the site, and will serve to attract residents and seniors seeking the slightly cooler and better views available at elevations above the Kaanapali-Kapalua makai urban development corridor.

- Some ocean and/or upslope panoramas will be available for most properties in Pulelehua, a desirable asset in the regional market.
- The overall low intensity of development, at less than 5 units per acre, is rare for an apartment project and will be strongly desired among potential tenants.

We conclude the proposed Pulelehua master plan represents a highest and best use of the underling site, will provide a positive return to the land, and will bring economic activity to a site currently hosting none. The use and the proposed project are appropriate for the property.

APPLICATION OF ABSORPTION ESTIMATING TECHNIQUES

Based on these attributes of the subject property, our analyses of the Lahaina District residential market, and the historic experience of competitive projects in the regional marketplace, we have estimated the probable absorption velocity for the subject inventory using three methodologies:

- Gross Demand/Supply Comparison -- This technique assumes that if there is insufficient existing and planned supply to meet projected market gross demand levels during the projection period there is rational support for the subject units.
- The Residual Method -- In this technique, all the competitive inventory proposed to be developed in the study area during the 2017-2030 projection period is placed on a time-line depicting their combined anticipated rates of absorption or assuming a reasonable market share. To the extent this periodic supply of units falls short of the forecast periodic demand for residential product in West Maui an undersupply situation is present and there is "residual" demand remaining for the subject inventory. This method is considered the most conservative as it allows the probable competitive product to achieve their full absorption potential before any residual demand flows to absorb the subject.
- The Market Shares Method -- This approach accounts for the probable competitiveness of the subject inventory regardless of the total level of product being otherwise offered on the market. It is an estimate of how much of the total forecast demand for new multifamily units in West Maui the subject could expect to capture on an annual basis considering its location, product type, estimated pricing (rents), perceived competitiveness, and community characteristics.

On a District-wide basis, the Gross Demand method indicates there is strong- support for the Pulelehua development. The demand for non-resort residential units through 2030 is forecast to be between 5,728 and 8,491 total units. The “committed/entitled” and “partially-entitled” proposed regional inventory (apart from Pulelehua) total some 3,871 units or only 46 to 68 percent of the needed residential product.

Therefore, we judge this method as highly supportive of sufficient market demand existing over the coming decade-plus to successfully absorb all the subject product during a reasonable exposure period.

Given the historic demand for units in the previously developed major projects, typically ranging up to more than 100 units per during their initial offering periods it is likely the subject units could achieve absorption (rent-up and sales) of some 130 units annually, **which would be sufficient to absorb all 900 proposed Pulelehua units in a 6 to 8-year period.**

There is little doubt based upon the experience of other projects currently offering inventory in the Maui market the Pulelehua workforce units would be quickly reserved, likely within a lottery program as each increment and type were offered. We believe that production of the inventory will most likely be the constraining factor and at worst case could be rented within a one to two period following completion.

As noted foregoing, for analytical purposes if we optimistically assume that 90% to 100% of the proposed West Maui units in entitled and partially-entitled proposed regional projects would be built out by 2030 placing some 768 to 1,024 total multifamily units on the market there will remain substantial unmet Residual Demand for Pulelehua product in every five-year projection period from 2017-2020 through 2026-2030, as shown in the charts below.

PROJECTION OF POTENTIAL SUBJECT UNIT ABSORPTION USING THE RESIDUAL METHOD BASED ON TOTAL DEMAND FOR RESIDENTIAL UNITS IN THE WEST MAUI STUDY AREA

Segment	TOTAL UNITS	2017-2020	2021-2025	2026-2030
1. Minimum Demand				
Assumed Supply (90% of entitled and partially entitled market projects)	3,484	260	1,612	1,612
Regional Housing Demand	5,728	1,523	2,072	2,133
Shortage or (Excess) Supply	2,244	1,263	460	521
Potential Residual Subject Minimum Demand				
at 95% Capture Rate	2,132	1,200	437	495
at 90% Capture Rate	2,020	1,137	414	469
2. Maximum Demand				
Assumed Supply (100% of entitled and partially entitled market projects)	3,871	260	1,806	1,806
Regional Housing Demand	8,941	2,160	3,083	3,698
Shortage or (Excess) Supply	5,070	1,900	1,278	1,893
Potential Residual Subject Maximum Demand				
at 95% Capture Rate	4,817	1,805	1,214	1,798
at 90% Capture Rate	4,563	1,710	1,150	1,703

Indicated Number of Years Required to Absorb 900 Pulelehua Units Using Residual Method

Scenario	Percent of Residual Demand	Number of Years to Achieve Full Absorption
Minimum	40.1%	10.0
Maximum	17.8%	4.5
Mid-Point	28.9%	7.3

= Absorption Period

Source: Maui County, Developers/Agents, & CBRE/Hallstrom Team

Even if the assumed supply brought on-line achieves full absorption within reasonable periods, there will still be excess residual demand available for the 900 Pulelehua units, which would be expected to capture some 90 to 95 percent of the left-over, unmet demand.

Using the residual analysis the 900 units and home/lots of Pulelehua would be fully-absorbed (leased-up) within 4.5 to 10.0 years, with a mid-point of 7.3 years.

Given the desirable location, the unique qualities of its product, and anticipated pricing envisioned for Pulelehua, it will achieve a solid market standing and prove competitive in the regional market; able to garner a reasonable share of West Maui demand regardless of the numbers of competing units built.

We estimate the subject could readily achieve an average Market Shares (or "Capture") Rate of 30 percent of the total Lahaina District new residential market sector during its planned offering period. This is an appropriate fraction of the total regional demand for new housing product, which we consider readily achievable.

Application of this method is shown for the Pulelehua units and lots/homes in the chart below.

SUMMARY OF SUBJECT PROJECTED UNIT ABSORPTION USING THE MARKET SHARES METHOD

Assuming Reservation/Lotteries Begin in 2019, Initial Occupancy 2020

Scenario One: Using Minimum Demand Assumptions

Sales Year Date	Sales Year Period	Total Regional Unit Demand	Effective Subject Share	Indicated Total Subject Absorption
2019	1	381	20.00%	76
2020	2	381	30.00%	114
2021	3	414	30.00%	124
2022	4	414	30.00%	124
2023	5	414	30.00%	124
2024	6	414	30.00%	124
2025	7	414	30.00%	124
2026	8	427	20.50%	87
Totals		2,834	31.74%	900

Indicated Absorption Period 7.7 Years

Scenario Two: Using Maximum Demand Assumptions

Sales Year Date	Sales Year Period	Total Regional Unit Demand	Effective Subject Share	Indicated Total Subject Absorption
2019	1	540	20.00%	108
2020	2	540	30.00%	162
2021	3	617	30.00%	185
2022	4	617	30.00%	185
2023	5	617	30.00%	185
2024	6	617	12.20%	75
Totals		2,930	30.72%	900

Indicated Absorption Period 5.4 Years

ANALYSIS MID-POINT			
6.6 Years	2,882	31.22%	900

Source: CBRE/Hallstrom Team

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A total absorption period for the subject units and lots/homes would be between 5.4-years and 7.7-years, with a mid-point at 6.6 years. This equates to an average regional market capture rate of 31.2 percent for this unit type during the exposure period with an average annual absorption of 136 units and lots.

Correlation of the three absorption quantification techniques indicates the 900-proposed residential units of the Pulelehua project will achieve full absorption within approximately 5 to 10-years of initial pre-leasing offerings, or approximately 7.0 years in total.

This is anticipated to commence with pre-leasing/pre-sales in the second-half of 2019, initial occupancy in 2020 and reach full-absorption/build-out in 2026.

Analysis of the Commercial/Retail Component

The Pulelehua master plan includes a minor commercial/retail component envisioned to have 70,000 square feet of gross leasable area spread among two development pads totaling 17.5 acres on either side of Akehele Street (the airport access drive) at Honoapiilani Highway. Based on the pads relative sizes we estimate the northerly pad will support some 50,000 square feet of floor area and the southerly pad about 20,000 square feet. The overall Floor Area Ratio will be an extremely low at .092.

The intent of the commercial/retail component is to service the needs of the Pulelehua community residents, not to be directly competitive within the overall regional market. Based on the average Maui per capita demand for commercial/retail space at 36.0 square feet per person and typical capture rates for “neighborhood retail”, “service commercial/medical” and “support/other commercial” space types, with nominal additional demand from on-site workers, passersby and residents of nearby development, we conservatively estimate there will be in-place demand for at least 66,000 square feet of proposed space. As shown on the table below.

SUMMARY OF NEIGHBORHOOD COMMERCIAL SPACE DEMAND CREATED BY SUBJECT RESIDENTS AT BUILD-OUT		
1. Stabilized Subject Population		
Full-Time Residents		2,296
Full Time Equivalent On-Site Workers		228
2. Project Resident Per Capita Demand for Commercial Space (in Gross Square Feet per Person)		
Total for All Commercial Needs (1)		36.0
"Neighborhood Retail" Space Demand as Percent of Total		55%
Total Per Capita "Neighborhood Retail" Commercial Space Demand in Square Feet		19.8
Allowance for "Service Commercial/Medical" Space (20% of Neighborhood demand)		4.0
Allowance for "Support/Other/Destination Commercial" Space (10% of Neighborhood demand)		2.0
Total Per Capita Floor Space Demand for Resident-Oriented/Neighborhood Commercial Space		25.7
Capture Rate of In-Project Resident Neighborhood Demand		85.0%
Total Floor Space Demand for Resident-Oriented/Neighborhood Commercial Space		50,234
3. Project Worker Resident Per Capita Demand for Commercial Space (in Gross Square Feet per Person)		
Estimated Percent of Workers not Residing in Project		85.0%
Non-Resident Workers Patronizing Subject Commercial Businesses		194
Total Per Capita Floor Space Demand by Workers for Neighborhood Commercial Space (2)		12.9
Total Floor Space Demand by Workers for Neighborhood Commercial Space		2,494
3. Indicated Subject Commercial Floor Space Demand (in SF)		
From Subject Project Resident and Worker Population		52,728
Patronage From Other Sources	% of Community Demand	
Nearby Population in Non-Subject Projects	10%	5,273
Passer-Bys/Intercept and Others	15%	7,909
Total Estimated Gross Floor Space Demand at Stabilization		**65,910**

(1) Based on mid-point per person spatial demand in 2030.
(2) Based on capture rate of 50 percent of per capita resident demand in square feet.

Source: CBRE/Hallstrom Team

Economic Impacts of the Proposed Development

The tables containing the data, analysis and modeling comprising this section of our study are contained in Addenda Exhibit C, including the full-size print-outs of those excerpted into the narrative section.

The development of Pulelehua will result in significant expenditures that will favorably impact the Maui economy on both a direct and indirect basis, increasing the level of capital investment and capital flow in the region, which will in turn create employment and widen the tax base.

From a direct perspective, the proposed 900 residential units and 70,000 square feet of commercial space will create numerous construction, equipment operator and specialty trade jobs on- and off-site, directly and indirectly, during the planning and emplacement of the infrastructure, and building of the improvements.

After completion of the common systems and vertical construction during a multi-increment development period, there will be permanent employment positions created by the commercial/retail businesses, apartment rental business, and community association administration and maintenance personnel (landscape, service, maintenance, and renovation needs during their use).

Numerous local businesses will see significant profit opportunities arising for contracting companies constructing the improvements, and for local businesses which would supply a substantial portion of the materials needed in the building efforts.

The general island economy also will benefit from the subject development, as its residents and employees will spend their discretionary income in shops, restaurants, and service establishments throughout Maui, and in purchasing goods and services.

Indirectly, as these wages, profits, and expenditures move through the regional economy, they will have a ripple, or "multiplier," effect which increases the amount of capital flowing to the entire community resulting from the development of the subject.

Construction, operational and other workers earning wages via Pulelehua development and associated off-site/supporting efforts will spend most of their income on living and entertainment expenses while supporting and patronizing other island businesses. Much of this spending would be re-directed by these businesses to other island industries, and significant portions of these secondary profits would in turn be put back through the region's economic and tax structure.

These substantial direct and indirect economic impacts associated with the proposed subject project, as quantified following, are all the result of the capital investment and entrepreneurship necessary to convert undeveloped, fair/poor quality agricultural lands into a moderate intensity multifamily residential project. The Maui County economy will be meaningfully stimulated by the capital investments, population/user spending and business operations of the development.

Our economic analysis was based on a 9-year build-out, absorption and stabilization period running from 2018 through 2026. The entitlement and construction could possibly take a shorter or longer period; however, whether full development takes 6 or 12 years, the economic impact during the build-out period and stabilized "operation" of the community and its resident population will be the same following completion. As constant, uninflated 2017 dollars are used throughout the model, time is not a significant variable in the analysis.

The life-span of the project from final approvals through build-out and stabilization are summarized in the following table.

PROJECTED BUILD-OUT AND ABSORPTION OF PULELEHUA PROJECT

Year	Residential Component							
	Workforce Rentals		Market Rentals		Market Single Family Homes (1)		Total Inventory	
Project	Annually	Cumulative	Annually	Cumulative	Annually	Cumulative	Annually	Cumulative
1 & 2	Final approvals/entitlements achieved in Year 1, initial grading/site work and infrastructure emplacement commences and is completed in Year 2. Vertical construction begins in Year 2 with unit reservations/lottery begining commensurately. First product completed and available for occupancy in Year 3.							
3	40	40	75	75	15	15	130	130
4	40	80	75	150	15	30	130	260
5	40	120	75	225	15	45	130	390
6	40	160	75	300	15	60	130	520
7	40	200	75	375	15	75	130	650
8	40	240	75	450	15	90	130	780
9	40	**280**	70	**520**	10	**100**	120	**900**

Commercial Component

Gross Leaseable Area in Square Feet	Project Year Built	Years to Absorb
50,000	3	2
20,186	5	1
70,186		**3**

(1) Includes one "Estate Lot" of 45 acres.

It is anticipated that final approvals, surveys and planning will require approximately 14 months (through 2018), the initial phase of site work and infrastructure will begin in 2019, vertical construction and pre-sales/pre-leasing will commence in 2019, with occupancy and use commencing in 2020. Completion and total absorption and full-occupancy would be completed by 2026.

CAPITAL INVESTMENT AND CONSTRUCTION COSTS

The subject will bring an estimated $324.2 million in direct development capital into Maui over the build-out period for the project, as shown below.

PROPOSED DEVELOPMENT SCHEDULE AND ESTIMATED CONSTRUCTION COSTS All Amounts Expressed in Constant 2017 Dollars				
	Development Period			
Project Year	2017 to 2020	2021 to 2025	2026	Totals During Build-Out
Infrastructure Emplacement (1)	$15,000,000	$12,500,000	$2,500,000	**$30,000,000**
Commercial Construction (2)	$21,428,571	$8,571,429		**$30,000,000**
Residential Component (3)	$38,583,333	$192,916,667	$32,666,667	**$264,166,667**
TOTAL PERIODIC CONSTRUCTION COSTS	**$75,011,905**	**$213,988,095**	**$35,166,667**	**$324,166,667**
Contractor Profits	$7,501,190	$21,398,810	$3,516,667	**$32,416,667**
Supplier Profits	$3,000,476	$8,559,524	$1,406,667	**$12,966,667**

Note: All development/construction costs of project estimated by developer.

(1) All infrastructure components estimated at $30,000,000 for entire project. Costs allocated to phases based on assumption initial phase will have many of the systems serving the entire project (including waste-water treatment).

(2) Estimated "All-in" development cost of $429 per square foot.

(3) Estimated "All-in" average development cost of $208,333 per apartment unit (includes interior improvements, site work, landscaping and amenities and $975,000 per single family home (2,500 SF X $350/SF + $100,000 in site finish and landscaping work).

Source: CBRE/Hallstrom Team

Infrastructure cost estimates prepared by Maui Oceanview LP and planning team members, are forecast at $30.0 million, excluding design, entitlement and indirect expenses incurred in the islands.

Vertical construction costs would total $294.2 million during the modeling period. This includes:

- $208,333 per apartment unit (from Maui Oceanview).
- An average of $975,00 per single family home, 2,500 interior SF at $350/SF =$875,000 plus $100,000 in site finish work, pool and landscaping.
- A total of $30,000,000 for commercial/retail buildings, 70,000 SF gross leasable area at $430 per SF (rounded).

The development costs are not intended to be indicative of the rental rates for the apartment units, as the developer may elect to allocate base costs in a far different matter. The cost estimates are intended to be "all in".

Pulelehua development will infuse on average an anticipated $40.5 million annually into the Maui building industry on average over the 8-year build-out period.

DIRECT BUSINESS PROFITS FROM CONSTRUCTION

While a significant percentage of the materials needed to build the subject infrastructure, clubhouse facility, and residential and commercial structures must be imported to Maui, a portion of the construction costs spent in the development will directly flow to local businesses in the form of contractor profits and supplier profits.

Typically, within the industry net contractor profit margins are expected to be at 8 to 20 percent of total construction costs. We have used a conservative ten percent figure. Supplier profits were extrapolated at four percent of total costs

The total Contractor's Profit generated by Pulelehua for local building companies will average some $4.1 million per year, with a cumulative profit of $32.4 million over the construction period. The total annual Supplier's Profit would be some $1.6 million equating to $13.0 million in aggregate.

EMPLOYMENT OPPORTUNITIES CREATED

Based on indicators provided by the construction of comparable sized projects and Hawaii industry averages, we have estimated the demand for on- and off-site, direct and indirect, full-time equivalent employment positions associated with laying of initial infrastructure systems, construction of the units, and the on-going commercial/retail businesses and the apartment business (and its community association efforts) in the project.

The construction, operating economic activities, and indirect/off-site employment opportunities created by the subject development will not all be "new" jobs requiring new Maui residents, but will be vitally needed new opportunities for in-place resident construction trade workers and existing local businesses. The jobs associated with the commercial/retail tenants and apartment business operations will represent an expansion of the employment pool.

It is assumed the off-site/indirect work created will be steered towards existing Maui supply, equipment providers.

The following table summarizes our worker-years, full-time equivalent (FTE) projections for Pulelehua during build-out and on a stabilized on-going annual basis thereafter.

ESTIMATED YEARLY FULL-TIME EQUIVALENT EMPLOYMENT POSITIONS CREATED BY DEVELOPMENT

Project Year	Development Period 2017 to 2020	Development Period 2021 to 2025	Development Period 2026	Totals During Build-Out	Stabilized Annually
Infrastructure Emplacement (1)	38	31	6	75	
Commercial Construction (2)	86	34		120	
Residential Component (2,3)	193	965	163	1,321	
Total Periodic Construction Jobs	316	1,030	170	1,516	
On-Going Business Employment					
Commercial Worker Years (3)		686	200	886	
Total FTE Jobs in Place at End of Period		200	200		200
Maintenance & Common Element (4)		69	28	97	
Total FTE Jobs in Place at End of Period		20	28		28
Total Periodic On-Going Business Jobs		754	228	982	
Total FTE Jobs in Place at End of Period		220	228		228
Off-Site Employment (5)	105	595	76	776	
Total FTE Jobs in Place at End of Period		73	76		76
TOTAL PERIODIC WORKER YEARS	422	2,379	474	3,274	
TOTAL END-OF-PERIOD PERMANENT JOBCOUNT		293	304		304

(1) Infrastructure construction employment estimated at 1 worker-year for every $400,000 in costs.
(2) Vertical construction (all types) employment estimated at 1 worker year for every $200,000 in costs.
(3) Includes 800 apartment units and 100 single family homes.
(4) Employment estimated at 1 full-time-equivalent worker for every 350 square feet of gross floor area. First stores opening in 2021.
(5) Includes community common element management administration, security, landscaping and maintenance staff of 19 FTE jobs. Plus ratio of one full-time-equivalent outside maintenance/repair worker for every 100 units.
(6) Estimated at one cumulative off-site employment position for every three on site positions.

Source: CBRE/Hallstrom Team

A total of 1,516 worker-years of employment in the construction trades will be needed for developing Pulelehua.

The commercial/retail businesses will have worker-years totaling 886 during the modeling period and 200 per year thereafter

The apartment business/community association and maintenance worker-years will total 97 during the modeling period and 28 per year thereafter.

Off-Site/Indirect/Secondary employment created by Pulelehua will total 776 worker-years from 2019 through 2026 and 76 FTE positions per year as stabilized.

WAGE INCOME GENERATED

In accordance with data compiled by the state Department of Labor and Industry Relations, as tempered through our analysis, we have estimated the personal income (in the form of wages) which will flow to Maui workers from Pulelehua construction and use. The results are shown on the table below.

ESTIMATED YEARLY EMPLOYEE WAGES CREATED BY DEVELOPMENT
All Amounts Expressed in Constant 2017 Dollars

Project Year	2017 to 2020	2021 to 2025	2026	Totals During Build-Out	Stabilized Annually
Infrastructure Emplacement (1)	$2,964,000	$2,470,000	$494,000	**$5,928,000**	
Residential Construction					
Rental Apartments & Homes (1)	$15,248,133	$76,240,667	$12,909,867	**$104,398,667**	
Total Periodic Construction Wages	**$18,212,133**	**$78,710,667**	**$13,403,867**	**$110,326,667**	
On-Going Business Wages					
Commercial (2)		$22,820,571	$6,656,000	$29,476,571	**$6,656,000**
Maintenance & Common Element (3)		$2,853,760	$1,164,800	$4,018,560	**$1,164,800**
Total Periodic On-Going Business Wages		**$25,674,331**	**$7,820,800**	**$33,495,131**	**$7,820,800**
Off-Site Employment Wages (4)	$5,698,787	$32,167,385	$4,110,080	$41,976,252	**$4,110,080**
TOTAL PERIODIC WAGES	**$23,910,921**	**$136,552,383**	**$25,334,747**	**$185,798,050**	**$11,930,880**

(1) Average annual wage for full-time-equivalent construction worker (all trades) at $79,040 ($38/hour X 2,080 hours).
(2) Average annual wage for full-time-equivalent retail & restaurant workers at $33,300 ($16/hour).
(3) Average annual wage for full-time-equivalent maintenance and security workers at $41,600 ($20/hour).
(4) Average annual wage for full-time-equivalent general worker at $54,080 ($26/hour), the average wage for all "Total Private Workers" in the state.

Wages taken from State of Hawaii "Hawaii Workforce Infonet" "Publications and Tables> Production Worker H&E Data Hours and Earnings" for 2016.

Source: CBRE/Hallstrom Team

Total construction wages paid during build-out will be $110.3 million.

Total commercial/retail employee wages during the modeling period will be $29.5 million and stabilize at $6.7 million thereafter.

Total apartment business/association and maintenance employee wages during the modeling period will be $4 million and stabilize at $1.2 million thereafter.

Off-sits/indirect employee wages will total $42.0 million during build-out and be $4.1 million annually on a stabilized basis.

POPULATION, INCOME AND EXPENDITURES

We anticipate all of the apartment units and the large majority of single family homes of Pulelehua will all be primary residences, divided equally between existing-relocating and new/in-migrating Maui residents and non-resident owners. The resident households will constitute the majority of the population of the project, whose income and discretionary expenditures will create major positive impacts on the Maui economy.

All (100%) of the apartment units will be occupied by resident households, comprised roughly half and half of Maui resident families relocating from elsewhere on the island and "new" in-migrating from another Hawaiian island or the mainland.

We estimate 80% to 85% (or more) of the single family homes will be occupied by full-time Maui residents, split equally between exiting relocating Maui households and in-migrating households, with the remaining 15% to 20% being owned and used by non-resident/second home purchasers. Thus, some 15 to 20 homes, or only 1.7% to 2.2% of the total project will not be constantly occupied; a proportion so low we did not analyze them separately but grouped them into the overall model context.

This assumption reflects trending in Maui population growth and in-migration since 2000. According to the State of Hawaii DBEDT and United States Census Bureau, between 2000 and 2010, there was a net gain of 15,954 persons due to migration to/from Maui out of a total net population gain of 26,683 persons, or 59.8 percent of the total increase.

The movement moderated between 2010 and 2016, with net migration contributing only 50.4 percent of the total Maui population increase (5,312 of 10,549 persons).

These "new" Maui residents represent new income, spending and economic activity on the island, in addition to creating new taxes and local government spending obligations.

We have quantified these focal statistics within the modeling process. The results are shown on the table below.

ESTIMATED DE FACTO POPULATION, RESIDENT HOUSEHOLD INCOME AND DISCRETIONARY EXPENDITURES

All Amounts Expressed in Constant 2017 Dollars

	Development Period			
	2017 to 2020	2021 to 2025	2026	Total During Build-Out
Workforce/Affordable Apartment Units				
Number of Periodically Rented	40	200	40	
Cumulative Units Rented	40	240	280	
Percent of Total Units in Project	4%	27%	31%	
Average Household Size	2.55	2.55	2.55	
Total Residents End of Each Period	102	612	714	
Market-Priced Apartment Units				
Number of Periodically Rented	75	375	70	
Cumulative Units Rented	75	450	520	
Percent of Total Units in Project	8%	50%	58%	
Average Household Size	2.55	2.55	2.55	
Total Residents End of Each Period	191	1,148	1,326	
Single Family Homes				
Number of Periodically Built	15	75	10	
Cumulative Homes Built	15	90	100	
Percent of Total Units in Project	2%	10%	11%	
Average Household Size	3.40	3.40	3.40	
Total Residents End of Each Period	51	306	340	
Total Resident Population End of Period	344	2,066	2,380	
Average Number of Residents Each Project Year During Period	344	1,205	2,380	
NEW (INMIGRATING) MAUI RESIDENTS END OF PERIOD	172	1,033	1,190	
Average Number of NEW Residents Each Project Year During Period	172	602	1,190	
RESIDENT HOUSEHOLD INCOME (1)				
Annually (at end of period)	$14,002,930	$81,539,581	$81,748,890	$81,748,890
Periodic	$14,002,930	$238,856,279	$81,748,890	$334,608,098
NEW (INMIGRATING) MAUI RESIDENTS				
Annually (at end of period)	$7,001,465	$40,769,791	$40,874,445	$40,874,445
Periodic	$7,001,465	$119,428,139	$40,874,445	$167,304,049
TOTAL DISCRETIONARY EXPENDITURES (2)				
Annually (at end of period)	$7,001,465	$40,769,791	$40,874,445	$40,874,445
Periodic	$7,001,465	$119,428,139	$40,874,445	$167,304,049
NEW (INMIGRATING) MAUI RESIDENTS				
Annually (at end of period)	$3,500,733	$20,384,895	$20,437,222	$20,437,222
Periodic	$3,500,733	$59,714,070	$20,437,222	$83,652,025

Stabilized Figure =

(1) The median household income for Maui is estimated at $82,600 for 2017. The estimated average household income for the "workforce" rental units is at 86.6% of Maui median (according to workforce housing ordinance formula), or $71,515 per year. For the market rental units the average household income is estimated at 139.9% of the Maui median, or $115,524 per year. The market rental household incomes could stretch higher, but above these levels there are widespread housing alternatives throughout West Maui. The 100 single family homes are estimated to have households income of $165,200, or 200% of the Maui median.

(2) Estimated at 50% of resident household incomes.

Source: CBRE/Hallstrom Team

It is projected the average apartment renter household size will be 2.55 persons and the average single family household size 3.40 persons. The total resident population in the project at build-out and full absorption will be 2,380 persons. Half of whom (1,190 persons) are relocating existing Maui resident households and half being in-migrants to West Maui (1,190).

It is assumed tenants in the workforce/affordable-priced units will have an average household income of $71,500, or 86.6 percent of the County median household income figure. The tenants in the market-priced units are estimated to have median household's incomes averaging $115,500, or 139.9 percent of the County median. All families are assumed to spend similar levels on discretionary spending at 50 percent of gross household income.

The single family households are assumed to have average incomes of $165,200 per year, or twice the Maui average.

During occupancy in the build-out period, the total resident household income will be $334.6 million, and at $81.7 million annually thereafter.

We estimate all resident households will spend about 50 percent of their total income on discretionary items (a figure at the lower-end of the overall market range in keeping with the moderate household incomes of the residents), with the remainder going towards lease rents and fixed expenses.

By build-out, the total resident population discretionary expenditures made by subject project owners in the local market will be at $40.9 million annually on a stabilized basis, in 2017 dollars. During the development and stabilization model period, (through 2026), the total sum of these expenditures will be $167.3 million.

The "new" Maui resident's annual household incomes will total $40.8 million on a stabilized basis, and their discretionary spending $20.4 million.

OPERATING ECONOMIC ACTIVITY

We estimate the operating economic activity within the Pulelehua project will be substantial, comprised of the commercial/retail businesses and the on-going apartment business (with community association and maintenance responsibilities). The following table summarizes the calculations.

PROJECTED ON-SITE OPERATING ECONOMIC ACTIVITY All Amounts Expressed in Constant 2017 Dollars	2017 to 2020	2021 to 2025	2026	Totals During Build-Out	Stabilized Annually
Commercial Businesses (1)					
Annual Sales Activity at End-of-Period	$18,750,000	$47,250,000	$52,500,000		$52,500,000
Total Sales Activity During Period	$18,750,000	$210,262,500	$262,500,000	$491,512,500	
In-Project De Facto Population Patronage %	50%	75%	87%		
In-Project Patronage Expenditures					
Annual at End-of-Period	$9,375,000	$35,437,500	$45,675,000		$45,675,000
Total During Period	$9,375,000	$157,696,875	$228,375,000	$395,446,875	
Outside Project Patronage Expenditures					
Annual at End-of-Period	$9,375,000	$11,812,500	$6,825,000		$6,825,000
Total During Period	$9,375,000	$52,565,625	$34,125,000	$96,065,625	
Maintenance & Common Element (2)					
Annual Activity at End-Of-Period	$450,000	$1,350,000	$1,800,000		$1,800,000
Total Activity During Period	$450,000	$6,007,500	$9,000,000	$15,457,500	
Rental Apartment Operations (3)					
Annual Rental Revenues at End-of-Period	$3,232,500	$15,262,500	$20,460,000		$20,460,000
Total Revenue Activity During Period	$3,232,500	$41,295,000	$90,613,500	$135,141,000	
ANNUAL ACTIVITY AT END-OF-PERIOD	$22,432,500	$63,862,500	$74,760,000		$74,760,000
TOTAL DURING PERIOD	$22,432,500	$257,565,000	$362,113,500	$642,111,000	

(1) Estimated based on average annual sales of $750 per square foot for 70,000 gross leasable square feet of commercial space..
(2) Estimated at 150% of operational employee wages costs (central element and maintenance).
(3) Based on forecast net rents paid to apartment owners, less maintenance and common element costs.

Source: Hallstrom Team/CBRE

During the modeling period (through 2026) these items are projected to total about $642.1 million and stabilize at $74.8 million annually, with the majority being associated with the commercial/retail business and apartment business rents and operations.

SUMMARY OF DIRECT, LOCAL ECONOMIC IMPACTS

As correlated on the table below, annual Total Base Economic Impact on a stabilized after build-out will be $74.8 million per year. During the development period, the aggregate total is $966.3 million.

SUMMARY OF ECONOMIC IMPACTS ASSOCIATED WITH DEVELOPMENT All Amounts Expressed in Constant 2017 Dollars	2017 to 2020	2021 to 2025	2026	Totals During Build-Out	Stabilized Annually
Construction Activity					
Construction Wages	$18,212,133	$78,710,667	$13,403,867	**$110,326,667**	
Contractor Profits	$7,501,190	$21,398,810	$3,516,667	**$32,416,667**	
Supplier Profits	$3,000,476	$8,559,524	$1,406,667	**$12,966,667**	
Other Construction Costs	$46,298,105	$105,319,095	$16,839,467	**$168,456,667**	
Total Construction Impact	**$75,011,905**	**$213,988,095**	**$35,166,667**	**$324,166,667**	
On-Site Business Activity					
Commercial/Retail Sales	$18,750,000	$210,262,500	$262,500,000	**$491,512,500**	**$52,500,000**
Maintenance & Common Element	$450,000	$6,007,500	$9,000,000	**$15,457,500**	**$1,800,000**
Rental Apartment Operations	$3,232,500	$41,295,000	$90,613,500	**$135,141,000**	**$20,460,000**
Total Business Impact	**$22,432,500**	**$257,565,000**	**$362,113,500**	**$642,111,000**	**$74,760,000**
TOTAL BASE ECONOMIC IMPACT Total During Period	**$97,444,405**	**$471,553,095**	**$397,280,167**	**$966,277,667**	**$74,760,000**

Source: Hallstrom Team/CBRE

STATE INPUT/OUTPUT MODEL

We have also analyzed the impacts of the project for Maui and Statewide using the *2012 Hawaii Inter-County Input-Output Economic Study* (approved August 2016) Type II multipliers for the County of Maui. These factors quantify the total Direct, Indirect and Induced "effects" of various forms of business and spending activity as it flows through the economy of the islands.

In every instance, application of the macro Input-Output multipliers resulted in higher dollar, employment, and tax revenue indicators than in our subject-focused micro model which was designed to reflect Direct and upper-level Indirect impacts only.

Among the outputs using the State method, summarized on the subsequent tables:

- The $324.2 million in cumulative Pulelehua construction costs will generate a total State Economic Output of $651.6 million during build-out with subsequent economic activity averaging $123.7 million annually on a stabilized basis.
- Direct subject construction wage earnings of $110.3 million will yield $178.7 million in statewide wage earnings during build-out and on-going earnings activity will generate $122.3 million during the modeling period and $19.3 million each stabilized year.

- Indirect and induced State taxes during build-out will total $33.2 million during construction and $3.8 million annually thereafter.
- Direct effect jobs created by construction employment will be 1.61 times the number of on-site workers, or a total of 2,441 worker years of employment. The on-going business activity will generate 2,304 jobs state wide through 2026 and 398 annually thereafter.

ESTIMATES OF TOTAL ECONOMIC IMPACT FROM SUBJECT CONSTRUCTION
USING INPUT-OUTPUT STUDY "TYPE II" MAUI COUNTY MULTIPLIERS
All Amounts Expressed in Constant 2017 Dollars

	Development, Leasing & Stabilization Period			
Year	2017 to 2020	2021 to 2025	2026	Totals During Build-Out
Construction Costs	$75,011,905	$213,988,095	$35,166,667	$324,168,693
1. Economic Output Multiplier	2.01	2.01	2.01	2.01
Total State Economic Output	$150,773,929	$430,116,071	$70,685,000	$651,579,072
2. Earnings Multiplier	0.68	0.68	0.68	0.68
Total Increase in State Earnings	$51,008,095	$145,511,905	$23,913,333	$220,434,711
3. State Tax Multipliers	0.1024	0.1024	0.1024	0.1024
Total Increase in State Taxes	$7,681,219	$21,912,381	$3,601,067	$33,194,874
4. Total Job Multipliers	9.40	9.40	9.40	9.40
Total State Jobs Created	705.1	2,011.5	330.6	3,047.2
Construction Employment	316	1,030	170	1,516
5. Direct-Effect Job Multipliers	1.61	1.61	1.61	1.61
Total Direct Jobs Created	509.0	1,658.5	273.0	2,440.5
Construction Wages	$18,212,133	$78,710,667	$13,403,867	$110,326,667
6. Direct-Effect Earnings	1.62	1.62	1.62	1.62
Total Increase in Direct Earnings	$29,503,656	$127,511,280	$21,714,264	$178,729,200

Source: 2012 Hawaii Inter-County Input-Output Study (approved August 2016), and CBRE/Hallstrom Team

ESTIMATES OF TOTAL ECONOMIC IMPACT FROM SUBJECT OPERATIONS
USING INPUT-OUTPUT STUDY "TYPE II" MAUI COUNTY MULTIPLIERS (1)
All Amounts Expressed in Constant 2017 Dollars

	Development, Leasing & Stabilization Period			
Year	2017 to 2020	2021 to 2025	2026	Stabilized Annually
Operating Revenues	$22,432,500	$257,565,000	$362,113,500	$74,760,000
1. Economic Output Multiplier	1.66	1.66	1.66	1.66
Total State Economic Output	$37,125,788	$426,270,075	$599,297,843	$123,727,800
2. Earnings Multiplier	0.44	0.44	0.44	0.44
Total Increase in State Earnings	$9,870,300	$113,328,600	$159,329,940	$32,894,400
3. State Tax Multipliers	0.0503	0.0503	0.0503	0.0503
Total Increase in State Taxes	$1,128,916	$12,961,959	$18,223,362	$3,762,297
4. Total Job Multipliers	10.68	10.68	10.68	10.68
Total State Jobs Created	239.5	2,749.5	3,865.6	798.1
Operating Employment	105	1,349	304	304
5. Direct-Effect Job Multipliers	1.31	1.31	1.31	1.31
Total Direct Jobs Created	138.0	1,767.4	398.2	398.2
Operating Wages	$5,698,787	$57,841,716	$11,930,880	$11,930,880
6. Direct-Effect Earnings	1.62	1.62	1.62	1.62
Total Increase in Direct Earnings	$9,232,035	$93,703,580	$19,328,026	$19,328,026

(1) Multipliers are taken from two categories and weighted based on economic activity relationship, with 75% weighting to "Retail Trade" multipliers and 25% weighting to "Real Estate & Rentals" category.

Source: 2012 Hawaii Inter-County Input-Output Study (approved August 2016), and CBRE/Hallstrom Team

Public Fiscal (Costs/Benefits) from the Proposed Development

The full-size tables depicting the modeling process summarized in this study section are presented in Addenda Exhibit D.

ASSESSMENT PERSPECTIVE

As previously noted, the households of Pulelehua are a mix of relocating "existing" Maui households and "new" in-migrating Maui households. The former, do not represent "new" fiscal benefits flowing to, or increased funding costs spending from, the State of Hawaii and County of Maui. The latter do add new revenues to the tax base, but also cumulatively require the government to spend more on services.

For the relocating Maui households, it is assumed their income and spending which would generate tax dollars is already effectively in-place on the island, and the cost of providing government services to them is already being absorbed. The issue is just the relocation of economic and public activity to the West Maui community from elsewhere on Maui. This group is not a consideration in our public fiscal assessment.

The tax revenue "benefits" from the new Maui residents and their per capita spending obligations they place on services is the focus of this section.

We did not complete an analysis of demand created for specific State and County services and facilities within our scope of study.

We have analyzed the public fiscal impacts considering only the new-resident component of Pulelehua, relative to tax benefits flowing to the State and County of Maui and the cost of providing government services to them on a per capita basis.

Based on the per capita within a countywide community perspective of our modeling, we would anticipate the service and facilities required by the new-resident component of Pulelehua would be identical to the existing budget and planning allowances for the County as-a-whole. Determination of the need for additional, specific facilities and services (police, fire, EMS, schools) would be best estimated by those departments/providers.

The exception is for County real property taxes, as all the 800 apartment units, 100 single family homes, and commercial buildings at Pulelehua will mean increased real property assessments and taxes for the County. For those existing residents relocating to the project, they are also contributing to new property tax revenues as their previous homes/units will continue producing assessments and real property taxes that would be paid by a subsequent owner/tenant.

Similarly, the on-going commercial/retail activity and apartment business (with community association and maintenance/renovation costs) are new to the State and County and included in the model.

Even when excluding the taxes on wages and spending by existing Maui residents moving to Pulelehua which are already integrated within the governmental tax base, Maui County and the State of Hawaii will still receive millions of dollars in "new" tax receipts from the construction, stabilized operation, and wages and spending by in-migrating households at Pulelehua from numerous revenue sources.

The purpose of this assessment is to delineate the direct areas in which the construction and long-term operation of Pulelehua will potentially provide new benefits to the public "purse.

MAUI COUNTY REAL PROPERTY TAXES AND TOTAL TAX REVENUES

For the County, the primary new tax source will be from Real Property Taxes which will be paid by the owners of Pulelehua apartment inventory (and passed on to the tenants). Real Property Tax assessments were assumed to be at the total per unit cost (of vertical construction) presented foregoing with an allowance of 33 percent for the land and infrastructure components and developer's profit.

The total net assessed value of the Pulelehua properties and associated real property taxes based on current tax rates for residential and commercial properties during the build-out period and on a stabilized basis are shown below.

PUBLIC COST AND BENEFITS ASSESSMENT ASSOCIATED WITH THE PROPOSED PULELEHUA COMMUNITY

All Amounts Expressed in Constant 2017 Dollars

	Development, Leasing & Stabilization Period				
Development Period	2017 to 2020	2021 to 2025	2026	Totals During Build-Out Period	Stabilized Annually After Build-out
PUBLIC BENEFITS (Revenues)					
1. COUNTY REAL PROPERTY TAXES					
Assessed Value					
Vacant Site	$12,390,300				
Commercial (at Construction Cost plus 20% for land)		$36,000,000	$36,000,000		$36,000,000
Residential Units (at Construction Costs plus 33% for land and profit)	$51,315,833	$307,895,000	$300,025,833		$300,025,833
Total Assessed Value	**$12,390,300**	**$343,895,000**	**$336,025,833**		**$336,025,833**
Real Property Taxes					
Vacant Site	$68,642				
Commercial		$237,600	$237,600		$237,600
Residential Component	$324,316	$1,945,896	$1,896,163		$1,896,163
Total Annual Property Taxes (End of Period)	**$392,958**	**$2,183,496**	**$2,133,763**		**$2,133,763**
Total Real Property Taxes During Period	**$1,964,792**	**$5,696,341**	**$2,133,763**	**$9,794,896**	

Source: CBRE/Hallstrom Team

We estimate the County will receive some $9.8 million in real property tax receipts during the entire projection period from the 2017 study date through 2026, and annual collections of $2.1 million on a stabilized basis thereafter.

Real Property Taxes (RPT) are forecast to generate about 35.2 percent of total Maui County General Fund revenues in the 2017-18 fiscal-year budget, with secondary taxes and fees the forming the remainder. It is logical to assume the Pulelehua development and business activities will generate secondary taxes in proportion to RPT as does the overall Maui community.

The secondary Maui County receipts are equal to an additional 184 percent of the RPT total (64.8% divided by 35.2%).

Application of this ratio (2.84 to 1.00) to the Pulelehua property tax sum, plus inclusion of an estimated $6.0 million in traffic impact fees, results in a cumulative total estimated County tax

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collection from the subject of $33.8 million during the initial projection period to 2026, and $6.1 million annually on a stabilized basis.

STATE OF HAWAII INCOME AND GROSS EXCISE TAXES AND TOTAL TAX REVENUES

The State of Hawaii will receive an estimated $20.2 million in primary receipts from State Income Taxes from worker wages, and profits from businesses based on average statewide corporate and personal payments rates of 4.4 percent and 5.1 percent, respectively, applied against the economic model forecasts. This represents only new/added taxable items resulting from Pulelehua and in-migrating households and does not include the existing/relocating resident household incomes.

On an annualized basis after stabilization of the community in 2026, the State will generate income taxes of $3.2 million. The State income tax portion of the public fiscal benefits model is shown following.

PUBLIC COST AND BENEFITS ASSESSMENT ASSOCIATED WITH THE PROPOSED PULELEHUA COMMUNITY
All Amounts Expressed in Constant 2017 Dollars

Development Period	Development, Leasing & Stabilization Period 2017 to 2020	2021 to 2025	2026	Totals During Build-Out Period	Stabilized Annually After Build-out
INCLUDES ONLY THOSE TAXES WHICH ARE "NEW" TO MAUI AS RESULT OF THE PROJECT					
2. STATE INCOME TAXES					
Taxable Personal Income (Wages Only, and New Resident Household Income)	$30,912,386	$177,322,174	$66,209,191	$274,443,751	**$52,805,325**
Taxable Corporate Profits	$13,866,542	$68,593,083	$59,240,358	$141,699,983	**$11,214,000**
Personal Taxes Paid	$1,576,532	$9,043,431	$3,376,669	$13,996,631	**$2,693,072**
Corporate Taxes Paid	$610,128	$3,018,096	$2,606,576	$6,234,799	**$493,416**
TOTAL STATE INCOME TAXES	$2,186,660	$12,061,527	$5,983,245	$20,231,431	$3,186,488

Source: CBRE/Hallstrom Team

As seen below, the State will collect Gross Excise Taxes (GET) of 4.166 percent on the gross amount of building contracts, construction supplies, spending by workers and residents, and from the on-going business activity (association and maintenance). During the construction, absorption and ramp-up period these receipts will total $20.0 million and a stabilized amount of $1.1 million annually.

PUBLIC COST AND BENEFITS ASSESSMENT ASSOCIATED WITH THE PROPOSED PULELEHUA COMMUNITY
All Amounts Expressed in Constant 2017 Dollars

Development Period	Development, Leasing & Stabilization Period 2017 to 2020	2021 to 2025	2026	Totals During Build-Out Period	Stabilized Annually After Build-out
INCLUDES ONLY THOSE TAXES WHICH ARE "NEW" TO MAUI AS RESULT OF THE PROJECT					
3. STATE GROSS EXCISE TAX					
Taxable Transactions					
Construction Contracts	$75,011,905	$213,988,095	$35,166,667	$324,166,667	
Disposable Income Purchases (% of Worker Wages and New Household Income)	$17,847,285	$102,316,325	$35,638,070	$155,801,680	$27,595,750
Total Taxable Transactions	**$92,859,190**	**$316,304,420**	**$70,804,737**	**$479,968,347**	**$27,595,750**
TOTAL STATE EXCISE TAX	$3,869,164	$13,179,456	$2,950,221	$19,998,841	$1,149,832

Source: CBRE/Hallstrom Team

In recent fiscal years, Income Tax and GET have generated about 46 percent of total State revenues, and secondary taxes and fees the remainder. We anticipate Pulelehua will have the same proportionate impact to the primary sources quantified.

The secondary State receipts are equal to 1.17 times the Income Tax and GET totals (54% divided by 46%).

Application of this ratio to the Pulelehua income tax and GET sums, and addition of the $1.75 million contractually-agreed payment to the Department of Education, results in a cumulative total estimated State tax collection from the subject of $89.0 million during the initial forecasting period through 2026, and $9.4 million annually on a stabilized basis.

CORRELATION OF TOTAL GOVERNMENTAL TAX REVENUES

The following table summarizes the cumulative County of Maui and State of Hawaii fiscal benefits arising from the development of Pulelehua.

PUBLIC COST AND BENEFITS ASSESSMENT ASSOCIATED WITH THE PROPOSED PULELEHUA COMMUNITY
All Amounts Expressed in Constant 2017 Dollars

	Development, Leasing & Stabilization Period				
Development Period	2017 to 2020	2021 to 2025	2026	Totals During Build-Out Period	Stabilized Annually After Build-out
INCLUDES ONLY THOSE REVENUES AND COSTS WHICH ARE "NEW" TO MAUI					
TOTAL GROSS PUBLIC REVENUES					
To County of Maui (Item #1)	$1,964,792	$5,696,341	$2,133,763	$9,794,896	$2,133,763
Adjustment for Other Proportional Taxes (1)	2.84	2.84	2.84	2.84	2.84
Adjusted Maui County Revenues	$5,580,008	$16,177,608	$6,059,888	$27,817,504	$6,059,888
Plus Impact Fees (2)	$6,000,000	$0	$0	$6,000,000	
Total County of Maui Receipts	$11,580,008	$16,177,608	$6,059,888	$33,817,504	$6,059,888
To State (Items #2 & #3)	$6,055,823	$25,240,983	$8,933,466	$40,230,272	$4,336,320
Adjustment for Other Proportional Taxes (3)	2.17	2.17	2.17	2.17	2.17
Adjusted State Revenues	$13,141,137	$54,772,933	$19,385,620	$87,299,690	$9,409,814
Plus Impact Fees (4)	$1,748,400	$0	$0	$1,748,400	
Total State of Hawaii Receipts	$14,889,537	$54,772,933	$19,385,620	$89,048,090	$9,409,814
AGGREGATE TAX REVENUES	$20,469,545	$70,950,541	$25,445,508	$116,865,594	$15,469,701

(1) Real property taxes comprise 35.2 percent of General Fund in the County of Maui 2017-18 budget. Economic activity generates other revenue items of 64.8 percent or additional 184 percent above real property taxes, or multiplier of 2.84.
(2) Includes Traffic Impact Fee of $5,000 per unit.
(3) Gross Excise and Income Taxes comprise 46 percent of collected Executive Branch State revenues; other revenue items 54 percent, or an additional 117% percent above income and gross excise taxes. Or a multiplier of 2.17.
(4) "Construction Cost Component" from negotiated agreement with Department of Education dated June 2006 at $1,457 obligation per multifamily unit. Developers additionally making "Land Component" contribution.

Source: CBRE/Hallstrom Team

ESTIMATE OF NEW COUNTY AND STATE SPENDING

The new/additional per capita cost for the County and State associated with the new, in-migrating resident population component at Pulelehua was calculated as follows based on the 2017-18 fiscal year budgets for each government as shown.

CALCULATION OF PER CAPITA GOVERNMENTAL COSTS FOR FISCAL-YEAR 2017-18	
County of Maui Operating and Capital Budget	**$747,195,044**
Divided by Total County De Facto Population (Residents & Tourists)	214,700
County Per Capita Fiscal Year Expense	**$3,480**
State of Hawaii Operating Budget	$13,473,466,599
State of Hawaii Capital Budget	$758,632,000
Total State Budget	**$14,232,098,599**
Divided by Total State De Facto Population (Residents & Tourists)	1,702,168
State Per Capita Fiscal Year Expense	**$8,361**

For each of the 1,148 new Maui residents in Pulelehua the County of Maui and State of Hawaii will have to provide a comprehensive spectrum of services, at a cost of $3,480 and $8,361 per capita respectively. This assessment is based on the concept of a community being a "commonweal" where all the costs and benefits, as determined by a representative government, are equitably shared by all members regardless of whether they personally avail themselves of, or contribute to, a specific budget item.

The total new governmental costs on a periodic basis for the subject to service the new resident component of the project population for the development period and as stabilized are on the following chart.

PUBLIC COST AND BENEFITS ASSESSMENT ASSOCIATED WITH THE PROPOSED PULELEHUA COMMUNITY
All Amounts Expressed in Constant 2017 Dollars

	Development, Leasing & Stabilization Period				
Development Period	2017 to 2020	2021 to 2025	2026	Totals During Build-Out Period	Stabilized Annually After Build-out
INCLUDES ONLY THOSE REVENUES AND COSTS WHICH ARE "NEW" TO MAUI					
PUBLIC COSTS (Expenses)					
By County of Maui	$599,026	$10,482,953	$4,141,414	$15,223,392	$4,141,414
By State of Hawaii	$1,439,165	$25,185,382	$9,949,781	$36,574,328	$9,949,781
TOTAL PUBLIC COSTS	$2,038,191	$35,668,335	$14,091,194	$51,797,720	$14,091,194

Source: CBRE/Hallstrom Team

The total added operating and capital costs to the County of Maui will amount to $15.2 million during the build-out period and stabilize at $4.1 million annually. The total added per capita costs to the State of Hawaii budget will be $36.6 million during the build-out period and $9.9 million per year thereafter.

CORRELATION OF NEW STATE AND COUNTY TAX REVENUES AND NEW SPENDING OBLIGATIONS

As shown below, the County will be provided with a net positive benefit (or "profit") from Pulelehua in each development period and on an annual stabilized basis. The State will have a major net benefit during the development period and a minor annual stabilized shortfall.

PUBLIC COST AND BENEFITS ASSESSMENT ASSOCIATED WITH THE PROPOSED PULELEHUA COMMUNITY All Amounts Expressed in Constant 2017 Dollars	Development, Leasing & Stabilization Period				
Development Period	2017 to 2020	2021 to 2025	2026	Totals During Build-Out Period	Stabilized Annually After Build-out
INCLUDES ONLY THOSE REVENUES AND COSTS WHICH ARE "NEW" TO MAUI					
TOTAL NET PUBLIC BENEFITS					
County of Maui	$10,980,982	$5,694,655	$1,918,474	$18,594,112	$1,918,474
State of Hawaii	$13,450,372	$29,587,550	$9,435,839	$52,473,762	($539,967)
AGGREGATE NET BENEFITS	$24,431,354	$35,282,206	$11,354,314	$71,067,874	$1,378,507

Source: CBRE/Hallstrom Team

The net benefit to the County of Maui will total $18.6 million during build-out and stabilize at $1.9 million per year (rounded). The State of Hawaii will have net fiscal benefits of $52.4 million during construction and incur a minimal shortfall of $540,000 per year thereafter.

The combined fiscal assessment table is shown following.

PUBLIC COST AND BENEFITS ASSESSMENT ASSOCIATED WITH THE PROPOSED PULELEHUA COMMUNITY
All Amounts Expressed in Constant 2017 Dollars

	Development, Leasing & Stabilization Period				
Development Period	2017 to 2020	2021 to 2025	2026	Totals During Build-Out Period	Stabilized Annually After Build-out
PUBLIC BENEFITS (Revenues)					
1. COUNTY REAL PROPERTY TAXES					
Assessed Value					
Vacant Site	$12,390,300				
Commercial (at Construction Cost plus 20% for land)		$36,000,000	$36,000,000		$36,000,000
Residential Units (at Construction Costs plus 33% for land and profit)	$51,315,833	$307,895,000	$300,025,833		$300,025,833
Total Assessed Value	**$12,390,300**	**$343,895,000**	**$336,025,833**		**$336,025,833**
Real Property Taxes					
Vacant Site	$68,642				
Commercial		$237,600	$237,600		$237,600
Residential Component	$324,316	$1,945,896	$1,896,163		$1,896,163
Total Annual Property Taxes (End of Period)	**$392,958**	**$2,183,496**	**$2,133,763**		**$2,133,763**
Total Real Property Taxes During Period	**$1,964,792**	**$5,696,341**	**$2,133,763**	**$9,794,896**	
INCLUDES ONLY THOSE TAXES WHICH ARE "NEW" TO MAUI AS RESULT OF THE PROJECT					
2. STATE INCOME TAXES					
Taxable Personal Income (Wages Only, and New Resident Household Income)	$30,912,386	$177,322,174	$66,209,191	$274,443,751	**$52,805,325**
Taxable Corporate Profits	$13,866,542	$68,593,083	$59,240,358	$141,699,983	**$11,214,000**
Personal Taxes Paid	$1,576,532	$9,043,431	$3,376,669	$13,996,631	**$2,693,072**
Corporate Taxes Paid	$610,128	$3,018,096	$2,606,576	$6,234,799	**$493,416**
TOTAL STATE INCOME TAXES	**$2,186,660**	**$12,061,527**	**$5,983,245**	**$20,231,431**	**$3,186,488**
3. STATE GROSS EXCISE TAX					
Taxable Transactions					
Construction Contracts	$75,011,905	$213,988,095	$35,166,667	$324,166,667	
Disposable Income Purchases (% of Worker Wages and New Household Income)	$17,847,285	$102,316,325	$35,638,070	$155,801,680	$27,595,750
Total Taxable Transactions	**$92,859,190**	**$316,304,420**	**$70,804,737**	**$479,968,347**	**$27,595,750**
TOTAL STATE EXCISE TAX	**$3,869,164**	**$13,179,456**	**$2,950,221**	**$19,998,841**	**$1,149,832**
INCLUDES ONLY THOSE REVENUES AND COSTS WHICH ARE "NEW" TO MAUI					
TOTAL GROSS PUBLIC REVENUES					
To County of Maui (Item #1)	$1,964,792	$5,696,341	$2,133,763	$9,794,896	$2,133,763
Adjustment for Other Proportional Taxes (1)	2.84	2.84	2.84	2.84	2.84
Adjusted Maui County Revenues	$5,580,008	$16,177,608	$6,059,888	$27,817,504	$6,059,888
Plus Impact Fees (2)	$6,000,000	$0	$0	$6,000,000	
Total County of Maui Receipts	$11,580,008	$16,177,608	$6,059,888	$33,817,504	$6,059,888
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Total State of Hawaii Receipts	$14,889,537	$54,772,933	$19,385,620	$89,048,090	$9,409,814
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PUBLIC COSTS (Expenses)					
By County of Maui	$599,026	$10,482,953	$4,141,414	$15,223,392	$4,141,414
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TOTAL PUBLIC COSTS	$2,038,191	$35,668,335	$14,091,194	$51,797,720	$14,091,194
TOTAL NET PUBLIC BENEFITS					
County of Maui	$10,980,982	$5,694,655	$1,918,474	$18,594,112	$1,918,474
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AGGREGATE NET BENEFITS	$24,431,354	$35,282,206	$11,354,314	$71,067,874	$1,378,507

(1) Real property taxes comprise 35.2 percent of General Fund in the County of Maui 2017-18 budget. Economic activity generates other revenue items of 64.8 percent or additional 184 percent above real property taxes, or multiplier of 2.84.
(2) Includes Traffic Impact Fee of $5,000 per unit.
(3) Gross Excise and Income Taxes comprise 46 percent of collected Executive Branch State revenues; other revenue items 54 percent, or an additional 117% percent above income and gross excise taxes. Or a multiplier of 2.17.
(4) "Construction Cost Component" from negotiated agreement with Department of Education dated June 2006 at $1,457 obligation per multifamily unit. Developers additionally making "Land Component" contribution.

Source: CBRE/Hallstrom Team

Assumptions and Limiting Conditions

1. CBRE, Inc. through its appraiser (collectively, "CBRE") has inspected through reasonable observation the subject property. However, it is not possible or reasonably practicable to personally inspect conditions beneath the soil and the entire interior and exterior of the improvements on the subject property. Therefore, no representation is made as to such matters.
2. The report, including its conclusions and any portion of such report (the "Report"), is as of the date set forth in the letter of transmittal and based upon the information, market, economic, and property conditions and projected levels of operation existing as of such date. The dollar amount of any conclusion as to value in the Report is based upon the purchasing power of the U.S. Dollar on such date. The Report is subject to change as a result of fluctuations in any of the foregoing. CBRE has no obligation to revise the Report to reflect any such fluctuations or other events or conditions which occur subsequent to such date.
3. Unless otherwise expressly noted in the Report, CBRE has assumed that:

(i) Title to the subject property is clear and marketable and that there are no recorded or unrecorded matters or exceptions to title that would adversely affect marketability or value. CBRE has not examined title records (including without limitation liens, encumbrances, easements, deed restrictions, and other conditions that may affect the title or use of the subject property) and makes no representations regarding title or its limitations on the use of the subject property. Insurance against financial loss that may arise out of defects in title should be sought from a qualified title insurance company.

(ii) Existing improvements on the subject property conform to applicable local, state, and federal building codes and ordinances, are structurally sound and seismically safe, and have been built and repaired in a workmanlike manner according to standard practices; all building systems (mechanical/electrical, HVAC, elevator, plumbing, etc.) are in good working order with no major deferred maintenance or repair required; and the roof and exterior are in good condition and free from intrusion by the elements. CBRE has not retained independent structural, mechanical, electrical, or civil engineers in connection with this appraisal and, therefore, makes no representations relative to the condition of improvements. CBRE appraisers are not engineers and are not qualified to judge matters of an engineering nature, and furthermore structural problems or building system problems may not be visible. It is expressly assumed that any purchaser would, as a precondition to closing a sale, obtain a satisfactory engineering report relative to the structural integrity of the property and the integrity of building systems.

(iii) Any proposed improvements, on or off-site, as well as any alterations or repairs considered will be completed in a workmanlike manner according to standard practices.

(iv) Hazardous materials are not present on the subject property. CBRE is not qualified to detect such substances. The presence of substances such as asbestos, urea formaldehyde foam insulation, contaminated groundwater, mold, or other potentially hazardous materials may affect the value of the property.

(v) No mineral deposit or subsurface rights of value exist with respect to the subject property, whether gas, liquid, or solid, and no air or development rights of value may be transferred. CBRE has not considered any rights associated with extraction or exploration of any resources, unless otherwise expressly noted in the Report.

(vi) There are no contemplated public initiatives, governmental development controls, rent controls, or changes in the present zoning ordinances or regulations governing use, density, or shape that would significantly affect the value of the subject property.

(vii) All required licenses, certificates of occupancy, consents, or other legislative or administrative authority from any local, state, nor national government or private entity or organization have been or can be readily obtained or renewed for any use on which the Report is based.

(viii) The subject property is managed and operated in a prudent and competent manner, neither inefficiently or super-efficiently.

(ix) The subject property and its use, management, and operation are in full compliance with all applicable federal, state, and local regulations, laws, and restrictions, including without limitation environmental laws, seismic hazards, flight patterns, decibel levels/noise envelopes, fire hazards, hillside ordinances, density, allowable uses, building codes, permits, and licenses.

(x) The subject property is in full compliance with the Americans with Disabilities Act (ADA). CBRE is not qualified to assess the subject property's compliance with the ADA, notwithstanding any discussion of possible readily achievable barrier removal construction items in the Report.

(xi) All information regarding the areas and dimensions of the subject property furnished to CBRE are correct, and no encroachments exist. CBRE has neither undertaken any survey of the boundaries of the subject property nor reviewed or confirmed the accuracy of any legal description of the subject property.

Unless otherwise expressly noted in the Report, no issues regarding the foregoing were brought to CBRE's attention, and CBRE has no knowledge of any such facts affecting the subject property. If any information inconsistent with any of the foregoing assumptions is discovered, such information could have a substantial negative impact on the Report. Accordingly, if any such information is subsequently made known to CBRE, CBRE reserves the right to amend the Report, which may include the conclusions of the Report. CBRE assumes no responsibility for any conditions regarding the foregoing, or for any expertise or knowledge required to discover them. Any user of the Report is urged to retain an expert in the applicable field(s) for information regarding such conditions.

4. CBRE has assumed that all documents, data and information furnished by or behalf of the client, property owner, or owner's representative are accurate and correct, unless otherwise expressly noted in the Report. Such data and information include, without limitation, numerical street addresses, lot and block numbers, Assessor's Parcel Numbers, land dimensions, square footage area of the land, dimensions of the improvements, gross building areas, net rentable areas, usable areas, unit count, room count, rent schedules, income data, historical operating expenses, budgets, and related data. Any error in any of the above could have a substantial impact on the Report. Accordingly, if any such errors are subsequently made known to CBRE, CBRE reserves the right to amend the Report, which may include the conclusions of the Report. The client and intended user should carefully review all assumptions, data, relevant calculations, and conclusions of the Report and should immediately notify CBRE of any questions or errors within 30 days after the date of delivery of the Report.
5. CBRE assumes no responsibility (including any obligation to procure the same) for any documents, data or information not provided to CBRE, including without limitation any termite inspection, survey or occupancy permit.
6. All furnishings, equipment and business operations have been disregarded with only real property being considered in the Report, except as otherwise expressly stated and typically considered part of real property.
7. Any cash flows included in the analysis are forecasts of estimated future operating characteristics based upon the information and assumptions contained within the Report. Any projections of income, expenses and economic conditions utilized in the Report, including such cash flows, should be considered as only estimates of the expectations of future income and expenses as of the date of the Report and not predictions of the future. Actual results are affected by a number of factors outside the control of CBRE, including without limitation fluctuating economic, market, and property conditions. Actual results may ultimately differ from these projections, and CBRE does not warrant any such projections.
8. The Report contains professional opinions and is expressly not intended to serve as any warranty, assurance or guarantee of any particular value of the subject property. Other appraisers may reach different conclusions as to the value of the subject property. Furthermore, market value is highly related to exposure time, promotion effort, terms, motivation, and conclusions surrounding the offering of the subject property. The Report is for the sole purpose of providing the intended user with CBRE's independent professional opinion of the value of the subject property as of the date of the Report. Accordingly, CBRE shall not be liable for any losses that arise from any investment or lending decisions based upon the Report that the client, intended user, or any buyer, seller, investor, or lending institution may undertake related to the subject property, and CBRE has not been compensated to assume any of these risks. Nothing contained in the Report shall be construed as any direct or indirect recommendation of CBRE to buy, sell, hold, or finance the subject property.
9. No opinion is expressed on matters which may require legal expertise or specialized investigation or knowledge beyond that customarily employed by real estate appraisers. Any user of the Report is advised to retain experts in areas that fall outside the scope of the real estate appraisal profession for such matters.
10. CBRE assumes no responsibility for any costs or consequences arising due to the need, or the lack of need, for flood hazard insurance. An agent for the Federal Flood Insurance Program should be contacted to determine the actual need for Flood Hazard Insurance.
11. Acceptance or use of the Report constitutes full acceptance of these Assumptions and Limiting Conditions and any special assumptions set forth in the Report. It is the responsibility of the user of the Report to read in full, comprehend and thus become aware of all such assumptions and limiting conditions. CBRE assumes no responsibility for any situation arising out of the user's failure to become familiar with and understand the same.
12. The Report applies to the property as a whole only, and any pro ration or division of the title into fractional interests will invalidate such conclusions, unless the Report expressly assumes such pro ration or division of interests.

13. The allocations of the total value estimate in the Report between land and improvements apply only to the existing use of the subject property. The allocations of values for each of the land and improvements are not intended to be used with any other property or appraisal and are not valid for any such use.
14. The maps, plats, sketches, graphs, photographs, and exhibits included in this Report are for illustration purposes only and shall be utilized only to assist in visualizing matters discussed in the Report. No such items shall be removed, reproduced, or used apart from the Report.
15. The Report shall not be duplicated or provided to any unintended users in whole or in part without the written consent of CBRE, which consent CBRE may withhold in its sole discretion. Exempt from this restriction is duplication for the internal use of the intended user and its attorneys, accountants, or advisors for the sole benefit of the intended user. Also exempt from this restriction is transmission of the Report pursuant to any requirement of any court, governmental authority, or regulatory agency having jurisdiction over the intended user, provided that the Report and its contents shall not be published, in whole or in part, in any public document without the written consent of CBRE, which consent CBRE may withhold in its sole discretion. Finally, the Report shall not be made available to the public or otherwise used in any offering of the property or any security, as defined by applicable law. Any unintended user who may possess the Report is advised that it shall not rely upon the Report or its conclusions and that it should rely on its own appraisers, advisors and other consultants for any decision in connection with the subject property. CBRE shall have no liability or responsibility to any such unintended user.

ADDENDA

Addendum A

MARKET STUDY TABLES

TABLE A-2

SELECTED WEST MAUI CENSUS DATA FOR PERIOD 2011 THROUGH 2015				
	Lahaina CDP	Kaanapali CDP	Launiupoko CDP	Napili-Honokowai CDP
Owner-Occupied (Percent of Total Units)	50.1%	82.8%	59.7%	40.6%
Renter-Occupied (Percent of Total Units)	49.9%	17.2%	40.3%	56.9%
Average Household Size Owner-Occupied Unit	3.74	2.18	2.75	2.45
Average Household Size Renter-Occupied Unit	3.21	2.42	2.32	2.35
Average Monthly Rent (1)	$1,245	$2,344	$2,667	$1,434
Percent of Rental Households Which Pay more than 35% of Income as Rent	44.4%	41.3%	39.4%	48.6%

(1) Gross figure. Average during years 2011 through 2015.

Source: CBRE/Hallstrom Team

TABLE A-3

2010 CENSUS DATA FOR WEST MAUI RESIDENT POPULATION, HOUSING UNITS AND HOUSEHOLD SIZES

Data Set	Resident Population 2010 Census	Total Housing Units Used by Residents	Average Resident Household Size	Total Units in Housing Inventory Including Second-Homes & TVUs	Percent of Total Units Which Are Second-Homes & TVUs
Maui County	158,834	53,131	2.99	71,722	34.99%
Zip Code 96761	22,156	7,759	2.86	11,928	53.73%
By Major Census Designated Places					
Olowalu CDP	80	35	2.29	40	12.50%
Launiupoko CDP	588	216	2.72	287	24.74%
Lahaina CDP	11,704	3,472	3.37	4,049	14.25%
Kaanapali CDP	1,045	465	2.25	1,806	74.25%
Napili-Honokowai CDP	7,261	2,729	2.66	4,284	36.30%
Kapalua CDP	353	207	1.71	927	77.67%
Totals	**21,031**	**7,124**	**2.95**	**11,393**	**37.47%**
By West Maui Census Tract Data					
314.02	3,003	844	3.56	928	9.05%
314.04	3,250	1,352	2.40	1,701	20.52%
314.05	5,491	1,355	4.05	1,443	6.10%
315.01	2,368	799	2.96	1,802	55.66%
315.02	5,036	2,128	2.37	3,230	34.12%
315.03	2,366	1,042	2.27	2,516	58.59%
320.00	994	435	2.29	895	51.40%
Totals	**22,508**	**7,955**	**2.83**	**12,515**	**36.44%**

Source: US Census 2010, CBRE/Hallstrom Team

TABLE A-4

QUANTIFICATION OF HOUSING UNIT DEMAND FOR WEST MAUI 2017 TO 2030 EXCLUDING TRANSIENT VACATION UNITS

Scenario	3rd QTR 2017	Projected West Maui Resident Population 2020	2025	2030	Additional Units Required by 2030
One: Minimum Based on Maui County General Plan 2030 Projection Series Percentile Periodic Growth					
Resident Population	**25,530**	**26,857**	**28,851**	**30,831**	
Average Annual Change		1.6%	1.5%	1.4%	
Average Household Size	2.85	2.82	2.78	2.74	
Total Resident Units Required	8,958	9,524	10,378	11,252	
Vacancy Allowance (3 % of resident unit demand)	269	286	311	338	
Non-Resident Purchaser Allowance (2)	1,845	2,158	2,565	3,013	
TOTAL MARKET UNIT DEMAND	**11,072**	**11,967**	**13,255**	**14,603**	**5,728**
Two: Maximum Based on Maui County General Plan 2030 Projection Series Absolute Growth to 2030 Figures					
Resident Population	**25,530**	**27,956**	**31,693**	**36,058**	
Average Annual Change		2.6%	2.6%	2.6%	
Average Household Size	2.85	2.81	2.76	2.71	
Total Resident Units Required	8,958	9,949	11,483	13,306	
Vacancy Allowance (3 % of resident unit demand)	269	298	344	399	
Non-Resident Purchaser Allowance (2)	1,845	2,357	3,075	4,111	
TOTAL MARKET UNIT DEMAND	**11,072**	**12,604**	**14,902**	**17,816**	**8,941**

CONCLUDED HOUSING UNIT DEMAND RANGE

	Latent Demand	2017-2020	2021-2025	2026-2030	Totals
MINIMUM DEMAND					
Periodic	2,197	1,523	2,072	2,133	5,728
Cumulative		1,523	3,595	5,728	
Average Annual Demand (3)		381	414	427	
MAXIMUM DEMAND					
Periodic	2,197	2,160	3,083	3,698	8,941
Cumulative		2,160	5,243	8,941	
Average Annual Demand (3)		540	617	740	
MID-POINT DEMAND					
Periodic	2,197	1,841	2,578	2,915	7,335
Cumulative		1,841	4,419	7,335	
Average Annual Demand (3)		460	516	583	

Note: "Land Use Forecast, Island of Maui, Maui County General Plan 2030 Technical Resource Study" projects there is a need for 7,850 additional units needed by 2030 to meet the "2030 Resident and Non-Resident Housing Demand" (excluding condo units used as visitor accommodations), Table 3-3. This is a variation of 5.9% from our forecasts.

(1) There are an estimated 13,625 total single family and condominium units in West Maui, of which some 4,740 are used for vacation rentals, resulting in 8,885 being available to meet resident housing and second-home owner (non-vacation retal) demand.

(2) Non-Hawaii ownership represents 56% of all units in West Maui, many of which are used for vacation rentals. Among housing units they are estimated to comprise about 20 percent of all ownership at present and projected to increase to between 26% and 30% by 2030.

(3) Latent Demand is assumed to be absorbed equally throughout projection time-frame (by 2030).

Source: US Census, State DBEDT, Hawaii Information Service, County of Maui Planning Dept. and CBRE/Hallstrom Team

TABLE A-5

DIVISION OF PROJECTED DEMAND BY UNIT TYPE FOR HOUSING UNITS IN THE WEST MAUI STUDY AREA 2017 TO 2030

	Projection Period			Total
	2017 to 2020	2021 to 2025	2026 to 2030	Demand 2017-2030
1. Using Minimum Demand Projections				
Single Family Homes & Lots	**929**	**1,326**	**1,386**	**3,642**
Percent of Total	61%	64%	65%	64%
Multifamily Units	**594**	**746**	**746**	**2,086**
Percent of Total	39%	36%	35%	36%
Total	**1,523**	**2,072**	**2,133**	**5,728**
	100%	100%	100%	100%
2. Using Maximum Projections				
Single Family Homes & Lots	**1,317**	**1,973**	**2,404**	**5,695**
Percent of Total	61%	64%	65%	64%
Multifamily Units	**842**	**1,110**	**1,294**	**3,247**
Percent of Total	39%	36%	35%	36%
Total	**2,160**	**3,083**	**3,698**	**8,941**
	100%	100%	100%	100%
Mid-Point				
Single Family Homes & Lots	1,123	1,650	1,895	4,668
Multifamily Units	718	928	1,020	2,667
Total	**1,841**	**2,578**	**2,915**	**7,335**

Source: CBRE/Hallstrom Team

TABLE A-6

STRIATED PROJECTIONS OF HOUSING UNIT DEMAND BY PRICE IN WEST MAUI STUDY AREA 2017 TO 2030

Expressed in Constant 2017 Dollars

Period	Household Income as a % of Median Income (1)	Projection Period 2017 to 2020	2021 to 2025	2026 to 2030	Total Demand 2017-2030
1. Minimum Demand Forecasts					
Less Than $365,000	80% or Less	426	539	512	1,477
Percent of Total Demand		28.00%	26.00%	24.00%	25.79%
$365,000 to $640,000	81% to 140%	366	497	512	1,375
Percent of Total Demand		24.00%	24.00%	24.00%	24.00%
$640,000 to $1,500,000	Above 140%	396	580	640	1,616
Percent of Total Demand		26.00%	28.00%	30.00%	28.21%
Over $1,500,000	Above 140%	335	477	512	1,324
Percent of Total Demand		22.00%	23.00%	24.00%	23.11%
Total Market Demand		1,523	2,072	2,133	5,728
		100.00%	101.00%	102.00%	101.11%
2. Maximum Demand Forecasts					
Less Than $365,000	80% or Less	605	802	888	2,294
Percent of Total Demand		28.00%	26.00%	24.00%	25.66%
$365,000 to $640,000	81% to 140%	518	740	888	2,146
Percent of Total Demand		24.00%	24.00%	24.00%	24.00%
$640,000 to $1,500,000	Above 140%	562	832	1,036	2,429
Percent of Total Demand		26.00%	27.00%	28.00%	27.17%
Over $1,500,000	Above 140%	475	709	888	2,072
Percent of Total Demand		22.00%	23.00%	24.00%	23.17%
Total Market Demand		2,160	3,083	3,698	8,941
		100.00%	100.00%	100.00%	100.00%

Median Housing Prices in West Maui (Through September 2017)

	Lahaina	Napili-Honokowai	Kaanapali
Single Family Median Price	$1,334,500	$1,700,000	$847,500
Multi-Family Average Price	$482,500	$922,000	$425,000
Median Rent (2015)	$1,245	$1,434	$2,344

Note: The estimated median household income for the Island of Maui (excluding Hana) in 2017 is $82,600 for a four-person household; the accepted median baseline. Based on growth of 1.4%, the compounded average increase from 2012-2016, from 2016 level of $81,500.

(1) While quoted in sales prices the household incomes are also aplicable to rental prices and general proportionate demand.

Source: Maui County, DBEDT, MLS and CBRE/Hallstrom Team

TABLE A-7

ISLAND OF MAUI (EXCEPT HANA) WORKFORCE/AFFORDABLE RENTAL LIMITS GUIDELINES FOR 2017

Prepared by:
HOUSING DIVISION
DEPARTMENT OF HOUSING AND HUMAN CONCERNS (DHHC)
COUNTY OF MAUI

Effective: **April 21, 2017**

2017
INCOME LIMITS & AFFORDABLE RENT GUIDELINES
MAUI (EXCEPT HANA)

INCOME LIMITS FOR RENTAL UNITS (BY FAMILY SIZE & PERCENTAGE OF MEDIAN FAMILY INCOME)

% of Median	1 PERSON	2 PERSON	3 PERSON	4 PERSON	5 PERSON	6 PERSON	7 PERSON	8 PERSON
	0.7	0.8	0.9	1.0	1.08	1.16	1.24	1.32
10%	$5,190	$5,930	$6,670	$7,410	$8,000	$8,600	$9,190	$9,780
20%	$10,370	$11,860	$13,340	$14,820	$16,010	$17,190	$18,380	$19,560
30%	$15,560	$17,780	$20,010	$22,230	$24,010	$25,790	$27,570	$29,340
40%	$20,750	$23,710	$26,680	$29,640	$32,010	$34,380	$36,750	$39,120
50%	$25,940	$29,640	$33,350	$37,050	$40,010	$42,980	$45,940	$48,910
60%	$31,120	$35,570	$40,010	$44,460	$48,020	$51,570	$55,130	$58,690
70%	$36,310	$41,500	$46,680	$51,870	$56,020	$60,170	$64,320	$68,470
80%	$41,500	$47,420	$53,350	$59,280	$64,020	$68,760	$73,510	$78,250
90%	$46,680	$53,350	$60,020	$66,690	$72,030	$77,360	$82,700	$88,030
100%	$51,870	$59,280	$66,690	$74,100	$80,030	$85,960	$91,880	$97,810
110%	$57,060	$65,210	$73,360	$81,510	$88,030	$94,550	$101,070	$107,590
120%	$62,240	$71,140	$80,030	$88,920	$96,030	$103,150	$110,260	$117,370
130%	$67,430	$77,060	$86,700	$96,330	$104,040	$111,740	$119,450	$127,160
140%	$72,620	$82,990	$93,370	$103,740	$112,040	$120,340	$128,640	$136,940

AFFORDABLE RENT GUIDELINES (BY UNIT SIZE & PERCENTAGE OF MEDIAN FAMILY INCOME)

% of Median	UNIT SIZE (NO. OF BEDROOMS)					
	0	1	2	3	4	5
10%	$130	$139	$167	$193	$215	$237
20%	$259	$278	$334	$385	$430	$474
30%	$389	$417	$500	$578	$645	$711
40%	$519	$556	$667	$771	$860	$948
50%	$649	$695	$834	$963	$1,075	$1,186
60%	$778	$834	$1,000	$1,156	$1,289	$1,423
70%	$908	$973	$1,167	$1,349	$1,504	$1,660
80%	$1,038	$1,112	$1,334	$1,541	$1,719	$1,897
90%	$1,167	$1,250	$1,501	$1,734	$1,934	$2,134
100%	$1,297	$1,389	$1,667	$1,927	$2,149	$2,371
110%	$1,427	$1,528	$1,834	$2,119	$2,364	$2,608
120%	$1,556	$1,667	$2,001	$2,312	$2,579	$2,845
130%	$1,686	$1,806	$2,168	$2,505	$2,794	$3,083
140%	$1,816	$1,945	$2,334	$2,697	$3,009	$3,320

Note: Affordable rents are based on 30% of gross monthly income. Affordable rents include utilities.

Source: County of Maui Department of Housing and Human Concerns, Housing Division

TABLE A-8

YEAR-END MEDIAN SALES PRICE FOR MAUI AND SELECT WEST MAUI AREAS FROM MULTIPLE LISTING SERVICE DATABASE 2000 THROUGH ANNUIALIZED 2017

Location and Property Type	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Annualized September 2017
Overall Maui																		
Single Family	$275,000	$295,000	$375,000	$440,000	$550,000	$679,000	$693,000	$630,069	$577,867	$498,106	$460,000	$432,500	$470,000	$530,000	$570,000	$580,000	$636,750	$700,000
% Change		*7.27%*	*27.12%*	*17.33%*	*25.00%*	*23.45%*	*2.06%*	*-9.08%*	*-8.29%*	*-13.80%*	*-7.65%*	*-5.98%*	*8.67%*	*12.77%*	*7.55%*	*1.75%*	*9.78%*	*9.93%*
Condominium	$181,750	$190,500	$195,000	$241,325	$310,000	$385,000	$505,000	$550,000	$549,500	$450,000	$377,500	$310,000	$358,995	$373,000	$415,000	$410,000	$429,000	$449,000
% Change		*4.81%*	*2.36%*	*23.76%*	*28.46%*	*24.19%*	*31.17%*	*8.91%*	*-0.09%*	*-18.11%*	*-16.11%*	*-17.88%*	*15.80%*	*3.90%*	*11.26%*	*-1.20%*	*4.63%*	*4.66%*
Vacant Land	$218,000	$249,500	$262,760	$330,100	$400,000	$540,000	$688,066	$565,000	$700,000	$500,000	$405,000	$310,500	$350,000	$400,000	$520,000	$447,650	$459,750	$358,000
% Change		*14.45%*	*5.31%*	*25.63%*	*21.18%*	*35.00%*	*27.42%*	*-17.89%*	*23.89%*	*-28.57%*	*-19.00%*	*-23.33%*	*12.72%*	*14.29%*	*30.00%*	*-13.91%*	*2.70%*	*-22.13%*
Lahaina																		
Single Family	$260,000	$300,000	$355,500	$520,000	$625,000	$877,000	$962,500	$1,125,000	$1,295,000	$650,000	$501,900	$518,550	$512,500	$606,250	$775,000	$700,000	$760,000	$1,334,500
% Change		*15.38%*	*18.50%*	*46.27%*	*20.19%*	*40.32%*	*9.75%*	*16.88%*	*15.11%*	*-49.81%*	*-22.78%*	*3.32%*	*-1.17%*	*18.29%*	*27.84%*	*-9.68%*	*8.57%*	*75.59%*
Condominium	$225,000	$130,000	$225,000	$190,000	$295,000	$337,500	$536,000	$529,000	$455,000	$399,000	$378,583	$337,205	$365,100	$352,500	$420,000	$440,000	$485,573	$482,500
% Change		*-42.22%*	*73.08%*	*-15.56%*	*55.26%*	*14.41%*	*58.81%*	*-1.31%*	*-13.99%*	*-12.31%*	*-5.12%*	*-10.93%*	*8.27%*	*-3.45%*	*19.15%*	*4.76%*	*10.36%*	*-0.63%*
Vacant Land	$350,000	$404,099	$380,000	$485,000	$825,000	$690,357	$975,000	$1,425,000	$1,000,000	$900,000	$655,280	$790,000	$825,000	$784,000	$707,500	$508,500	$999,500	$1,170,000
% Change		*15.46%*	*-5.96%*	*27.63%*	*70.10%*	*-16.32%*	*41.23%*	*46.15%*	*-29.82%*	*-10.00%*	*-27.19%*	*20.56%*	*4.43%*	*-4.97%*	*-9.76%*	*-28.13%*	*96.56%*	*17.06%*
Kaanapali																		
Single Family	$795,000	$855,000	$944,500	$969,500	$1,285,000	$1,850,000	$2,222,500	$2,300,875	$1,600,000	$1,447,500	$965,000	$1,100,000	$1,230,000	$1,172,500	$1,600,000	$1,785,000	$1,597,500	$1,700,000
% Change		*7.55%*	*10.47%*	*2.65%*	*32.54%*	*43.97%*	*20.14%*	*3.53%*	*-30.46%*	*-9.53%*	*-33.33%*	*13.99%*	*11.82%*	*-4.67%*	*36.46%*	*11.56%*	*-10.50%*	*6.42%*
Condominium	$352,500	$535,000	$510,000	$535,000	$667,500	$805,000	$1,300,000	$1,100,000	$795,000	$975,000	$823,250	$646,700	$499,900	$782,950	$850,000	$992,500	$1,022,500	$922,000
% Change		*51.77%*	*-4.67%*	*4.90%*	*24.77%*	*20.60%*	*61.49%*	*-15.38%*	*-27.73%*	*22.64%*	*-15.56%*	*-21.45%*	*-22.70%*	*56.62%*	*8.56%*	*16.76%*	*3.02%*	*-9.83%*
Vacant Land	$307,500	$550,000	$335,000	$405,000	$625,000	$775,000	$795,000	$759,500	$915,000	$407,000	$400,000	$425,000	$455,000	$716,931	$610,000	$642,500	$680,000	$643,500
% Change		*78.86%*	*-39.09%*	*20.90%*	*54.32%*	*24.00%*	*2.58%*	*-4.47%*	*20.47%*	*-55.52%*	*-1.72%*	*6.25%*	*7.06%*	*57.57%*	*-14.92%*	*5.33%*	*5.84%*	*-5.37%*
Napili/Kahana/Honokowai																		
Single Family	$382,500	$408,000	$495,000	$553,500	$765,000	$915,000	$995,000	$985,000	$1,050,000	$755,000	$660,000	$605,000	$632,000	$799,000	$750,000	$881,000	$875,000	$847,500
% Change		*6.67%*	*21.32%*	*11.82%*	*38.21%*	*19.61%*	*8.74%*	*-1.01%*	*6.60%*	*-28.10%*	*-12.58%*	*-8.33%*	*4.46%*	*26.42%*	*-6.13%*	*17.47%*	*-0.68%*	*-3.14%*
Condominium	$180,500	$199,500	$215,000	$275,000	$360,000	$428,545	$534,500	$550,000	$525,000	$367,500	$310,000	$259,000	$299,000	$382,500	$399,000	$400,000	$407,500	$425,000
% Change		*10.53%*	*7.77%*	*27.91%*	*30.91%*	*19.04%*	*24.72%*	*2.90%*	*-4.55%*	*-30.00%*	*-15.65%*	*-16.45%*	*15.44%*	*27.93%*	*4.31%*	*0.25%*	*1.87%*	*4.29%*
Vacant Land	$178,000	$178,015	$185,800	$238,000	$420,000	$530,000	$573,500	$565,000	$425,000	$250,000	$0	$265,000	$270,000	$282,500	$725,000	$975,000	$412,500	$765,000
% Change		*0.01%*	*4.37%*	*28.09%*	*76.47%*	*26.19%*	*8.21%*	*-1.48%*	*-24.78%*	*-41.18%*	*#NUM!*	*#NUM!*	*1.89%*	*4.63%*	*156.64%*	*34.48%*	*-57.69%*	*85.45%*

Source: Maui Multiple Listing Service and CBRE/Hallstrom Team.

TABLE A-9

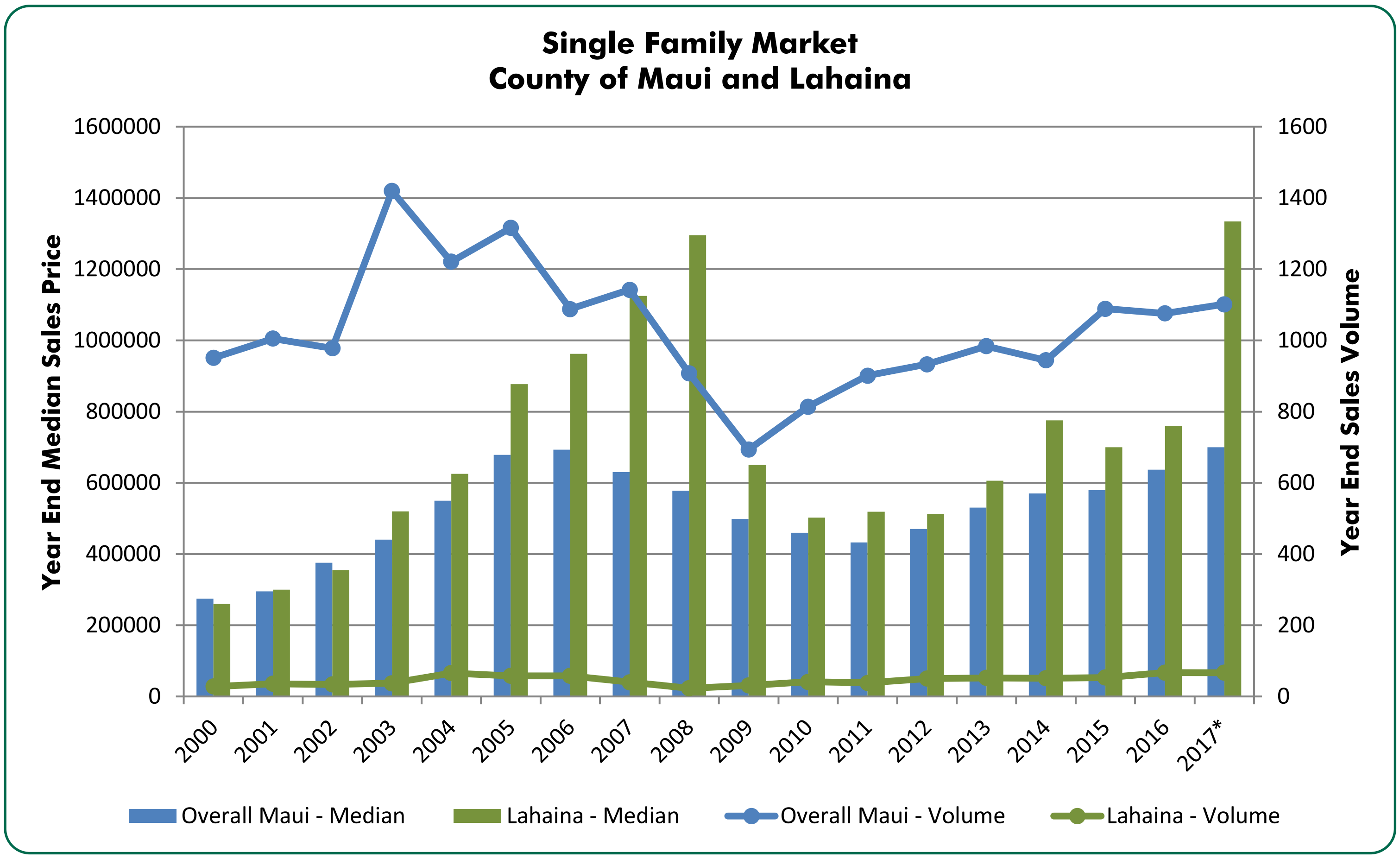
YEAR-END NUMBER OF SALES FOR MAUI AND SELECT WEST MAUI AREAS FROM MULTIPLE LISTING SERVICE DATABASE 2000 THROUGH ANNUALIZED 2017

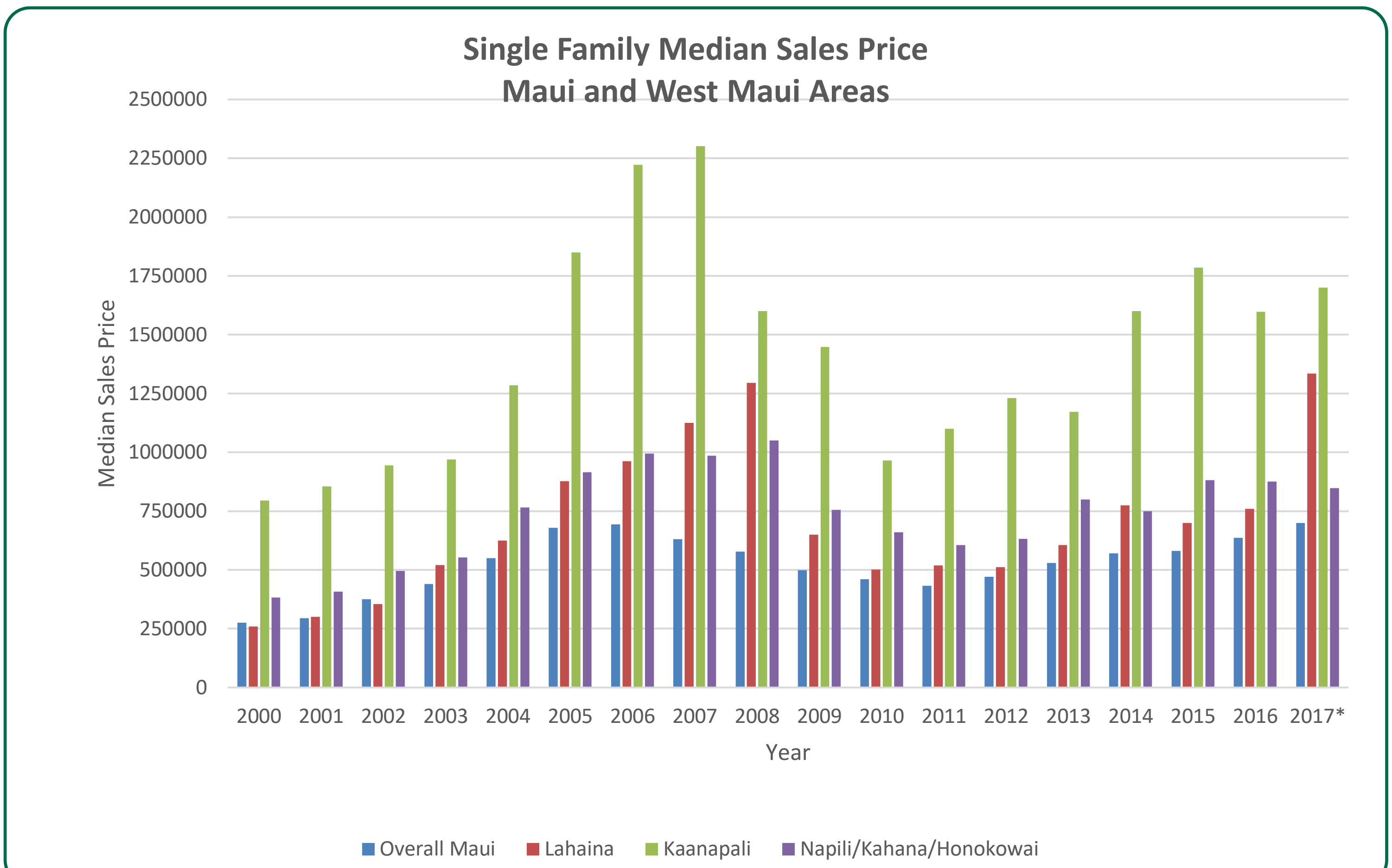
Property Type	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Annualized September 2017
Overall Maui																		
Single Family	951	1,005	978	1,420	1,221	1,316	1,088	1,142	907	693	814	901	933	984	944	1,089	1,076	1,101
% Change		*5.68%*	*-2.69%*	*45.19%*	*-14.01%*	*7.78%*	*-17.33%*	*4.96%*	*-20.58%*	*-23.59%*	*17.46%*	*10.69%*	*3.55%*	*5.47%*	*-4.07%*	*15.36%*	*-1.19%*	*2.35%*
Condominium	1,456	1,348	1,551	2,001	1,933	2,050	1,210	1,187	788	826	1,147	1,157	1,248	1,333	1,203	1,199	1,232	1,399
% Change		*-7.42%*	*15.06%*	*29.01%*	*-3.40%*	*6.05%*	*-40.98%*	*-1.90%*	*-33.61%*	*4.82%*	*38.86%*	*0.87%*	*7.87%*	*6.81%*	*-9.75%*	*-0.33%*	*2.75%*	*13.53%*
Vacant Land	359	368	393	447	479	427	255	227	97	111	127	134	173	216	166	154	160	225
% Change		*2.51%*	*6.79%*	*13.74%*	*7.16%*	*-10.86%*	*-40.28%*	*-10.98%*	*-57.27%*	*14.43%*	*14.41%*	*5.51%*	*29.10%*	*24.86%*	*-23.15%*	*-7.23%*	*3.90%*	*40.83%*
Lahaina																		
Single Family	28	36	34	37	66	58	58	40	23	31	41	38	50	52	51	53	67	67
% Change		*28.57%*	*-5.56%*	*8.82%*	*78.38%*	*-12.12%*	*0.00%*	*-31.03%*	*-42.50%*	*34.78%*	*32.26%*	*-7.32%*	*31.58%*	*4.00%*	*-1.92%*	*3.92%*	*26.42%*	*-0.50%*
Condominium	45	35	39	44	44	55	82	75	21	55	64	83	80	85	72	103	68	83
% Change		*-22.22%*	*11.43%*	*12.82%*	*0.00%*	*25.00%*	*49.09%*	*-8.54%*	*-72.00%*	*161.90%*	*16.36%*	*29.69%*	*-3.61%*	*6.25%*	*-15.29%*	*43.06%*	*-33.98%*	*21.57%*
Vacant Land	5	23	9	20	24	29	21	20	3	13	24	15	12	11	12	10	20	5
% Change		*360.00%*	*-60.87%*	*122.22%*	*20.00%*	*20.83%*	*-27.59%*	*-4.76%*	*-85.00%*	*333.33%*	*84.62%*	*-37.50%*	*-20.00%*	*-8.33%*	*9.09%*	*-16.67%*	*100.00%*	*-73.33%*
Kaanapali																		
Single Family	21	16	36	40	24	29	16	18	15	14	21	35	23	22	27	22	22	24
% Change		*-23.81%*	*125.00%*	*11.11%*	*-40.00%*	*20.83%*	*-44.83%*	*12.50%*	*-16.67%*	*-6.67%*	*50.00%*	*66.67%*	*-34.29%*	*-4.35%*	*22.73%*	*-18.52%*	*0.00%*	*9.09%*
Condominium	136	156	121	133	130	120	73	55	39	193	237	122	160	160	151	102	119	91
% Change		*14.71%*	*-22.44%*	*9.92%*	*-2.26%*	*-7.69%*	*-39.17%*	*-24.66%*	*-29.09%*	*394.87%*	*22.80%*	*-48.52%*	*31.15%*	*0.00%*	*-5.62%*	*-32.45%*	*16.67%*	*-23.81%*
Vacant Land	24	10	38	60	34	21	44	20	5	7	9	18	13	16	27	14	17	16
% Change		*-58.33%*	*280.00%*	*57.89%*	*-43.33%*	*-38.24%*	*109.52%*	*-54.55%*	*-75.00%*	*40.00%*	*28.57%*	*100.00%*	*-27.78%*	*23.08%*	*68.75%*	*-48.15%*	*21.43%*	*-5.88%*
Napili/Kahana/Honokowai																		
Single Family	31	48	49	72	67	67	38	37	22	24	27	42	45	35	34	30	40	45
% Change		*54.84%*	*2.08%*	*46.94%*	*-6.94%*	*0.00%*	*-43.28%*	*-2.63%*	*-40.54%*	*9.09%*	*12.50%*	*55.56%*	*7.14%*	*-22.22%*	*-2.86%*	*-11.76%*	*33.33%*	*13.33%*
Condominium	362	284	417	489	430	451	250	163	113	96	173	213	233	215	209	197	266	247
% Change		*-21.55%*	*46.83%*	*17.27%*	*-12.07%*	*4.88%*	*-44.57%*	*-34.80%*	*-30.67%*	*-15.04%*	*80.21%*	*23.12%*	*9.39%*	*-7.73%*	*-2.79%*	*-5.74%*	*35.03%*	*-7.27%*
Vacant Land	29	44	28	23	12	15	2	3	1	5	0	1	3	5	3	1	2	3
% Change		*51.72%*	*-36.36%*	*-17.86%*	*-47.83%*	*25.00%*	*-86.67%*	*50.00%*	*-66.67%*	*400.00%*	*#NUM!*	*#NUM!*	*200.00%*	*66.67%*	*-40.00%*	*-66.67%*	*100.00%*	*33.33%*

Source: Maui Multiple Listing Service and CBRE/Hallstrom Team.

TABLE A-10

GRAPHS OF MAUI MULTIPLE LISTING SERVICE SINGLE FAMILY SALES FOR MAUI AND SELECTED WEST MAUI AREAS

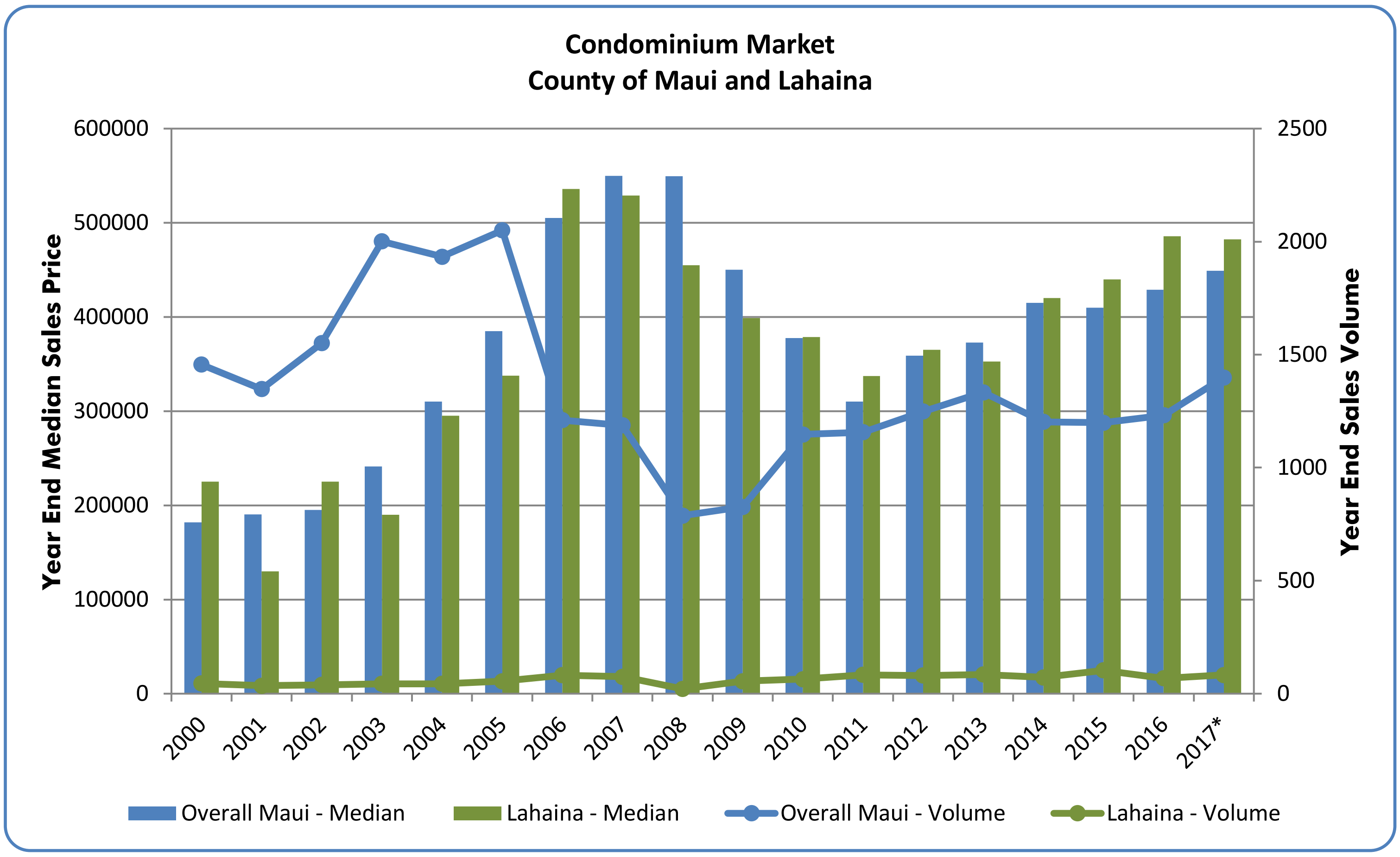


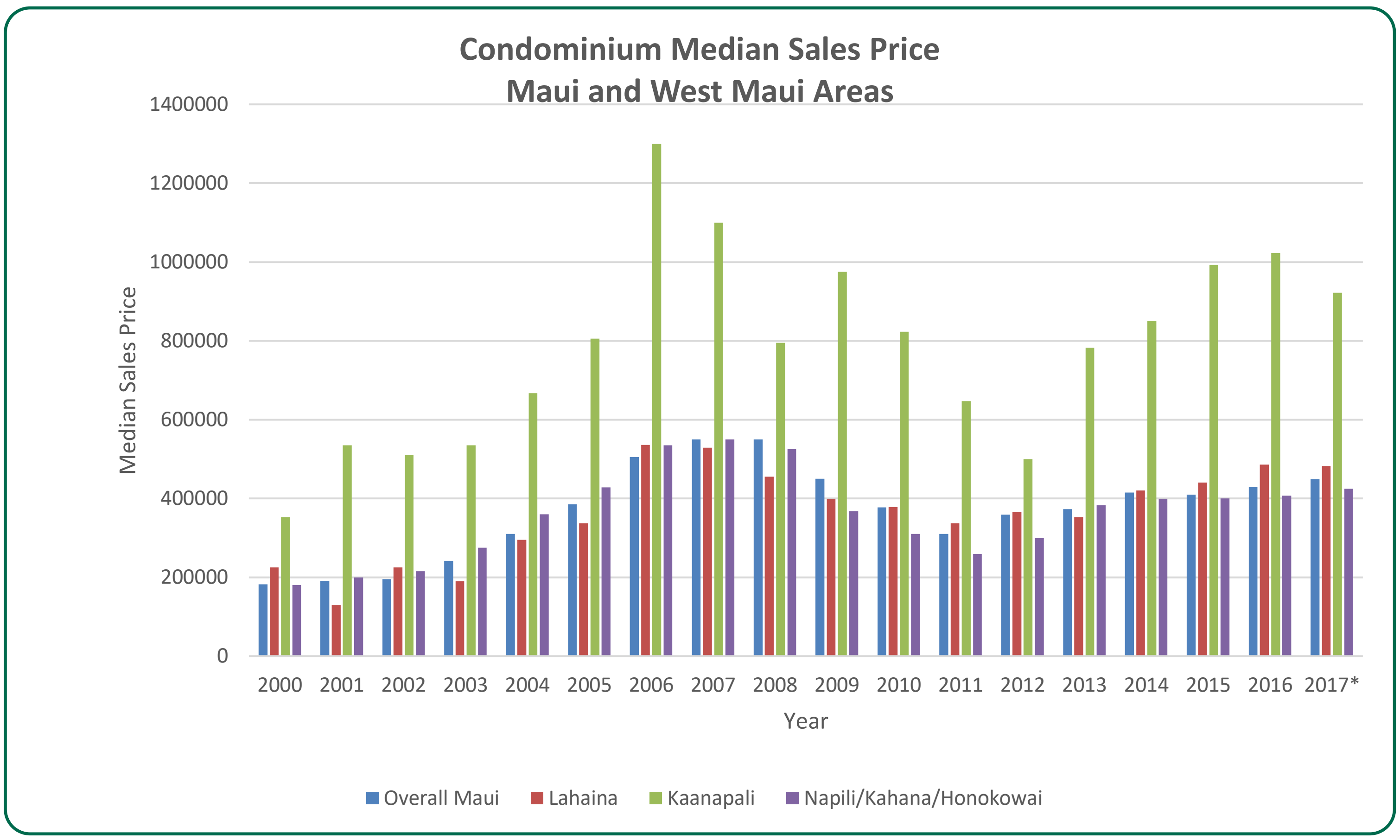


Source: Maui Multiple Listing Service and CBRE/Hallstrom Team.

TABLE A-11

GRAPHS OF MAUI MULTIPLE LISTING SERVICE CONDOMINIUM UNIT SALES FOR MAUI AND SELECTED WEST MAUI AREAS





Source: Maui Multiple Listing Service and CBRE/Hallstrom Team.

TABLE A-12

LAHAINA DISTRICT LONG-TERM RESIDENTIAL RENTAL UNIT SURVEY SEPTEMBER 29 THROUGH NOVEMBER 3, 2017

Source	Address	Type	Bed	Bath	Sq Ft	Listing Price (Rent)	Utilities Included	Date
Realtor	6 Poinciana Pl, Lahaina, HI 96761	Condo	4	2.5		$4,787		9/29/2017
Zillow	861 Kale St,Lahaina, HI 96761	House	4	2	2648	$3,500		9/29/2017
Desination Maui	1660 Limahana Circle - Opukea F108, F108, Lahaina, HI 96761	Condo	3	2	1332	$3,500	Water, Trash, Electric, Cable, Internet	9/29/2017
Craiglist	Kahana Ridge Dr, Lahaina, HI 96761	Apartment	3	2.5		$3,950		9/29/2017
Zillow	25 Heather Ln APT 131,Lahaina, HI 96761	Apartment	2	2	960	$2,400	Utilities included except Electric	9/29/2017
Zillow	3626 Lower Honoapiilani Rd, Lahaina, HI 96761	Apartment	2	1	796	$2,395		9/29/2017
Zillow	50 Puu Anoano St APT 1602,Lahaina, HI 96761	Apartment	2	2		$3,646	Rent+Utilities (PV electric System for Water and Heater)	9/29/2017
Zillow	500 Kapalua Dr,Lahaina, HI 96761	House	2	2	1344	$3,500		9/29/2017
Craiglist		Apartment	2	2		$2,650		9/29/2017
Zillow	3627 Lower Honoapiilani Rd, Lahaina, HI 96761	Apartment	1	1	618	$1,825		9/29/2017
Zillow	3740 Lower Honoapiilani Rd APT A304,Lahaina, HI 96761	Apartment	1	1	530	$1,900	Water & Trash	9/29/2017
Zillow	4909 Lower Honoapiilani Rd # E3E,	Apartment	1	1	700	$2,300		9/29/2017
Zillow	3628 Lower Honoapiilani Rd, Lahaina, HI 96761	Apartment	0	1	444	$1,545		9/29/2017
Craiglist		House	4	3.5	3600	$5,700		10/1/2017
Craiglist	16 Plumeria Place, Lahaina, HI 96761	House	3	2	1830	$4,400		10/1/2017
Craiglist	15 E Kuu Aku Lane, Lahaina, HI 96761	Condo	2	2.5	1282	$4,700		10/1/2017
Craiglist	3788 Lower Honoapiilani Rd, Lahaina, HI 96761	Condo	2	2		$3,200	High Speed Internet, Cable, Electricity up to $150	10/1/2017
Craiglist	Ainakea Rd	House	3	1	800	$2,795		10/4/2017
Craiglist		Condo	3	2		$3,000		10/4/2017
Trulia	300 Aalii Way, Lahaina, HI 96761	House	4	3.5	3800	$6,953		10/11/2017
Zillow	146 Kahana Nui Rd, Lahaina, HI 96761	House	3	2.5		$3,950		10/11/2017
Trulia	16 Polohina Ln #4, Lahaina, HI 96761	Apartment	3	2		$2,800		10/11/2017
Zillow	1660 Limahana Circle Opukea F108, Lahaina, HI 96761	Condo	3	2	1332	$3,500	Water, Trash, Electric, Cable, Internet	10/11/2017
Zillow	31 E Ku U Aku Ln, Lahaina, HI 96761	Condo	3	2	1165	$4,000	All utilities except electricity	10/11/2017
Zillow	3530 Lower Honaoapiilani Rd, Lahaina, HI 96761	House	3	2	1088	$2,800		10/11/2017
Zillow	486 Wainee St, Lahaina, HI 96761	House	3	2	1194	$3,750		10/11/2017
Zillow	500 Bay Dr #23, Lahaina, HI 96761	House	1	1.5		$3,600		10/11/2017
ApartmentFinder	877 Anupuni Loop, Lahaina, HI 96761	House	5	4		$12,000	Yard, Trash, Pool, Spa Maintenance	10/13/2017
ApartmentFinder	102 Woodrose PL, Lahaina, HI 96761	Apartment	3	3		$6,700	Trash, Pool, Spa Maintenance	10/13/2017
ApartmentFinder	43 Polohina Ln, Lahaina, HI 96761	Apartment	3	2		$2,890	All utilities except electric and cable	10/13/2017
ApartmentFinder	4955 Hanawai St, Lahaina, HI 96761	House	2	1.5	767	$2,600		10/13/2017
Craiglist		House	2	2		$2,700		10/13/2017
Craiglist		House	1	1	520	$2,100	Utilities Included	10/13/2017
Craiglist		Apartment	0	1		$1,000	Electricity, Water	10/13/2017
Craiglist	36 Puu Hale, Lahaina, HI 96761	Condo	4	3.5	3650	$5,800	Solar Panel	10/18/2017
Trulia	15 Wailau Pl, Lahaina, HI 96761	House	3	2	1937	$6,900		10/18/2017
Craiglist	206 Front Street, Lahaina, HI 96761	House	2	1	900	$2,100		10/18/2017
Craiglist	Mahinahina St & Uli Pl, Lahiana, HI 96761	House	2	1	1600	$3,200	Water, Trash	10/18/2017
Craiglist		House	2	1	750	$2,300	All utilites except water, trash, electricity	10/18/2017
Zillow	36 Puu Hale St,Lahaina, HI 96761	Condo	4	3.5	3650	$5,500	No Utilities+Solar Panels	10/27/2017
Zillow	45 E Kuu Aku Ln UNIT 314,Lahaina, HI 96761	Condo	3	2	1165	$2,950	All utilities except electric and cable	10/27/2017
Zillow	31 E Kuu Aku Ln # 13,Lahaina, HI 96761	Condo	3	2	1165	$3,300	All utilites except cable, electric, internet	10/27/2017
Zillow	25 Heather Ln APT 114,Lahaina, HI 96761	Apartment	3	2		$2,500		10/30/2017
Zillow	3788 Lower Honoapiilani Rd APT D101,Lahaina, HI 96761	Condo	2	2	1100	$2,400		10/30/2017
Zillow	Lower Honoapiilani RdLahaina, HI 96761	Condo	1	1	768	$2,900	Electricity, Water, Sewer, and Cable	11/2/2017
Zillow	4064 Lower Honoapiilani Rd,Lahaina, HI 96761	House	1	1.5	1750	$2,200	Cable+Internet	11/3/2017
Hotpad	Hui Road F, Lahaina, HI 96761	Condo	2	1	1080	$2,300		11/3/2017
Zillow	4365 Lower Honoapiilani Rd # 201,Lahaina, HI 96761	Condo	2	2	1141	$3,995		11/3/2017

Source: As Cited andCBRE/Hallstrom Team

TABLE A-13

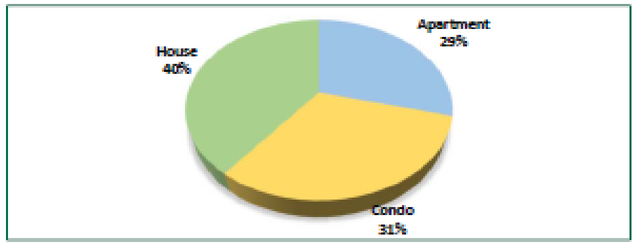
GRAPHS OF WEST MAUI LONG-TERM RESIDENTAL RENTAL UNIT SURVEY

Unit Type	Number of Units
Apartment	14
Condo	15
House	19
Grand Total	48

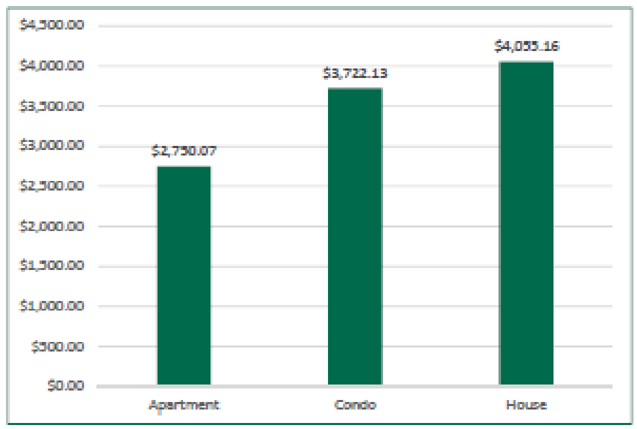
Unit Type	Average Rent
Apartment	$2,750.07
Condo	$3,722.13
House	$4,055.16
Grand Total	$3,570.44

Beds	Average (Rent)
Studio	$1,272.50
1	$2,403.57
2	$2,939.07
3	$3,746.18
4	$5,373.33
Grand Total	$3,391.09

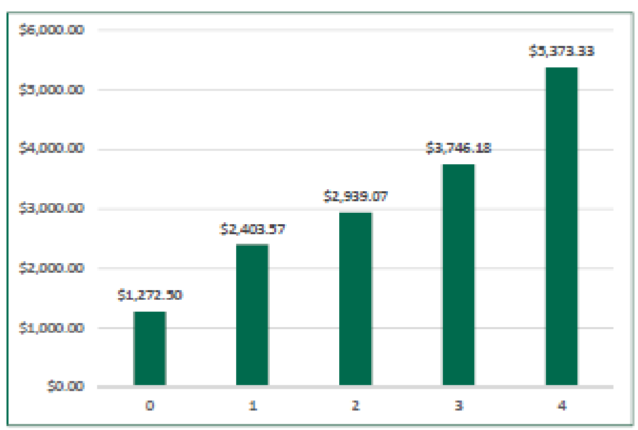
RESIDENTIAL SUPPLY IN STUDY AREA BY TYPE



AVERAGE ASKING RENT BY TYPE



Average Asking Rent by Bedroom Total



Source: As Cited andCBRE/Hallstrom Team

TABLE A-14

SUMMARY OF COMPARABLE MIXED-INCOME AND MARKET APARTMENT RENTALS

Property Name	Location	Occupancy	No. of Units	Year Built
Kahana Manor	4310 Lower Honoapiilani Rd	100%	105	1981
Leinani Apartments	3750 Lower Honoapiilani Rd	100%	30	1970
Sunset Terrace Apartments	3626 Lower Honoapiilani Rd	97%	288	1987
Coconut Inn	181 Hui Road F	100%	46	1977
Napili Ridge	120 Hui Road	100%	130	1972
Maui Lani Terrace	3740 Lower Honoapiilani Rd	100%	159	1989
Opukea at Lahaina	Limahana Circle	100%	114	2009
Napili Villas	Hanawai St.	100%	184	2002
Lahaina Town Luxury Apartments	134 Wahie Ln	100%	30	1968
Totals		**99%**	**1,086**	

Compiled by CBRE/Hallstrom Team

TABLE A-15

WEST MAUI LIHTC APARTMENT RENTAL PROPERTIES - INCOME RESTRICTED			
Name	Affordable Units	Percent of Median Income Rental Basis	Percent Occupied
Front Street Apartment	142	60%	100%
Honokowai Villa	56	30%/60%	100%
Honokowai Kauhale	184	60%	100%
Komohana	20	60%	100%
Lahaina Surf	112	60%	100%
Weinberg Court Apartments	62	60%	100%
Total	**576**		**100%**

Compiled by CBRE/Hallstrom Team

TABLE A-16

Summary of West Maui Rental Complexes				
Comparable Project	**Unit Type**	**Size**	**Rental Rates $/Mo.**	**$/SF**
Studio Units				
Lahaina Town Luxury Apartments	Studio/1BA	308	1195	3.88
Sunset Terrace	Studio/1BA	444	1570	3.54
One Bedroom Units				
Kahana Manor	1BD/1BA	675	$1,625	$2.41
Leinani Apartments	1BD/1BA	560	$1,600	$2.86
Sunset Terrace Apartments	1BD/1BA	618	$1,825	$2.95
Coconut Inn	1BD/1BA	631	$1,850	$2.93
Napili Ridge	1BD/1BA	564	$1,700	$3.01
Maui Lani Terrace	1BD/1BA	530	$1,900	$3.58
Coconut Inn	1BD/1BA	499	$1,700	$3.41
Two Bedroom Units				
Kahana Manor	2BD/2BA	975	$2,200	$2.26
Opukea at Lahaina	2BD/2BA	1250	$2,900	$2.32
Napili Villas	2BD/2BA	854	$2,400	$2.81
Maui Lani Terrace	2BD/1BA	705	$2,100	$2.98
Leinani Apartments	2BD/2BA	780	$2,350	$3.01
Sunset Terrace Apartments	2BR/2BA	796	$2,395	$3.01
Three Bedroom Units				
Opukea at Lahaina	3BD/2BA	1357	3500	2.58
Napili Villas	3BD/2.5BA	1236	3100	2.51
Napili Villas	3BD/2BA	1165	3000	2.58

Compiled by CBRE/Hallstrom Team

TABLE A-17

PROPOSED MAJOR WEST MAUI RESIDENTIAL PROJECTS BY ENTITLEMENT STATUS Excluding Proposed Pululehua Community	Single Family Lots and Homes	Multi-Family Units	Total Residential Units
Committed (Entitled)			
Kahoma Resident Housing (Under-Construction)	68	0	68
Kahoma Village PD4 (Under-Construction)	101	102	203
Kai A Ulu Affordable Homes (Under-Construction)	33	0	33
Kapalua Mauka Residential	690	0	690
Pailolo Place	0	42	42
Pukuolii Villages	292	648	940
Wailele Ridge (Under-Construction)	0	158	158
Sub-Total	**1,116**	**950**	**2,066**
Percent of Total	54.0%	46.0%	100.0%
Maui Island Plan & Community Plan (Partly Entitled)			
Kaanapali Lower North Honokowai	275	330	605
Lealii HHFDC Community	600	600	1,200
Sub-Total	**875**	**930**	**1,805**
Percent of Total	48.5%	51.5%	100.0%
Maui Island Plan Only			
Kaanapali Lower East Honokowai	225	0	225
Kaanapalai Lower South Honokowai	410	630	1,040
Makila (Includes Polanui Gardens)	200	0	200
Olowalu	1,500	0	1,500
Wainee Residential Community	360	360	720
Sub-Total	**2,695**	**990**	**3,685**
Percent of Total	73.1%	26.9%	100.0%
WEST MAUI TOTAL	**4,686**	**2,870**	**7,556**
Percent of Total	62.0%	38.0%	100.0%

Source: Long Range Planning Division, Department of Planning, County of Maui, "Kapalua North Lahaina" & "South Lahaina Ukumehame" Development Project Maps, May 2016.

TABLE A-18

NEW MAJOR UNDER-CONSTRUCTION MAUI RESIDENTIAL PROJECTS

Project Name	Number of Units			Unit Size in Sq. Ft.		Sales Prices		Comments
	Multi Family	Single Family	Total	Multifamily	Single Family	Multifamily	Single Family	
West Maui								
Kalama Village	102	101	203	1,000 to 1,223	1,043 to 2,194	Starting at $275,000	Up to $750,000	Infrastructure complete, homes under-construction, applications being accepted.
Wailele Ridge	158	0	158	500 to 1,600	N/A	$404,900 to $939,900	N/A	Construction began 4/16 with 20 of 38 units offered reserved.
Central Maui								
Kamanai at Kehalani	24	0	24	1,425 to 1,465	N/A	$475,000 to $506,000	N/A	Phase 4 of 122-unit project, all units reserved, all prior phases sold-out
Parkways at Maui Lani	0	120	120	N/A	1,385 to 2,404	N/A	Starting at mid-$500,000s	Later phases of 2013 project. 65 homes reserved.
Alohilani at Kehalani	0	88	88	N/A	1,502 to 1,736	N/A	$619,000 to $641,000	Construction underway, 66 homes reserved by year-end 2016
South Maui								
Hokulani Golf Villas	0	152	152	N/A	1,800 to 2,500	N/A	$966,000 to $1,295,000	Later phases of 2009 project. 33 homes sold from 2014-2016.
Cove Beach Villas	32	0	32	896 to 948	N/A	$499,900 to $599,900	N/A	17 units reserved or held by developer
Keala O Wailea	70	0	70	1,241 to 1,312	N/A	$888,900 to $1,019,000	N/A	Construction began early 2016. 6 of 17 units offered sold.

Compiled by CBRE/Hallstrom Team

Addendum B

ABSORPTION FORECAST TABLES

TABLE B-1

PROJECTION OF POTENTIAL SUBJECT UNIT ABSORPTION USING THE RESIDUAL METHOD BASED ON TOTAL DEMAND FOR RESIDENTIAL UNITS IN THE WEST MAUI STUDY AREA

Segment	TOTAL UNITS	2017-2020	2021-2025	2026-2030
1. Minimum Demand				
Assumed Supply (80% of entitled and partially entitled market projects)	3,097	260	1,418	1,418
Regional Housing Demand	5,728	1,523	2,072	2,133
Shortage or (Excess) Supply	**2,631**	**1,263**	**654**	**714**
Potential Residual Subject Minimum Demand				
at 95% Capture Rate	2,500	1,200	621	678
at 90% Capture Rate	2,368	1,137	588	643
2. Maximum Demand				
Assumed Supply (100% of entitled and partially entitled market projects)	3,871	260	1,806	1,806
Regional Housing Demand	8,941	2,160	3,083	3,698
Shortage or (Excess) Supply	**5,070**	**1,900**	**1,278**	**1,893**
Potential Residual Subject Maximum Demand				
at 95% Capture Rate	4,817	1,805	1,214	1,798
at 90% Capture Rate	4,563	1,710	1,150	1,703

Indicated Number of Years Required to Absorb 900 Pulelehua Units Using Residual Method

Scenario	Percent of Residual Demand	Number of Years to Achieve Full Absorption
Minimum	34.2%	**8.0**
Maximum	17.8%	**4.5**
Mid-Point	**26.0%**	**6.3**

(shaded) = Absorption Period

Source: Maui County, Developers/Agents, & CBRE/Hallstrom Team

TABLE B-2

SUMMARY OF SUBJECT PROJECTED UNIT ABSORPTION USING THE MARKET SHARES METHOD

Assuming Reservation/Lotteries Begin in 2019, Initial Occupancy 2020

Scenario One: Using Minimum Demand Assumptions

Sales Year Date	Sales Year Period	Total Regional MF Unit Demand	Effective Subject Share	Indicated Total Subject Absorption
2019	1	149	50.00%	74
2020	2	149	55.00%	82
2021	3	149	60.00%	90
2022	4	149	60.00%	90
2023	5	149	60.00%	90
2024	6	149	60.00%	90
2025	7	149	60.00%	90
2026	8	149	60.00%	90
2027	9	149	60.00%	90
2028	10	149	60.00%	90
2029	11	149	18.50%	28
Totals		1,640	54.86%	900
		Indicated Absorption Period	10.3 Years	

Scenario Two: Using Maximum Demand Assumptions

Sales Year Date	Sales Year Period	Total Regional MF Unit Demand	Effective Subject Share	Indicated Total Subject Absorption
2019	1	211	55.00%	116
2020	2	211	60.00%	126
2021	3	222	65.00%	144
2022	4	222	65.00%	144
2023	5	222	65.00%	144
2024	6	222	65.00%	144
2025	7	222	36.50%	81
Totals		1,531	58.80%	900
		Indicated Absorption Period	6.6 Years	

ANALYSIS MID-POINT			
8.5 Years	1,586	56.77%	900

Source: CBRE/Hallstrom Team

Addendum C

ECONOMIC IMPACT TABLES

TABLE C-1

SUMMARY COMPARISON OF MAJOR ECONOMIC IMPACTS AND PUBLIC FISCAL COSTS/BENEFITS

All Amounts Expressed in Constant, Uninflated 2017 Dollars

Model Item	Cumulative During Build-Out Period	Stabilized Annually Thereafter
Direct Capital Investment	$324,166,667	
Local Contractor's Profits	$32,416,667	
Local Supplier's Profits	$12,966,667	
Worker Years of Jobs	3,274	304
Employee Wages	$185,798,050	$11,930,880
Total Resident Population		2,380
New Inmigrating Maui Residents		1,190
Resident Household Income	$334,608,098	$81,748,890
New Maui Resident Household Income	$167,304,049	$40,874,445
Resident Discretionary Expenditures	$167,304,049	$40,874,445
New Maui Resident Discretionary Income	$83,652,025	$20,437,222
Total Operating/Business Activity Gross Receipts	$642,111,000	$74,760,000
Outside Patronage Expenditures	$96,065,625	$6,825,000
Total Maui "Base" Economic Impact	$966,277,667	$74,760,000
INCLUDES ONLY THOSE TAXES WHICH ARE "NEW" TO MAUI		
County of Maui Gross New Tax Receipts	$33,817,504	$6,059,888
State of Hawaii Gross New Tax Receipts	$89,048,090	$9,409,814
County of Maui New Expenditures	$15,223,392	$4,141,414
State of Hawaii New Expenditures	$36,574,328	$9,949,781
County of Maui Net New Profits/(Expenses)	$18,594,112	$1,918,474
State of Hawaii Net New Profits/(Expenses)	$52,473,762	($539,967)

Source: CBRE/Hallstrom Team

TABLE C-2

PROPOSED DEVELOPMENT SCHEDULE AND ESTIMATED CONSTRUCTION COSTS All Amounts Expressed in Constant 2017 Dollars				
	Development Period			
Project Year	2017 to 2020	2021 to 2025	2026	Totals During Build-Out
Infrastructure Emplacement (1)	$15,000,000	$12,500,000	$2,500,000	**$30,000,000**
Commercial Construction (2)	$21,428,571	$8,571,429		**$30,000,000**
Residential Component (3)	$38,583,333	$192,916,667	$32,666,667	**$264,166,667**
TOTAL PERIODIC CONSTRUCTION COSTS	**$75,011,905**	**$213,988,095**	**$35,166,667**	**$324,166,667**
Contractor Profits	$7,501,190	$21,398,810	$3,516,667	**$32,416,667**
Supplier Profits	$3,000,476	$8,559,524	$1,406,667	**$12,966,667**

Note: All development/construction costs of project estimated by developer.

(1) All infrastructure components estimated at $30,000,000 for entire project. Costs allocated to phases based on assumption initial phase will have many of the systems serving the entire project (including waste-water treatment).

(2) Estimated "All-in" development cost of $429 per square foot.

(3) Estimated "All-in" average development cost of $208,333 per apartment unit (includes interior improvements, site work, landscaping and amenities and $975,000 per single family home (2,500 SF X $350/SF + $100,000 in site finish and landscaping work).

Source: CBRE/Hallstrom Team

TABLE C-3

ESTIMATED YEARLY FULL-TIME EQUIVALENT EMPLOYMENT POSITIONS CREATED BY DEVELOPMENT

	Development Period				
Project Year	2017 to 2020	2021 to 2025	2026	Totals During Build-Out	Stabilized Annually
Infrastructure Emplacement (1)	38	31	6	75	
Commercial Construction (2)	86	34		120	
Residential Component (2,3)	193	965	163	1,321	
Total Periodic Construction Jobs	316	1,030	170	1,516	
On-Going Business Employment					
Commercial Worker Years (3)		686	200	886	
Total FTE Jobs in Place at End of Period		200	200		200
Maintenance & Common Element (4)		69	28	97	
Total FTE Jobs in Place at End of Period		20	28		28
Total Periodic On-Going Business Jobs		754	228	982	
Total FTE Jobs in Place at End of Period		220	228		228
Off-Site Employment (5)	105	595	76	776	
Total FTE Jobs in Place at End of Period		73	76		76
TOTAL PERIODIC WORKER YEARS	422	2,379	474	3,274	
TOTAL END-OF-PERIOD PERMANENT JOBCOUNT		293	304		304

(1) Infrastructure construction employment estimated at 1 worker-year for every $400,000 in costs.

(2) Vertical construction (all types) employment estimated at 1 worker year for every $200,000 in costs.

(3) Includes 800 apartment units and 100 single family homes.

(4) Employment estimated at 1 full-time-equivalent worker for every 350 square feet of gross floor area. First stores opening in 2021.

(5) Includes community common element management administration, security, landscaping and maintenance staff of 19 FTE jobs. Plus ratio of one full-time-equivalent outside maintenance/repair worker for every 100 units.

(6) Estimated at one cumulative off-site employment position for every three on site positions.

Source: CBRE/Hallstrom Team

TABLE C-4

ESTIMATED YEARLY EMPLOYEE WAGES CREATED BY DEVELOPMENT

All Amounts Expressed in Constant 2017 Dollars

Project Year	2017 to 2020	2021 to 2025	2026	Totals During Build-Out	Stabilized Annually
Infrastructure Emplacement (1)	$2,964,000	$2,470,000	$494,000	**$5,928,000**	
Residential Construction					
Rental Apartments & Homes (1)	$15,248,133	$76,240,667	$12,909,867	**$104,398,667**	
Total Periodic Construction Wages	**$18,212,133**	**$78,710,667**	**$13,403,867**	**$110,326,667**	
On-Going Business Wages					
Commercial (2)		$22,820,571	$6,656,000	$29,476,571	**$6,656,000**
Maintenance & Common Element (3)		$2,853,760	$1,164,800	$4,018,560	**$1,164,800**
Total Periodic On-Going Business Wages		**$25,674,331**	**$7,820,800**	**$33,495,131**	**$7,820,800**
Off-Site Employment Wages (4)	$5,698,787	$32,167,385	$4,110,080	$41,976,252	**$4,110,080**
TOTAL PERIODIC WAGES	$23,910,921	$136,552,383	$25,334,747	$185,798,050	$11,930,880

(1) Average annual wage for full-time-equivalent construction worker (all trades) at $79,040 ($38/hour X 2,080 hours).

(2) Average annual wage for full-time-equivalent retail & restaurant workers at $33,300 ($16/hour).

(3) Average annual wage for full-time-equivalent maintenance and security workers at $41,600 ($20/hour).

(4) Average annual wage for full-time-equivalent general worker at $54,080 ($26/hour), the average wage for all "Total Private Workers" in the state.

Wages taken from State of Hawaii "Hawaii Workforce Infonet" "Publications and Tables> Production Worker H&E Data Hours and Earnings" for 2016.

Source: CBRE/Hallstrom Team

TABLE C-5

ESTIMATED DE FACTO POPULATION, RESIDENT HOUSEHOLD INCOME AND DISCRETIONARY EXPENDITURES

All Amounts Expressed in Constant 2017 Dollars

	Development Period			
	2017 to 2020	2021 to 2025	2026	Total During Build-Out
Workforce/Affordable Apartment Units				
Number of Periodically Rented	40	200	40	
Cumulative Units Rented	40	240	280	
Percent of Total Units in Project	4%	27%	31%	
Average Household Size	2.55	2.55	2.55	
Total Residents End of Each Period	**102**	**612**	**714**	
Market-Priced Apartment Units				
Number of Periodically Rented	75	375	70	
Cumulative Units Rented	75	450	520	
Percent of Total Units in Project	8%	50%	58%	
Average Household Size	2.55	2.55	2.55	
Total Residents End of Each Period	**191**	**1,148**	**1,326**	
Single Family Homes				
Number of Periodically Built	15	75	10	
Cumulative Homes Built	15	90	100	
Percent of Total Units in Project	2%	10%	11%	
Average Household Size	3.40	3.40	3.40	
Total Residents End of Each Period	**51**	**306**	**340**	
Total Resident Population End of Period	344	2,066	2,380	
Average Number of Residents Each Project Year During Period	344	1,205	2,380	
NEW (INMIGRATING) MAUI RESIDENTS END OF PERIOD	172	1,033	1,190	
Average Number of NEW Residents Each Project Year During Period	172	602	1,190	
RESIDENT HOUSEHOLD INCOME (1)				
Annually (at end of period)	$14,002,930	$81,539,581	$81,748,890	$81,748,890
Periodic	$14,002,930	$238,856,279	$81,748,890	$334,608,098
NEW (INMIGRATING) MAUI RESIDENTS				
Annually (at end of period)	$7,001,465	$40,769,791	$40,874,445	$40,874,445
Periodic	$7,001,465	$119,428,139	$40,874,445	$167,304,049
TOTAL DISCRETIONARY EXPENDITURES (2)				
Annually (at end of period)	$7,001,465	$40,769,791	$40,874,445	$40,874,445
Periodic	$7,001,465	$119,428,139	$40,874,445	$167,304,049
NEW (INMIGRATING) MAUI RESIDENTS				
Annually (at end of period)	$3,500,733	$20,384,895	$20,437,222	$20,437,222
Periodic	$3,500,733	$59,714,070	$20,437,222	$83,652,025

Stabilized Figure =

(1) The median household income for Maui is estimated at $82,600 for 2017. The estimated average household income for the "workforce" rental units is at 86.6% of Maui median (according to workforce housing ordinance formula), or $71,515 per year. For the market rental units the average household income is estimated at 139.9% of the Maui median, or $115,524 per year. The market rental household incomes could stretch higher, but above these levels there are widespread housing alternatives throughout West Maui. The 100 single family homes are estimated to have households income of $165,200, or 200% of the Maui median.

(2) Estimated at 50% of resident household incomes.

Source: CBRE/Hallstrom Team

TABLE C-6

PROJECTED ON-SITE OPERATING ECONOMIC ACTIVITY All Amounts Expressed in Constant 2017 Dollars	2017 to 2020	2021 to 2025	2026	Totals During Build-Out	Stabilized Annually
Commercial Businesses (1)					
Annual Sales Activity at End-of-Period	$18,750,000	$47,250,000	$52,500,000		**$52,500,000**
Total Sales Activity During Period	$18,750,000	$210,262,500	$262,500,000	**$491,512,500**	
In-Project De Facto Population Patronage %	50%	75%	87%		
In-Project Patronage Expenditures					
Annual at End-of-Period	$9,375,000	$35,437,500	$45,675,000		**$45,675,000**
Total During Period	$9,375,000	$157,696,875	$228,375,000	**$395,446,875**	
Outside Project Patronage Expenditures					
Annual at End-of-Period	$9,375,000	$11,812,500	$6,825,000		**$6,825,000**
Total During Period	$9,375,000	$52,565,625	$34,125,000	**$96,065,625**	
Maintenance & Common Element (2)					
Annual Activity at End-Of-Period	$450,000	$1,350,000	$1,800,000		**$1,800,000**
Total Activity During Period	$450,000	$6,007,500	$9,000,000	**$15,457,500**	
Rental Apartment Operations (3)					
Annual Rental Revenues at End-of-Period	$3,232,500	$15,262,500	$20,460,000		**$20,460,000**
Total Revenue Activity During Period	$3,232,500	$41,295,000	$90,613,500	**$135,141,000**	
ANNUAL ACTIVITY AT END-OF-PERIOD	**$22,432,500**	**$63,862,500**	**$74,760,000**		**$74,760,000**
TOTAL DURING PERIOD	**$22,432,500**	**$257,565,000**	**$362,113,500**	**$642,111,000**	

(1) Estimated based on average annual sales of $750 per square foot for 70,000 gross leasable square feet of commercial space..

(2) Estimated at 150% of operational employee wages costs (central element and maintenance).

(3) Based on forecast net rents paid to apartment owners, less maintenance and common element costs.

Source: Hallstrom Team/CBRE

TABLE C-7

SUMMARY OF ECONOMIC IMPACTS ASSOCIATED WITH DEVELIOPMENT

All Amounts Expressed in Constant 2017 Dollars

	2017 to 2020	2021 to 2025	2026	Totals During Build-Out	Stabilized Annually
Construction Activity					
Construction Wages	$18,212,133	$78,710,667	$13,403,867	**$110,326,667**	
Contractor Profits	$7,501,190	$21,398,810	$3,516,667	**$32,416,667**	
Supplier Profits	$3,000,476	$8,559,524	$1,406,667	**$12,966,667**	
Other Construction Costs	$46,298,105	$105,319,095	$16,839,467	**$168,456,667**	
Total Construction Impact	**$75,011,905**	**$213,988,095**	**$35,166,667**	**$324,166,667**	
On-Site Business Activity					
Commercial/Retail Sales	$18,750,000	$210,262,500	$262,500,000	**$491,512,500**	**$52,500,000**
Maintenance & Common Element	$450,000	$6,007,500	$9,000,000	**$15,457,500**	**$1,800,000**
Rental Apartment Operations	$3,232,500	$41,295,000	$90,613,500	**$135,141,000**	**$20,460,000**
Total Business Impact	**$22,432,500**	**$257,565,000**	**$362,113,500**	**$642,111,000**	**$74,760,000**
TOTAL BASE ECONOMIC IMPACT Total During Period	**$97,444,405**	**$471,553,095**	**$397,280,167**	**$966,277,667**	**$74,760,000**

Source: Hallstrom Team/CBRE

TABLE C-8

ESTIMATES OF TOTAL ECONOMIC IMPACT FROM SUBJECT CONSTRUCTION USING INPUT-OUTPUT STUDY "TYPE II" MAUI COUNTY MULTIPLIERS

All Amounts Expressed in Constant 2017 Dollars

	Development, Leasing & Stabilization Period			
Year	2017 to 2020	2021 to 2025	2026	Totals During Build-Out
Construction Costs	$75,011,905	$213,988,095	$35,166,667	$324,168,693
1. Economic Output Multiplier	2.01	2.01	2.01	2.01
Total State Economic Output	$150,773,929	$430,116,071	$70,685,000	$651,579,072
2. Earnings Multiplier	0.68	0.68	0.68	0.68
Total Increase in State Earnings	$51,008,095	$145,511,905	$23,913,333	$220,434,711
3. State Tax Multipliers	0.1024	0.1024	0.1024	0.1024
Total Increase in State Taxes	$7,681,219	$21,912,381	$3,601,067	$33,194,874
4. Total Job Multipliers	9.40	9.40	9.40	9.40
Total State Jobs Created	705.1	2,011.5	330.6	3,047.2
Construction Employment	316	1,030	170	1,516
5. Direct-Effect Job Multipliers	1.61	1.61	1.61	1.61
Total Direct Jobs Created	509.0	1,658.5	273.0	2,440.5
Construction Wages	$18,212,133	$78,710,667	$13,403,867	$110,326,667
6. Direct-Effect Earnings	1.62	1.62	1.62	1.62
Total Increase in Direct Earnings	$29,503,656	$127,511,280	$21,714,264	$178,729,200

Source: 2012 Hawaii Inter-County Input-Output Study (approved August 2016), and CBRE/Hallstrom Team

TABLE C-9

ESTIMATES OF TOTAL ECONOMIC IMPACT FROM SUBJECT OPERATIONS USING INPUT-OUTPUT STUDY "TYPE II" MAUI COUNTY MULTIPLIERS (1)

All Amounts Expressed in Constant 2017 Dollars

	Development, Leasing & Stabilization Period			
Year	2017 to 2020	2021 to 2025	2026	Stabilized Annually
Operating Revenues	$22,432,500	$257,565,000	$362,113,500	$74,760,000
1. Economic Output Multiplier	1.66	1.66	1.66	1.66
Total State Economic Output	$37,125,788	$426,270,075	$599,297,843	$123,727,800
2. Earnings Multiplier	0.44	0.44	0.44	0.44
Total Increase in State Earnings	$9,870,300	$113,328,600	$159,329,940	$32,894,400
3. State Tax Multipliers	0.0503	0.0503	0.0503	0.0503
Total Increase in State Taxes	$1,128,916	$12,961,959	$18,223,362	$3,762,297
4. Total Job Multipliers	10.68	10.68	10.68	10.68
Total State Jobs Created	239.5	2,749.5	3,865.6	798.1
Operating Employment	105	1,349	304	304
5. Direct-Effect Job Multipliers	1.31	1.31	1.31	1.31
Total Direct Jobs Created	138.0	1,767.4	398.2	398.2
Operating Wages	$5,698,787	$57,841,716	$11,930,880	$11,930,880
6. Direct-Effect Earnings	1.62	1.62	1.62	1.62
Total Increase in Direct Earnings	$9,232,035	$93,703,580	$19,328,026	$19,328,026

(1) Multipliers are taken from two categories and weighted based on economic activity relationship, with 75% weighting to "Retail Trade" multipliers and 25% weighting to "Real Estate & Rentals" category.

Source: 2012 Hawaii Inter-County Input-Output Study (approved August 2016), and CBRE/Hallstrom Team

Addendum D

PUBLIC FISCAL ASSESSMENT TABLES

TABLE D-1

PUBLIC COST AND BENEFITS ASSESSMENT ASSOCIATED WITH THE PROPOSED PULELEHUA COMMUNITY

All Amounts Expressed in Constant 2017 Dollars

	Development, Leasing & Stabilization Period				
Development Period	2017 to 2020	2021 to 2025	2026	Totals During Build-Out Period	Stabilized Annually After Build-out
PUBLIC BENEFITS (Revenues)					
1. COUNTY REAL PROPERTY TAXES					
Assessed Value					
Vacant Site	$12,390,300				
Commercial (at Construction Cost plus 20% for land)		$36,000,000	$36,000,000		$36,000,000
Residential Units (at Construction Costs plus 33% for land and profit)	$51,315,833	$307,895,000	$300,025,833		$300,025,833
Total Assessed Value	$12,390,300	$343,895,000	$336,025,833		$336,025,833
Real Property Taxes					
Vacant Site	$68,642				
Commercial		$237,600	$237,600		$237,600
Residential Component	$324,316	$1,945,896	$1,896,163		$1,896,163
Total Annual Property Taxes (End of Period)	$392,958	$2,183,496	$2,133,763		$2,133,763
Total Real Property Taxes During Period	$1,964,792	$5,696,341	$2,133,763	$9,794,896	
INCLUDES ONLY THOSE TAXES WHICH ARE "NEW" TO MAUI AS RESULT OF THE PROJECT					
2. STATE INCOME TAXES					
Taxable Personal Income (Wages Only, and New Resident Household Income)	$30,912,386	$177,322,174	$66,209,191	$274,443,751	$52,805,325
Taxable Corporate Profits	$13,866,542	$68,593,083	$59,240,358	$141,699,983	$11,214,000
Personal Taxes Paid	$1,576,532	$9,043,431	$3,376,669	$13,996,631	$2,693,072
Corporate Taxes Paid	$610,128	$3,018,096	$2,606,576	$6,234,799	$493,416
TOTAL STATE INCOME TAXES	$2,186,660	$12,061,527	$5,983,245	$20,231,431	$3,186,488
3. STATE GROSS EXCISE TAX					
Taxable Transactions					
Construction Contracts	$75,011,905	$213,988,095	$35,166,667	$324,166,667	
Disposable Income Purchases (% of Worker Wages and New Household Income)	$17,847,285	$102,316,325	$35,638,070	$155,801,680	$27,595,750
Total Taxable Transactions	$92,859,190	$316,304,420	$70,804,737	$479,968,347	$27,595,750
TOTAL STATE EXCISE TAX	$3,869,164	$13,179,456	$2,950,221	$19,998,841	$1,149,832
INCLUDES ONLY THOSE REVENUES AND COSTS WHICH ARE "NEW" TO MAUI					
TOTAL GROSS PUBLIC REVENUES					
To County of Maui (Item #1)	$1,964,792	$5,696,341	$2,133,763	$9,794,896	$2,133,763
Adjustment for Other Proportional Taxes (1)	2.84	2.84	2.84	2.84	2.84
Adjusted Maui County Revenues	$5,580,008	$16,177,608	$6,059,888	$27,817,504	$6,059,888
Plus Impact Fees (2)	$6,000,000	$0	$0	$6,000,000	
Total County of Maui Receipts	$11,580,008	$16,177,608	$6,059,888	$33,817,504	$6,059,888
To State (Items #2 & #3)	$6,055,823	$25,240,983	$8,933,466	$40,230,272	$4,336,320
Adjustment for Other Proportional Taxes (3)	2.17	2.17	2.17	2.17	2.17
Adjusted State Revenues	$13,141,137	$54,772,933	$19,385,620	$87,299,690	$9,409,814
Plus Impact Fees (4)	$1,748,400	$0	$0	$1,748,400	
Total State of Hawaii Receipts	$14,889,537	$54,772,933	$19,385,620	$89,048,090	$9,409,814
AGGREGATE TAX REVENUES	$20,469,545	$70,950,541	$25,445,508	$116,865,594	$15,469,701
PUBLIC COSTS (Expenses)					
By County of Maui	$599,026	$10,482,953	$4,141,414	$15,223,392	$4,141,414
By State of Hawaii	$1,439,165	$25,185,382	$9,949,781	$36,574,328	$9,949,781
TOTAL PUBLIC COSTS	$2,038,191	$35,668,335	$14,091,194	$51,797,720	$14,091,194
TOTAL NET PUBLIC BENEFITS					
County of Maui	$10,980,982	$5,694,655	$1,918,474	$18,594,112	$1,918,474
State of Hawaii	$13,450,372	$29,587,550	$9,435,839	$52,473,762	($539,967)
AGGREGATE NET BENEFITS	$24,431,354	$35,282,206	$11,354,314	$71,067,874	$1,378,507

(1) Real property taxes comprise 35.2 percent of General Fund in the County of Maui 2017-18 budget. Economic activity generates other revenue items of 64.8 percent or additional 184 percent above real property taxes, or multiplier of

(2) Includes Traffic Impact Fee of $5,000 per unit.

(3) Gross Excise and Income Taxes comprise 46 percent of collected Executive Branch State revenues; other revenue items 54 percent, or an additional 117% percent above income and gross excise taxes. Or a multiplier of 2.17.

(4) "Construction Cost Component" from negotiated agreement with Department of Education dated June 2006 at $1,457 obligation per multifamily unit. Developers additionally making "Land Component" contribution.

Source: CBRE/Hallstrom Team

TABLE D-2

PUBLIC COST AND BENEFITS ASSESSMENT ASSOCIATED WITH THE PROPOSED PULELEHUA COMMUNITY All Amounts Expressed in Constant 2017 Dollars					
	Development, Leasing & Stabilization Period				
Development Period	2017 to 2020	2021 to 2025	2026	Totals During Build-Out Period	Stabilized Annually After Build-out
PUBLIC BENEFITS (Revenues)					
1. COUNTY REAL PROPERTY TAXES					
Assessed Value					
Vacant Site	$12,390,300				
Commercial (at Construction Cost plus 20% for land)		$36,000,000	$36,000,000		$36,000,000
Residential Units (at Construction Costs plus 33% for land and profit)	$51,315,833	$307,895,000	$300,025,833		$300,025,833
Total Assessed Value	**$12,390,300**	**$343,895,000**	**$336,025,833**		**$336,025,833**
Real Property Taxes					
Vacant Site	$68,642				
Commercial		$237,600	$237,600		$237,600
Residential Component	$324,316	$1,945,896	$1,896,163		$1,896,163
Total Annual Property Taxes (End of Period)	**$392,958**	**$2,183,496**	**$2,133,763**		**$2,133,763**
Total Real Property Taxes During Period	**$1,964,792**	**$5,696,341**	**$2,133,763**	**$9,794,896**	

Source: CBRE/Hallstrom Team

TABLE D-3

PUBLIC COST AND BENEFITS ASSESSMENT ASSOCIATED WITH THE PROPOSED PULELEHUA COMMUNITY

All Amounts Expressed in Constant 2017 Dollars

Development Period	Development, Leasing & Stabilization Period 2017 to 2020	2021 to 2025	2026	Totals During Build-Out Period	Stabilized Annually After Build-out
INCLUDES ONLY THOSE TAXES WHICH ARE "NEW" TO MAUI AS RESULT OF THE PROJECT					
2. STATE INCOME TAXES					
Taxable Personal Income (Wages Only, and New Resident Household Income)	$30,912,386	$177,322,174	$66,209,191	$274,443,751	**$52,805,325**
Taxable Corporate Profits	$13,866,542	$68,593,083	$59,240,358	$141,699,983	**$11,214,000**
Personal Taxes Paid	$1,576,532	$9,043,431	$3,376,669	$13,996,631	**$2,693,072**
Corporate Taxes Paid	$610,128	$3,018,096	$2,606,576	$6,234,799	**$493,416**
TOTAL STATE INCOME TAXES	$2,186,660	$12,061,527	$5,983,245	$20,231,431	$3,186,488
3. STATE GROSS EXCISE TAX					
Taxable Transactions					
Construction Contracts	$75,011,905	$213,988,095	$35,166,667	$324,166,667	
Disposable Income Purchases (% of Worker Wages and New Household Income)	$17,847,285	$102,316,325	$35,638,070	$155,801,680	$27,595,750
Total Taxable Transactions	**$92,859,190**	**$316,304,420**	**$70,804,737**	**$479,968,347**	**$27,595,750**
TOTAL STATE EXCISE TAX	$3,869,164	$13,179,456	$2,950,221	$19,998,841	$1,149,832

Source: CBRE/Hallstrom Team

TABLE D-4

PUBLIC COST AND BENEFITS ASSESSMENT ASSOCIATED WITH THE PROPOSED PULELEHUA COMMUNITY

All Amounts Expressed in Constant 2017 Dollars

	Development, Leasing & Stabilization Period				
Development Period	2017 to 2020	2021 to 2025	2026	Totals During Build-Out Period	Stabilized Annually After Build-out
INCLUDES ONLY THOSE REVENUES AND COSTS WHICH ARE "NEW" TO MAUI					
TOTAL GROSS PUBLIC REVENUES					
To County of Maui (Item #1)	$1,964,792	$5,696,341	$2,133,763	$9,794,896	$2,133,763
Adjustment for Other Proportional Taxes (1)	2.84	2.84	2.84	2.84	2.84
Adjusted Maui County Revenues	$5,580,008	$16,177,608	$6,059,888	$27,817,504	$6,059,888
Plus Impact Fees (2)	$6,000,000	$0	$0	$6,000,000	
Total County of Maui Receipts	$11,580,008	$16,177,608	$6,059,888	$33,817,504	$6,059,888
To State (Items #2 & #3)	$6,055,823	$25,240,983	$8,933,466	$40,230,272	$4,336,320
Adjustment for Other Proportional Taxes (3)	2.17	2.17	2.17	2.17	2.17
Adjusted State Revenues	$13,141,137	$54,772,933	$19,385,620	$87,299,690	$9,409,814
Plus Impact Fees (4)	$1,748,400	$0	$0	$1,748,400	
Total State of Hawaii Receipts	$14,889,537	$54,772,933	$19,385,620	$89,048,090	$9,409,814
AGGREGATE TAX REVENUES	$20,469,545	$70,950,541	$25,445,508	$116,865,594	$15,469,701
PUBLIC COSTS (Expenses)					
By County of Maui	$599,026	$10,482,953	$4,141,414	$15,223,392	$4,141,414
By State of Hawaii	$1,439,165	$25,185,382	$9,949,781	$36,574,328	$9,949,781
TOTAL PUBLIC COSTS	$2,038,191	$35,668,335	$14,091,194	$51,797,720	$14,091,194
TOTAL NET PUBLIC BENEFITS					
County of Maui	$10,980,982	$5,694,655	$1,918,474	$18,594,112	$1,918,474
State of Hawaii	$13,450,372	$29,587,550	$9,435,839	$52,473,762	($539,967)
AGGREGATE NET BENEFITS	$24,431,354	$35,282,206	$11,354,314	$71,067,874	$1,378,507

Source: CBRE/Hallstrom Team

Addendum E

QUALIFICATIONS

PROFESSIONAL QUALIFICATIONS OF THOMAS W. HOLLIDAY, CRE, FRICS

Business Affiliation

Director	The Hallstrom Team | CBRE, Inc. Valuation & Advisory Services Honolulu, Hawaii (2015 – Present)
Senior Analyst/ Supervisor	The Hallstrom Group, Inc. Honolulu, Hawaii (1980 – 2014)
Former Staff Appraiser	Davis-Baker Appraisal Co. Avalon, Santa Catalina Island, California (1977 -1979)

International Designation and Membership

- CRE Designation (2015) - The Counselors of Real Estate
- FRICS Designation (2016)–Fellow of the Royal Institution of Chartered Surveyors

Education/Qualifications

- California State University, Fullerton (Communications/Journalism)
- More than 600 Hawaii Hotel/Hospitality Valuation and Consulting Assignments
- More than 150 Market Studies, Economic Impact Analyses and Public Fiscal Assessments for Proposed Projects and Entitlement Purposes
- Qualified expert witness testimony before State of Hawaii Land Use Commission, County Planning Commissions, County Councils and various state and county boards and agencies since 1983.
- Only certified real estate economist by County of Kauai for workforce housing assessments.
- Numerous SREA, Appraisal Institute and RICS Courses
- Numerous professional seminars and clinics.
- Contributing author to Hawaii Real Estate Investor, Honolulu Star Bulletin, Pacific Business News, Other Publications

On January 1, 1991, the American Institute of Real Estate Appraisers (AIREA) and the Society of Real Estate Appraisers (SREA) consolidated, forming the Appraisal Institute (AI).

Recent Assignments

- Market Study, Economic Impact Analyses and Public Costs/ Benefits (Fiscal Impact) Assessments

Oahu

-- OHA Kakaako Makai (Mixed-Use Project)
-- Howard Hughes/Ward Kewalo Basin (Retail Project)
-- Marriott Waikiki Parking Lot (Hotel/Timeshare Project)
-- Residence Inn Kapolei (Hotel)
-- Turtle Bay Resort (Destination Resort Community)
-- Waikapu Country Town (Mixed-Use Community)
-- Oahu Community Correctional Center Relocation
-- Oahu Tourism Spending/Tax Impact Analysis
-- Waikapu Country Town (Mixed-Use Community)

Maui County
-- Waikapu Country Town (Mixed-Use Community)
-- Lanai City Expansion (Mixed-Use/201H Community)
-- Polanui Garden (201H Residential Community)
-- Molokai Ranch Holdings (Mixed-Use)
-- Makila Rural Subdivision (201H Residential Community)
-- Makila Kai (201H Residential Community)
-- Maui Research & Tech Park (Mixed-Use Community)
-- Maui Lani (Mixed-Use Community)
-- Honuaula (Mixed-Use Community)
-- Makena Beach Resort
-- Maui Business Park, Phase II (Industrial/Commercial)
-- Kapalua Mauka (Master Planned Community)
-- Hailiimaile (Mixed-Use Master Planned Community)
-- Pulelehua (Master Planned Community)
-- Westin Kaanapali Ocean Villas Expansion (Resort/Timeshare)
Big Island
-- Parker Ranch Waimea Town Center (Mixed-Use)
-- West Hawaii/Gold Coast Tourism & Hotel Analysis
-- Puako Farms/Kamakoa (Residential Subdivision)
-- Kau Tea Farm (Agricultural/Mixed-Use Project)
-- Kamakana Villages (Mixed-Use Residential Development)
-- W.H. Shipman Ltd, Master Plan (Various Urban Uses)
-- Nani Kahuku Aina (Mixed-Use Resort Community
-- Kona Kai Ola (Mixed-Use Resort Community)
-- Waikoloa Highlands (Residential)
-- Waikoloa Heights (Mixed-Use Residential Development)
Kauai
-- Princeville Lodge (Hotel)
-- Princeville Phase II (Destination Resort Community)
-- Hanalei Plantation Workforce Housing (Resort)
-- Lima Ola (Residential Community)
-- Coco Palms (Hotel)
-- Sheraton Kauai Workforce Housing (Resort)
-- Coconut Coast Tourism and Hotel Analysis
-- Hanalei Plantation Resort (Resort/Residential)
-- Kukuiula (Resort/Residential)
-- Waipono/Puhi (Mixed-Use Planned Development)
-- Eleele Commercial Expansion (Commercial)
-- Village at Poipu (Resort/Residential)
-- Ocean Bay Plantation (Resort/Residential)

- Major Neighbor Island Valuation Assignments

  -- Mauna Lani Bay Hotel
  -- Courtyard Kahului Airport Hotel
  -- Maui Oceanfront Days Inn
  -- Holiday Inn Express – Kona Hotel (proposed)
  -- Keauhou Beach Hotel
  -- Courtyard King Kamehameha Kona Beach Hotel
  -- Aloha Beach Resort
  -- Coco Palms Resort
  -- Grand Hyatt Kauai
  -- Islander on the Beach
  -- Waimea Plantation Cottages
  -- Coconut Beach Resort
  -- Sheraton Maui Hotel
  -- Outrigger Wailea Resort Hotel
  -- Maui Lu Hotel
  -- Coconut Grove Condominiums
  -- Palauea Bay Holdings
  -- Wailea Ranch
  -- Maui Coast Hotel
  -- Westin Maui Hotel
  -- Maui Marriott Hotel
  -- Waihee Beach
  -- Kapalua Bay Hotel and The Shops at Kapalua

Email Address Tom.Holliday@cbre.com

EXHIBIT P

Letter from T.H. Pritchett (Flora and Fauna; Agricultural Resources)

Flora and Fauna

Part A

The ecosystem on the site today was transformed by human activity dating back to very early cattle grazing, farming, and most recent times Pineapple Cultivation. These past uses have resulted in the sites native ecosystem removal completely. Even the ravines are eroded native ecosystems and continue to be changing.

Part B

What is present today is evolving as farming has stopped for over 10 years and the land has laid fallow. The landscape is evolving as a native Low Land Dry Shrubland and Grassland found elsewhere in this general West Maui area.

Part C

The Flora now has been blown in as seeds and or dropped seeds by passingbirds and is primarily Pili Grasslands and ‘A’ali’i shrublands. The Fauna most likely contains introduced animals such as rats, mongoose, cats, and alien birds. Such as House Finches (Carpodacus mexcanus) and Japanese White-eye (Zosterops japonicus) have largely replaced native animals.

Source: Atlas of Hawaii, Third Edition, 1998

Part D

The Concept Landscape Plan is planned to introduce Hawaiian Endemic Plants, Native Plants, Polynesian introduced plants and other plants used as landscape plant materials to create a creative planting using many diverse types of plants.

Part E

Listed below are the Hawaiian Endemic Plants, Native Indigenous Plants and Polynesian introduced plants we are proposing to use in the Landscape

Hawaiian Endemic Plants

Common name	Botanical name
Lama	Diospyros sandwicensis
Hoawa	Pittosporum hosmeri
Ohia Lehua	Metrosideros polymorha
Koa	Acacia Koa
Loula	Prichardia hillebrandii
Naeo	Myoporum sandwicense
Nupaka Kuahuiwi	Scaevola chamissoniana
Nupaka	Scaevola coriacea
Ha’awa	Pittosporum glabrum
Ape	Alocassia macrrorrhiza
Nehe	Lipochaeta intesrifolia
Hibiscus, Aloalo	Hibiscus brackenridgei , yellow,
Hibiscus, Koki’o	Hibicus koki’o ‘ula , yellow, orange
Hibiscus, Koki’o ula	Hibicus clayi, koki’o ‘ula , red
Na’nu	Gardenia brighami

Native, Indigenous Plants

Common name	Botanical name
‘A’ali’i	Donodnaea viscosa

Milo	Thespesia populnea
Pandauas	Pandanuas tectorius
Iliee	Plumbago zeylanica
Kalo, Taro	Colocasia esculenta
Pauchiiaka	Jacquemontia ovalifolra, sandwicensis
Lavae Fern	Phymatosorus scolopendria
Kupukupu fern	Neprolepis cordifolia
‘Ilima,	Sida fallax
Beach Vitex	Vitex rotundifolia
Pili Grass	Heteropgon contrtus

Polynesian Introduced Plants
Common name Botanical name
Ti Cordyline fruiticosa

Part F
Listed below are the Quality Locally Available Landscape Plants we are proposing to use in the Landscape in addition to the list of plants above

Trees

Common name	Botanical name
Alibangbang	Bauhinia hookeri
Red Bottlebrush	Callistemon citrinus
Tree Fushia	Schotia brachypetala
Yellow Bauhinia	Bauhina tomentosa
Australian Flame	Brachychiton acerifoliuos
Golden Shower	Cassia fistula
Hong Kong Orchid	Bauhinia blakeana
Rainbow Shower	Cassia nealiae
Yellow Trumpet	Tabebuia ochracea
Singapore Plumeria	Plumeria Obtusa
Dwarf Poinciana	Caesalpina pulcherrima
Jatropha	Jatropha intergerrima
Royal Poinciana	Delonix regia
Monkey Pod	Samanea Saman
Coral Shower	Cassia Grandis
Pink Tecoma	Tabebuia heterophylla
Df. White Tecoma	Tabebuia bahamensis
Plumeria	Plumeria obtuse
Norfolk island pine	Araucaria heterophylla
Yellow Poinciana	Peltophorum pterocarpum

Palms

Common name	Botanical name

Pigmy Date Palm	Phoenix Roebelinii
Manila Palm	Vetchia merrilli
Foxtail Palm	Wodyetia bifurcata
Queen Palm	Syagrus romanzoffiana
Jonais Palm	Vetchia Joannis
Royal Palm	Roystonea regis

Shrubs

Common name	Botanical name
Bouganvillea	Bouganvillea, Red, White, Purple
Red Ginger	Alipina Purpurata
Eldorado	Pseuderanthemum carruthersii
Natal Plum	Carissa macrocarpa
Cape Plumbago	Plumbago auriculate
Df. Bird of Paradise	Strelizia reginae
Oleander, red	Nerium oleander, red
Mock Orange	Philadelphus coronaries

Ground Covers and Vines

Common name	Botanical name
Hottentot Fig	Carpobrotos edulis
Blue Daze	Evolvulus glomertus grandifloras
Late Yellow Daylily	Hemerocallis thumbergii
Pink Honeysuckle	Lonicerus x heckrotii
Purple Lantana	Lantana Montevidensis trailing
Mondo Grass	Ophiopogon japonicum
Hawaiian Moon	Impomea horsfalline
Evergreen Clematis	Clematis armandii
Rocket Trumpet	Diplandenia mandevilla, red
Fig Ivy	Ficus Pumila

Grasses

Common name	Botanical name
Zoyzia, El Toro	Zoyzia japonica
Vetiver Grass	Chrysopogon zizanoiides

EXHIBIT Q-1

Annual Report

Maui Oceanview LP
16610 Dallas Parkway Suite 1600
Dallas, TX 75248

Mr. Daniel E. Orodenker, Executive Officer
Land Use Commission
Department of Business, Economic Development & Tourism
State of Hawaii
PO Box 2359
Honolulu, HI 96804-2359

Mr. Leo R. Asuncion, Jr., AICP, Director
Office of Planning
Department of Business, Economic Development & Tourism
State of Hawaii
PO Box 2359
Honolulu, HI 96804-2359

Ms. Michele McLean, Director
Department of Planning County of Maui
One Main Plaza #315
2200 Main Street
Wailuku, HI 96793-2155

February 19, 2019

Re: **2018 Annual Report for LUC Docket No. A04-751**
Petition of Maui Oceanview LP, Mahinahina and Kahana, Lahaina, Maui, Hawaii
TMKs (2) 4-3-001-082 & 083 [previously (2) 4-3-01: por. 31]

Dear Messrs. Orodenker, Asuncion, and Ms. McLean:

Pursuant to Condition No. 29 in the Decision and Order for the above referenced docket, Maui Oceanview LP, is pleased to provide this report to the Land Use Commission, the Office of State Planning, and the County of Maui Planning Department concerning the current status of compliance with the conditions of approval.

General Project Progress:
The Land Use Commission of the State of Hawaii ("LUC" or “the Commission”) approved Maui Land and Pineapple’s (“MLP’s”) petition to reclassify approximately 310 acres of land at Mahinahina and Kahana, Lahaina, Maui, Hawaii from Agricultural to Urban for the Pulelehua project on June 22, 2006. The Decision and Order (“D&O”) sets forth thirty-two (32) conditions of approval regarding the reclassification.

Since the LUC’s approval, the previous owner, MLP received several major discretionary governmental approvals for the Pulelehua project. On November 18, 2011, County of Maui Mayor Alan M. Arakawa approved:

- Bill No. 62 (2011), designated as Ordinance No. 3887, which amended the West Maui Community Plan Land Use Map from Agriculture, Park, and Open Space to West Maui Project District 5 (Pulelehua) for TMKs (2) 4-3-001-082 & 083 (previously (2) 4-3-01: por. 31);

- Bill No. 63 (2011), designated as Ordinance No. 3888, which amended Title 19, Maui County Code, by adding a new chapter designated as Chapter 19.93, West Maui Project District 5 (Pulelehua); and

- Bill No. 64 (2011), designated as Ordinance No. 3889, which granted a change in zoning from the County Agricultural District to West Maui Project District 5 (Pulelehua) (Conditional Zoning) for TMKs (2) 4-3-001-082 & 083 (previously (2) 4-3-01: por. 31).

On November 22, 2017, Maui Oceanview LP filed with the Commission a motion to amend the D&O. On August 28, 2018 submitted additional filings to the Commission in support of the motion to amend. Maui Oceanview LP expects to submit supplemental filings to the Commission in January 2019. By stipulations, Maui Oceanview LP, the State of Hawaii Office of Planning ("OP") and the County of Maui Department of Planning ("Maui Planning") agreed to additional time for OP and Maui Planning to file responses to the motion to amend, which time has not expired. A hearing before the Commission on Maui Oceanview LP's motion has not been scheduled.

<u>Conditions and Compliance:</u>

1. *Affordable Housing. Petitioner shall do the following to provide affordable housing opportunities for low, low-moderate, and gap group income residents of the State of Hawaii in accordance with the affordable housing policies and guidelines of the County of Maui and its representations in this docket:*
    a. *Petitioner shall develop and offer for rent not less than 125 affordable housing units to qualified families or individuals to satisfy a condition imposed by the Commission in its approval of Petitioner's Kapalua Mauka development in LUC Docket No. AOJ-741.*
    b. *In addition, Petitioner shall develop and offer for sale not less than 325 affordable housing units to low, low-moderate, and moderate income residents of Maui as a feature of Pulelehua.*
    c. *To ensure continued owner occupancy, rental, and resale to qualified low and moderate income residents and maintain the affordable housing inventory within Pulelehua, Petitioner shall prior to the rental or sale of any affordable housing unit establish County-approved restrictions governing the rental, sale, or transfer of all affordable housing units.*
    d. *Subject to applicable laws, Petitioner shall establish at a minimum, qualifications for rental or purchase which specify that a renter or buyer must: be currently employed in Maui; attain a minimum age of 18 years; demonstrate evidence of sufficient income; agree to physically reside in the affordable housing unit; and not already own a housing unit or other real property.*

Compliance: Maui Oceanview LP entered into a Residential Workforce Housing Agreement with the County of Maui.

Additionally, the County of Maui had requested that Maui Oceanview LP receive confirmation from the LUC that its revised plans is a conforming site plan. Maui Oceanview LP filed the pending motion to amend the D&O to comply with the County of Maui's request.

2. *Public School Facilities. Petitioner shall contribute to the development, funding, and/or construction of public school facilities, on a fair-share basis, pursuant to an Education Contribution Agreement for Pulelehua executed between Petitioner and the DOE. The Education Contribution Agreement shall provide for the dedication of land and/or other consideration to be applied to the construction of a public elementary school in Pulelehua. Petitioner shall file the Education Contribution Agreement and any subsequent amendments with the Commission after it has been executed by Petitioner and the DOE. Petitioner shall also submit copies of all executed Education Contribution Agreements to the County of Maui prior to the Council approving an ordinance amending the West Maui Community Plan Land Use Map designation for Pulelehua.*

Petitioner shall pursue alternatives with the DOE to expedite the design and construction of the public elementary school in Pulelehua. Such alternatives may include a design- build agreement whereby Petitioner would agree to design and build public school facilities for a sum to be paid by the DOE.

Compliance: The Education Contribution Agreement was executed on June 16, 2006 by the Petitioner's predecessor, Maui Land and Pineapple (MLP). A copy of the agreement was submitted to the Land Use Commission and County Planning Department which was included as an exhibit to the Community Plan Amendment, County Change in Zoning, and Project District applications. MLP had numerous meetings with the Department of Education ("DOE") to finalize the 13-acre school site. DOE conducted design charrettes in West Maui and completed its master plan in December 2015. Maui Oceanview,LP has met with DOE officials, made them aware of the transfer of ownership and progress in moving forward on developing the Pulelehua project. DOE officials informed Maui Oceanview LP that they had preliminary architectural plans for the development. DOE officials explained that their budget does not include funding for the development of the School and they will inform Maui Oceanview LP when they are ready to move forward with a new campus.

3. *Wastewater Facilities. Discussions are underway with the Maui County Wastewater Reclamation Department for Phase 1 temporary needs. At the same time, Maui Oceanview LP has been in full development planning for a wastewater treatment facility on site that will serve Pulelehua. It is the intention of Pulelehua to have a zero discharge wastewater treatment facility at completion such that all treated R-1 water will be reused for internal landscaping purposes.*

Compliance: Maui Oceanview LP had been working with the County of Maui Department of Environmental Management, Wastewater Reclamation Division on connection to the Lahaina Waste Water Reclamation Facility ("LWWRF"). However, instead of connecting to the LWWRF, Maui Oceanview LP will go forward with developing a wastewater treatment facility on site to serve Pulelehua.

4. *Akahele Street. Petitioner is under discussions and shall be entering into an agreement with the DOT, Airports Division, under terms and conditions acceptable to the DOT, for access to and use of Akahele Street. Petitioner acknowledges, understands, and agrees that Petitioner's obligation and responsibilities in an agreement can extend to, but not be limited to, design and construction of the roadway improvements and intersections, compliance with the Kapalua-West Maui Airport security programs, and upkeep and maintenance of Akahele Street.*

Compliance: MLP submitted a revised Traffic Impact Analysis Report (TIAR) dated May 4, 2009 to DOT. DOT provided a letter of acceptance for the TIAR dated September 9, 2010 which details conditions for a Memorandum of Understanding that will reflect the obligations of and requirements on MLP covering both DOT highway (including Akahele Street) and airport facilities. Maui Oceanview LP has submitted a revised TIAR to DOT and has been in continuing discussions regarding updated conditions for the Memorandum of Understanding.

5. *Transportation Improvements. Petitioner shall submit a revised TIAR for Pulelehua to the DOT for their review and approval no later than the completion date of the final development and internal circulation plan for Pulelehua. Petitioner shall implement traffic mitigation measures and roadway intersection improvements, including signalization and pedestrian facilities, for access to and use of Honoapi'ilani Highway, as determined by and to the satisfaction of the DOT, including those improvements and mitigation measures as recommended or required by the TIAR approved by the DOT. Petitioner shall obtain the DOT's prior written approval of Petitioner's TIAR and Petitioner may not proceed with the development of Petitioner's project until the DOT approves the TIAR.*

Compliance: An updated TIAR has been completed and revised and will be reviewed by the County and the DOT as well as submitted to the LUC as part of its request for amendment stated above.

6. Roadway Connectivity and Regional Circulation. Petitioner shall plan and prepare for lateral (in general parallel to the coastline and fronting the highway) roadway connections from the Petition Area to adjoining lands in cooperation with the respective neighboring landowner(s) to provide potential alternate roadway routes to improve transportation capabilities in the area. Petitioner shall facilitate and promote the need for a Regional Traffic Circulation Plan from the County government to assist Petitioner and the DOT in determining roadway connections from the Petition Area to other adjoining lands and to existing roads and highways.

Compliance: Maui Oceanview LP is integrating lateral roadway connections into the design of the project.

7. *Traffic Fair-Share Contribution. Petitioner and the County of Maui shall enter into an agreement which establishes a Traffic Fair-Share or Voluntary Contribution to be paid by Petitioner to mitigate the traffic-related impact generated by the development of Pulelehua. A copy of the executed agreement shall be filed with the Commission prior to the occupancy of any unit within Pulelehua. The agreement shall provide that Petitioner shall in the order specified below:*
   a. pay the fee calculated pursuant to chapter 14.62, Maui County Code ("MCC"), Impact Fees for Traffic and Roadway Improvements in West Maui, Hawai 'i; however, if there is a written agreement between the County of Maui and the State of Hawai'i specified by section 14.62.080 MCC, the County shall share the funds collected from Petitioner with the State in accordance with this written agreement; or
   b. make a voluntary contribution to the County of Maui in an amount equivalent to the above referenced fee upon issuance of a building permit for each dwelling; or
   c. pay the above referenced fee to the State pursuant to the enactment of State legislation authorizing such payment.

   The above referenced fee or voluntary contribution will be applied towards the funding, design, and construction of local and regional transportation improvements and programs necessitated *by the proposed development of the Petition Area, but in any event neither the traffic fair-share nor the voluntary contribution will exceed the greater of*

(a) $3,500 per market priced and gap group priced single-family unit or lot developed on the Petition Area, or

(b) the traffic impact fee established for a market priced and gap group priced single-family and multi-family unit pursuant to Maui County Code chapter 14.62 at the time a building permit is issued.

Compliance: No specific action taken to date.

8. Civil Defense. Petitioner shall, on a fair-share basis, fund and construct adequate solar-powered civil defense measures serving the Petition Area as determined by the State of Hawai 'i Department of Defense, Office of Civil Defense, and the County of Maui Civil Defense Agency.

Compliance: Maui Oceanview LP has been in contact with Maui Emergency Management Agency ("Maui-EMA") officials and provided Maui-EMA with current plans for the Pulelehua project.

9. Archaeological Inventory Survey and Historic Preservation Mitigation Plan. Petitioner shall comply with the conditions recommended by the DLNR, SHPD, on March 3, 2005, regarding revisions to Petitioner's archaeological inventory survey and approval of an acceptable monitoring plan in the general vicinity of historic sites on the Petition Area prior to commencement of any ground altering activities.

Compliance: A plan will be developed at the time of Development to the above.

10. Previously Unidentified Burial/Archaeological/Historic Sites. Without any limitation to any other condition found herein, if any burials or archaeological or historic sites, such as artifacts, marine shell concentrations, charcoal deposits, stone platforms, pavings, and walls not previously identified in studies referred to herein, are discovered during the course of construction of the Project, then all construction activity in the vicinity of the discovery shall stop until the issuance of an archaeological clearance from the DLNR, SHPD, that mitigative measures have been implemented to its satisfaction.

Compliance: No specific action taken to date.

11. Air Quality Monitoring. Petitioner shall participate in an air quality-monitoring program if required by the DOH.

Compliance: No specific action taken to date.

12. Notification of Noise. Petitioner shall notify and disclose to all prospective buyers and/or lessees of the Petition Area, in accordance with State law, the potential adverse impacts of aircraft and airport activity from the adjacent Kapalua-West Maui Airport, such as but not limited to noise, right of flight, emissions, vibrations, and other incidences of aircraft operations. Petitioner shall implement procedures and provide covenants in any grant or transfer of interest *in the Petition Area, or portion thereof, whereby buyers and lessees and other future owners, lessees, or occupants will release the State of Hawai'i from and against all claims, liability, and losses resulting from aircraft and ailport operations, provided that the State of Hawai 'i shall not be released from its negligence.*

Compliance: Maui Oceanview LP will notify all prospective buyers and lessees of potential adverse aviation impacts once sales and rentals commence.

13. *Airport Infrastructure. Petitioner shall provide and be responsible at its costs for any relocation, change, repair, or alteration to existing airport utility, service, and related infrastructure lines and equipment affected by Petitioner's Project, located in or surrounded by the Petition Area, to the satisfaction of the DOT.*

Compliance: MLP submitted a revised TIAR dated May 4, 2009 to DOT. DOT provided a letter of acceptance for the TIAR dated September 9, 2010 which details conditions for a Memorandum of Understanding that will reflect the obligations of and requirements on MLP covering both DOT highway and airport facilities. Maui Oceanview LP has submitted a revised TIAR to DOT and has been in continuing discussions regarding conditions for the Memorandum of Understanding. A draft Memorandum of Understanding will be prepared and will be finalized by Maui Oceanview LP once additional infrastructure design for the highway connection is completed.

14. *Sound Attenuation. Petitioner shall employ the following noise mitigation measures: Petitioner shall follow the Maximum Operation Scenario in its noise study and place residential units and similar noise sensitive uses outside the 60 DNL (toward lesser DNL) noise contour. Residential units and similar noise sensitive uses located in between the 55 to 60 DNL noise contours should be properly designed and constructed to meet, at a minimum, Federal EPA residential interior noise standards. Industrial commercial- business type uses, if located in the 60-65 or higher noise contours, containing noise sensitive uses (e.g., rest area, offices, etc.) should have the noise sensitive area properly designed and constructed to meet, at a minimum, applicable Federal EPA interior noise standards.*

Compliance: Development plans prepared for Pulelehua by Maui Oceanview LP shall conform to the above requirements.

15. *Runway Safety, Protection, and Use. Petitioner acknowledges that portions of the Petition Area lay within, or are subject to, the airport runway safety protection areas (the RPZ, the RSA, and the ROFA) required by the FAA at the Kapalua-West Maui Airport. Petitioner agrees to comply with FAA requirements and cooperate with the DOT for the documentation and recordation of the safety and protection areas. Petitioner agrees to provide the DOT access in order that the DOT may undertake mitigation measures (grading, lengthening, alteration, or improvement) to bring safety and protection areas up to FAA standards. Petitioner will sell an aviation easement on the affected lands in favor of the State of Hawai'i.*

Compliance: MLP submitted a revised TIAR dated May 4, 2009 to DOT. DOT provided a letter of acceptance for the TIAR dated September 9, 2010 which details conditions for a Memorandum of Understanding that will reflect the obligations of and requirements on MLP covering both DOT highway and airport facilities. Obligations of and requirements on MLP include compliance with all FAA, DOT and TSA requirements for runway and airport safety as well as agreement to give and grant an aviation easement in favor of the State of Hawaii. Maui Oceanview LP has submitted a revised TIAR to DOT and has been in continuing discussions regarding conditions for the Memorandum of Understanding. A draft Memorandum of Understanding will be prepared and will be finalized by Maui Oceanview LP once additional infrastructure design for the highway connection is completed.

16. Hazards to Aircraft Operations. Petitioner shall take appropriate measures to fund and implement a program to control any bird nesting or gathering and any insect, pest or wildlife infestation, especially in any drainage retention basins serving the Petition Area and in any portion of the Petition Area in the RSA, RPZ, and ROFA, or abutting the Kapalua-West Maui Airport to minimize the hazards to aircraft operations, as deemed necessary by the DOT, Airports Division.

Compliance: No vertical development is designed to take place within the flight path or ends of the runway within Pulelehua that may pose as a hazard to aircraft operations. Presentations will be made to the DOT for their approval before Development begins.

17. Drainage. Petitioner shall fund the design and construction of drainage system improvements to prevent runoff resulting from the development of the Petition Area from adversely affecting State airport and highway facilities to the satisfaction of appropriate State and County agencies, based on one hour runoff from a 50-year storm.

Compliance: Maui Oceanview LP will integrate drainage system improvements into the design of the project.

18. Notification of Potential Nuisances. Petitioner shall disclose to all prospective buyers and/or lessees of the Petition Area that potential odor, noise, and dust pollution may result from agricultural uses on adjacent lands.

Compliance: Maui Oceanview LP will notify all prospective buyers and lessees of potential odor, noise, and dust pollution once sales and rentals commence.

19. Provisions of the Hawaii Right to Farm Act. Petitioner shall notify all prospective buyers and/or lessees of the Petition Area that the Hawai 'i Right to Farm Act, chapter 165, HRS, limits the circumstances under which pre-existing farm activities may be deemed a nuisance if there are any lands in the Agricultural District adjacent to the Petition Area.

Compliance: Maui Oceanview LP will notify all prospective buyers and lessees of the Hawaii Right to Farm act once rentals and sales commence.

20. Integrated Solid Waste Management Plan. Petitioner shall cooperate with the DOH and the DPWEM to conform to the program goals and objectives of chapter 342G, HRS and the County of Maui's approved integrated solid waste management plan in accordance with a schedule and timeframe satisfactory to the DOH. Petitioner shall, in coordination with appropriate State and County government agencies, assist in the planning and promotion of solid waste recycling *facilities, including recycling bins in public places, such as schools and parks, if any, within the proposed development.*

Compliance: Maui Oceanview LP will comply with the above.

21. Water Resources Allocation. Petitioner shall provide adequate potable and non-potable water source, storage, and transmission facilities and improvements to the satisfaction of the DWS to accommodate the proposed development on the Petition Area.

Compliance: Maui Oceanview LP was in discussions with the Maui Department of Water Supply ("DWS") regarding possible temporary water resource allocation and connection the DWS facilities. Maui Oceanview LP will be constructing a potable water treatment plant and a non-potable transmission system to serve the Pulelehua project without an allocation from DWS. Maui Oceanview LP has provided DWS with copies of its draft plans.

22. Established Access Rights Protected. Petitioner shall preserve any established access rights of native Hawaiians who have customarily and traditionally used the Petition Area for access to other areas to exercise subsistence, cultural, and religious practices.

Compliance: No specific action taken to date but Maui Oceanview LP acknowledges community concerns raised regarding access to lands mauka of Pulelehua that are not owned by Maui Oceanview LP.

23. Best Management Practices. Petitioner shall implement applicable best management practices applicable to each proposed land use to reduce or eliminate soil erosion and groundwater pollution, and effect dust control measures during and after the development process in accordance with the DOH guidelines.

Compliance: No specific action taken to date.

24. Soil Analysis. Petitioner shall conduct a soil analysis study of the Petition Area to determine the impact of the Project from fertilizer and pesticide residue that may be present on the Petition Area and undertake measures to abate and remove any hazardous materials identified.

Compliance: Prior soil studies performed on the property indicated no significant amounts of hazardous materials on site.

25. Water Conservation Measures. Petitioner shall implement water conservation measures and best management practices, such as use of indigenous and drought tolerant plants and turf, and incorporate such measures into common area landscape planting.

Compliance: The potable water system planned for Pulelehua will incorporate R1 water reuse for landscaping purposes. Landscape planting will include the use of indigenous and drought tolerant plants.

26. *Energy Conservation Measures. Petitioner shall implement energy conservation measures such as use of solar energy and solar heating and incorporate such measures into the Project.*

Compliance: Pulelehua will review in depth all renewable energy options available to it for economic practicality.

27. *Compliance with Representations to the Commission. Petitioner shall develop the Petition Area in substantial compliance with the representations made to the Commission. Failure to so develop the Petition Area may result in reversion of the Petition Area to its former classification, or change to a more appropriate classification.*

Compliance: All applications and developmental submittals to date have been in substantial compliance with the representations made during the reclassification process. Maui Oceanview LP has filed the pending motion to amend the D&O to reflect its proposal for the Pulelehua project.

28. *Notice of Change of Ownership Interests. Petitioner shall give notice to the Commission of any intent to sell, lease, assign, place in trust, or otherwise voluntarily alter the ownership interests in the Petition Area, prior to development of the Petition Area.*

Compliance: MLP sold ownership of the Petition Area to Maui Oceanview LP on June 3, 2016 and a notice was provided to the Land Use Commission.

29. *Annual Reports. Petitioner shall provide timely and without any prior notice, annual reports to the Commission, the OP, and the Planning Department in connection with the status of the development proposed for the Petition Area, and Petitioner's progress in complying with the conditions imposed herein. The annual report shall be submitted in a form prescribed by the Executive Officer of the Commission.*

Compliance: This letter represents the 2018 annual report submitted in compliance with this condition. MLP provided annual reports in compliance with this condition from 2007 through 2016. ;Maui Oceanview LP submitted an annual report for 2017 (filed June 16, 2017).

30. *Release of Conditions Imposed by the Commission. The Commission may fully or partially release the conditions provided herein as to all or any portion of the Petition Area upon timely motion and upon the provision of adequate assurance of satisfaction of these conditions by Petitioner.*

Compliance: Maui Oceanview LP has a pending motion to amend certain portions of the D&O. When requesting the release of a condition, Maui Oceanview LP will file the appropriate motions upon formal acknowledgement from the appropriate agencies on the satisfaction of these conditions.

31. *Statement of Imposition of Conditions. Within seven days of the issuance of the Commission's Decision and Order for the subject reclassification, Petitioner shall: (a) record with the Bureau of Conveyances a statement that the Petition Area is subject to conditions*

imposed herein by the Commission in the reclassification of the Petition Area,· and (b) shall file a copy of such recorded statement with the Commission.

Compliance: MLP has recorded the Statement of Impositions of Conditions by Land Use Commission dated July 17, 2006, with the Bureau of Conveyances as Document 2006-129979. Maui Oceanview LP is the successor in interest of MLP.

32. Recordation of Conditions. Petitioner shall record the conditions imposed by the Commission with the Bureau of Conveyances pursuant to section 15-15-92, HAR.

Compliance: MLP has recorded the Amended and Restated Declaration of Conditions with the Bureau of Conveyances on September 29, 2006 as Document No 2006-178683. Maui Oceanview LP is the successor in interest of MLP.

Should you have any questions or requests for additional information, please feel free to contact me at 214.415.8868(phone #) or paul@usaiinvestments.com(email). Your acceptance of this annual report is appreciated.

Sincerely,

MAUI OCEANVIEW LP
By MAUI OCEANVIEW GP, INC.
Its General Partner

Paul Cheng

By PAUL CHENG
Its President

EXHIBIT R-1

Proposed Amended Decision and Order (in ramseyer format)

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAII

In the Matter of The Petition Of MAUI LAND & PINEAPPLE COMPANY, INC., a Hawaii corporation To Amend The Agricultural Land Use District Boundary Into The Urban Land Use District for Approximately 310.440 Acres of Land at Mahinahina and Kahana, Lahaina, Maui, Hawaii, Tax Map Key: 4-3-01: Por. 31 And 79.	DOCKET NO. A04-751 PROPOSED AMENDED FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER

PROPOSED AMENDED

FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER

MAUI LAND & PINEAPPLE COMPANY, INC., a Hawai'i corporation ("Petitioner")[1], filed a Petition For Land Use District Boundary Amendment ("Petition") on June 28, 2004, and an Amended Petition For Land Use District Boundary Amendment ("Amended Petition") on July 27, 2005, pursuant to chapter 205, Hawai'i Revised Statutes ("HRS"), and chapter 15-15, Hawai'i Administrative Rules ("HAR"), to amend the State Land Use District boundary to reclassify approximately 310.440 acres of land at Mahinahina and Kahana, Lahaina, Maui, Hawai'i, identified as Tax Map Key ("TMK"): 4-3-01: por. 31[2] and 79 ("Petition Area"), from the State Land Use Agricultural District to the State Land Use Urban ~~xx~~ District for the master-planned Pulelehua residential community ("Pulelehua" or "Project").

The State of Hawai'i Land Use Commission ("Commission" or "LUC"), having heard

[1] At the time of its original Petition, **Petitioner's address and principal place of business is 120 Kane Street, Kahului, Hawai'i, 96732.**

[2] The property has since been assigned TMK 4-3-01: 082, :083.

and examined the testimony, evidence, and arguments of counsel presented during the hearings; the Stipulated Findings Of Fact, Conclusions Of Law, And Decision And Order ("Stipulated D&O") entered into by Petitioner and the County of Maui Planning Department ("Planning Department"); the Exceptions To The Stipulated D&O ("Exceptions") filed by the State of Hawai'i Office of Planning ("OP"); the Comments On The Stipulated D&O And Exceptions filed by Petitioner; and the Supplement To The Stipulated D&O To Support OP's Condition Nos. 4, 10, 11 And 13 filed by the OP, adopted findings of fact, conclusions of law and decision and order on June 30, 2006 ("2006 D&O").

By Limited Warranty Deeds With Reservations and Covenants, dated June 3. 2016,[3] Maui Oceanview LP purchased the portions of the project area owned by Petitioner. On November 22, 2017, Maui Oceanview LP filed a motion to amend the 2006 D&O. Maui Oceanview LP submitted additional information in support of its motion on August 24, 2018 and again on ____________________________. The Commission, having heard and examined the testimony, evidence, and arguments of counsel presented during the hearings; the Proposed Amended Findings of Fact, Conclusions of Law, and Decision and Order "(Amended D&O") submitted by Maui Oceanview LP; any Exceptions to the Amended D&O filed by the Planning Department and OP; any Comments on the Amended D&O filed by Maui Oceanview LP; hereby makes the following amended findings of fact, conclusions of law, and decision and order:

FINDINGS OF FACT

PROCEDURAL MATTERS

1. On June 28, 2004, Petitioner filed the Petition. The Petition included an

[3] Limited Warranty Deed with Reservations and Covenants from Maui Land and Pineapple Company, Inc., recorded in the Bureau of Conveyances of the State of Hawai'i on June 3, 2016 as Document No. A-59980843 (for TMK 4-3-01-82); and Limited Warranty Deed with Reservations and Covenants from Maui Land and Pineapple Company, Inc., recorded in the Bureau of Conveyances of the State of Hawai'i on June 3, 2016 as Document No. A-59980844 (for TMK 4-3-01-83)

Environmental Impact Statement Preparation Notice pursuant to sections 343-5(a)(l) and 343-5(a)(6), HRS, and sections 11-200-6(b)(l)(A), 11-200- 6(b)(2)(A), and 11-200-6(b)(2)(B), HAR. On July 27, 2005, Petitioner filed the Amended Petition[4] (hereinafter collectively referred to as "Petition").

2. On July 8, 2004, and by a written Order dated September 1, 2004, the Commission (i) agreed to be the accepting authority pursuant to chapter 343, HRS; and (ii) determined that the proposed action may have a significant effect on the environment to warrant the preparation of an Environmental Impact Statement ("EIS").

3. On July 12, 2004, Majesty Akahi Nui, Trustee, Kingdom of Hawaii Nation Ministry Trust, filed a Motion For Intervention.

4. On July 22, 2004, the Commission took a field trip to the Petition Area.

5. On July 13, 2005, and by a written Order dated August 18, 2005, the Commission accepted the Final EIS.

6. On July 29, 2005, Petitioner filed an Errata To Amended Petition For Land Use District Boundary Amendment.

7. By letter dated August 18, 2005, the Executive Officer of the Commission deemed the Petition a proper filing and accepted it for processing as of July 29, 2005.

8. On August 26, 2005, and by a written Order dated September 15, 2005, the Commission denied the Motion For Intervention.

9. On October 12, 2005, the Commission held a pre-hearing conference on the Petition in Honolulu, Hawai'i, which was attended by all parties. At this time, the OP and the Planning Department filed their respective Statements Of Position conditionally supporting the Petition. A PreHearing Order was issued on October 20, 2005.

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[4] The Amended Petition, among other things, revised the acreage of the Petition Area from approximately 312 acres to approximately 310.440 acres.

10. On November 17 and 18, 2005, the Commission opened the hearing on the Petition at the Sheraton Maui Ka'anapali Beach Resort in Lahaina, Maui; pursuant to a public notice published on September 21, 2005, in the Honolulu Star-Bulletin, the Maui News, the Hawaii Tribune-Herald, West Hawaii Today, and The Garden Island.

11. On November 17, 2005, the following individuals testified as public witnesses and/or provided written testimony: William Kennison, Nell Woods, Terry Eoff, Lehua Kalua, Chloe Okada, Sharyn Matin, Dick Mayer, Lucienne DeNaie, Vicki McCarty, Don Gerbig, Dennis Harmon, June N. Higa, Greg Hansen, and Giovanni Rosati. On November 18, 2005, the Commission adjourned the hearing until its next meeting on Maui on December 2, 2005.

12. On December 2, 2005, the Commission resumed the hearing on the Petition at the Maui Arts and Cultural Center in Kahului, Maui. The following individuals testified as public witnesses and/or provided written testimony: Joe Bertram, III; May Fujiwara; John Rizzo; Loren Shim; Greg Hansen; Giovanni Rosati; and several residents of the Kahana Ridge Subdivision, including Danny Chin, Lisa Carts, Debbie Bozlee, Cal Lewin, Warren Montoya, Diane Stanislaw, Steven Bronson, and Dena Jackson. The Commission continued the hearing to February 16, 2006.

13. On February 16, 2006, the Commission resumed the hearing on the Petition at the Kapalua Bay Hotel in Kapalua, Maui. The following individuals testified as public witnesses and/or provided written testimony: Dick Mayer, Hans Michel, Cosco Carlbom, Darice Garcia, Amy Kahula, Nell Woods, Marika Zimmerman, Daniel San Miguel, Elaine Waldow, Masamichi Hattori, Rhonda Pang, and several residents of the Kahana Ridge Subdivision, including Danny Chin, Lisa Carts, Debbie Bozlee, Cal Lewin, Warren Montoya, Steven Bronson, Dena Jackson, Ron Boudreaux, Pam Higginbotham, Don Gerbig, and Stanley Zajac. The Commission continued the hearing on February 17, 2006. The Commission subsequently adjourned the hearing

until its next meeting on Maui on April 7, 2006.

14. On April 7, 2006, the Commission resumed the hearing on the Petition at the Maui Beach Hotel in Kahului, Maui. The following individuals testified as public witnesses and/or provided written testimony: Dick Mayer, Robin Knox, Lindsay Ball, Carmen Schillaci, Sharyn Matin, William and Courtney Noye, and Tom Muromoto. Following the conclusion of the parties' respective cases-in- chief, the Commission closed the hearing.

15. On June 22, 2006, the Commission met to consider the Petition at the Maui Prince Hotel in Makena, Maui.

16. On June 30, 2006, the Commission adopted the 2006 D&O.

17. On June 16, 2017, Maui Oceanview LP filed with the Commission a Notice of Change of Ownership. The date of the sale to Maui Oceanview LP was June 3, 2016.

18. On November 22, 2017, Maui Oceanview LP filed a motion with the Commission to amend the 2006 D&O.

19. On Novem~~e~~ber 29, 2017, December 19, 2017, and February 23, 2018, Maui Oceanview LP, OP and the Planning Department filed stipulations extending the time for the State and the County of Maui to file responses to the motion.

20. Maui Oceanview LP submitted supplemental information in support of the motion on August 24, 2018 and again on ______________________________________.

21. OP responded to the motion on ____________________, 2019; the Planning Department responded to the motion on ___________________, 201~~8~~9.

~~15.~~22. The Commission heard the motion on _________________, 2019.

DESCRIPTION OF THE PETITION AREA

~~16.~~23. The Petition Area is located at Mahinahina and Kahana, Lahaina, Maui, Hawai'i, and consists of approximately 310.440 acres.

24. Petitioner is the owner in fee simple of that portion of the Petition Area, identified as TMK: 4-3-01: por. 31, having acquired it by deed dated June 21, 1978, recorded in the Bureau of Conveyances of the State of Hawai'i in Liber 13012, Page 652. Petitioner's fee simple interest in the Petition Area was confirmed by Judgment and Decree, filed January 31, 1985, in State of Hawai'i v. Pioneer Mill Company, Ltd., et al., Civil No. 3673 (1), Second Circuit Court, State of Hawai'i, recorded in Liber 18447, Page 6, as amended by First Amended Judgment and Decree filed on October 21, 1986, recorded in Liber 19979, Page 731, and Second Amended Judgment and Decree filed on August 3, 1987, recorded in Liber 20993, Page 48.

~~17.~~25. Maui Oceanview LP is the owner in fee simple of those portions of the Petition Area designated as TMK 4-3-01-82 and TMK 4-3-01-83, having acquired them by Limited Warranty Deeds With Reservations and Covenants from Maui Land and Pineapple Company, Inc., recorded in the Bureau of Conveyances of the State of Hawaii as Documents Nos. A-59980843 and A-59980844.

~~18.~~26. The County of Maui, through its Department of Public Works and Environmental Management ("DPWEM"), is the owner of Lot 2-B-2 of the ML&P-NHLC Subdivision (Subdivision File No. 4.823), an area of approximately 6.18 acres ("Lot 2-B-2"). Lot 2-B-2 is the location of certain drainage improvements constructed for the Honolua Watershed Project. The Petition Area completely surrounds Lot 2-B-2. At the time the Petition was filed, the County of Maui had not yet assigned a tax map key number to Lot 2-B-2. Lot 2-B-2 has since been designated as TMK: 4-3-01: 79

27. By letter dated February 8, 2005, the DPWEM authorized

Petitioner to include Lot 2-B-2 as a portion of the Petition Area in this Petition.

~~19.~~28. By letter and notarized document from David C. Goode, director of Public Works, dated February 12, 2018, the County of Maui Department of Public Works (formerly known as DPWEM), confirmed Maui Oceanview LP was authorized to file the motion seeking amendments to the 2006 D&O in this docket. Director Goode requested that any amended Decision and Order include clarification that TMK 4-3-001-079 be released from all Land Use Commission conditions as that property is merely a drainage basin, and that Maui Oceanview LP agree to take over maintenance of the drainage basin.

~~20.~~29. ~~The~~ At the time of the original petition, the Petition Area ~~currently contains~~contained cultivated pineapple fields and fallow fields formerly cultivated in pineapple. The Petition Area has not been in cultivation for many years.

~~21.~~30. The Petition Area is located makai of the existing Kapalua-West Maui Airport, and borders the mauka side of Honoapi'ilani Highway. The primary access point to the Petition Area is Akahele Street, which intersects Honoapi'ilani Highway, a limited access State highway. An agricultural road at the northern end of the Petition Area also provides access to Honoapi'ilani Highway.

~~22.~~31. The Petition Area is bordered by Kahanaiki Gulch along its northern boundary. Shallow Pohaku-Ka'anapali Gulch bisects the Petition Area at the approximate midpoint. Mahinahina Gulch traverses the Petition Area at approximately 1,000 feet from its southern boundary.

~~23.~~32. The climate of the Petition Area is generally mild. Temperatures in the area are generally very consistent and moderate with an average daily range of approximately 66 to 85 degrees Fahrenheit. Average annual rainfall in the vicinity of the Petition Area ranges from

20 to 30 inches per year, depending on elevation. Rainfall occurs primarily between November and April.

~~24.~~33. Elevations within the Petition Area range from 75 feet above mean sea level ("MSL") along its western boundary to approximately 240 feet above MSL along its eastern boundary. The grade of the Petition Area, exclusive of gulches, is gently sloping.

~~25.~~34. The U.S. Department of Agriculture, Natural Resources Conservation Service ("USDA, NRCS"), classifies the soils of the Petition Area as follows: Lahaina Silty Clays (LaB and LaC), Rough Broken and Stony Land (rRS), and Ewa Silty Clay Loam (EaA). A description of each soil type follows:

a. The Lahaina Silty Clay (LaB) Series, 3 to 7 percent slopes, consists of soils whose permeability is moderate, runoff is slow, and the erosion hazard is slight. Cobblestones are common on the surface in places, and near coastal plains the soils contain fragments of coral, stones, gravel, or sand. These soils are used for sugarcane and pineapple as well as homesites.

b. The Lahaina Silty Clay (LaC) Series, 7 to 15 percent slopes, consists of soils whose runoff is medium and the erosion hazard is moderate. These soils are used for sugarcane and pineapple. Small acreages are used for truck crops, pasture, and wildlife habitat.

c. The Rough Broken and Stony Land (rRS) Seriesconsists of steep, stony gulches. Runoff is rapid and geologic erosion is active. These soils share severe limitations that restrict their use. Land within this series is used for pasture, wildlife habitat, and watershed.

d. The Ewa Silty Clay (EaA) Series, 0 to 3 percent slopes, consist of soils whose runoff is very slow and whose erosion hazard is slight. These soils are used for sugarcane and homesites.

~~26.~~35. The Land Capability Grouping of the USDA, NRCS, rates the above soil types according to eight levels, ranging from the highest classification, level I, to the lowest, level VIII.[5] Approximately 156.7 acres (50 percent) of the Petition Area contain LaB soils rated Ile if irrigated, Ilk if non-irrigated. Class II soils have moderate limitations that reduce the choice of plants or require moderate conservation practices. Subclass Ile soils are subject to moderate erosion if they are cultivated and not protected. Approximately 86.9 acres (27.7 percent of the Petition Area) contain LaC soils rated Ille. Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both. Subclass Ilk soils have severe limitations because of climate. Subclass Ille soils are subject to severe erosion if they are cultivated and not protected. Approximately 67.1 acres (21.4 percent) contain rRS soils rated VIIs. Class VII soils have very severe limitations that make them unsuited to cultivation, and restrict their use largely to pasture woodland and wildlife habitat. Subclass VIIs soils are extremely rocky, stony, or steep. Approximately 2.1 acres (0.7 percent) contain EaA soils rated Class I if irrigated, and IVc if non-irrigated. Class I soils have few limitations that restrict use. Class IV soils have very severe limitations that reduce the choice of plants, require very careful management practices, or both. Subclass IVc soils have very severe limitations because of climate.

~~27.~~36. The University of Hawai'i Land Study Bureau's ("LSB") *Detailed Land Classification for the Island of Maui* classifies the lands of the Petition Area from "A" and "B" to "E" in productivity rating.[6] Soils rated A represent the highest class of productivity, and soils rated E represent the lowest. The "E" rated soils of the Petition Area are primarily within gulches and are considered as having little or no suitability for soil based agricultural production. The "A" and "B" rated soils are suitable for pineapple production with irrigation. Approximately 246 acres (78 percent)

[5] The figure under the respective levels of the Land Capability Grouping system reflect the larger acreage of the Petition Area prior to being revised in the Amended Petition.

[6] The figure under the rating system of the LSB reflect the larger acreage of the Petition Area prior to being revised in the Amended Petition.

of the soils of the Petition Area are rated"A" and 12.7 acres (4 percent) are rated "B" under irrigated conditions. The remaining approximately 53.3 acres (17 percent) are rated "E." The lands rated"A" and "B" would be rated "D," the second lowest productivity rating, without irrigation.

~~28.~~37. The State Department of Agriculture's Agricultural Lands of Importance to the State of Hawai'i ("ALISH") classification system[7] classifies approximately 252.8 acres (81 percent) of the Petition Area as "Prime Agricultural Land" and approximately 60 acres (19 percent) of the Petition Area as "Unclassified Land." When treated and managed using modem farming methods, Prime Agricultural Land has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops economically. Unclassified Lands have no value for soil-based agriculture.

~~29.~~38. The U.S. Federal Emergency Management Agency's flood insurance rate maps designate the entire Petition Area in Zone C, which indicates an area determined to be outside the 500-year floodplain.

PROPOSAL FOR RECLASSIFICATION

~~30.~~39. Petitioner proposes to develop Pulelehua as a master-planned "sustainable" or "traditional neighborhood design" residential and mixed-use community. The 310-acre community will include a mix of residential, commercial, and public uses. Parks, open space, a public elementary school, biking and walking paths, a town center, pedestrian friendly streets, community gardens, and accessible public spaces will be incorporated in the design. Pulelehua will be designed for lower vehicle speeds, and to encourage pedestrian and bicycle circulation throughout the community.

[7] The figures under the ALISH classification system reflect the larger acreage of the Petition Area prior to being revised in the Amended Petition.

~~31.~~40. Pulelehua will be designed as a compact community with three distinct neighborhoods: Central, Kahanaiki, and Mahinahina. Other design principles of Pulelehua include an identifiable town center, where development is more intense, neighborhoods with an edge, a mix of land uses and building types, an integrated network of walkable streets, and sites reserved for civic purposes, including view corridors.

~~32.~~41. The neighborhood center will combine commercial and residential uses. Live/work units are intended to be allowed to change over time to reflect the needs of the residents. Thus, a residential building could be converted to a building with a small shop or office on the first floor.

~~33.~~42. Petitioner selected the Petition Area as the site for Pulelehua because it is centrally located between West Maui's two primary employment bases, Kapalua to the north and Ka'anapali to the south. The Petition Area is readily accessible to Honoapi'ilani Highway, is adjacent to existing infrastructure and is adjacent to existing urban uses. It is also not one of Petitioner's core lands for continuing pineapple cultivation.

~~34.~~43. Petitioner intends to develop approximately 882 residential units in Pulelehua. A variety of housing types, including mixed use apartments above commercial spaces, apartment houses, townhouses and detached terrace houses, detached single-family residences, and large estate edge lots on the boundaries and along gulches of the Petition Area will be offered to attract a broad spectrum of residential purchasers and tenants.

~~35.~~44. Single-family residences in Pulelehua will range in area from detached terrace houses on zero-lot line lots having a land area of approximately 2,200 square feet in area to traditional single-family lots ranging from 5,000 square feet to 7,500 square feet in area to estate edge lots over an acre in size. The gross density for residential areas will average 2.8 dwelling units per acre. The proposed distribution of unit types for each of the three principal neighborhoods is shown in the table below:

Pulelehua- Unit Count
(based on Conceptual Lot Layout)

Unit Type	**Neighborhood**			TOTAL
	Central	Kahanaiki	Mahinahina	
Main Street Apartment	20	0	0	20
Live/Work	22	21	0	43
Apartment	77	31	43	151
Terrace House	74	17	44	135
Sideyard/ Cottage House	144	73	49	266
Front Lanai House	101	57	86	244
Estate House	0	17	6	23
Residential Units	438	216	228	882

~~36.~~45. Petitioner contemplates selling market price homes as house and lot packages, with the exception of the edge lots that border on gulches or other open space. Estate edge lots will range in size from one-third of an acre to over an acre in size, and will be sold as finished lots. Market price units will be sold at a range of prices, depending upon unit type, location, and market conditions at the time units are offered for sale. Petitioner anticipates that the range of housing prices for market price units at Pulelehua will reflect the range of housing prices for market price homes throughout the island of Maui. At 2005-2006 market conditions, the range of prices for market price homes will start at $500,000. The median home sales price of market price homes at Pulelehua will be at or below Maui's median home sales price, which in May 2005 was $780,000.

The median sales price for estate edge lots would exceed $700,000.

~~37.~~46. The construction of accessory ‘ohana units may be permitted. Petitioner will not build any ‘ohana units. The construction of ‘ohana units, where permitted, will b~~n~~e at the discretion of the individual homebuyers.

~~38.~~47. One of the design principles of Pulelehua is affordable housing with dignity. Pulelehua is intended to include an integrated mix of market priced and affordable rental and for-sale single-family and multi-family housing. Street-oriented, privacy-protecting buildings will be made affordable by design without diminishing their quality.

~~39.~~48. Petitioner proposes to address the housing needs of low income, low-moderate income, moderate income, and gap groups in a manner consistent with an approved affordable housing policy of the County of Maui, or in the absence of such policy, under such terms and conditions as may be mutually agreeable to Petitioner and the County of Maui. Petitioner intends to satisfy this requirement by offering at least 325 units, or 36.8 percent, of the residential units in Pulelehua as "affordable housing" for sale to low, low-moderate, and moderate income residents of Maui.

~~40.~~49. Petitioner proposes to offer approximately 125 additional residential units as affordable rentals. The affordable rental units will be utilized to satisfy a condition imposed by the Commission in its approval of Petitioner's Kapalua Mauka development in LUC Docket No. A03-741.

~~41.~~50. The maximum sales prices of the affordable units will conform to County of Maui guidelines at the time the units are offered for sale. If the affordable units were to be offered for sale in 2005, the maximum sales price of a single-family home for families in each income bracket, using 2005 U.S. Department of Housing and Urban Development ("HUD") guidelines and assuming a 6.5 percent interest rate with 5 percent of the sales price paid as a down payment, is described in the following table:

Percentage of Units in project	Type	Percentage of HUD Median Family Income	Maximum Price
10	Low	50 to 80	$193,500
21	Low-Moderate	81 to 100	$245,600
20	Moderate	101 to 140	$359,800

~~42.~~51. The HUD median income for the County of Maui has increased from $62,350 in 2005 to $65,700 in 2006. Maximum sales prices for affordable units would be expected to increase if the median income continues to increase and other factors remain the same.

~~43.~~52. To qualify to buy an affordable home at Pulelehua, a buyer must: (i) currently be employed in Maui; (ii) attain a minimum age of 18 years; (iii) demonstrate evidence of sufficient income; (iv) agree to physically reside in the home; and (v) not already own a home or other real property. Additional qualifications may be imposed. It is intended that all affordable homes within Pulelehua will be affordable in perpetuity. Petitioner will place County-approved restrictions on the transfer of affordable homes to assure continued owner occupancy and resale to qualified low and moderate income buyers. Petitioner will establish a trust or other entity to administer the affordable housing program in Pulelehua.

~~44.~~53. Petitioner proposes to give preferences to the following categories of affordable buyers and renters in the sale and rental of affordable units:

a. Employees of Petitioner and its subsidiaries.

b. Employees of Kapalua Nui Partners, which includes related business and organizations, affiliated with Petitioner, for example, employees of businesses operating within Kapalua Resort.

c. Maui residents employed as police officers, public school teachers, and firefighters.

d. Maui residents who work in West Maui but do not live in West Maui.

e. West Maui residents.

~~45.~~54. In addition to the residential units which will be priced as affordable to low, low-moderate, and moderate income Maui residents, Petitioner intends to offer approximately an additional 100 of the residential units in Pulelehua for sale to "gap group" income families. These families may earn more than 140 percent of median income ($91,980 in 2006) but less than 180 percent of median income, which is not enough to afford a home at Maui's median home sales price in May 2005 of $780,000. These gap group homes would be sold at prices ranging between $300,000 and $600,000 if offered in 2005.

~~46.~~55. Petitioner is currently in discussions with the Hawai'i Health System Corporation ("HHSC") to provide up to 15 acres in Pulelehua's south Mahinahina neighborhood to support a medical facility as well as other ancillary medical related uses. These facilities could include a 30 to 50-bed long-term care facility, an urgent/emergency care center, and a medical clinic. The urgent/emergency care facility would address critically injured or sick patients to provide stabilization and diagnostic services. The development of such facilities within Pulelehua would reduce the residential unit count by 90 units (evenly split between affordable and market rate units). Petitioner also plans to develop a cultural center that will offer wellness programs in the center of Pulelehua.

56. Petitioner intends to commence construction of Pulelehua after all necessary permits and approvals have been issued. Petitioner anticipates receiving County of Maui permits by the end of 2006, and starting construction of the major backbone infrastructure.

Construction of the first homes is anticipated in 2007. The first homes could be completed in late 2008. Once construction has commenced, Petitioner intends to develop Pulelehua in a single continuous phase, to be substantially completed over a ten-year period.

MAUI OCEANVIEW LP'S MOTION TO AMEND

57. Maui Oceanview LP filed a motion to amend the 2006 D&O to reflect~~s~~ its plans to develop ~~9~~800 primarily rental residential units and 100 single family for sale lots at Pulelehua. Maui Oceanview LP will offer for rent 800 units in apartment houses and will offer for sale 99 single family residential lots and one (1) large estate edge lot~~s~~ on the northern boundaries between Kahanaiki and Mahinahina gulches. Some live-work units will be allowed in apartment buildings in close proximity to the proposed commercial areas.

58. In its revised proposal, Maui Oceanview LP proposes to address the rental housing needs of low income, low-moderate income, moderate income and "gap groups" in a manner consistent with HUD requirements, the Residential Workforce Housing Policy, Chapter 2.96, Maui County Code. Maui Oceanview LP has entered into a housing agreement with the County of Maui Department of Housing and Human Concerns (DHHC) dated March 7, 2019. Maui Oceanview LP proposes to develop a total of 280 workforce housing units (which includes the 125 rental housing units associated with MLP's Kapalua Mauka project), 520 market rental units, and 100 Single-Family House Lots for sale.

59. Maui Oceanview LP's primarily rental project will offer 280 units, or 35% of the 800 rental units, as workforce rental housing.

60. Maui Oceanview LP will offer preferences for the 280 units consistent with the Residential Workforce Housing Policy, Chapter 2.96, Maui County Code and the housing agreement with DHHC.

61. Maui Oceanview LP will integrate the Residential Workforce Housing rental units with the market rental apartment units developed throughout the Pulelehua Project.

62. Maui Oceanview LP contemplates the development of Pulelehua in five phases, anticipated to be completed over an eleven-year period as follows:

PULELEHUA PROPOSED PHASING				
PHASE	**SINGLE FAMILY LOTS**	**WORKFORCE RENTAL HOUSING UNITS**	**MARKET RENTAL HOUSING UNITS**	**TOTAL UNITS**
PHASE 1		90	150	240
PHASE 2		120	230	350
PHASE 3		70	140	210
PHASE 4				
PHASE 5	100			100
TOTALS	**100**	**280**	**520**	**900**

~~47.~~63. The County zoning for the Pulelehua Project District provides for a maximum number of 1200 units, which includes up to 300 accessory/'ohana units. Maui County Code §**19.93.050(1).** Maui Oceanview LP does not intend to construct any accessory/'ohana units as part of the Pulelehua Project. Construction of 'ohana units, where permitted, will be at the discretion of the individual homebuyers.

PETITIONER'S FINANCIAL CAPABILITY TO UNDERTAKE THE PROPOSED DEVELOPMENT

~~48.~~64. Costs to develop the Pulelehua community are preliminary and will be better defined during the detailed site engineering phase. The order of magnitude costs for the development of onsite infrastructure and final subdivision layout for Pulelehua is expected to exceed $65 million.

~~49.~~65. Residential construction costs are estimated to be at least $201 million. Commercial construction costs are estimated to be approximately $34 million. In total, costs for Pulelehua are estimated to exceed $301 million.

66. A consolidated balance sheet for Petitioner showed that Petitioner had $160.9 million in assets, $89.3 million in liabilities, and $71.6 million in shareholders' equity as of December 31, 2004. Petitioner intends to finance the Project using a combination of bank loans and equity. Petitioner's balance sheet demonstrates Petitioner has the necessary economic ability to carry out the development of the Project.

67. When Maui Oceanview LP purchased Pulelehua, MLP had not yet begun any construction of improvements on the Project.

68. Maui Oceanview LP is a partnership between ANICO-EAGLE and USA Infrastructure Investments, LP of Texas. ANICO-EAGLE is a subsidiary of the American National Insurance Company, based in Galveston, Texas and is a publicly held NASDAQ listed insurance company with over $26Billion in assets. Maui Oceanview intends to finance the project's funding needs from internal or appropriate external resources as it arises. ANICO-EAGLE typically finances such construction needs with either construction financing or equity financing. A separate audited statement is not prepared for ANICO-EAGLE but the most recent statement was submitted for American National Insurance Company. Maui Oceanview LP has demonstrated it has the necessary economic ability to carry out the development of the Project

69. For its primarily rental unit project, Maui Oceanview LP proposes the following distribution of unit types in the table below:

Pulelehua - Unit Count				
(based on Conceptual Lot Layout)				
Unit Type	**Neighborhood**			**Total**
	Central	Kahanaiki	Mahinahina	

Main Street Apartment		0	0	
Live/Work	70		0	70
Apartment	280	240	210	730
Terrace House				
Sidevard/Cottage House				
Front Lana'i House	0	85	14	99
Estate House	0	1	0	1
Residential Units	350	326	224	900

STATE AND COUNTY LAND USE PLANS AND PROGRAMS

~~50.~~70. The Petition Area is currently designated in the State Land Use Agricultural District, as reflected on the Commission's official maps M-1 (Honolua) and M-2 (Lahaina).

71. The West Maui Community Plan Land Use Map currently designates portions of the Petition Area for Park and Open Space Uses, and the remainder of the Petition Area for agricultural use. The Petition Area is classified in the AG Agricultural zoning district. Petitioner has applied for an amendment to the West Maui Community Plan Land Use Map to designate the Petition Area as Project District 5. The purpose of the project district designation is to provide for a flexible and creative planning approach to a large-scale urban development, which would feature customized zoning district standards and specified uses to be determined in a project district ordinance.

~~51.~~72. Project District No. 5 was approved as Ordinance No. 3888(2011) and codified as Maui County Code chapter 19.93.

~~52.~~73. The Petition Area is not within the County of Maui's special management area.

NEED FOR THE PROPOSED DEVELOPMENT

~~53.~~74. The Hallstrom Group, Inc., prepared a market study and economic impact analysis report and a public cost/benefit assessment of the Project. The market study and economic impact analysis report analyzed the West Maui housing sector. The West Maui housing sector is currently undersupplied by between 470 to 1,168 units, and will require some additional 3,447 to 5,400 new housing units for the period 2004 thru 2020. Approximately 31 percent of the unit demand during the next two decades will be at prices (or rental equivalents) of under $205,000 in current 2005 dollars, 25 percent of the demand will be for units priced between $205,000 and $380,000, 25 percent for homes ranging between $380,000 to $550,000, and 18 percent for homes priced above $550,000.

~~54.~~75. Single-family homes presently comprise over 60 percent of the offered inventory in West Maui. Projections are for multi-family units to take an increasing role, reaching approximately 48 percent of total new product in West Maui by 2020. Virtually all new "residential" product recently offered in West Maui has either been resort oriented (within Kapalua or Ka'anapali), estate-sized agricultural lots (Launiupoko), or homesites beyond the affordability of most local households (Kahana Ridge). Even so, all offered product has been rapidly absorbed, with most developments having waiting lists.

~~55.~~76. There have been proposals and discussion for approximately 10,664 potential additional units within major proposed West Maui developments over the past two decades. Only a fraction of these units, approximately 1,265 units (excluding Pulelehua) have a likely chance of being built in the mid to near term. Approximately 8,500 units are in developments in the earliest planning stages, or face meaningful community opposition, or are for native Hawaiians only, or have been halted by interminable litigation and thus are unlikely to be developed within the next 10 years. The approximately 1,265 units which may be completed in the near future would satisfy less than 1/3 of projected demand through the year 2020.

77. Total demand for neighborhood and airport-oriented commercial-mixed use space at Pulelehua would be approximately 175,000 square feet of leaseable floor space. Pulelehua residents would generate the need for approximately 96,000 square feet of neighborhood and supporting commercial and light industrial floor space. Secondary consumer groups, including guests, workers, specialty shoppers, and airport users, are anticipated to support demand for an additional 40,300 square feet of floor space. Retail uses will be limited and oriented towards meeting the direct daily consumer demands of the community. Airport- related businesses will generate a demand for approximately 39,000 square feet of floor space.

78. Maui Oceanview LP proposes to develop retail space in multiple locations, with neighborhood, island style retail south of Akahele Street and at the north and south ends of the project site. Approximately 70 live/work units will be allowed in certain apartment buildings in close proximity to the central commercial area offering local services. The Pulelehua master plan includes a commercial/retail component envisioned to provide approximately 70,000 square feet maximum of gross leasable area spread among multiple development pads totaling approximately 21 acres south of Akehele Street (the airport access drive) at Honoapi'ilani Highway, as well as at the north and south ends of the development. The intent of the commercial/retail component is to primarily service the needs of the Pulelehua community residents. Based on the average Maui per capita demand for commercial/retail space at 36.0 square feet per person and typical capture rates for "neighborhood retail", "service commercial/medical" and "support/other commercial" space types, with nominal additional demand from on-site workers, passersby and residents of nearby development, we conservatively estimate

there will be in-place demand for approximately 66,000 square feet of proposed space.

SOCIO-ECONOMIC IMPACTS

79. West Maui is among the most desirable resort/residential areas in Maui, with an exceptional and diverse visitor industry, a historic town with modem services, and a variety of recreational resources. Pulelehua is intended to create opportunities for homeownership among local working class families on Maui. It is anticipated that employees at Kapalua and Ka'anapali resorts who currently commute from Central Maui to West Maui will buy homes closer to work. As such, Pulelehua is not anticipated to cause a significant increase in the population of the island.

~~56.~~80. Maui Oceanview LP’s Pulelehua Project, offering primarily rental units, would provide longterm rental opportunities for Maui residents working in West Maui to rent a unit closer to work.

~~57.~~81. During the construction and sales period for Pulelehua, the number of jobs created by construction and related activities is expected to range from 260 to 1,331 positions annually. On a stabilized basis following the construction and sales period, Pulelehua will generate approximately 960 permanent full-time equivalent and/or enhanced employment opportunities: 705 directly related to onsite activities and 255 indirect positions throughout the island.

82. Development and construction of Pulelehua is anticipated to generate approximately $996 million in direct new capital investment and spending into the Maui economy over the ten year construction and sales period. On a stabilized basis after construction, Petitioner estimates that Pulelehua's overall impact in wages and spending would be approximately $132 million annually.

83. Tom Halliday from CBRE prepared for Maui Oceanview LP a Market Study, Economic Impact Analysis and Public Fiscal Assessement of the Proposed Pulelehua 900-Unit Project.

84. CBRE constructed a model depicting the economic impact of the Pulelehua project on the Maui and Statewide community during its "lifespan" from anticipated ground-breaking in 2019, through build-out and absorption in 2026, and stabilized "operations" (commercial/retail businesses, common element management and maintenance) thereafter.

85. From a direct perspective, Maui Oceanview LP's proposed 900 residential units (800 apartment rental units and 100 single family homes) and 70,000 square feet maximum of commercial space will create numerous construction, equipment operator and specialty trade jobs on- and off-site, directly and indirectly, during the planning and emplacement of the infrastructure, and building of the improvements.

86. Pulelehua will bring an estimated $249 million in direct development capital into Maui over the build-out period for the project.

87. The development of the Pulelehua project will bring in an estimated $249 million of new, direct capital investment with significant unquantified indirect expenditures into the island's real estate market and generate $891 million in total economic activity islandwide during its build-out and stabilization over a 9-year period (forecast from circa 2018 to 2026). Pulelehua will contribute some $74.8 million in annual economic activity on a stabilized basis thereafter.

88. Infrastructure cost estimates prepared by Maui Oceanview LP and planning team members, are forecast at $30.0 million, excluding design, entitlement and indirect expenses incurred in the islands. Vertical construction costs would total $229.3 million during the modeling period (based on construction costs averaging $208,333 per unit estimated from Maui Oceanview). The

development costs are not intended to be indicative of the rental rates for the respective units, as the developer may elect to allocate base costs in a far different matter.

89. Pulelehua development will infuse on average an anticipated $31.2 million annually into the Maui building industry on average over the 8-year build-out period. While a significant percentage of the materials needed to build Pulelehua's infrastructure, and residential and commercial structures must be imported to Maui, a portion of the construction costs spent in the development will directly flow to local businesses in the form of contractor profits and supplier profits.[8]

90. The total Contractor's Profit generated by Pulelehua for local building companies will average some $3.1 million per year, with a cumulative profit of $24.9 million over the construction period. The total annual Supplier's Profit would be some $1.2 million equating to $10 million in aggregate.

91. Based on indicators provided by the construction of comparable sized projects and Hawaii industry averages, CBRE estimated the demand for on- and off-site, direct and indirect, fulltime equivalent employment positions associated with laying of initial infrastructure systems, construction of the units, and the on-going commercial/retail businesses and the apartment business (and its community association efforts) in the project.

92. The construction, operating economic activities, and indirect/off-site employment opportunities created by the subject development will not all be "new" jobs requiring new Maui residents, but will be vitally needed new opportunities for in-place resident construction trade workers and existing local businesses. The jobs associated with the commercial/retail tenants and apartment business operations will represent an expansion of the employment pool. CBRE assumed the

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[8] Typically, within the industry net contractor profit margins are expected to be at 8 to 20 percent of total construction costs. CBRE used a conservative ten percent figure and extrapolated supplier profits at four percent of total costs

off-site/indirect work created will be steered towards existing Maui supply, equipment providers.

93. A total of 1,141 worker-years of employment in the construction trades will be needed for developing Pulelehua. The commercial/retail businesses will have worker-years totaling 982 during the modeling period and 228 per year thereafter. The apartment business/community association and maintenance worker-years will total 97 during the modeling period and 28 per year thereafter.

94. The construction of the Pulelehua infrastructure and finished apartment units, will directly create an estimated 1,141 "worker-years" of employment (the equivalent of 52 work weeks at 40 hours per week) in the construction trades, support and supply businesses during build-out, averaging about 143 worker years annually, with an estimated $80.7 million in wages (averaging about $10 million per year).

95. The commercial/retail businesses, apartment rental company, and community management and landscape/maintenance of the maximum 70,000 square feet of commercial space and 898 apartment units will create 982 worker-years of employment from 2020 through 2026 and associated wages of $33.4 million. Once stabilized these project components will create demand for 228 permanent FTE positions with annual wages of $7.8 million.

96. Associated secondary/off-site employment during the overall development and absorption time-frame will total 654 worker-years with wages of $33.4 million and a stabilized FTE job-count of 76 with total wages of $4.1 million per year.

97. Off-Site/Indirect/Secondary employment created by Pulelehua will total 982 worker-years from 2019 through 2026 and 76 FTE positions per year as stabilized.

98. Total construction wages paid during build-out will be $80.7 million. Total commercial/retail employee wages during the modeling period will be $29.5 million and

stabilize at \$6.7 million thereafter. Total apartment business/association and maintenance employee wages during the modeling period will be \$4 million and stabilize at \$1.2 million thereafter. Off-sits/indirect employee wages will total \$35.4 million during build-out and be \$4.1 million annually on a stabilized basis.

99. During build-out the 900 households containing 2,296 residents at Pulelehua will have aggregate incomes of \$349.3 million (2020-2026) and will stabilize at \$95.8 million annually thereafter. Discretionary expenditures into Maui businesses by the Pulelehua population will be some \$174.6 million during build-out and average \$47.9 million per year on a stabilized basis. CBRE notes the amounts will not all necessarily be new income and spending for Maui as many of the households would merely be located elsewhere on the island if Pulelehua wasn't constructed.

100. CBRE estimate that about one-half (50%) of the resident households in the project will be comprised of new/in-migrating Maui residents. Their household income and spending will be "new" to Maui and not just redirected from elsewhere on the island. These 1,148 persons will have cumulative household incomes of some \$176.6 million during build-out and \$47.9 million annually on a stabilized basis. Their discretionary income will total \$87.3 million from 2020 through 2026, and stabilize at \$24 million per year.

101. The on-going commercial/retail, apartment rental, and management and maintenance activity in the community will total \$642.1 million during the 2020-2026 projection period and average \$74.8 million per year on a stabilized basis. The base impact to the Maui from 2018 through 2026 will be \$891 million and average \$74.8 million annually thereafter.[9]

[9] CBRE notes application of the Hawaii Inter-County Input-Output Model macro multipliers depicting direct, indirect and induced economic impacts arising from development of Pulelehua result in significantly higher economic out-flow indicators for every item than those from CBRE's direct, subject-specific micro model.

IMPACT ON RESOURCES OF THE AREA

Agricultural Resources

~~58.~~102. Petitioner's subsidiary Maui Pineapple Company, Ltd. ("Maui Pineapple"), has recently cultivated approximately 150 acres of the Petition Area in pineapple. This portion of the Petition Area is a part of Maui Pineapple's Honolua Plantation, which presently consists of less than 2,000 net acres in pineapple cultivation ("Net Pine Acres").

~~59.~~103. Maui Pineapple has reversed its prior decision to reduce its Net Pine Acres in West Maui. Previously abandoned Honolua Plantation fields have been replanted. Maui Pineapple is using larger trucks to transport fruit to Maui Pineapple's processing plant at Hali'imaile.

~~60.~~104. Reclassification of the Petition Area will not adversely affect Maui Pineapple's business operations, as the portion of the Petition Area withdrawn from cultivation represents 2.5 percent of the 5,800 Net Pine Acres on which Maui Pineapple will continue to cultivate pineapple in West Maui and Central Maui.

~~61.~~105. Maui Pineapple has identified approximately 2,000 Net Pine Acres in the Honolua Plantation that it considers Petitioner's "core lands" in West Maui. Petitioner considered different factors, such as elevation, availability of water, cost to farm, and topography in determining the relative productivity of its lands. The core lands are the highest productivity lands that are necessary for Maui Pineapple to maintain a profitable pineapple operation. The Petition Area is not considered to be part of Petitioner's core lands. The Petition Area is bisected by gulches and Akahele Street, and cultivation and harvesting activities within the runway obstacle free areas ("ROFA"), the runway protection zones ("RPZA"), and the runway safety areas ("RSA") of the

Kapalua-West Maui Airport must be conducted at night.

~~62.~~106. If Petitioner were to designate its own lands as important agricultural lands pursuant to Act 183, SLH 2005, Petitioner would designate the core lands as its important agricultural lands in West Maui. Petitioner would not include the Petition Area as part of its important agricultural lands. Petitioner has considered but has not made a determination to voluntarily designate its important agricultural lands on Maui.

~~63.~~107. Petitioner has organized a new subsidiary, Maui Agricultural Partners, to conduct its diversified agriculture operations. Maui Agricultural Partners will be pasturing cattle at the northern end of Honolua Plantation on land formerly cultivated in pineapple. Maui Agricultural Partners is also working on a composting operation and will develop a plant nursery emphasizing native plants near its Honolua Plantation headquarters. Development of the Petition Area will not adversely affect Maui Agricultural Partners' agricultural operations as Petitioner has sufficient land to devote to agriculture at Honolua.

Flora and Fauna

~~64.~~108. Winona P. Char of Char & Associates conducted a survey of flora on the Petition Area. Gulch vegetation consists primarily of koa haole and guinea grass. Seven native plant species were observed scattered about the Petition Area. All are widespread throughout the Hawaiian Islands in lowland and dry to mesic environments.

~~65.~~109. There were no plant species detected in the Petition Area that are classified as an endangered or threatened species by the U.S. Fish and Wildlife Service ("USFWS") nor any plant species of concern in the Petition Area. Development of Pulelehua is not expected to have an adverse impact on the botanical resources of the Petition Area.

110. Phillip L. Bruner, Environmental Consultant, conducted an

avifaunal and feral mammal survey of the Petition Area. No native water birds orland birds were observed on the Petition Area. Two native birds, the Pueo, or Hawaiian owl *(Asia flammeus sandwichensis),* and Nene, or Hawaiian goose *(Branta sandvicensis),* have been observed on lands similar in character to the Petition Area. The Pueo is listed by the State of Hawai'i as an endangered species on the island of O'ahu but not elsewhere. The Nene is listed as an endangered species by the USFWS. The Petition Area is not believed to be a critical habitat for either species. Two migratory plover and eleven introduced birds were observed on the Petition Area. The Small Indian Mongoose *(Herpestes auropunctatus)* and the Roof Rat *(Rattus rattus),* both introduced species, were the only mammals observed in the Petition Area. Development of Pulelehua is not expected to have an adverse impact on the fauna! resources of the Petition Area.

111. Maui Oceanview LP's landscape planning consultant T.H. Pritchett/Associates provided a letter describing the Pulelehua project area and the Concept Landscape Plan for the development.

112. The ecosystem on the site today was transformed by human activity dating back to very early cattle grazing, farming, and most recent times Pineapple Cultivation. These past uses have resulted in the site's native ecosystem removal completely. Even the ravines are eroded native ecosystems and continue to be changing.

113. Pritchett describes what is present today is evolving as farming has stopped for over 10 years and the land has laid fallow. The landscape is evolving as a native Low Land Dry Shrubland and Grassland found elsewhere in this general West Maui area.

114. The Flora now has been blown in as seeds and or dropped seeds by passingbirds and is primarily Pili Grasslands and 'A'ali'i shrublands. The Fauna most likely contains introduced animals such as rats, mongoose, and cats. Alien birds such as House Finches (Carpodacus

mexcanus) and Japanese White-eye (Zosterops japonicus) have largely replaced native animals.

Source: Atlas of Hawaii, Third Edition, 1998

115. Maui Oceanview LP's Concept Landscape Plan is planned to introduce Hawaiian Endemic Plants, Native Plants, Polynesian introduced plants and other plants used as landscape plant materials to create a creative planting using many diverse types of plants, including the following Hawaiian Endemic Plants, Native Indigenous Plants and Polynesian introduced plants:

Hawaiian Endemic Plants

Common name	Botanical name
Lama	Diospyros sandwicensis
Hoawa	Pittosporum hosmeri
Ohia Lehua	Metrosideros polymorha
Koa	Acacia Koa
Loula	Prichardia hillebrandii
Naeo	Myoporum sandwicense
Nupaka Kuahuiwi	Scaevola chamissoniana
Nupaka	Scaevola coriacea
Ha'awa	Pittosporum glabrum
Ape	Alocassia macrrorrhiza
Nehe	Lipochaeta intesrifolia
Hibiscus, Aloalo	Hibiscus brackenridgei , yellow,
Hibiscus, Koki'o	Hibicus koki'o 'ula , yellow, orange
Hibiscus, Koki'o ula	Hibicus clayi, koki'o 'ula , red
Na'nu	Gardenia brighami

Native, Indigenous Plants

Common name	Botanical name
'A'ali'i	Donodnaea viscosa
Milo	Thespesia populnea
Pandauas	Pandanuas tectorius
Iliee	Plumbago zeylanica
Kalo, Taro	Colocasia esculenta
Pauchiiaka	Jacquemontia ovalifolra, sandwicensis
Lavae Fern	Phymatosorus scolopendria
Kupukupu fern	Neprolepis cordifolia
'Ilima,	Sida fallax
Beach Vitex	Vitex rotundifolia
Pili Grass	Heteropgon contrtus

Polynesian Introduced Plants

Common name Botanical name

Ti Cordyline fruiticosa

Listed below are the Quality Locally Available Landscape Plants Maui Oceanview LP is proposing to use in the Landscape in addition to the list of plants above

Trees

Common name	Botanical name
Alibangbang	Bauhinia hookeri
Red Bottlebrush	Callistemon citrinus
Tree Fushia	Schotia brachypetala
Yellow Bauhinia	Bauhina tomentosa
Australian Flame	Brachychiton acerifoliuos
Golden Shower	Cassia fistula
Hong Kong Orchid	Bauhinia blakeana
Rainbow Shower	Cassia nealiae
Yellow Trumpet	Tabebuia ochracea
Singapore Plumeria	Plumeria Obtusa
Dwarf Poinciana	Caesalpina pulcherrima
Jatropha	Jatropha intergerrima
Royal Poinciana	Delonix regia
Monkey Pod	Samanea Saman
Coral Shower	Cassia Grandis
Pink Tecoma	Tabebuia heterophylla
Df. White Tecoma	Tabebuia bahamensis
Plumeria	Plumeria obtuse
Norfolk island pine	Araucaria heterophylla
Yellow Poinciana	Peltophorum pterocarpum

Palms

Common name	Botanical name
Pigmy Date Palm	Phoenix Roebelinii
Manila Palm	Vetchia merrilli
Foxtail Palm	Wodyetia bifurcata
Queen Palm	Syagrus romanzoffiana
Jonais Palm	Vetchia Joannis
Royal Palm	Roystonea regis

Shrubs

Common name	Botanical name
Bouganvillea	Bouganvillea, Red, White, Purple
Red Ginger	Alipina Purpurata
Eldorado	Pseuderanthemum carruthersii
Natal Plum	Carissa macrocarpa
Cape Plumbago	Plumbago auriculate
Df. Bird of Paradise	Strelizia reginae

Oleander, red	Nerium oleander, red
Mock Orange	Philadelphus coronaries

Ground Covers and Vines

Common name	Botanical name
Hottentot Fig	Carpobrotos edulis
Blue Daze	Evolvulus glomertus grandifloras
Late Yellow Daylily	Hemerocallis thumbergii
Pink Honeysuckle	Lonicerus x heckrotii
Purple Lantana	Lantana Montevidensis trailing
Mondo Grass	Ophiopogon japonicum
Hawaiian Moon	Impomea horsfalline
Evergreen Clematis	Clematis armandii
Rocket Trumpet	Diplandenia mandevilla, red
Fig Ivy	Ficus Pumila

Grasses

Common name	Botanical name
Zoyzia, El Toro	Zoyzia japonica
Vetiver Grass	Chrysopogon zizanoiides

Archaeological, Historical, and Cultural Resources

~~66.~~116. In *Ka Pa'akai O Ka'Aina* v. Land Use Commission, 95 Haw. 31, 46, 7 P. 3d 1068 (2000) the Hawai'i Supreme Court held that Article XII, Section 7, of the Hawai'i State Constitution obligates the Commission to protect the reasonable exercise of native Hawaiian customary and traditional practices *to the extent feasible* when granting a petition for district boundary amendment. The Court established the following three-prong test:

> In order to fulfill its duty to preserve and protect customary and traditional native Hawaiian rights to the extent feasible, the LUC, in its review of a petition for reclassification of district boundaries, must--at *a minimum-make* specific findings and conclusions as to following: (1) the identity and scope of "valued cultural, historical, or natural resources" in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area; (2) the extent to

which those resources-including traditional and customary native Hawaiian rights-will be affected or impaired by the proposed action; and (3) the feasible action, if any, to be taken by the LUC to reasonably protect native Hawaiian rights if they are found to exist

~~67.~~117. Jeffrey Pantaleo of Archaeological Services of Hawai'i, LLC, conducted an archaeological inventory survey of the Petition Area. The remains of a historic flume in the Mahinahina 1, 2, 3 Gulch constructed in the nineteenth century by Pioneer Mill Company, Ltd., and abandoned in 1917 and three isolated surface artifacts were identified. The State of Hawai'i Department of Land and Natural Resources, Historic Preservation Division ("DLNR, SHPD"), concurred with Archaeological Services Hawai'i, LLC's, conclusion that these sites are significant under criteria D for the potential to yield information, and recommended that monitoring be conducted in the vicinity of the artifacts as mitigation against adverse impacts to historic properties. No other preservation actions are required.

~~68.~~118. Petitioner will prepare an archaeological monitoring plan for approval by the DLNR, SHPD, prior to the commencement of any construction activities.

~~69.~~119. Maria Ka'imipono Orr conducted a cultural impact study and assessment of the Petition Area. At one time, the gulch areas may have been inhabited and other areas may have been used for cultivation of sweet potatoes and dry land taro. Other than a few kukui trees in the gulches, there are no traces of any native plants that were used for food, medicine, crafts, and lumber within the Petition Area. To the extent that the gulches will not be developed, there will be no adverse impact to any cultural resources.

120. Kama'aina interviewed as a part of the cultural survey all stated that use of the valleys for cultivation of lo'i or dry land crops such as sweet potatoes had long since ceased. All kama'aina recalled that the upland plains between the valleys have been in pineapple cultivation since the mid-nineteenth century. Although pig hunters use mauka trails in

areas adjacent to the Petition Area intermittently, no kama'aina was aware of access over the Petition Area for gathering or other cultural purposes. The most significant cultural practices in the general vicinity are fishing and sea gathering along the Mahinahina and Kahana shoreline outside of the Petition Area.

121. After preliminary meetings with LUC and Office of Planning staff, Maui Oceanview LP also contracted to update the Cultural Impact Assessment (CIA) conducted in connection with the initial 2005 LUC review and approval of the project.

122. Maria Orr of Kaimipono Consulting Services LLC, the consultant who prepared the original CIA, concludes "[t]here are no changes to the 2005 Cultural Impact Assessment." Specifically,

> **Cultural Resources (Land) Impact.** The lands within the project area were heavily impacted by the historic activities of the 19th and 20th centuries. Any cultural sites and/or resources would have been destroyed or buried by ranching, sugar and pineapple plantation activities; therefore, there will be no adverse impact to any cultural resources on Pulelehua lands (except for the gulches). However, it should be noted that cultural sites (i.e., hearths/*imu*) have been found below the plow zone in other areas (islands) of sugar cultivation.
>
> **Cultural Practices/Access (Land) Impact.** Since there are no cultural resources on Pulelehua lands, there will be no adverse effects to cultural practices on Pulelehua lands. However, there are cultural resources in the gulches and access to these areas may be adversely impacted or compromised by the Pulelehua Community.
>
> **Cultural Practices: Indirect Adverse Impact.** According to consultants interviewed, there are two conditions that have the potential to create an adverse effect or impact on the cultural fishing practices and resources *makai* of the proposed Pulelehua Community; over-flow runoff and contaminated groundwater seepage. Given the propensity for runoff problems in West Maui, unless they are adequately addressed, development activities for this project may adversely impact both traditional cultural marine resources and practices by the silt-laden overflow into the ocean from both the drainages and surface runoff. One suggested solution was to periodically remove dried sediment from the desilting basins before any heavy rain fall can create overflows taking the collected sediment/silt with it into the ocean. The condition of the contaminated groundwater seepage into the ocean is created by the continuous use of

pesticides and fertilizers leaching into the aquifer or groundwater. While this may be mitigated by a change from agricultural use to urban use, unless private (residents/business) and public (open spaces/parks) activity is monitored, this problem could persist.

123. A separate CIA update[10] prepared by Tanya Lee-Grieg of `Aina Archaeology makes similar findings:

> Uncle Felimon Sadang has stated that in regard to the specific lands of the proposed Pulelehua Community project, both personally and as the Kāʻanapali Moku representative, and per those in the *moku* that he has reached to, there are no known traditional cultural practices being carried out within the boundaries of the proposed project area. This assertion is also shared by all who have participated in this study (see also section 4.2) which is also consistent with the documentation of the initial cultural impact assessment (Orr 2005:106).

124. Further, Grieg finds:

> With regard to potential direct effects on the adjacent gulch environments and historic properties within the gulch bottoms, the development footprint does not extend to the gulch edge and therefore no direct adverse effects to gulche

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[10] In the course of her work on the updated CIA, Ms. Grieg was referred to members of the Aha Moku Advisory Committee. Felimon Sadang was identified as the Kaanapali Moku. Aina Arch CIA [Exhibit E], sec. 4.2.5. Since LUC approval of the 2006 D&O, the legislature recognized the Aha Moku Advisory Committee system to assist DLNR. Hawaii Revised Statute **§171-4.5 provides:**

> **Aha moku advisory committee; established.** (a) There is established the aha moku advisory committee to be placed within the department of land and natural resources for administrative purposes. The committee may advise the chairperson of the board of land and natural resources in carrying out the purposes of this section.
>
> (b) The committee shall consist of eight members appointed by the governor and confirmed by the senate from a list of nominations submitted by the aha moku councils of each island. Oversight of the aha moku advisory committee shall be by the chairperson of the board of land and natural resources. The committee members shall select the committee chairperson from among the members.
>
> (c) The members shall not receive compensation for their service, but shall be reimbursed for necessary expenses, including travel expenses, incurred while participating in meetings and events approved in advance by the chairperson of the board of land and natural resources.
>
> The aha moku advisory committee may hire an executive director who shall be exempt from chapter 76. The executive director may hire an administrative or executive assistant to assist the executive director in accomplishing the purposes of the aha moku advisory committee.
>
> (d) The aha moku advisory committee may provide advice on the following:
>
> (1) Integrating indigenous resource management practices with western management practices in each moku;
>
> (2) Identifying a comprehensive set of indigenous practices for natural resource management;
>
> (3) Fostering the understanding and practical use of native Hawaiian resource knowledge, methodology, and expertise;
>
> (4) Sustaining the State's marine, land, cultural, agricultural, and natural resources;
>
> (5) Providing community education and fostering cultural awareness on the benefits of the aha moku system;
>
> (6) Fostering protection and conservation of the State's natural resources; and
>
> (7) Developing an administrative structure that oversees the aha moku system.

areas are anticipated. The existing field roads along both Kahana and Māhinahina Gulches are situated approximately 80 ft. from the gulch edges with no development plans for the space between these field roads and the gulches. Additionally, building construction is anticipated to be a minimum of 150 ft. from the edges of the gulches thus creating a construction buffer between the proposed project and the gulch edges. Therefore, and in so long as access to the *mauka* region and upper reaches of the gulches are maintained (see Figure 5-1), no direct adverse effects from proposed project on traditional cultural practices are anticipated.

125. Grieg describes Indirect effects as follows:

With regard to potential indirect effects, according to those consulted for this study, the most prominent and significant cultural practice within the vicinity of the current project revolves around the coastal marine resources of Kahana and Māhinahina. This finding is consistent with the findings of the initial cultural impact assessment completed by Maria Orr (2005). Fishing, diving, and resource gathering continues to play a large role in the livelihood of those consulted for this study, as well as the previous study. Siltation and construction run off from project development and cumulative effects of storm water run-off from the life-span of the development itself was a concern expressed by those who participated in both studies. Current development plans, as indicated by the project proponent, calls for use of the current drainage infrastructure and desilting basins and zero runoff. Those consulted for this study remain cautious, and advocate for some balance to allow for some nutrients to come through the *muliwai* in order to have thriving *limu* beds, but only in so far as what might naturally occur. Some concern was also expressed about the increase in population affecting the integrity of the marine resources as more people are present to observe the locations of the generational fishing grounds which may result in the loss of the resource to over fishing or destruction.

126. As the LUC found in the original proceeding, the most significant cultural practices in the general vicintiy remain fishing and gathering along the Mahinahina and Kahana shoreline outside of the Petition Area. 2006 D&O, ¶74. An additional concern expressed by kamaaina was maintaining access to areas mauka of the Petition Area and Kapalua-West Maui Airport.[11]

[11] Orr noted:

> While there are no cultural practices on Pulelehua Community lands to be adversely impacted, there is potential that access to gathering and hunting practices in the upper gulches/mountains may be compromised during the construction phase of the proposed Pulelehua Community. However, concerns regarding access to upper gulches/mountain resources would be mitigated upon completion of the project and the subsequent dedication of the project streets as public thoroughfares.

Orr CIA Update [Exhibit D], p. 8.

127. To the extent Maui Oceanview LP has control of existing mauka access from its property, mauka access from Pulelehua will not be impeded.

Groundwater Resources

~~70.~~128. In the Lahaina region, the Honolua and Honokowai Aquifers serve as a source of water for area wells. Each aquifer has a sustainable yield of 8 million gallons per day ("MGD"). The current pumpage from the aquifers by area wells is substantially below their sustainable yield. The Commission on Water Resource Management has not designated either aquifer as groundwater management areas.

Recreational Resources

~~71.~~129. The Lahaina area has over 10.3 acres of sub-regional and special-use park land per 1,000 residents. The sub-regional park system consists of 23 neighborhood parks. The West Maui community has access to two tennis courts, two sports fields, a gym, and a community center. The resorts in the area also offer supplemental recreational facilities.

130. Pulelehua will increase the number of recreational facilities available to Maui residents. Pulelehua will contain approximately 100 acres of parks and recreation areas. Recreation areas will include ~~two~~a ~~5~~10-acre community park with ball fields, neighborhood and pocket park~~s with ball fields,~~with community gardens, passive recreational areas, and an extensive multi-use trail system. Gulch areas will provide an additional 33 acres of open space. Petitioner intends to develop all parks and dedicate the larger community~~neighborhood~~ park~~s~~ and ball fields to the County of Maui. Petitioner intends to have the homeowner association maintain the trail system and neighborhood ~~the~~ parks.

131. Maui Oceanview LP has reached a general agreement with the

Maui Department of Parks and Recreation to develop and dedicate to the County a 10-acre regional park. The park will be located at the southern boundary of the property, off Honoapi’ilani Highway, and will be accessed through the additional access requested from the Hawaii Department of Transportation.

132. Maui Oceanview LP will also develop a number of smaller, privately maintained park areas as part of the Pulelehua community. A trail system will connect all phases of Pulelehua.

~~72.~~133. The original petitioner Maui Land and Pineapple Company, Inc. acknowledges it retains the obligation to provide the County of Maui with a 50-acre regional park.

Scenic Resources

~~73.~~134. The Petition Area is gently sloping and primarily characterized by active pineapple fields and fallow fields. Beyond the adjacent Kapalua-West Maui Airport are pineapple fields, most in active cultivation. Forested areas rise to the mountain peaks beyond the pineapple fields. An earthen berm and ironwood trees along Honoapi'ilani Highway block most mauka views, although such views are available where the highway crosses Mahinahina Gulch. From the highway in front of the Kahana Ridge Subdivision, the high retaining walls and houses block all mauka views. Within the Petition Area in the makai direction, there are panoramic views of the Pailolo Channel, Lana'i, and Moloka 'i from most areas.

~~74.~~135. A theme of Pulelehua is to preserve surrounding agricultural lands and open space vistas by creating a compact community in an appropriate setting. Development of Pulelehua would change existing mauka views from Honoapi'ilani Highway and Akahele Street from fallow agricultural fields to urban uses. A key design element of Pulelehua is a landscaped greenway along the length of Honoapi'ilani Highway. This greenway, as well as biking and walking trails, will be located where the existing earthen berm and ironwood trees are currently found.

~~75.~~136. Petitioner represents that all common area exterior lighting within Pulelehua will be shielded from adjacent residential properties to the extent possible. In addition, street lighting and common area lighting will be designed to minimize night sky light pollution to the extent possible. Petitioner will incorporate a combination of properly selected light fixture shades, bulb types and wattages, reflectors, and lens used within each fixture. To further reduce the visual impacts of Pulelehua, Petitioner will bury all utility lines underground.

Coastal/Marine Resources

~~76.~~137. Dr. Steven J. Dollar of Marine Research Consultants, Inc., conducted an assessment of the marine environment in the nearshore areas off the Petition Area. Since the mid-1980s, Dr. Dollar has studied the effect of resort development and golf course nutrient input on ocean water quality on all of the major Hawaiian Islands. Golf courses and resorts have a minimal impact on nearshore ocean water quality compared to large-scale sugarcane and pineapple cultivation. Nutrients such as nitrogen and phosphorus are found in high quantities in natural groundwater that flow into the ocean through underground streams. It is impossible to distinguish any nitrogen and phosphorus contributed by fertilizers from that contributed by groundwater entering the ocean. In addition, there is a high degree of mixing in nearshore waters in Hawai'i.

138. Development of housing at Pulelehua would have a positive rather than a negative effect on nearshore ocean water quality. All drainage will be retained onsite ~~land~~. The amount of nitrogen and phosphate expected to enter the ocean will be significantly reduced from the amounts used in pineapple cultivation. In addition, former pineapple fields presently lying

fallow will no longer be subject to erosion, reducing sedimentation discharge to the ocean and consequently the impact to any potential cultural practices along the shoreline.

139. At the time of MLP's original approval, MLP contemplated that Pulelehua would transmit wastewater to the County of Maui's Lahaina Wastewater Reclamation Facility (LWWRF). Maui Oceanview LP plans to develop its own wastewater treatment facility to meet the needs of Pulelehua.

~~77.~~140. Unlike the LWWRF, Maui Oceanview LP will develop a wastewater treatment system that does not employ injection wells to dispose of treated water. Instead, any treated water will be used for Pulelehua's irrigation needs (with any excess taken by MLP for its project needs).

ENVIRONMENTAL QUALITY

Noise

~~78.~~141. D.L. Adams & Associates, Ltd., prepared non-aircraft noise assessments for Pulelehua. The dominant noise sources in the vicinity of the Petition Area are traffic from Honoapi'ilani Highway and aircraft from the Kapalua-West Maui Airport. Other noise sources include wind and birds. Existing agricultural operations can also contribute to noise in the area depending on field operations, such as harvesting and plowing. The dominant short-term noise sources during construction of Pulelehua will be earth moving and other equipment. Petitioner will incorporate mitigative measures to minimize the level of noise and comply with all Federal and State noise control regulations. Following completion of construction, vehicular traffic volumes will increase due to the Project. Traffic noise predictions for the year 2011 including Pulelehua and other planned West Maui developments will increase ambient noise levels less than 3 decibels ("Db") over existing conditions. The noise impact due to Pulelehua traffic is less than 2 Db over future predictions of ambient noise levels without Pulelehua. The landscaped greenway along Honoapi'ilani Highway will act as a sound barrier to mitigate noise. A 3 Db increase is not perceptible to most people.

~~79.~~142. The Kapalua-West Maui Airport currently has approximately 25 operations per day. Under zoning and other rules currently in effect, airport operations could increase to a maximum of 140 operations per day. These restrictions preclude jet aircraft, helicopters, night flights, and general aviation. Mestre Greve Associates developed Day Night Noise Level ("DNL") Contours for the Kapalua-West Maui Airport using both the current level of operations and maximum level of operations. These models show that residential development at Pulelehua will not be significantly impacted by airport noise under the current level of operations or at maximum level of operations at Kapalua-West Maui Airport.

~~80.~~143. Petitioner is proposing the following mitigation measures to ensure compatibility of the residential portion of Pulelehua with the Kapalua-West Maui Airport:

- Notification to buyers of the proximity of the Kapalua-West Maui Airport and the presence of aircraft noise.
- No homes will be located within the 65 DNL contour (existing or on maximum operations).
- The residential units, if any, that are within the maximum operations 60 DNL will be built using noise reduction measures.
- No single-wall residential construction.

Air Quality

~~81.~~144. B.D. Neal & Associates prepared an air quality study of the Petition Area. Air quality in the region is relatively good. Existing impacts include distant volcanic emissions and possibly occasional localized impacts from traffic congestion. Emissions of fugitive dust can occur during periods where agricultural operations and field activity expose soils. Ambient air quality of the Petition Area and the surrounding communities is anticipated to be adversely affected from fugitive dust during the construction phase of Pulelehua. An effective dust control plan, which would include watering of active work areas and the use of windscreens in sensitive areas, will be implemented to ensure compliance with the State of Hawai'i Department of Health ("DOH") regulations. Following construction, motor vehicles entering, exiting, and transiting the Petition Area will result in a long-term increase in air pollution emissions on the Petition Area. To assess the impact of emissions, an air quality modeling study was undertaken to estimate current ambient concentrations of carbon monoxide at several intersections near the Petition Area and to predict future levels both within and outside the Petition Area. During worst-case conditions, model results indicated that 1-hour and 8-hour carbon monoxide concentrations will be within both State and Federal ambient air quality standards. Any impact development of Pulelehua is expected to have on ambient air quality will not be significant; therefore, implementing mitigation measures for traffic related air quality impacts is both unnecessary and unwarranted.

Soil Quality

~~82.~~145. Since approximately 1985, Petitioner's subsidiary, Maui Pineapple, has cultivated portions of the Petition Area in pineapple. In connection with its pineapple cultivation operations, Maui Pineapple has applied various fertilizers, pesticides, and plant growth regulators. Petitioner will conduct appropriate assessment and soils analyses to determine the possible impact to human habitation of the Petition Area due to potential residues of fertilizers and pesticides that may be present in the soil of former pineapple fields. If necessary, Petitioner will undertake measures to abate and remove any hazardous materials identified.

ADEQUACY OF PUBLIC SERVICES AND FACILITIES

Highway and Roadway Facilities

~~83.~~146. Hall Planning and Engineering, Inc., prepared a Traffic Impact

Analysis Report ("TIAR") for Pulelehua in March 2005 to identify the long-range traffic impacts of development of the Petition Area on the West Maui regional transportation system at peak hour traffic conditions at full buildout in the year 2011.

~~84.~~147. Honoapi'ilani Highway is a State highway with limited access that is designed primarily for regional circulation. It is intended to accommodate travel from one region to another as quickly and safely as possible and provides the primary access between West Maui and the rest of Maui. From Nakalele Point to Honokowai, it is a two-lane, undivided roadway. Between Honokowai and South Lahaina it is a four-lane, undivided roadway. From South Lahaina to Ma'alaea, it is again a two-lane, undivided roadway.

~~85.~~148. The TIAR evaluated present and projected 2011 level of service conditions at 11 intersections from the intersection of Honoapi'ilani Highway and Office Road, the main mauka-makai circulator roadway that serves the Kapalua Resort, to the intersection of Honoapi'ilani Highway and Aholo Street, south of Lahaina.

~~86.~~149. At all 11 intersections, Honoapi'ilani Highway could accommodate traffic projected to be generated from Pulelehua at full buildout. Existing peak hour traffic conditions at these 11 intersections, as well as projected future traffic conditions at these 11 intersections in year 2011, with and without construction of Pulelehua, are anticipated to be at level of service C or better, which is the optimal level of service. The TIAR projections assume that there will be five access points to Pulelehua but do not assume completion of the Lahaina Bypass Road described below, a reduction in school traffic as the number of elementary school students commuting to school in Lahaina will be reduced, or a reduction in commuter traffic as a number of people commuting to West Maui for work will move to Pulelehua.

~~87.~~150. The State of Hawai'i Department of Transportation ("DOT"), Highways Division, is proposing to construct a Honoapi'ilani Highway realignment. Phase I of the Honoapi'ilani Highway realignment is the Lahaina Bypass Road from Launiupoko to Mahinahina. Phase I is to be constructed in three parts. Phase IA, the first part, will run from the Keawe Street extension to Lahainaluna Road. The design-build contract for Phase IA is scheduled to be awarded in late 2006. Phase IA is estimated to cost $45 million. Phase IB, the second part, will run from Lahainaluna Road to Launiupoko. Phase IB is estimated to cost between $45 million to $60 million. Phase IC, the final part of the first phase, will be construction of the portion of the Bypass Road from Mahinahina to the Keawe Street extension. Phase IC is estimated to cost between $70 million to $90 million. Phase II, the larger phase of the Honoapi'ilani Highway realignment, is estimated to cost between $150 to $180 million and will run from Launiupoko to Ma'alaea. Construction of the Lahaina Bypass Road may start in 2007 and be completed in seven to eight years. Completion of the entire Honoapi'ilani Highway realignment will take at least 20 years.

~~88.~~151. At the present time, there are two existing and approved access points on Honoapi'ilani Highway from the Petition Area: Akahele Street and the North Road.

~~89.~~152. Akahele Street will serve as both the principal access to Pulelehua as well as to the Kapalua-West Maui Airport. Petitioner has proposed an additional three non-signalized intersections on Honoapi'ilani Highway from Pulelehua. In addition to Akahele Street and the North Road, the DOT, Highways Division, supports a third access point at South Street and is willing to consider a fourth, right-tum in and out movements at Middle Street. The DOT, Highway Division's, approval of a fourth access point will depend on the results of a revised TIAR that will evaluate Honoapi'ilani Highway as a two-lane highway and as a four-lane highway for three access points and for four access points. The four-lane analyses are required because Honoapi 'ilani Highway is on the verge of being warranted as a four-lane highway. The TIAR will be revised after the final development plan and internal circulation is set.

~~90.~~153. Petitioner would construct the access improvements, including acceleration and deceleration lanes on Honoapi'ilani Highway, and may be required to contribute land for the Lahaina Bypass Road. The DOT, Highways Division, will also encourage interconnecting points between adjacent or adjoining subdivisions for internal circulation.

~~91.~~154. The County of Maui encourages more access points to Pulelehua to facilitate emergency access and discourage speeding on Honoapi'ilani Highway. The County of Maui also prefers to split traffic over many access points rather than concentrate it at only two or three locations. The County of Maui also recommends an access point near the proposed Pulelehua elementary school. The DOT, Highways Division, opposes multiple access points, and considers an access point near the Pulelehua elementary school to be an unsafe condition that would allow school children access to a high-speed highway. It supports extending Ho'ohui road, a private road originally intended to provide access from Honoapi 'ilani Highway to the mauka subdivision, to provide the fourth access to Pulelehua.

155. The Federal government will make only $160 million per year available statewide over the next six years for highway projects. The Federal fuel tax revenues that make up the Federal Highway Trust Fund are projected to decrease as people purchase more fuel-efficient cars. The DOT, Highways Division, does not have enough funds to build needed new infrastructure using only public funds. The Federal Highway Administration is encouraging states and counties to use public- private partnerships for funding alternatives, including dedication of land for rights-of-ways, privately-funded planning and design, and tollways. Such partnering speeds up the planning and design process. The Lahaina Bypass is a public-private partnership between the Kaanapali Development Group and the DOT.

156. Under Maui Oceanview LP's proposed development, the existing Akahele Street continues to be a primary entrance to Pulelehua. Two additional access points to Honoapi'ilani Highway have been proposed to the Hawaii Department of Transportation (DOT). The northernmost access point will be limited to right-in, right-out access, whereas the southernmost access will provide full access to the southern retail and residential units, and the proposed 10-acre County Regional Park on the project site.

157. At the request of DOT-Highways, a Transportation Impact Assessment Report (TIAR) [Exhibit C] was prepared to reanalyze traffic impacts related to the Pulelehua development. The TIAR contemplates build out of Pulelehua as four scenarios.

~~92.~~158. In the initial scenario, two new Project roadways would bisect Akahele Street and provide direct access to the residential apartment buildings in addition to a new right-in, right-out connection at Honoapi'ilani Highway. In the second scenario primary access would continue to be provided at Akahele Street. The residential units and County Regional Park developed in the third scenario would be served by a new intersection to Honoapi'ilani Highway south of Mahinahina Gulch and Akahele Street. The addition of the elementary school in the fourth scenario would be served by the new intersection at Honoapi'ilani Highway and Akahele Street. –TIAR [Exhibit C], Project Description , p. 1-2.

Kapalua-West Maui Airport

~~93.~~159. The Kapalua-West Maui Airport borders the Petition Area to the east. The Kapalua-West Maui Airport was-privately built in 1987 and was subsequently acquired by DOT, Airports Division, which presently operates the Kapalua-West Maui Airport. There is an average of 25 aircraft operations a day at the Kapalua-West Maui Airport. Operations at the Kapalua-West Maui Airport are subject to a number of acquisition, zoning, and other restrictions which preclude operation of helicopters, jet aircraft, air tours, or general aviation. The limited size of the terminal, lack of fuel facilities, and topography of adjacent gulches as well as economics are other limiting factors to expansion of the airport or aircraft operations.

~~94.~~160. The Federal Aviation Administration ("FAA") has determined that the design and operating standards for the Kapalua-West Maui Airport must meet the specification for operation of the DeHavilland Canada-8. These design requirements include an 800-foot-wide ROFA, a trapezoidal-shaped RPZA, and RSA extending 600 feet from each end of the runway. Petitioner will not develop any structures within the ROFA, the RPZA, or the RSA. The DOT, Airports Division, has requested that Petitioner dedicate avigation easements over the ROFA, the RPZA, and the RSA. Petitioner requires that the DOT condemn avigation easements. The FAA has determined that proposed buildings and improvements in Pulelehua present no hazard to air navigation.

~~95.~~161. There is a rise in the terrain at the approach (south) end of the runway that extends down the runway for about 1,500 feet. This rise in terrain penetrates the imaginary surface (transitional surface) within the ROFA. This obstruction is a discrepancy resulting in the Kapalua-West Maui Airport not being in compliance with the requirements of Title 14 CFR Part 139 of the FAA's Airport Certification Manual. This discrepancy is related to development of the Kapalua-West Maui Airport but is not caused by and has no relationship to Petitioner's development of Pulelehua.

Potable Water Service

~~96.~~162. Petitioner intends to use treated surface water from its Honolua Ditch to provide potable water to Pulelehua. Honolua Ditch collects water from Honolua and Honokohau Streams. The County of Maui Department of Water Supply ("DWS") presently draws approximately 2.5 MGD of water from the Honolua Ditch at its treatment facility at Mahinahina to supply domestic water to West Maui. Petitioner and the DWS are presently negotiating an agreement pursuant to which the DWS will expand its Mahinahina water treatment facility and Petitioner will permit the DWS to draw up to an additional 2.0 MGD from the Honolua Ditch for treatment. Petitioner would then be entitled to potable water service from the DWS for Pulelehua.

163. Pulelehua is expected to use approximately 0.72 MGD potable water at full buildout. The required quantity of potable water could be furnished either using the DWS Mahinahina Treatment Facility or a private treatment facility built by Petitioner. As an alternative, Petitioner could provide potable water service through wells drilled mauka of the Petition Area in the Honolua or Honokowai Aquifers.

~~97.~~164. Maui Oceanview LP has negotiated access to water from MLP and plans to develop a private water treatment facility for Pulelehua.

Non-Potable Water Service

~~98.~~165. Petitioner intends to use recycled R-1 water from the Lahaina Wastewater Reclamation Facility ("LWWRF") located approximately 3,500 feet south of the Petition Area to irrigate landscaping for the community parks, neighborhood parks, open spaces, and the common areas for the multi-family units and the proposed school site, as well as to satisfy fire flow requirements. Irrigation requirements are estimated to be 0.2 MGD. R-1 water is presently pumped from the LWWRF to a 5.5 million-gallon open reservoir above the Kapalua-West Maui Airport where it is mixed with surface water and used for plantation irrigation. Use of R-1 water for irrigation will reduce the average daily potable water demand of Pulelehua by approximately 22 percent to 0.72 MGD of water per day.

Wastewater

~~99.~~166. All existing County wastewater facilities in the vicinity of the Petition Area are located makai of Honoapi'ilani Highway, along Lower Honoapi-'ilani Road. These facilities include gravity sewer lines, sewer force mains, and sewer pump stations. In addition, there is a private wastewater collection for Kahana Ridge in the north area of the subdivision. The Kahana Ridge wastewater system connects to the County's sewer system at Ho' ohui Road. All sewage from the area is transported to the LWWRF.

~~100.~~167. Petitioner intends to construct a new sewage collection system within the Petition Area to transport wastewater to the LWWRF for processing and disposal.

168. When fully built_out, Pulelehua is expected to generate approximately 0.346 MGD of wastewater. The LWWRF has sufficient capacity to treat wastewater to be generated by Pulelehua if the Project were developed today. The LWWRF is permitted to inject approximately 9.0 MGD of treated effluent into the onsite injection wells, and currently processes approximately 5.2 MGD. While the County of Maui has the capacity to process an additional approximately 4.0 MGD, or sufficient capacity to serve an additional 11,000 homes, the LWWRF does not currently have the manpower or equipment to process the additional wastewater. The County of Maui has a plan to upgrade capacity to 7 MGD to serve an additional 1,000 to 2,000 homes with minimal staffing and infrastructure improvements. Major improvements will be required to enable the LWWRF to increase processing capacity to 9 MGD. Petitioner and the DPWEM, Wastewater Division, have been discussing collection system and LWWRF expansion improvements to accommodate Pulelehua.

169. At the time of MLP's original approval, MLP contemplated that Pulelehua would transmit wastewater to the County of Maui's Lahaina Wastewater Reclamation Facility (LWWRF). Maui Oceanview LP plans to develop its own wastewater treatment facility to

serve the needs of Pulelehua, with no connection to the LWWRF.

170. Further, unlike the LWWRF, Maui Oceanview LP will develop a wastewater treatment system that does not employ injection wells to dispose of treated water. Instead, the treated R-1 water will be used for Pulelehua's irrigation needs (with any excess taken by MLP for its project needs).

Maui Oceanview LP anticipates that Pulelehua will be more ecologically friendly for the makai nearshore waters. Maui Oceanview LP's treatment plant will serve the entire project without implementing injection wells for disposal of treated water. Instead, Maui Oceanview LP intends to use the reclaimed water for the nonpotable irrigation needs of Pulelehua.

Drainage

~~101.~~171. There are three drainageways which traverse through or bound the Petition Area. To the north, Kahanaiki Gulch traverses the northern boundary. It joins Kahana Stream before it crosses Honoapi'ilani Highway. The shallow P~~6~~ohaku-Ka'anapali Gulch traverses approximately midway through the Petition Area. The Kapalua-West Maui Airport intercepts drainage from the upper limits of this gulch so that it is primarily dry within the Petition Area. Mahinahina Gulch traverses the Petition Area at approximately 1,000 feet from its southern boundary.

~~102.~~172. The existing drainage pattern is generally in the east to west (mauka-makai) direction toward Honoapi'ilani Highway. There are three large existing drainage basins within or adjacent to the Petition Area which collect runoff and remove silt and debris before the runoff discharges into the ocean. These basins are: (i) the Kahana Basin located immediately to the north of the Petition Area; (ii) the Pohaku-Ka'anapali Basin located approximately in the middle of the Petition Area; and (iii) the Mahinahina Basin located at the southwest corner of the

Petition Area. Two smaller detention basins are located to the north and south of the intersection of Akahele Street and Honoapi'ilani Highway.

~~103.~~173. There are two 144-inch culverts where Honoapi'ilani Highway crosses Miihinahina Gulch that were designed to accommodate a 100-year flow of 4,275 cubic feet per second ("cfs"). A 120-inch culvert diverts runoff from Pohaku- Ka'anapali Gulch under Honoapi'ilani Highway with a 100-year design flow of 674 cfs. A bridge (Kahana Kai Bridge) along Honoapi'ilani Highway diverts the 100- year discharge flow of 7,540 cfs from Kahanaiki Stream and Kahana Stream. Runoff from all three drainageways eventually discharges into the ocean.

174. Development of Pulelehua is expected to generate a fifty-year storm runoff of 878 cfs, an increase of 544 cfs over existing conditions. The increase in onsite runoff will be diverted to onsite detention basins located within greenways located mauka of Honoapi'ilani Highway. The greenways will also serve as a landscape buffer between Honoapi'ilani Highway and Pulelehua. There will be no increase in runoff from Pulelehua sheet flowing onto Honoapi'ilani Highway, makai properties, or the ocean for a 50-year storm.

175. Maui Oceanview LP's consultant Kimley-Horn has prepared a preliminary draining report for the Pulelehua project as proposed for development. At full build-out the development is planned to construct approximately 800 affordable and market-rate, multi-family residential units (roughly 80 buildings with 10 units each), 100 single-family residential lots, a 10-acre community park, 3 retail centers totaling approximately 70,000 square feet, along with open space of varying levels of use. A future school site is also planned for the site, situated on approximately 13 acres. See Preliminary Drainage Report ("Prelim. Drainage Rep.") [Exhibit G], p. 1.

176. The Final Environmental Impact Statement prepared for Pulelehua noted, "development of the Pulelehua project is not expected to have a significant adverse effect on

downstream properties or coastal marine waters." Prelim. Drainage Rep. [Exhibit G], p. 3.

177. Kimley-Horn estimates "[t]he post development runoff from the Pulelehua site is estimated to be 851 cfs, an increase of 451 cfs over existing conditions." Prelim. Drainage Rep. [Exhibit G], p. 3. " However, additional runoff due to development of the community will be detained onsite in a series of detention basins, with no increased flow to downstream properties (including Honoapi'ilani Highway and the Kahana Hui and Kahana Ridge subdivisions), or into the existing drainage ways, desilting basins, or the ocean." Prelim. Drainage Rep. [Exhibit G], p. 3 & Exhibit 5. "No additional runoff will be released into the existing drainageways or onto Honoapi'ilani Highway." Prelim. Drainage Rep. [Exhibit G], p. 5.

178. Maui Oceanview LP will have detailed drainage studies prepared to accompany the improvement plans for each phase of development and will include storm drain inlet and pipe sizing calculations, detention basin sizing and draw-down calculations and the design of onsite storm drain related features. Prelim. Drainage Rep. [Exhibit G], p. 4. "The net result of the proposed drainage improvements will be no increase in runoff from the project site to the downstream properties." Prelim. Drainage Rep. [Exhibit G], p. 5.

Solid Waste

~~104.~~179. The DPWEM provides residential refuse collection in the Mahinahina area. Refuse is collected and taken to the County's Central Maui Sanitary Landfill, located four miles southeast of the Kahului Airport on Piilehu Road. The Olowalu transfer station is located about four miles southeast of Lahaina and accepts self-haul waste from West Maui residents for transfer to the landfill. The landfill is projected to have sufficient capacity to accommodate residential and commercial waste through 2020.

~~105.~~180. Significant levels of solid waste are not currently being generated on the Petition Area.

~~106.~~181. After buildout and sales of all Pulelehua homes, total waste from all households is estimated to be approximately 10,827 pounds per day. This estimate includes the waste from all potential 'ohana units. The DPWEM, Solid Waste Division, does not have an established method or formula to estimate the amount of solid waste generated from commercial and light industrial uses. There are also no established methods or formulae established by the State of Hawai'i or at the national level. This is likely due to the fact that, unlike residential uses, the type and amount of solid waste generated by commercial and light industrial uses can vary widely, and is therefore difficult to accurately project.

~~107.~~182. Petitioner anticipates that it will collect solid waste generated by the commercial operations, and the homeowners associations will contract with private refuse collection companies to dispose of solid waste generated by residents of Pulelehua. All solid waste will be disposed at the landfill. Petitioner will encourage recycling, and will continue and expand its green waste recycling program for all green waste generated on the Petition Area. The development of Pulelehua is not expected to adversely impact the County of Maui's solid waste facilities.

Schools

~~108.~~183. Educational facilities in West Maui include four public schools and two private schools. The public schools include King Kamehameha III Elementary (grades K-5), Princess Nahienaena Elementary (grades K-5), Lahaina Intermediate (grades 6-8), and Lahainaluna High (grades 9-12). The private schools include Sacred Hearts School (grades K-8) and West Maui Carden Academy.

~~109.~~184. Kamehameha III Elementary School is the designated public elementary school for students from Honokohau Valley to Ka'anapali (which includes the Petition Area). All Kamehameha III Elementary School students must be transported to and from school, either by school buses, or by other means. The State of Hawai'i Department of Education ("DOE") operates six school buses to transport 254 students to Kamehameha III Elementary School from Honokohau Valley to the Ka'anapali area. Many of these students reside in the vicinity of the Petition Area.

~~110.~~185. Petitioner has designated a 13-acre site in Pulelehua for development of a public elementary school ("School Site"). The DOE is willing to accept the School Site and construct a public school on the School Site, subject to legislative approval and appropriation of funds. Petitioner and the DOE estimate that at full buildout, Pulelehua will generate approximately 239 elementary school students, 115 middle school students, and 136 high school students for a total of 490 public school students.

~~111.~~186. Children living in Pulelehua would attend either Pulelehua's new elementary school, Lahaina Intermediate School, or Lahainaluna High School. Pulelehua's school would also serve many of the approximately 495 of Kamehameha III School's 750 students who live north of Kifanapali.

~~112.~~187. Petitioner and the DOE have entered into an education contribution agreement for Pulelehua which provides for dedication of approximately 5.8 acres of land as well as a cash contribution of $2.38 million 'Which will be used to acquire the remainder of the School Site. These contributions will be made to the DOE pursuant to the conditions set forth in the agreement.

188. It is critical that construction of the public elementary school at the School Site be timed to coincide with occupancy of the housing.

~~113.~~189. Maui Oceanview LP's plans for Pulelehua include locating a future Hawaii DOE elementary school off Honoapi'ilani Highway within the Project District. DOE has selected a location as shown on the updated Site Plan. See Preliminary Phasing Plan [Site Plan Sheets]. Maui Oceanview LP will reserve portions of its property along Honoapi'ilani Highway for future dedication for storage and turning lanes that may be required when the school is constructed and operating.

Police and Fire Protection

~~114.~~190. The Petition Area is located within the County of Maui Police Department's Lahaina District. The closest police station is at the Lahaina Civic Center. Petitioner is willing to include a police substation in the Pulelehua Town Center. Availability of affordable housing at Pulelehua may ameliorate the Police Department's difficulty in retaining officers to serve in the Lahaina District. Development of Pulelehua is not expected to significantly impact the need for public police services.

~~115.~~191. Two fire stations cover the Lahaina region: the Lahaina Fire Station and the Napili Fire Station. The Lahaina Fire Station is responsible for the Lahaina, Olowalu, and Ka'anapali areas. The Napili Fire Station is responsible for the Honok6wai, Napili, and Kapalua areas and is approximately two miles from the Petition Area.

~~116.~~192. The proposed street widths of Pulelehua are sufficient to accommodate fire equipment in an emergency.

~~117.~~193. The Napili Fire Station is adequate to provide the level of service that is needed for Pulelehua.

Emergency Medical Services

~~118.~~194. Emergency medical services to the Petition Area are presently provided from the Maui Memorial Medical Center in Kahului. Petitioner has offered the HHSC a 15-acre site in Pulelehua for the development of a medical facility in West Maui that could include urgent care and long-term care services.

Electrical Power and Telecommunications Services

~~119.~~195. Main electrical, telephone, and cable television overhead transmission lines are located on the mauka side of Honoapi'ilani Highway. Maui Electric Company, Ltd., has a substation adjacent to the Petition Area above the Kapalua-West Maui Airport. Electrical and telecommunications capacity is adequate to serve the Petition Area. All utility lines and distribution systems serving Pulelehua will be underground.

COMMITMENT OF STATE FUNDS AND RESOURCES

~~120.~~196. Government costs to provide services are expected to exceed State and County tax revenues derived from Pulelehua on a long-term basis, which follows the normal trend of residential housing subdivisions. Government costs will include public education, fire, emergency medical service, and police service. Although Petitioner is expected to contribute its fair share for the capital cost of constructing government improvements, the cost of delivering public services to a housing development with a substantial affordable component will exceed anticipated tax revenues.

~~121.~~197. State tax revenue for the ten-year construction and sales period should exceed $26.8 million from income tax and $37.7 million from general excise tax, and will stabilize at $5.8 million annually from income tax and $6.9 annually from general excise tax following completion of construction. State costs associated with delivering services to Pulelehua are estimated to be $58.1 million during the construction and sales period and $14.7 million a year thereafter. The State will experience a net revenue benefit of $6.4 million during the buildout and sales period and a stabilized loss of approximately $2.0 million a year thereafter.

198. The County of Maui should receive $8 million in real property tax revenue from Pulelehua over the ten-year construction and sales period and an estimated $1.5 million a year thereafter. The County government operating costs associated with providing services to Pulelehua on a per capita basis is estimated to total approximately $23.0 million for the construction and sales period and approximately $5.8 million thereafter on a stabilized basis. The County should expect a net revenue loss of $15.0 million during the construction and sales period and a loss of approximately $4.3 million a year thereafter. Property tax revenue is anticipated to be substantially lower for an affordable housing development than for a market price development, and the cost of delivering services higher for an affordable housing development than for a market price development.

199. Maui Oceanview LP's consultant CBRE forecast public fiscal (or cost/benefit) impacts estimated on a per capita basis founded on a conservative assumption that each new person added to the Maui community is "responsible for" a similar tax cost/obligation as every other person on the island. CBRE's analysis focused on "new" or additional fiscal benefits (incoming tax dollars) to the State and County arising from the development of Pulelehua not those monies/costs which are merely flowing from elsewhere on the island.

200. In-migration to Maui accounts for about 50 to 60 percent of the total net increase in resident population figures. We estimate that about half (50%) of Pulelehua residents and households will be in-migrating during the absorption period. These individuals represent "new" impacts to the economy and the public purse. Their household income and spending create new tax dollars the State, while their presence on the island creates new per capita spending obligations for the State and County. CBRE's analysis focused on these "new" to Maui 1,148 individuals and 449 households.

201. The 1,148 full-time residents within the subject project which are not in-migrants are the product of "natural growth" of existing Maui households or relocating from elsewhere on the island. As such, their government fiscal impacts (tax revenues and services costs) are already in-place and factored into existing County and State budgets. Their household income and spending and the tax dollars they create are already being earned, spent and taxed, while their public costs, such as schools, parks, emergency and social services and capital expenditures are already being expensed in governmental budgets. Neither their taxes-generated or government-costs are "new" or additions to Maui and the State, they are assumed to already be flowing through the Maui economy and government coffers and would continue to do so at the same level regardless of the development of Pulelehua.

202. The "new" tax benefits flowing from Pulelehua include Real Property Taxes to Maui County; the General Excise Taxes and Income Taxes to the State from construction worker wages, the new Maui households, the commercial/retail businesses and their employees, the apartment rental operation, and community association management and maintenance (and their employees).

- The County of Maui will realize "new" Real Property Taxes ($5.9 million), traffic impact fees ($6 million), and other secondary receipts and development fee totaling $22.6 million during the 9-year building and initial residency projection period (2018-2026), and $4.8 million annually on a stabilized basis thereafter.
- The State of Hawaii will receive "new" Gross Excise and Income taxes, secondary revenues, and school impact fees of $76.4 million during the 2018-2026 modeling period, and $10.5 million per year thereafter. The County of Maui will incur "new" additional per capita public costs of $14.6 million during build-out and $4 million annually on a stabilized basis in 2027 and beyond.
- The State of Hawaii will incur "new" additional per capita public costs of $35 million during build-out and $9.6 million annually on a stabilized basis in 2027 and beyond.
- The net public benefit to Maui from Pulelehua, beyond the provision of critical workforce and market rental opportunities in West Maui, will be $8.1 million during construction and absorption and $756,600 per year as stabilized.
- The net public benefit to the State of Hawaii from Pulelehua will be $41.5 million during construction and absorption and $908,300 per year as stabilized.

• In no model period does either the County or the State "lose" money (run a negative regarding new tax income versus new tax obligations).

CONFORMANCE TO URBAN DISTRICT STANDARDS

~~122.~~203. Pulelehua generally conforms to the standards applicable to establishing the boundaries of the State Land Use Urban District set forth in section 15-15-18, HAR, in the following respects:

a. Pulelehua is bordered by the Kapalua-West Maui Airport, and the Kahana Ridge Subdivision, and urban development makai of Honoapi'ilani Highway, all of which are in the Urban District, and is characterized by "city-like" concentrations of people, structures, streets, urban level of services, and other related land uses.

b. The in-fill location of Pulelehua - between the Kapalua Resort and the K~~i~~a~~f'~~anapali Resort in the existing Urban District - is an appropriate location for the new community and is in accord with widely accepted planning principles of placing new urban uses contiguous to existing urban uses. Once development occurs on the Department of Hawaiian Horne Lands properties to the south, the entire Petition Area will be effectively surrounded by urban development.

c. Pulelehua is located between Ka'anapali and Kapalua, two of West Maui's primary centers of trading and employment.

d. Basic services such as schools, parks, wastewater systems, drainage, potable water, irrigation water, transportation systems, public utilities, and police and fire protection are either already available to the Petition Area or can readily be provided to the Petition Area.

e. Reclassification of the Petition Area is reasonably necessary for urban growth.

f. The Petition Area is reasonably free from danger of flood, tsunami, unstable soil condition, and other adverse environmental effects. The Petition Area does not include land with a general slope of 20 percent or more, except for portions characterized as gulches. Design and construction controls to be imposed on Pulelehua will be adequate to protect the public health, welfare, and safety and the public's interests in the aesthetic quality of the landscape.

g. Pulelehua will be designed to complement the Petition Area's natural attributes, mitigate environmental conflicts, enhance scenic amenities, and protect historic resources. The portions of the Petition Area planned for the residential and other uses are located on relatively flat areas formerly cultivated in pineapple. To the extent possible, improvements will conform to the contours of the land, limiting the need for extensive grading.

CONFORMANCE WITH THE GOALS. OBJECTIVES, AND POLICIES OF THE HAWAI'I STATE PLAN; RELATIONSHIP WITH APPLICABLE PRIORITY GUIDELINES AND FUNCTIONAL PLANS

Hawai'i State Plan

~~123.~~204. Reclassification of the Petition Area generally conforms to the following applicable goals, objectives, policies, and guidelines of the Hawaii State Plan.

HRS §226-4 State goals

Goal:	(3)	*Physical, social, and economic well-being, for individuals and families in Hawaii, that nourishes a sense of community responsibility, of caring, and of participation in community life.*

HRS §226-5 Objective and policies for population

Policies:	5(b)(1)	*Manage population growth statewide in a manner that provides*

increased opportunities for Hawaii's people to pursue their physical, social, and economic aspirations while recognizing the unique needs of each county.

5(b)(3) *Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.*

As a function of conditions imposed on Petitioner's Kapalua Mauka development in LUC Docket No. A03-741 and representations by Petitioner in this docket, Pulelehua will promote increased opportunities for Hawai'i's people to pursue their physical, social, and economic aspirations by:

- Helping to satisfy the housing demand of a growing population and expanding job base by providing ~~882~~ 900 homes in West Maui, at least ~~51~~ 31 percent of which will be for ~~sale or~~ rent to families earning less than 140 percent of the County of Maui median income;
- Creating a community that fosters an authentic sense of place, respects the land, and provides a vital and sustaining life experience;
- Providing affordable and moderately priced housing for the working families of Maui, and specifically for residents who work in West Maui;
- Providing homes near employment centers, thereby increasing quality of life by decreasing commuting; and
- Creating "affordable housing with dignity," by providing a variety of affordable housing options integrated into a complete community rather than an affordable housing development

HRS §226-6 Objectives and policies for the economy in general

Policies:

6(a)(1) *Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people.*

Pulelehua will contribute to Hawai'i's economy by:

- Providing homes for sale and rent to Maui's primary workers who earn less than 140 percent of the median income. These workers, including resort employees, teachers, police, firefighters, and others, fill necessary positions and provide essential services crucial to keeping Maui's economy stable and growing; and
- Creating approximately:
  - ~~8,399~~1,141 "worker years" of construction trades employment on Maui over the initial construction and sales period (a "worker year" is the amount of time one full-time worker can work in one year); the commercial/retail businesses will have 982 worker years and business/community association and

maintenance worker years will total 97 during the same period;

- ~~634~~ 228 permanent full-time equivalent jobs onsite (businesses within Pulelehua) with annual wages of $~~16~~ 7.8million, with initially 982 worker years of employment from 2020 to 2026 and associated wages of $33.4million;
- permanent full-time equivalent jobs in the regional economy with annual wages of $1.~~7~~ 2 million (maintenance, landscaping, and upgrading of the Pulelehua homes and buildings); and

$~~30.9~~47.9 million per year in discretionary expenditures infused into the island economy from community residents.

HRS §226-11 Objectives and policies for the physical environment-land-based, shoreline, and marine resources

Policies:

11(b)(2) *Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.*

11(b)(3) *Take into account the physical attributes of areas when planning and designing activities and facilities.*

- The Petition Area is not a known habitat for any threatened or endangered plant species.
- The Petition Area is not a known habitat for any threatened or endangered species of bird or mammal.
- Pulelehua has the potential to improve conditions in the marine environment as sedimentation discharge to the ocean will be significantly less with Pulelehua compared to agricultural uses, and there is likely to be a decrease in the flux of nutrients (e.g., fertilizers) to the ocean. Any cultural practices along the Mahinahina and Kahana shoreline will not be adversely impacted.

HRS §226-13 Objectives and policies for the physical environment-land, air, and water quality

Policies: 13(b)(2) *Promote the proper management of Hawai'i 's land and water resources.*

13(b)(7) *Encourage urban developments in close proximity to existing services and facilities.*

Pulelehua's design will be sensitive to the environment and scenic beauty, and will complement the Petition Area's natural attributes. The portions of the Petition Area planned for residential use are located on gently sloping areas formerly cultivated in pineapple. To the extent possible, improvements will conform to the contours of the land, limiting the need for extensive grading.

Development of Pulelehua will have a positive rather than an adverse effect on coastal marine waters. Detention and desilting basins within Pulelehua will maintain the exiting flows and there will be no increase in runoff flowing from the Petition Area.

The Petition Area is located between West Maui's primary employment areas of Kapalua and Ka'anapali. The Petition Area is also bordered by existing urban uses makai of Honoapi'ilani Highway, Kapalua-West Maui Airport, and the Kahana Ridge Subdivision

HRS §226-15 Objectives and policies for facility systems-solid and liquid wastes

Policies: 15(b)(1) *Encourage the adequate development of sewerage facilities that complement planned growth.*

15(b)(2) *Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.*

~~Petitioner~~ Maui Oceanview LP will build a sewer collection system in Pulelehua that will transmit wastewater to ~~the LWWRF~~a privately maintained and operated treatment plant. Petitioner will utilize R-l water to irrigate common area landscaping and for fire protection.

Petitioner will encourage recycling, including recycling of all green waste onsite. Petitioner will also encourage low flow water fixtures and water efficient appliances.

HRS §226-16 Objective and Policies for Facility Systems-Water

Policies: 16(b)(1) *Coordinate development of land use activities with existing and potential water supply.*

16(b)(3) *Reclaim and encourage the productive use of runoff water and wastewater discharges.*

16(b)(4) *Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.*

~~The DWS~~ Maui Oceanview LP will provide potable water for Pulelehua by treating water from the privately-owned and operated Honolua Ditch, without increasing the amount of water diverted from the Honokohau Stream. Petitioner will use a mixture of R-1 water and surface water for non-potable irrigation and fire requirements.

HRS §226-17 Objectives and policies for facility systems-transportation

Policies:	17(a)(1)	*An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.*
	17(b)(6)	*Encourage transportation systems that serve to accommodate present and future development needs of communities.*
	17(b)(10)	*Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawai'i 's natural environment.*

- Pulelehua's homes near employment will allow workers more transportation options to travel to work, such as walking and bicycling, and will make public transportation more feasible by clustering populations and destinations within in a defined area along a practical route.
- Providing homes near employment centers will decrease commuting time, thereby increasing quality of life.
- ~~The traditional neighborhood design of Pulelehua will serve to minimize trips onto Honoapi'ilani Highway as many essential services needed by Pulelehua residents will be within walking and biking distance, such as stores, restaurants, parks, and a school.~~
-

HRS §226-19 Objectives and policies for socio-cultural advancement-housing

Policies:	19(b)(1)	*Effectively accommodate the housing needs of Hawai'i's people.*
	19(b)(2)	*Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income, and gap-group households.*
	19(b)(3)	*Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.*
	19(b)(5)	*Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.*
	19(b)(7)	*Foster a variety of lifestyles traditional to Hawai'i through the design and maintenance of neighborhoods that reflect the culture and values of the*

community.

As a function of conditions imposed on Petitioner's Kapalua Mauka development in LUC Docket No. A03-741 and representations by Petitioner in this docket, Pulelehua implements objectives and policies for socio-cultural advancement by:

- Helping to satisfying the housing demand of a growing population and expanding job base by providing ~~882~~ 900 homes in West Maui, at least ~~51~~ 31 percent of which will be for sale or rent to families making less than 140 percent of the County of Maui median income;
- Creating "affordable housing with dignity," by providing a variety of affordable housing options integrated into complete neighborhoods, and not segregated into an affordable "project;"
- Creating a community that fosters an authentic sense of place, respects the land, and provides a vital and sustaining life experience;
- Providing affordable and moderately priced housing for the working families of Maui, and specifically for those who work in West Maui;
- Providing homes near employment centers, thereby increasing quality of life by decreasing commuting;
- Creating genuine neighborhoods by design where residents can walk and interact with their neighbors; and
- Creating traditional neighborhoods with a mix of uses and housing types that embrace a diversity of people and activities.

HRS §226-23 Objective and policies for socio-cultural advancement-leisure

Policies: 23(b)(3) *Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.*

- Pulelehua will include neighborhood parks, ball fields, community gardens, and an extensive trail system of linked paths and trails to allow pedestrians and bicyclists to have another option for movement through the neighborhood. Maui Oceaview LP will provide the County of Maui with a 10-acre regional park.
- Pulelehua's parks will be open to all Maui residents.

HRS §226-104 Population growth and land resources priority guidelines

10(a)(1) *Encourage planning and resource management to ensure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawai'i 's people.*

- Maui County's population is projected to increase from 139,573 people in 2005 to 175,136 people in 2020, a 25.5 percent increase. West Maui's population is expected to increase from 19,779 people in 2005 to 25,431 people in 2020, a 28.5 percent increase. The increase in West Maui's population results in projected housing demand of approximately 3,447 to 5,440 additional homes in West Maui by 2020. The majority of this demand will be for homes affordable to families making between 80 to 140 percent of the County of Maui median income.

- Pulelehua will help to satisfy the housing demand of a growing population and expanding job base, thus contributing to the stable social and economic well-being of residents.

HRS §226-106 Affordable Housing

226-106(4) *Create incentives for development which would increase home ownership and rental opportunities for Hawaii's low- and moderate- income households, gap group households, and residents with special needs.*

226-106(6) *Encourage public and private sector cooperation in the development of rental housing alternatives.*

226-106(8) *Give higher priority to the provision of quality housing that is affordable for Hawai'i's residents and less priority to development of housing intended primarily for individuals outside of Hawai'i.*

As a function of conditions imposed on Petitioner's Kapalua Mauka development in LUC Docket No. A03-741 and representations by Petitioner in this docket, Pulelehua implements these affordable housing guidelines by:

- Helping to satisfy the housing demand of a growing population and expanding job base by providing ~~882~~ 900 homes in West Maui, at least ~~51~~ 31 percent of which will be for sale or rent to families making less than 140 percent of the County of Maui median income;
- Creating traditional neighborhoods with a mix of uses and housing types that embrace a diversity of people and activities;
- Creating "affordable housing with dignity," by providing a variety of affordable housing options integrated into complete neighborhoods, and not segregated into an affordable "project;"
- Creating genuine neighborhoods by design where residents can walk and interact with their neighbors; and
- Providing homes near employment centers, thereby increasing quality of life by decreasing commuting.

Functional Plans

~~124.~~205. Reclassification of the Petition Area generally conforms to the functional plans in the following program areas: employment, housing, recreation, and transportation.

CONFORMANCE WITH THE COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES

~~125.~~206. Reclassification of the Petition Area generally conforms to the objectives and policies of the Coastal Zone Management Program as defined in chapter 205A, HRS, as follows:

(1) Recreational resources

(A) Provide Coastal recreational opportunities to the public

While not on the coast, Pulelehua will include neighborhood parks, ball fields, community gardens, and an extensive trail system, which will be open to the public. Maui Oceanview LP will provide the County of Maui with a 10-acre regional park.

(2) Historical resources

(A) Provide, preserve, and where feasible, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

No significant archaeological resources have been identified on the Petition Area. Petitioner will comply with all laws and rules regarding the preservation of archaeological, cultural, and historic sites should any sites be found during construction of Pulelehua.

(3) Scenic and open space resources

(A) Protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources.

Pulelehua is located mauka of Honoapi'ilani Highway and will not impede the coastal scenic and open resources of the area. Pulelehua will be a compact community designed to preserve and enhance open space areas. It will feature a landscaped greenway along the length of

Honoapi'ilani Highway. Moreover, all common area exterior lighting will be shielded from adjacent residential properties and designed to minimize night sky light pollution to the extent possible.

(4) Coastal ecosystems

(A) Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Development of Pulelehua has the potential to improve conditions in the marine environment. With the change from agricultural use to residential use, there is likely to be a decrease in the flux of nutrients (e.g., fertilizers) to the ocean. It is likely that sedimentation discharge to the ocean will be significantly less following development of Pulelehua.

(5) Economic uses

(A) Provide public or private facilities and improvements important to the State's economy in suitable locations.

With the increase in West Maui's population, forecasts of housing demands, and the creation of additional jobs in West Maui, Pulelehua will provide homes to workers, including resort employees, teachers, police, firefighters, and others who provide essential services that keep Maui's economy stable and growing. Pulelehua is an in-fill community between existing urban areas and is not located along the coast.

(6) Coastal hazards

(A) Reduce hazard to life and property; from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

- Pulelehua is not in a tsunami zone or flood zone.
- All additional runoff due to the community will be retained on site with no increased flow to downstream properties (including Honoapi'ilani Highway, and the Kahana Hui and Kahana Ridge Subdivisions).
- Pulelehua will be in compliance with all laws and regulations regarding runoff and non-point

source pollution, ensuring that storm water runoff and siltation will not adversely affect the downstream marine environment and nearshore and offshore water quality.

(7) Managing development

(A) ' *Improve the development review process, communication, and public participation in the management of coastal resources and hazards.*

(8) Public participation

(A) Stimulate public awareness, education, and participation in coastal management.

Petitioner conducted a week-long public charrette in March 2004 to solicit public participation in the design of Pulelehua. The potential short-term and long-term impacts of Pulelehua have been described in the Final EIS for Pulelehua which the Commission accepted on July 13, 2005. In addition, the Maui County Planning Commission ~~is currently conducting~~conducted public hearings on Pulelehua and the County adopted zoning for Pulelehua as Project District No. 5 and codified as Maui County Code chapter 19.93.

(9) Beach protection

(A) Protect beaches for public use and recreation.

Pulelehua will not be ~~locatetl~~ located along the shoreline, and is therefore not expected to interfere with the public's use of the beaches in the area.

(10) Marine resources

(A) Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Development of Pulelehua has the potential to improve conditions in the marine environment. With the change from agricultural use to residential use, there is likely to be a decrease in the flux of nutrients to the ocean. It is likely that sedimentation discharge to the ocean will be less following development of Pulelehua.

CONFORMANCE WITH THE COUNTY OF MAUI GENERAL PLAN

~~126.~~207. Petitioner has filed an application to amend the West Maui Community Plan Land Use Map to designate Project District 5. The County adopted zoning for Pulelehua as Project District No. 5 and codified as Maui County Code chapter 19.93. Development of Pulelehua is consistent with the following objectives and policies of the Maui County General Plan and the West Maui Community Plan.

The following are General Plan objectives and policies that are applicable to Pulelehua:

Land Use

Objective 1: To preserve for present and future generations existing geographic, cultural and traditional community lifestyles by limiting and managing growth through environmentally sensitive and effective use of land in accordance with the individual character of the various communities and regions of the country.

Objective 2: To use the land within the County for the social and economic benefit of all the County's residents.

Policy d: Formulate a directed land use growth strategy that will encourage the redevelopment and infill of existing communities allowing mixed land uses, where appropriate.

Policy b: Encourage land use patterns that foster a pedestrian oriented environment to include such amenities as bike paths, linear parks, landscape buffer areas, and mini parks.

Policy d. Encourage land use methods that will provide a continuous balanced inventory of housing types in all price ranges.

Policy e. Encourage programs to stabilize affordable land and housing prices.

Pulelehua will be developed as ~~an affordable~~ a community between existing urban areas in accordance with widely accepted planning principles of placing new urban uses contiguous to existing urban uses. Pulelehua will include rental and for-sale housing in all price ranges. Pulelehua's ~~traditional~~ neighborhood design, with homes, neighborhood businesses, and recreation areas all within walking distance, will encourage pedestrian and bicycle access and minimize use of the automobile. Puelelehua's compact design will encourage preservation of surrounding productive agricultural lands.

Housing

Obiective 1: To provide a choice of attractive, sanitary, and affordable homes of all our residents.

Policy b. Encourage the construction of housing in a variety of price ranges and geographic locations.
Policy f: Encourage large land owners in the context of new projects to provide land and/or housing for their employees.
Policy j. Ensure that each community plan region contains its fair share of affordable housing.

To satisfy affordable housing requirements imposed on Petitioner's Kapalua Mauka development in LUC Docket No. A03-741 and on this docket, ~~Petitioner~~ Maui Oceanview LP proposes to provide ~~450~~ 280 affordable housing units for ~~sale or~~ rent to families making less than 140 percent of the County of Maui's median income. Plans for the affordable housing units include integrating affordable units with market price units in the different phases. Pulelehua is expected to include such services as neighborhood commercial, parks, ~~civic uses,~~ and trails. The community has been designed to encourage walking which will decrease the need for commuting and reduce traffic impacts. The design of the affordable rental units is proposed with the same quality and materials as the market units. Pulelehua, with its affordable component and gap group housing, is planned to fill a critical need for the working families of West Maui.

West Maui Community Plan

The West Maui Community Plan designates the Petition Area as Agricultural, Open Space, and Park. The Community Plan includes a lateral Open Space designation along Honoapi'ilani

Highway to accommodate a landscape buffer. The proposed development plan for Pulelehua includes a landscaped greenway along the length of Honoapi'ilani Highway that has a width ranging from 100 to 200 feet. The width of this greenway exceeds the area specified in the Community Plan for the buffer area.

The West Maui Community Plan also includes a 50-acre District Park site in Pulelehua. Although Petitioner proposes to remove this designation from the Community Plan, Pulelehua will contain approximately 100 acres of useable parks and trails, including ~~two 5-acre park sites~~a 10-acre County Regional Park. ~~Petitioner~~ MLP will also cooperate with the County to designate a ~~6~~50-acre site mauka of the Kapalua-West Maui Airport and to the north of Pulelehua for development of a district park for West Maui. The County's Parks Department supports the parks plans for Pulelehua.

Land Use

Goal:

An attractive, well-planned community with a mixture of compatible land uses in appropriate areas to accommodate the future needs of the residents and visitors in a manner that provides for the stable social and economic well-being of the residents and the preservation and the enhancement of the region's open space areas and natural environmental resources.

Objectives and Policies.

4. Establish an appropriate supply of urban land within the region to meet the needs of the community over the next 20 years. The Community Plan and its map shall define the urban growth limits for the region and all zoning requests and/or proposed land uses and developments shall be consistent with the West Maui Community Plan and its land use.

Housing

Goal:

A sufficient supply and choice of attractive, sanitary and affordable housing accommodations for a broad cross section of residents.

Objectives and Policies.

2. Provide a variety of affordable housing opportunities including improved lots and *self help projects and special needs housing for the elderly, single parent families, homeless and disabled.*

6. Promote efficient housing designs in order to reduce residential home energy consumption.

7. Maintain acceptable standards for affordable housing projects, including but not limited to the installation of sidewalks and provision for off-street parking.

To satisfy affordable housing requirements imposed on Petitioner's Kapalua Mauka development in LUC Docket No. A03-741 and on this docket, Petitioner will offer a variety of housing options to families of various income levels. Petitioner proposes to offer ~~450~~ 280 of the ~~882~~ 800 rental units ~~for sale or rent~~ to families earning less than 140 percent of the County of Maui's median income. ~~Speculation in the resale of homes will be discouraged with strong buy backs and shared appreciation provisions~~The Housing Agreement between Maui Oceanview LP and Maui DHHC ~~will~~ includes provisions to maintain the rents of the 280 units as affordable within HUD guideline.

~~PROTECT PHASING~~

208. Title 19 of the Maui County Code provides comprehensive zoning for the County. The purpose and intent of comprehensive zoning is to regulate the utilization of land in a manner encouraging orderly development and to promote and protect the health, safety and welfare of the people of the County. The Petitioner obtained Project District zoning for the Petition Area and the proposed project is subject to Chapter 19.93 West Maui Project District 5 (Pulelehua).

Section 19.93.010 Purpose and Intent, states "The purpose and intent of these standards is to create a compact, pedestrian-oriented, mixed use neighborhood where residential and community-related commercial and civic uses are within close proximity to each other. The planning concept is based on a study of historical Hawaiian towns and the principles of traditional neighborhood design."

Analysis: As proposed, Pulelehua will provide a pedestrian-oriented, mixed use neighborhood where rental apartments, active recreational facilities, an elementary school, commercial and civic uses are proposed within close proximity to each other and connected by an extensive onsite pedestrian path network. The planning concept for the proposed project is based on a study of the previous design and the Applicants market/business experience in building rental apartments.

Section 19.93.030 land use categories and acreage “The following are established as the approximate acreage for the various land use categories within the West Maui project district”

DISTRICT	ACRES
Core neighborhood district	7
Central neighborhood district	20
General neighborhood district	83
Edge neighborhood district	48
Estate edge district	23
Workplace edge district	5
Open space district (Note this district includes a County owned retention basin)	124
TOTAL	310 acres

Analysis: The Applicant has prepared a District Allocation map identifying the location and size of proposed districts in conformance with Chapter 19.93.030 land use categories and acreage. (**See**: Figure No. ~~6~~4 District Land Use Allocation Map) Similar to the approved Pulelehua Master plan the districts are dispersed throughout the total 310 acre site.

Section 19.93.040 Districts:

A. Core neighborhood district
Analysis: The Applicant has prepared a District Allocation map identifying the location and size of proposed districts in conformance with Chapter 19.93.040 District. (See: Figure No. ~~6~~4 District Land Use Allocation Map) The proposed Core neighborhood district will contain the majority of project’s commercial space, which is the most intense land use within the proposed project. The Core neighborhood district is located on the south side of Akahele Street, which is the main entrance to Pulelehua.

B. Central neighborhood district
Analysis: The Central neighborhood district is proposed to contain a portion of the commercial space and rental apartments. The central neighborhood district is located adjacent to proposed commercial uses, residential units and the 10 acre active recreation park space.

C. General neighborhood district

Analysis: The General neighborhood district occurs in ~~4~~5 locations containing residential units and the elementary school, with adjacent open spaces. The majority of the general neighborhood district is located on either side of Akahele Street, which is the main entrance to Pulelehua. The district is also connected by the onsite trail network.

D. Edge neighborhood district

Analysis: The Edge neighborhood district is located on 48 acres of land at the north and south edges of the project site with adjacent open space. The applicant is proposing this district for 99 single family residences.

E. Estate edge district

Analysis: The Estate edge district is located adjacent to the Edge neighborhood district at the extreme northern edge of the project site. The applicant is proposing this district for one (1) single family residence.

F. Workplace edge district

Analysis: As proposed the Workplace edge district is 5 acres in size and will not contain dwellings. The district may be developed as a "brightfield" *(brightfield means property covered by a solar photovoltaic energy system)*, or will be maintained as a private open space. The Applicant is not proposing to develop this district with workshop uses. The Workplace edge district is located at the norther portion of the project site.

Any "Brightfield" development will be completed in compliance with FAA and State DOT Airports requirements.

G. Open space district

Analysis: Similar to the approved Pulelehua Master plan the open space district is the largest district and contains a county stormwater retention basin, active park space and on-site pedestrian pathway network.

Section 19.93.050 Additional standards for all districts.

1. Density. No more than one thousand two hundred dwellings or dwelling units, including accessory dwellings, shall be developed in the Pulelehua project district.

Analysis: The proposed project estimates 800 multifamily units and 1100 single family units.

2. Design. Each building or structure within Pulelehua shall be designed to conform to the Pulelehua design guidelines which shall be approved by the urban design review board.

Analysis: Each building or structure shall conform to the Pulelehua design guidelines to be adopted and approved by the urban design review board.

3. Landscaping. A landscape planting plan shall be provided to specify plant species, sizes, quantities, and locations. Drought tolerant and/or slow growing hardy grasses, native and indigenous plants, shrubs, ground covers, and trees appropriate for local conditions shall be used to minimize the need for irrigation. Each landscape planted area shall be irrigated and maintained as needed. Landscape planting and *irrigation plans shall be reviewed and approved by the department of planning.*

Analysis: The Applicant has retained a Landscape Architect to prepare a landscape planting plan and irrigation plans for review and approval by the Department of Planning.

4. Signs. A comprehensive sign plan shall be submitted for Pulelehua, subject to review and approval by the department of planning. The department of planning may refer the comprehensive sign plan to the urban design review board.

Analysis: The Applicant has retained an Architect to prepare a comprehensive signage plan for review and approval by the Department of Planning.

5. Special building elements. Special building elements, such as awnings/marquees, balconies, colonnades/arcades, porches, and outside open air dining, may project within the right-of-way, subject to Chapter 16.26, Maui County Code, as amended.

Analysis: The Applicant acknowledges that special building elements are subject to Chapter 16.26 Maui County Code, as amended.

6. Live/work mixed uses may be permitted only on live/work lots.

Analysis: The Applicant acknowledges that live/work mixed uses are only permitted on live/work lots.

7. A dwelling or dwelling unit shall not be used for fractional ownership or as a transient vacation rental, time-share unit or bed and breakfast home.

Analysis: No dwelling or dwelling unit will be used for fractional ownership or as a transient vacation rental, time-share unit or bed and breakfast home.

8. Parking requirements. The intent of these parking regulations is to encourage a balance between compact pedestrian oriented development and necessary car storage. Notwithstanding any provision in Chapter 19.36 of this Code to the contrary, the off-street parking requirements shall be as follows:
a. The mixed-use land pattern within Pulelehua fosters more pedestrian trips and fewer automobile trips than other more automobile dependent commercial districts in Maui County. Therefore, a thirty percent reduction in the required number of parking spaces stated below shall be applied to all non-residential uses.

Analysis: The Applicant acknowledges this parking requirement for non-residential uses.

b. When the computation of required parking spaces results in a fractional number of spaces, the number of spaces required shall be rounded up to the nearest whole number when a fraction of a space is greater than or equal to .5 and rounded down when a fraction of a space is less than .5.

Analysis: The Applicant acknowledges this requirement for calculating parking spaces.

Conditions of Zoning

In 2011 the Maui County council adopted Ordinance No 3889 to change the zoning for the Pulelehua project area from Agricultural District to the West Maui Project District 5 (Pulelehua). Consistent with Ordinance No 3889, the Pulelehua development is subject to the following seventeen (17) conditions:

1. That Maui Land & Pineapple Company, Inc. shall comply with the affordable housing provisions of Chapter 2.96, Maui County Code. In addition, Maui Land & Pineapple Company, Inc. shall construct the 125 units required by the State Land Use Commission Order filed on June 30, 2006, for Kapalua Mauka.

Analysis: The Applicant proposes to comply with the affordable housing provisions of Chapter 2.96, Maui County Code.

2. That Maui Land & Pineapple Company, Inc. shall provide potable and non-potable water source, storage and transmission improvements necessary to serve Pulelehua in accordance with the requirements of the County of Maui Department of Water Supply.

Analysis: The Applicant will provide potable and non-potable water source, storage and transmission improvements necessary to serve Pulelehua in accordance with the requirements of the County of Maui Department of Water Supply.

3. That Maui Land & Pineapple Company, Inc. shall notify potential lot owners of the Hawaii Right-to-Farm Act, Chapter 165, Hawaii Revised Statutes, which limits the circumstances under which normal farming activities may be considered a nuisance.

Analysis: The Applicant will notify potential lot owners of the Hawaii Right-to-Farm Act.

4. That Maui Land & Pineapple Company, Inc. shall construct a 400 square-foot police substation in the Center Neighborhood District that includes a restroom, or provide an in-lieu cash contribution for the construction of a new West Maui Police Station, as determined by the Maui County Police Department.

Analysis: The Applicant will provide an adequate location for a Police substation within the Center Neighborhood District. The Applicant will work with the Police department to identify the optimal location or will provide cash in-lieu of construction.

5. That Maui Land & Pineapple Company, Inc. shall contribute land for the development of a public elementary school to the State of Hawaii Department of Education ("DOE") along with a cash contribution as determined by the DOE on a fair share basis, pursuant to the education contribution agreement for Pulelehua executed on June 16, 2006 by DOE and Maui Land & Pineapple Company, Inc. In addition to the education contribution agreement, Maui Land & Pineapple Company, Inc. shall: dedicate an additional amount of land, contiguous with the land provided for in the educational contribution agreement, so that the DOE will receive a total of 13 acres; and include the land dedicated in the contribution agreement, to be used toward the development of one (1) elementary school within the project to serve the region.

Analysis: The Applicant will provide the 13 acre school site for a DOE elementary school site in the location selected by DOE.

6. That Maui Land & Pineapple Company, Inc. shall pursue alternatives with the DOE for the design and construction of the elementary school in Pulelehua. Such alternatives shall include, but not be limited to, a design-build arrangement whereby Maui Land & Pineapple Company, Inc., or a third party on Maui Land & Pineapple Company, Inc.'s behalf, may undertake the design and construction of public school facilities, subject to approval and reimbursement by the State of Hawaii, in order to expedite the delivery of school facilities.

Analysis: The Applicant will continue to communicate with the DOE and consider design and construction alternatives for the proposed elementary school.

7. That, as represented by Maui Land & Pineapple Company, Inc., a voluntary contribution for road and traffic improvements in the West Maui Community Plan area shall be provided by Maui Land & Pineapple Company, Inc. to the County of Maui for all non-affordable dwelling units or lots developed at Pulelehua, at the rate of $3,500 for each single family market unit or lot and gap group unit and $1,500 for each multi-family market unit and gap group unit in the West Maui Project District 5 (Pulelehua), or the then prevailing County rate, whichever is higher. This contribution shall be made prior to issuance of a building permit. An agreement between Maui Land & Pineapple Company, Inc. and the County of Maui shall be executed and recorded setting forth the terms and conditions of the voluntary contribution prior to Phase II Project District approval.

Analysis: The applicant will provide a voluntary contribution for road and traffic improvements in the West Maui Community Plan area to the County of Maui for all non-affordable dwelling units or lots developed at Pulelehua, at the rate of $3,500 for each single family market unit or lot and gap group unit and $1,500 for each multi-family market unit and gap group unit in the West Maui Project District 5 (Pulelehua), or the then prevailing County rate, whichever is higher.

The contribution will be made prior to issuance of a building permit. An agreement between the Applicant and the County of Maui will be executed and recorded setting forth the terms and conditions of the voluntary contribution prior to Phase II Project District approval.

8. That Maui Land & Pineapple Company, Inc. shall: resolve the issue of the number of approved access points from Pulelehua to Honoapi'ilani Highway with the State Department of Transportation ("DOT") prior to public hearing on any Project District Phase II application for Pulelehua; and execute an agreement with the DOT Airports Division to utilize Akahele Street prior to Project District Phase II approval by the Maui Planning Commission.

Analysis:
The Applicant will:
(1) resolve the issue of the number of approved access points from Pulelehua to Honoapi'ilani Highway with the State Department of Transportation ("DOT") prior to public hearing on any Project District Phase II application for Pulelehua; and
(2) execute an agreement with the DOT Airports Division to utilize Akahele Street prior to Project District Phase II approval by the Maui Planning Commission.

9. That Maui Land & Pineapple Company, Inc. shall comply with requirements of the DOT to mitigate impacts associated with the development of Pulelehua, which may include, but not be limited to, traffic mitigation measures, roadway and intersection improvements, including roundabouts or signalization and pedestrian facilities, road widening for access to and use of Honoapi'ilani Highway and dedication of land within Pulelehua to accommodate the right-of-way for the Lahaina bypass as determined by and to the satisfaction of the DOT.

Analysis: The Applicant will comply with requirements of the DOT to mitigate impacts associated with the development of Pulelehua, which may include, but not be limited to, traffic mitigation measures, roadway and Intersection improvements, including roundabouts or signalization and pedestrian facilities, road widening for access to and use of Honoapi'ilani Highway and dedication of land within Pulelehua to accommodate the right-of-way for the Lahaina bypass as determined by and to the satisfaction of the DOT.

10. That whenever a 4-way stop or traffic signal is considered as a means of traffic control at an intersection within the project, roundabouts that meet current federal standards must be deemed unwarranted prior to installing either a 4-way stop or traffic signal.

Analysis: *Whenever a 4-way stop or traffic signal is considered as a means of traffic control at an intersection within the project, roundabouts that meet current federal standards will be deemed unwarranted prior to installing either a 4-way stop or traffic signal.*

11. That Maui Land & Pineapple Company, Inc. shall notify all prospective buyers and/or lessees of the property of potential adverse impacts of aircraft and airport activity from the adjacent Kapalua-West Maui Airport, including but not limited to noise, right of flight, emissions, vibrations, and other incidences of aircraft operations. Maui Land & Pineapple Company, Inc., shall provide covenants in the deed to initial purchasers releasing the County of Maui, State of Hawaii and the United States Government from all liability related to aircraft and airport activity from the adjacent Kapalua- West Maui Airport, including but not limited to noise, right of flight, emissions, vibrations, and other incidences of aircraft operations.

Analysis: The Applicant will notify all prospective buyers and/or lessees of the property of potential adverse impacts of aircraft and airport activity from the adjacent Kapalua-West Maui Airport. The Applicant will provide covenants in the deed to initial purchasers releasing the County of Maui, State of Hawaii and the United States Government from all liability related to aircraft and airport activity from the adjacent Kapalua- West Maui Airport.

12. That Maui Land & Pineapple Company, Inc., shall plan and prepare for lateral roadway connections from the Property to adjoining lands in cooperation with the respective neighboring landowners to provide potential alternate roadway routes to improve transportation capabilities in the area.

Analysis: the conceptual site plan provides future lateral roadway connection openings to adjacent lands.

13. That the two 5-acre parks within Pulelehua shall be privately owned, maintained and dedicated for public use. The two 5-acre parks shall be developed to the satisfaction of the Department of Parks and Recreation in fulfillment of the Park Dedication ordinance.

Analysis: The Applicant has met with the Maui County Department of Parks and Recreation. The Department determined it preferred the two, 5-acre parks be consolidated into a single 10 acre park space with active sports fields, parking and comfort station. The dedication of the active park with amenities will fulfill the Applicants requirement of the park dedication ordinance.

14. That all other park sites within Pulelehua serving community, recreational, and neighborhood use shall be privately owned and maintained.

Analysis: The Applicant concurs that all other park sites within Pulelehua serving community, recreational, and neighborhood use will be privately owned and maintained.

15. That Maui Land &Pineapple Company, Inc. designate and offer for sale to the County of Maui, at agricultural land rates, a 50-acre park site presently identified in the West Maui Community Plan at an alternate site mauka of the Honoapi'ilani Highway and along the Honoapi'ilani Highway in the vicinity of residential uses. The 50-acre park site shall be determined during the Community Plan Update process, provided that the park site not be located mauka of the Kapalua West Maui Airport.

Analysis: The Applicant's predecessor, Maui Land & Pineapple Company, Inc. will designate and offer for sale to the County of Maui, at agricultural land rates, a 50-acre park site presently identified in the West Maui Community Plan at an alternate site mauka of the Honoapi'ilani Highway and in the vicinity of residential uses. The 50-acre park site shall be determined during the 2018 West Maui Community Plan Update process. The park site shall not be located mauka of the Kapalua West Maui Airport.

16. That Maui Land & Pineapple Company, Inc. shall construct a private wastewater treatment plant, as approved by the Department of Health in the event the County of Maui's Lahaina Wastewater Reclamation Facility ("LWWRF") does not have the capacity or cannot be expanded to service Pulelehua. If Maui Land & Pineapple Company, Inc. connects to the LWWRF, it shall pay a fair-share contribution, as determined by the County, to fund improvements at the LWWRF necessary to accommodate the additional flow, and construct wastewater transmission facilities to transport wastewater from Pulelehua to the appropriate County wastewater transmission facilities leading to the LWWRF. The fair-share contribution shall be paid prior to the issuance of the first building permit requiring a connection to the LWWRF for Pulelehua.

Analysis: The Applicant will construct a private wastewater treatment plant, as approved by the Department of Health to service Pulelehua. If the Applicant connects to the LWWRF, it will pay a fair-share contribution, as determined by the County, to fund improvements at the LWWRF necessary to accommodate the additional flow, and construct wastewater transmission facilities to transport wastewater from Pulelehua to the appropriate County wastewater transmission facilities leading to the LWWRF. The fair-share contribution shall be paid prior to the issuance of the first building permit requiring a connection to the LWWRF for Pulelehua.

17. That Maui Land &Pineapple Company, Inc. shall provide annual compliance reports to the Department of Planning and the Maui County Council on the status of the project and progress in complying with the conditions imposed, commencing within one year of the effective date of the ordinance.

Analysis: The Applicant has provided compliance reports to the Department of Planning and the Maui County Council on the status of the project and progress in complying with the conditions imposed.

West Maui Community Plan

In addition to Title 19 Zoning and Conditions of Zoning, the Pulelehua project is subject to the West Maui Community Plan. In 2011 the plan was amended by Ordinance No. 3877 to read as follows:

Project District 5 (Pulelehua) approximately 310 acres

This project district is within the Mahinahina region between Honoapi'ilani Highway and the Kapalua West Maui Airport. It is generally bound by Kahanaiki Gulch to the north and the Department of Hawaiian homelands property to the south.

The project district is intended to provide a mix of residential units for all income groups, commercial, civic uses, parks and open space. "Traditional neighborhood design" (TND) concepts shall be incorporated to emphasize mixed uses, pedestrian friendly streets, multi-modal transportation options, traditional architecture, and urban design. The project district may contain up to 900 single-family and multi-family units with the potential for an additional 300 accessory dwelling units. A 13-acre school site is included in the project district. The project district overall average residential density is approximately 2.8 units per acre.

The project district will include a range of districts. The limited Core Neighborhood District will contain the highest densities and most intense mix of uses. From the Core Neighborhood District, each subsequent district will have progressively less intense uses, with the Estate Edge District, marked by single family homes and larger lots, primarily along edges of the project district. The Open Space District will provide for buffer areas and separation of neighborhoods. The restricted Workplace Edge District will allow for a range of appropriate uses as a buffer to the Kapalua West Maui Airport. Spatial allocations are as follows:

DISTRICT	*ACRES*
Core neighborhood district	*7*
Central neighborhood district	*20*
General neighborhood district	*83*
Edge neighborhood district	*48*
Estate edge district	*23*
Workplace edge district	*5*
Open space district	*124*

Analysis: The proposed development plan for Pulelehua has been designed in accordance with the required development standards as outlined in Chapter 19.93 and the West Maui Community Plan. The proposed development will feature residential uses, retail, public/quasi-public, a 13 acre elementary school site, a private wastewater treatment facility, 10 acre active sports park and over 120 acres of open space.

The project will contain all of the allowed districts and will emphasize Traditional Neighborhood Design (TND) concepts such as providing pedestrian friendly streets and an extensive pedestrian pathway network throughout the site providing connectivity to the commercial, residential, public/quasi-public, and recreational uses.

The residential component of Pulelehua is comprised of approximately 800 rental apartment units and 100 single family lots, for a total of 900 residential units. The Apartments are designed as one story residential buildings containing 10 units per building that have direct access to parking and sidewalks. (See: Figure No. 2 Conceptual Site Plan)

The Core neighborhood district is proposed to contain commercial/retail space, which is the most intense development of the proposed project and subsequent districts have progressively less intense uses. The commercial/retail component of the project will contain a maximum of 70,000 square feet in size and is envisioned as multi-tenant buildings located on both sides of Akahele Street at the project connection with the Honoapi'ilani Highway as well as near the north and south ends of the project.. Commercial Buildings will be sited along roadway frontages with parking behind the buildings. (See: Figure No. 2 Conceptual Site Plan)

Public/Quasi-public uses will include a 13-acre elementary school site, a police substation within the core Neighborhood or Center Neighborhood districts and public park space. The Open Space District with pedestrian pathway networks will provide for connectivity, active park space, buffer areas, and separation of neighborhoods.

PROJECT PHASING

~~127.~~209. Permitting, development, buildout, and sale of Pulelehua are proposed to occur over an eleven ~~ten~~-year period. Permitting is anticipated to require at least two years, and design and construction would commence as soon as all discretionary permits have been obtained. Petitioner is planning to develop infrastructure for the Project as a single integrated system. Therefore, incremental redistricting would be inappropriate for Pulelehua.

RULING ON PROPOSED FINDINGS OF FACT

Any of the proposed findings of fact submitted by Petitioner or any other party not already ruled upon by the Commission by adoption, or rejected by clearly contrary findings of fact, are hereby denied and rejected.

Any conclusion of law improperly designated as a finding of fact should be deemed or construed as a conclusion of law; any finding of fact improperly designated as a conclusion of law should be deemed or construed as a finding of fact.

CONCLUSIONS OF LAW

1. Pursuant to chapter 205, HRS, and the Commission Rules under chapter 15-15, HAR, and upon consideration of the Commission decision- making criteria under section 205-17, HRS, this Commission finds upon the clear preponderance of the evidence that the reclassification of the Petition Area, consisting of approximately 310.440 acres of land at Mahinahina and Kahana, Lahaina, Maui, Hawai'i, and identified as TMK: 4-3-01: por. 31 and 79, from the State Land Use Agricultural District to the State Land Use Urban District for the development of Pulelehua, subject to the conditions in the Order below, conforms to the standards for establishing the Urban District boundaries, is reasonable, is not violative of section 205-2, HRS, and is consistent with the policies and criteria established pursuant to sections 205-16, 205-17, and 205A-2, HRS.

2. Article XII, Section 7, of the Hawai'i State Constitution requires the Commission to protect native Hawaiian traditional and customary rights: The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights.

3. No significant archaeological sites were encountered during the archaeological inventory surveys of the Petition Area.

4. The Petition Area is set well back from the coast, has no surface water, and no unique topographic features. There were no commoner land claims within the Petition Area. There is no evidence that native Hawaiians utilized the Petition Area for gathering or any cultural or

religious purposes.

5. Article XI, Section 1, of the Hawai'i State Constitution requires the State to conserve and protect Hawai'i's natural beauty and all natural resources, including land, water, air, minerals and energy sources, and to promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State.

6. There are no naturally growing endangered or threatened species of flora nor any species of concern on the Petition Area.

7. There is no critical habitat of any endangered or threatened species of bird, mammal, or insect nor any critical habitat of any species of fauna proposed as a candidate for listing as an endangered or threatened species on the Petition Area.

8. The ambient air quality of the Petition Area and the surrounding communities is anticipated to be adversely impacted from fugitive dust during the construction phase of Pulelehua. A dust control plan that would include watering of active work areas and the use of wind screens in sensitive areas will be employed to minimize the potential for fugitive dust emissions.

9. Based on the relatively small increases in predicted concentrations from Pulelehua's traffic and continued compliance with national standards, air quality mitigation measures for long-term traffic related impacts from the development are unnecessary.

10. The development of Pulelehua will alter the existing views from lands makai of the Petition Area. However, most distant views of the Petition Area and the West Maui mountains as well as makai views of the ocean from the Petition Area will not be impeded.

11. Article XI, Section 3, of the Hawai'i State Constitution requires the State to conserve and protect agricultural lands, promote diversified agriculture, increase agricultural self-sufficiency, and assure the availability of agriculturally suitable lands.

12. Development of the Petition Area will eliminate continuation of plantation

agriculture on the Petition Area or the possibility of using these areas for diversified agriculture but will not adversely impact growth of diversified agriculture in West Maui in particular, or on Maui, as a whole. Petitioner is presently continuing cultivation of pineapple in West Maui. Through Maui Agricultural Partners, Petitioner is working to expand diversified agriculture on Maui. There is ample agricultural land available on Maui for diversified agriculture because of the closure of the sugar plantations.

13. Article XI, Section 7, of the Hawai'i State Constitution states that the State has an obligation to protect the use of Hawai'i's water resources for the benefit of its people.

14. Development of the Petition Area will not adversely affect stream flows of Honokohau Stream. There is presently sufficient water flowing through Honolua Ditch to accommodate the additional 2.0 MGD proposed to be treated by the DWS, including water to serve the potable water requirements of Pulelehua, without diverting additional water from Honokohau Stream. In the alternative, if Petitioner elects to draw potable water from new wells, the potable water requirements of Pulelehua will not adversely affect recharge of the Honolua or Honokowai Aquifers. Petitioner will use R-1 water for non-potable requirements.

DECISION AND ORDER

IT IS HEREBY ORDERED that the Petition Area in Docket No. A04- 751, consisting of approximately 310.440 acres of land in the State Land Use Agricultural District located at Mahinahina and Kahana, Lahaina, Maui, Hawai'i, identified as TMK: 4-3-01: por. ~~31~~82 and ~~79~~83, and approximately shown on Exhibit"A," attached hereto and incorporated by reference herein, shall be and is hereby reclassified to the State Land Use Urban District, and the State Land Use District boundary shall be amended accordingly.

Based upon the findings of fact and conclusions of law stated herein, it is hereby determined that the reclassification of the Petition Area will not significantly affect or impair the preservation or maintenance of natural systems and habitats or the valued cultural, historical, agricultural, and natural resources of the area.

IT IS HEREBY FURTHER ORDERED that the reclassification of the Petition Area from the State Land Use Agricultural District to the State Land Use Urban District shall be subject to the following conditions:

1. **Affordable Housing.** ~~Petitioner~~ Maui Oceanview LP shall do the following to provide affordable housing opportunities for low, low-moderate, and gap group income residents of the State of Hawaii ~~in accordance with the affordable housing policies and guidelines of the County of Maui~~ consistent with the County of Maui Residential Workforce Housing Policy, Chapter 2.96, Maui County Code, and a Housing Agreement with the County of Maui Department of Housing and Human Concerns (DHHC), and its representations in this docket:

a. Petitioner (MLP) shall develop and offer for rent not less than 125 affordable housing units to qualified families or individuals to satisfy a condition imposed by the Commission in its approval of Petitioner's (MLP's) Kapalua Mauka development in LUC Docket No. A03-741. Maui Oceanview LP acknowledges that it will fulfill this obligation of original Petitioner (MLP).

b. ~~In addition, Petitioner~~ Maui Oceanview LP shall develop and offer for ~~sale~~ rent not less than ~~325~~ ~~155~~280 affordable housing units, which total includes the 125 Kapalua Mauka units, to low, low-moderate, and moderate income residents of Maui as a feature of Pulelehua in accordance with the Residential Workforce Housing Policy, Chapter 2.96, Maui County Code and the executed Residential Workforce Housing Agreement Pulelehua Multi-Family Dwelling Units – Rental with Maui DHHC dated March 7, 2019.

c. To ensure continued ~~owner occupancy, rental, and resale~~rental to qualified low, low-moderate and moderate income residents and maintain the affordable rental housing inventory within Pulelehua, ~~Petitioner~~Maui Oceanview LP shall prior to the rental ~~or sale~~ of any affordable housing unit comply ~~establish~~ with County-approved restrictions governing the rental, ~~sale,~~ or transfer of all affordable housing units as set out in the Residential Workforce Housing Agreement Pulelehua Multi-

Family Dwelling Units – Rental with Maui DHHC.

d. Subject to applicable laws, ~~Petitioner~~Maui Oceanview LP shall establish at a minimum, qualifications for rental ~~or purchase~~ which specify that a renter ~~or buyer~~ must: be currently employed in Maui; be retired from employment in Maui; be a full-time student residing in Maui; be a disabled person residing in Maui and previously employed in Maui; be the parent or guardian of a disabled person residing in Maui; be the spouse or dependent of any such employee, retired person, student or disabled person, in the event of death of an employee; retired person, student or disabled person, the spouse or dependent of any such person residing in Maui; attain a minimum age of 18 years; demonstrate evidence of sufficient income; agree to physically reside in the affordable housing unit; and not already own a housing unit or other real property.

2. **Public School Facilities.** Petitioner shall contribute to the development, funding, and/or construction of public school facilities, on a fair-share basis, pursuant to an Education Contribution Agreement for Pulelehua executed between Petitioner and the DOE. The Education Contribution Agreement shall provide for the dedication of land and/or other consideration to be applied to the construction of a public elementary school in Pulelehua. Petitioner shall file the Education Contribution Agreement and any subsequent amendments with the Commission after it has been executed by Petitioner and the DOE. Petitioner shall also submit copies of all executed Education Contribution Agreements to the County of Maui prior to the Council approving an ordinance amending the West Maui Community Plan Land Use Map designation for Pulelehua.

Petitioner shall pursue alternatives with the DOE to expedite the design and construction of the public elementary school in Pulelehua. Such. alternatives may include a design-build agreement whereby Petitioner would agree to design and build public school facilities for a sum to be paid by the DOE.

3. **Wastewater Facilities.** ~~Petitioner shall, upon connection, pay a fair-share contribution to fund improvements to wastewater treatment facilities to serve the Petition Area if such facilities are approved and developed by the County of Maui prior to the issuance of building~~

~~permits, and Petitioner shall receive wastewater treatment service for wastewater from the Petition Area from the County of Maui at the LWWRF. In the event connection is made to the LWWRF, Petitioner shall construct wastewater transmission facilities to transport wastewater from the Petition Area to appropriate County wastewater transmission facilities leading to the LWWRF~~Maui Oceanview LP shall develop and construct a wastewater treatment facility for Pulelehua.

4. **Akahele Street.** Petitioner shall enter into an agreement with the DOT, Airports Division, under terms and conditions acceptable to the DOT, for access to and use of Akahele Street. Petitioner acknowledges, understands, and agrees that Petitioner's obligation and responsibilities in an agreement can extend to, but not be limited to, design and construction of the roadway improvements and intersections, compliance with Kapalua-West Maui Airport security programs, and upkeep and maintenance of Akahele Street.

5. **Transportation Improvements.** Petitioner shall submit a revised TIAR for Pulelehua to the DOT for their review and approval no later than the completion date of the final development and internal circulation plan for Pulelehua.

Petitioner shall implement traffic mitigation measures and roadway and intersection improvements, including signalization and pedestrian facilities, for access to and use of Honoapi'ilani Highway, as determined by and to the satisfaction of the DOT, including those improvements and mitigation measures as recommended or required by the TIAR approved by the DOT. Petitioner shall obtain the DOT's prior written approval of Petitioner's TIAR and Petitioner may not proceed with the development of Petitioner's Project until the DOT approves the TIAR.

~~5.~~6. **Roadway Connectivity and Regional Circulation.** Petitioner shall plan and prepare for lateral (in general parallel to the coastline and fronting the highway) roadway connections from the Petition Area to adjoining lands in cooperation with the respective neighboring landowner(s) to provide potential alternate roadway routes to improve transportation capabilities in the area. Petitioner shall facilitate and promote the need for a Regional Traffic Circulation Plan from the County government to assist Petitioner and the DOT in determining roadway connections from the Petition Area to other adjoining lands and to existing roads and highways.

Traffic Fair-Share Contribution. Petitioner and the County of Maui shall enter into an agreement which establishes a Traffic Fair-Share or Voluntary Contribution to be paid by Petitioner to mitigate the traffic-related impact generated by the development of Pulelehua. A copy of the executed agreement shall be filed with the Commission prior to the occupancy of any unit within Pulelehua. The agreement shall provide that Petitioner shall in the order specified below:

a) pay the fee calculated pursuant to chapter 14.62, Maui County Code ("MCC"), Impact Fees for Traffic and Roadway Improvements in West Maui, Hawai'i; however, if there is a written agreement between the County of Maui and the State of Hawai'i specified by section 14.62.080 MCC, the County shall share the funds collected from Petitioner with the State in accordance with this written agreement; or

b) make a voluntary contribution to the County of Maui in an amount equivalent to the above referenced fee upon issuance of a building permit for each dwelling; or

c) pay the above referenced fee to the State pursuant to the enactment of State legislation authorizing such payment.

The above referenced fee or voluntary contribution will be applied towards the funding, design, and construction of local and regional transportation improvements and programs necessitated by the proposed development of the Petition Area, but in any event neither the traffic fair-share nor the voluntary contribution will exceed the greater of (a) $3,500 per market priced and gap group priced single-family unit or lot developed on the Petition Area, and $1,500 per market priced and gap group priced multi-family unit developed on the Petition Area, or (b) the traffic impact fee established for a market priced and gap group priced single-family and multi-family unit pursuant to Maui County Code chapter 14.62 at the time a building permit is issued.

~~6.~~7. **Civil Defense.** Petitioner shall, on a fair-share basis, fund and construct adequate solar-powered civil defense measures serving the Petition Area as determined by the State of Hawai'i Department of Defense, Office of Civil Defense, and the County of Maui Civil Defense Agency.

~~7.~~8. **Archaeological Inventory Survey and Historic Preservation Mitigation Plan.** Petitioner shall comply with the conditions recommended by the DLNR, SHPD, on March 3, 2005, regarding revisions to Petitioner's archaeological inventory survey and approval of an acceptable monitoring plan in the general vicinity of historic sites on the Petition Area prior to commencement of any ground altering activities.

~~8.~~9. Previously Unidentified Burial/Archaeological/Historic Sites. Without any limitation to any other condition found herein, if any burials or archaeological or historic sites, such as artifacts, marine shell concentrations, charcoal deposits, stone platforms, pavings, and walls not previously identified in studies referred to herein, are discovered during the course of construction of the Project, then all construction activity in the vicinity of the discovery shall stop until the issuance of an archaeological clearance from the DLNR, SHPD, that mitigative measures have been implemented to its satisfaction.

~~9.~~10. **Air Quality Monitoring.** Petitioner shall participate in an air quality-monitoring program if required by the DOH.

~~10.~~11. **Notification of Noise.** Petitioner shall notify and disclose to all prospective buyers and/or lessees of the Petition Area, in accordance with State law, the potential adverse impacts of aircraft and airport activity from the adjacent Kapalua West Maui Airport, such as but not limited to noise, right of flight, emissions, vibrations, and other incidences of aircraft operations. Petitioner shall implement procedures and provide covenants in any grant or transfer of interest in the Petition Area, or portion thereof, whereby buyers and lessees and other future owners, lessees, or occupants will release the State of Hawai'i from and against all claims, liability, and losses resulting from aircraft and airport operations, provided that the State of Hawai'i shall not be released from its negligence.

~~11.~~12. **Airport Infrastructure.** Petitioner shall provide and be responsible at its costs for any relocation, change, repair, or alteration to existing airport utility, service, and related infrastructure lines and equipment affected by Petitioner's Project, located in or surrounded by the Petition Area, to the satisfaction of the DOT.

~~12.~~13. **Sound Attenuation.** Petitioner shall employ the following noise mitigation measures: Petitioner shall follow the Maximum Operation Scenario in its noise study and place residential units and similar noise sensitive uses outside the 60 DNL (toward lesser DNL) noise contour. Residential units and similar noise sensitive uses located in between the 55 to 60 DNL noise contours should be properly designed and constructed to meet, at a minimum, Federal EPA residential interior noise standards. Industrial commercial-business type uses, if located in the 60-65 or higher noise contours, containing noise sensitive uses (e.g., rest area, offices, etc.) should have the noise sensitive area properly designed and constructed to meet, at a minimum, applicable Federal EPA interior noise standards.

~~13.~~14. **Runway Safety, Protection, and Use.** Petitioner acknowledges that portions of the Petition Area lay within, or are subject to, the airport runway safety and protection areas (the RPZ, the RSA, and the ROFA) required by the FAA at the Kapalua-West Maui Airport. Petitioner agrees to comply with FAA requirements and cooperate with the DOT for the documentation and recordation of the safety and protection areas. Petitioner agrees to provide the DOT access in order that the DOT may undertake mitigation measures (grading, lengthening, alteration, or improvement) to bring the safety and protection areas up to FAA standards. Petitioner will sell an aviation easement on the affected lands in favor of the State of Hawai'i.

~~14.~~15. **Hazards to Aircraft Operations.** Petitioner shall take appropriate measures to fund and implement a program to control any bird nesting or gathering and any insect, pest, or wildlife infestation, especially in any drainage retention basins serving the Petition Area and in any portion of the Petition Area in the RSA, RPZ, and ROFA, or abutting the Kapalua-West Maui Airport to minimize the hazards to aircraft operations, as deemed necessary by the DOT, Airports Division.

~~15.~~16. **Drainage.** Petitioner shall fund the design and construction of drainage system improvements to prevent runoff resulting from the development of the Petition Area from adversely affecting State airport and highway facilities to the satisfaction of appropriate State and County agencies, based on one hour of runoff from a 50-year storm.

~~16.~~17. **Notification of Potential Nuisances.** Petitioner shall disclose to all prospective buyers and/or lessees of the Petition Area that potential odor, noise, and dust pollution may result from agricultural uses on adjacent lands.

~~17.~~18. **Provisions of the Hawai'i Right to Farm Act.** Petitioner shall notify all prospective buyers and/or lessees of the Petition Area that the Hawai'i Right to Farm Act, chapter 165, HRS, limits the circumstances under which pre- existing farm activities may be deemed a nuisance if there are any lands in the Agricultural District adjacent to the Petition Area.

~~18.~~19. **Integrated Solid Waste Management Plan.** Petitioner shall cooperate with the DOH and the DPWEM to conform to the program goals and objectives of chapter 342G, HRS, and the County of Maui's approved integrated solid waste management plan in accordance with a schedule and timeframe satisfactory to the DOH. Petitioner shall, in coordination with appropriate State and County government agencies, assist in the planning and promotion of solid waste recycling facilities, including recycling bins in public places, such as schools and parks, if any, within the proposed development.

~~19.~~20. **Water Resources Allocation.** ~~Petitioner~~Maui Oceanview LP shall provide adequate potable and non-potable water source, storage, and transmission facilities and improvements ~~to the satisfaction of the DWS~~ to accommodate the proposed development on the

Petition Area.

~~20.~~21. **Established Access Rights Protected.** Petitioner shall preserve any established access rights of native Hawaiians who have customarily and traditionally used the Petition Area for access to other areas to exercise subsistence, cultural, and religious practices.

~~21.~~22. **Best Management Practices.** Petitioner shall implement applicable best management practices applicable to each proposed land use to reduce or eliminate soil erosion and groundwater pollution, and effect dust control measures during and after the development process in accordance with the DOH guidelines.

~~22.~~23. **Soil Analysis.** Petitioner shall conduct a soil analysis study of the Petition Area to determine the impact of the Project from fertilizer and pesticide residue that may be present on the Petition Area and undertake measures to abate and remove any hazardous materials identified.

~~23.~~24. **Water Conservation Measures.** Petitioner shall implement water conservation measures and best management practices, such as use of indigenous and drought tolerant plants and turf, and incorporate such measures into common area landscape planting.

~~24.~~25. **Energy Conservation Measures.** Petitioner shall implement energy conservation measures such as use of solar energy and solar heating and incorporate such measures into the Project.

~~**25.**~~**26. Compliance with Representations to the Commission.** Petitioner shall develop the Petition Area in substantial compliance with the representations made to the Commission. Failure to so develop the Petition Area may result in reversion of the Petition Area to its former classification, or change to a more appropriate classification.

~~**26.**~~**27. Notice of Change to Ownership Interests.** Petitioner shall give notice to the Commission of any intent to sell, lease, assign, place in trust, or otherwise voluntarily alter the ownership interests in the Petition Area, prior to development of the Petition Area.

28. **Annual Reports.** Petitioner shall provide timely and without any prior notice, annual reports to the Commission, the OP, and the Planning Department in connection with the status of the development proposed for the Petition Area, and Petitioner's progress in complying with the conditions imposed herein. The annual report shall be submitted in a form prescribed by the Executive Officer of the Commission.

~~27.~~**29. While the drainage basin owned by the Maui County Department of Public Works is included in the Project acreage covered by this Petition, the conditions set out in this order shall not be applicable to the Maui County Department of Public Works.**

~~28.~~30. **Release of Conditions Imposed by the Commission.** The Commission may fully or partially release the conditions provided herein as to all or any portion of the Petition Area upon timely motion and upon the provision of adequate assurance of satisfaction of these conditions by Petitioner.

~~29.~~31. **Statement of Imposition of Conditions.** Within seven days of the issuance of the Commission's Decision and Order for the subject reclassification, Petitioner shall: (a) record with the Bureau of Conveyances a statement that the Petition Area is subject to conditions imposed herein by the Commission in the reclassification of the Petition Area; and (b) shall file a copy of such recorded statement with the Commission.

~~30.~~32. **Recording of Conditions.** Petitioner shall record the conditions imposed by the Commission with the Bureau of Conveyances pursuant to section 15-15-92, HAR

ADOPTION OF ORDER

The undersigned Commissioners, being familiar with the record and proceedings, hereby adopt and approve the foregoing ORDER this ~~22nd~~ _____day of ~~June, 2006~~__________, 20___, as conforming to the vote taken on Mau~~.~~i on ~~June 22, 2006~~______________. 20___. This ORDER and its ADOPTION shall take effect upon the date this ORDER is certified and filed by this Comm~~n,~~ission.

Any person aggrieved by this decision and order may seek judicial review in accordance with the provisions of HRS section 91-4.

Done at Maui, Hawai'i, thi~~.~~s ~~22nd~~ ______day of ~~June, 2006~~__________, 20___, per motion on ~~June 22, 2006~~___________, 20___

EXHIBIT S

Agreement between Maui Land & Pineapple Company, Inc. and Maui Oceanview LP to provide 50 acre offsite park

Maui Land & Pineapple Company, Inc.

September 21, 2018

Ms. Michele McLean, Director
Department of Planning
County of Maui
250 South High St., Suite 315
Wailuku, HI 96793

Re: The Planned Pulelehua Project District Approvals Condition No. 15 of County of Maui Ordinance 3889 – *50-Acre Park Site*

Dear Ms. McLean,

As requested by Mr. Paul Cheng, current owner & developer of the Pulelehua Project in West Maui, we are providing this letter to confirm that Maui Land & Pineapple Company, Inc. ("MLP") is responsible to satisfy the the *County of Maui Ordinance 3889 Condition No. 15 – 50-Acre Park Site* ("Park Site Condition"):

> ***50-Acre Park Site.*** *That Maui Land & Pineapple Company, Inc. designate and offer for sale to the County of Maui, at agricultural land rates, a 50-acre park site presently identified in the West Maui Community Plan at an alternate site mauka of the Honoapiilani Highway and along the Honoapiilani Highway in the vicinity of residential uses. The 50-acre park site shall be determined during the Community Plan Update process, provided that the park site not be located mauka of the Kapalua West Maui Airport.*

Also attached to this letter is an executed and recorded *Pulelehua Permitting Conditions Compliance Agreement*, dated June 3, 2016 which spells out MLP's responsibility to satisfy the Park Site Condition:

> ***2. Compliance with Park Site Condition.*** *If the 50-acre park site contemplated by the Park Site Condition is designated on land owned by MLP during the pending West Maui Community Plan update, MLP shall promptly and at its expense take all steps reasonably necessary to offer and sell the designated site to the County at agricultural land rates in accordance with the Park Site Condition...*

Should you have any questions or requests for additional information, please feel free to contact me at 808-757-2666.

Sincerely,

Paulus Subrata
CC: Paul Cheng, USA Land Investments, LLC

PULELEHUA PERMITTING CONDITIONS COMPLIANCE AGREEMENT

This PULELEHUA PERMITTING CONDITIONS COMPLIANCE AGREEMENT (this "**Agreement**") is made as of June 3, 2016 (the "**Effective Date**"), by and between **MAUI LAND & PINEAPPLE COMPANY, INC.**, a Hawaii corporation, whose address is 200 Village Road, Lahaina, Hawaii 96761, ("**MLP**") and **MAUI OCEANVIEW LP,** a Delaware limited partnership, whose address is 2525 McKinney Avenue, Suite B, Dallas, Texas 75201 ("**MO**"), with reference to the following facts:

R E C I T A L S:

A. MLP is the record owner of fee simple title to that certain real property commonly referred to as "Pulelehua" located in Lahaina, Maui, Hawaii bearing Tax Map Key ("**TMK**") Nos. (2) 4-3-001-082 and -083 consisting of approximately 304.255 acres of land more particularly described on Exhibit "A" attached hereto and made a part hereof (the "**Pulelehua Site**").

B. Pulelehua is planned as a mixed-use community that will include not less than 125 affordable housing units for rent.

C. MLP and MO, as assignee of USA Land Investments, LLC, a Texas limited liability company, have entered into that certain Purchase & Sale Agreement (Pulelehua) dated effective as of March 2, 2016 (the "**Pulelehua PSA**") under which MLP has agreed to sell the Pulelehua Site to MO, subject to certain conditions, including but not limited to, MO committing to the construction and delivery of the 125 affordable housing rental units.

D. Entitlements and government approvals for the Pulelehua Site include a State of Hawaii Land Use Commission ("**LUC**") Order filed in LUC Docket No. A04-751 (the "**Order**") and County of Maui Ordinance No. 3889, Bill No. 64 (2011) (the "**Ordinance**", with the Ordinance and the Order being collectively hereinafter referred to as the "**Permit Approvals**"). The Permit Approvals pertain to the development of the Pulelehua Site. Attached as Exhibit "B" to this Agreement is a copy of the Order and attached as Exhibit "C" to this Agreement is a copy of the Ordinance.

E. The Permit Approvals include conditions of approval (the "**Conditions**") requiring, among other things, (1) the development and offering for rent of not less than 125 affordable housing rental units to qualified families or individuals (the "**125 Unit Condition**"), as set forth in Condition No. 1 of the Order and the Ordinance, and (2) the designation and offering for sale to the County of Maui, at agricultural land rates, of a 50-acre park site to be identified in the pending update of the West Maui Community Plan in a location mauka of the Honoapiilani Highway and along the Honoapiilani Highway (the "**Park Site Condition**"), as set forth in Condition No. 15 of the Ordinance.

F. The Park Site Condition is expected to involve lands owned by MLP outside of the Pulelehua Site, and thus satisfaction of the Park Site Condition and MO's satisfaction of the

125 Unit Condition would require certain commitments and actions of MLP notwithstanding the fact that it no longer is the owner or developer of the Pulelehua Site.

G. Fulfillment of the 125 Unit Condition is a condition on MLP's Kapalua Mauka development (also known as "West Maui Project District Number 2"), and thus MLP needs assurances that this condition will be satisfied at the Pulelehua Site when MLP is no longer the owner or developer of the Pulelehua Site.

H. Concurrently herewith, MO is closing its purchase of the Pulelehua Site pursuant to the Pulelehua PSA. Accordingly, in connection with and as a condition to such closing, MLP and MO have agreed to enter into this Agreement for the purpose of defining the parties' respective responsibilities, duties, and obligations to comply with the 125 Unit Condition, the Park Site Condition, the Permit Approvals and the Conditions.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, MLP and MO hereby agree as follows:

1. Compliance with 125 Unit Condition. MO shall be responsible for satisfying the 125 Unit Condition by developing at its expense and offering for rent at the Pulelehua Site not less than 125 affordable housing rental units. MO shall designate the first 125 affordable housing units built by MO towards satisfying the 125 Unit Condition and shall satisfy the 125 Unit Condition as soon as reasonably practicable, but not later than 10 years from the Effective Date. MO shall develop such affordable housing rental units consistent with MO's overall development plan for the Pulelehua Site. MO acknowledges that in furtherance of the 125 Unit Condition, the County of Maui (**"County"**) shall require it to enter into a Residential Workforce Housing Agreement in accordance with Section 2.96 of the Maui County Code. The Residential Workforce Housing Agreement shall set forth the detailed terms and conditions of compliance with the County's residential workforce housing policy and shall be subject to MLP's review and approval, such approval to not be unreasonably withheld, conditioned or delayed. MO agrees to cooperate with MLP and the County to provide the County with the information necessary to satisfy the 125 Unit Condition.

2. Compliance with Park Site Condition. If the 50-acre park site contemplated by the Park Site Condition is designated on land owned by MLP during the pending West Maui Community Plan update, MLP shall promptly and at its expense take all steps reasonably necessary to offer and sell the designated site to the County at agricultural land rates in accordance with the Park Site Condition. MO agrees to cooperate with MLP and the County to provide such information as necessary to satisfy the Park Site Condition. The parties are entering into this Agreement with the understanding that MLP has a general, verbal understanding with the County that the County is amenable to locating the 50-acre park site on MLP real property outside of the Pulelehua Site, and this understanding is a material part of consideration to MO for proceeding to closing under the Pulelehua PSA and for entering into this Agreement. As such, and notwithstanding anything to the contrary in this Agreement and/or the Permit Approvals, if the West Maui Community Plan update (or the County or any future update) designates the 50-acre park site contemplated by the Park Site Condition on the Pulelehua Site, MLP hereby agrees to use its best efforts to either (i) work with the County to update the West Maui Community Plan in order to satisfy the Park Site Condition by relocating

the 50-acre site to land owned by MLP, or (ii) work with the County to remove and release the Park Site Condition from the Conditions that affect the Pulelehua Site. If, despite MLP using its best efforts, the County will not relocate the 50-acre park and determines that the site of the 50-acre park will be located on the Pulelehua Site, MLP shall convey to MO comparable real property, such comparability to be determined by MO in its reasonable opinion, which real property shall be at least 50 acres (the "**Additional Land**"); provided, MLP shall use its best efforts to work with the County to ensure that the Additional Land is incorporated into the Order and the Ordinance (and any other instrument that affects the Pulelehua Site with respect to the Conditions) so that (a) MO can develop the Additional Land in connection with the Pulelehua Site and (b) the Additional Land can be used to satisfy the Conditions.

3. Compliance with All Other Conditions. Except for the Park Site Condition, MO shall be responsible for satisfying all of the Conditions at its expense. MLP agrees to, upon MO's request, provide such information and documents in MLP's possession that may be relevant or necessary to the fulfillment of the Conditions.

4. Indemnification. MO shall indemnify, defend and hold harmless MLP from and against all actions, suits, investigations, governmental proceedings, losses, damages and claims filed against MLP, and for all costs and expenses (including attorneys' fees) incurred by MLP, by whomsoever brought or made by reason of or arising out of (a) MO's failure to comply with the Conditions (excluding the Park Site Condition) as described herein or (b) MO's breach of any of the terms, conditions, covenants or agreements of MO under this Agreement. MLP shall indemnify, defend and hold harmless MO from and against all actions, suits, investigations, governmental proceedings, losses, damages and claims filed against MO, and for all costs and expenses (including attorneys' fees) incurred by MO, by whomsoever brought or made by reason of or arising out of (c) MLP's failure to fulfill the Park Site Condition as set forth herein or (d) MLP's breach of any of the terms, conditions, covenants or agreements of MLP under this Agreement.

5. Further Assurances. Subject to the terms and conditions herein provided, each of the parties hereto agrees to in good faith use all reasonable efforts to take, or cause to be taken, all actions, and to do, or cause to be done, all things necessary, proper or advisable to consummate and make effective the commitments and transactions contemplated by this Agreement.

6. Notices. All communications hereunder will be in writing and shall be deemed duly communicated when delivered in person, sent by email, or four (4) days after being sent by certified or registered mail, postage prepaid, addressed to:

if to MLP, to:

Maui Land & Pineapple Company, Inc.
200 Village Road
Lahaina, Hawaii 96761
Attention: Tim T. Esaki
Email: tesaki@mlpmaui.com
Telephone: (808) 665-5480

with a copy to:

Cades Schutte LLP
444 Hana Highway Suite 204
Kahului, Hawaii 96732
Attention: Rick Kiefer
Email: rkiefer@cades.com
Telephone: (808) 871-9700

if to MO, to:

Maui Oceanview LP
2525 McKinney Avenue, Suite B
Dallas, Texas 75201
Attn: Paul Cheng
Email: paulc@chenginvestments.com
Telephone: (214) 415-8868

with a copy to:

Kessler Collins, P.C.
2100 Ross Avenue, Suite 750
Dallas, Texas 75201
Attention: Anthony J. Barbieri
Email: ajb@kesslercollins.com
Telephone: (214) 379-0733

7. Headings. The captions and headings contained in this Agreement are for reference purposes only and shall not in any way affect the meaning or interpretation of this Agreement.

8. Relationship. Nothing herein contained shall be deemed or construed by the parties hereto, nor by any third party, as creating the relationship of principal and agent or of partnership or joint venture between the parties hereto.

9. Exhibits. All exhibits referred to herein and attached hereto are a part hereof.

10. Interpretation. MLP and MO each acknowledge to the other that both it and its counsel have reviewed and revised this Agreement and that the normal rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Agreement or any amendments or exhibits hereto.

11. Attorneys' Fees. If any action at law or in equity is necessary to enforce or interpret the terms of this Agreement or to protect the rights obtained hereunder the prevailing

party shall be entitled to its reasonable attorneys' fees, costs, and disbursements in addition to any other relief to which it may be entitled.

12. Entire Agreement. This Agreement contains the entire agreement between the parties relating to the transactions contemplated hereby and all prior or contemporaneous agreements, understandings, representations and statements, oral or written, are merged herein.

13. Waiver; Consent. This Agreement may not be changed, amended, terminated, augmented, rescinded, or discharged (other than by performance), in whole or in part, except by a writing executed by the parties hereto, and no waiver of any of the provisions or conditions of this Agreement or any of the rights of a party hereto shall be effective or binding unless such waiver shall be in writing and signed by the party claimed to have given or consented thereto.

14. Counterparts. This Agreement may be executed in any number of counterparts, each of which so executed shall be deemed an original; such counterparts shall together constitute but one agreement. A facsimile copy of a signature or an electronic signature shall constitute an original signature for purposes of the execution of this Agreement.

15. Modification; Termination. No modification, waiver, amendment, consent, discharge or change of this Agreement shall be valid unless the same is in writing and signed by the party against which the enforcement of such modification, waiver, amendment, discharge or change is or may be sought.

16. Governing Law. This Agreement shall be construed and enforced in accordance with the laws of the State of Hawaii.

17. Jurisdiction. Each party hereby expressly and irrevocably submits itself to the non-exclusive jurisdiction of the state or federal courts of Maui, Hawaii, United States of America and so far as is permitted under applicable law, this consent to personal jurisdiction shall be self operative. Notwithstanding anything to the contrary herein, either party may seek injunctive relief (including, restraining orders and preliminary injunctions) in any court of competent jurisdiction.

18. Severability. If one or more provisions of this Agreement are held to be unenforceable under applicable law, such provision shall be excluded from this Agreement and the balance of the Agreement shall be interpreted as if such provision were so excluded and shall be enforceable in accordance with its terms.

19. Successors and Assigns. This Agreement and the various rights and obligations arising hereunder shall inure to the benefit of and be binding upon MLP, and its successors and permitted assigns, and MO and its successors and permitted assigns. Neither this Agreement nor any of the rights, interests, or obligations hereunder shall be transferred or assigned (by operation of law or otherwise) by any of the parties hereto without the prior written consent of the other party.

20. Recordation. This Agreement shall not be recorded in the Bureau of Conveyances of the State of Hawai'i. The parties shall record a short form memorandum of this Agreement in a form attached as Exhibit "D".

[Remainder of page intentionally left blank.]

IN WITNESS WHEREOF, this Agreement has been executed by the parties hereto as of the date first above written.

MAUI LAND & PINEAPPLE COMPANY, INC.

By: ______________________________
Tim T. Esaki
Its Chief Financial Officer

MAUI OCEANVIEW LP,
a Delaware limited partnership

By: Maui Oceanview GP Inc.,
a Texas corporation,
its sole general partner

By: ______________________________
Name: ______________________________
Title: ______________________________

IN WITNESS WHEREOF, this Agreement has been executed by the parties hereto as of the date first above written.

MAUI LAND & PINEAPPLE COMPANY, INC.

By: ______________________________
Tim T. Esaki
Its Chief Financial Officer

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a Delaware limited partnership

By: Maui Oceanview GP Inc.,
a Texas corporation,
its sole general partner

By: ______________________________
Name: ______________________________
Title: ______________________________

ImanageDB:3451392.3

ALAN M. ARAKAWA
Mayor

WILLIAM R. SPENCE
Director

MICHELE CHOUTEAU McLEAN
Deputy Director

COUNTY OF MAUI
DEPT OF PLANNING
JAN 10 2018
RECEIVED

RECEIVED
2018 JAN -2 AM 10: 30
PARKS & RECREATION
PLANNING & DEVELOPMENT

COUNTY OF MAUI
DEPARTMENT OF PLANNING

TRANSMITTAL

December 7, 2017

	STATE AGENCIES
	DAGS
	DBEDT
	Dept of AG, Honolulu
	Dept of Hawaiian Homelands
	Dept of Health, Honolulu
	Dept of Health, Maui (2)
	Dept of Human Services
	DLNR-Land, Maui

	COUNTY AGENCIES
x	Dept of Environmental Management (2)
x	Dept of Housing & Human Concerns
x	Dept of Parks & Recreation
x	Dept Public Works (1 CD, 2 Hard Copies)
x	Dept of Transportation
x	Dept of Water Supply
x	Fire & Public Safety
x	Police Department

PROJECT: **Pulelehua**
APPLICANT: **Maui Oceanview LP**
PROJECT LOCATION: **Intersection of Honoapiilani Highway and Akahele Street**
PROJECT DESCRIPTION: **Amend State Land Use Commission Decision and Order of June 22, 2006, to allow Petitioner the option to develop rentals and to reflect that Pulelehua will comply with the current County of Maui Workforce Housing Policy Requirements in developing a minimum of 180 affordable units across four income categories of Low, Low-moderate, moderate, and above-moderate incomes.**
TMK: **4-3-001-082 and 083 (formerly parcel 31)**
PERMIT NO.: **A-04-751**

TRANSMITTED TO YOU ARE THE FOLLOWING:

X	Petition Documents

THESE ARE TRANSMITTED AS CHECKED BELOW:

X	For your Comment and Recommendation

Please submit your comments directly to me by **January 10, 2018.** Boxes for Recommended Conditions and General Comments are also provided to assist you. If you have no comment, please sign the "No Comment" box. Please reply either by email or regular mail. You may fill out this form and email to me as a PDF if that is more convenient. Thank you for your time and assistance. For additional clarification, please contact me via email at ann.cua@mauicounty.gov or at (808) 270-7521.

Sincerely,

Ann Cua

Ann T. Cua, Current Planning Supervisor

Attachments
xc: Clayton I. Yoshida, AICP, Planning Program Administrator
Staff Planner
Project File
General File
ATC:
K:\WP_DOCS\PLANNING\A\2004\751_Pulelehua\2017\AgencyTransmittal.doc

AGENCY NAME	Parks & Recreation	PHONE	808 270-7230

NO COMMENT			
Signed:		Dated:	
Print Name:	Ka'ala Buenconsejo	Title:	Director

RECOMMENDED CONDITIONS BOX			
Signed:		Dated:	
Print Name:		Title:	

GENERAL COMMENTS BOX			
Signed:		Dated:	
Print Name:		Title:	

EXHIBIT T

Residential Workforce Housing Agreement Pulelehua Multi-Family Dwelling Units – Rental

LAND COURT SYSTEM	REGULAR SYSTEM

Return by Mail ☐ Pickup ☐

To: Department of Housing and Human Concerns
County of Maui
2200 Main Street, Suite 546
Wailuku, Hawaii 96793

TITLE OF DOCUMENT:

RESIDENTIAL WORKFORCE HOUSING AGREEMENT
PULELEHUA
MULTI-FAMILY DWELLING UNITS – RENTAL

PARTIES TO DOCUMENT:

DEVELOPER: **MAUI OCEANVIEW, LP, a Delaware Limited Partnership**
16610 Dallas Parkway Suite 1600
Dallas, Texas 75248

COUNTY: COUNTY OF MAUI
200 S. High Street
Wailuku, Maui, Hawaii 96793

TAX MAP KEY: **(2) 4-3-001-082 and 083**

(This document consists of 13 pages.)

RESIDENTIAL WORKFORCE HOUSING AGREEMENT

PULELEHUA

SINGLE-FAMILY FEE SIMPLE HOUSE LOTS; MULTI-FAMILY DWELLING UNITS – RENTAL

THIS AGREEMENT is made this 7th day of March, 2019, by and between, MAUI OCEANVIEW, LP, a Delaware Limited Partnership, whose address is **16610 Dallas Parkway Suite 1600**, Dallas, Texas 75248 ("Developer"), and the COUNTY OF MAUI, a political subdivision of the State of Hawaii, whose address is 200 South High Street, Wailuku, Maui, Hawaii 96793 ("County").

WHEREAS, Developer intends to construct a development that is subject to County's Residential Workforce Housing Policy, Chapter 2.96, Maui County Code ("MCC"); and

WHEREAS, Section 2.96.040, MCC, requires that prior to final subdivision approval or issuance of a building permit for a development, the Department of Housing and Human Concerns ("DHHC") shall require a developer to enter into a Residential Workforce Housing Agreement.

NOW, THEREFORE, Developer and County hereby agree as follows:

1. Project Description. PULELEHUA ("Development") is to be located at Lahaina, Maui, Hawaii, on that certain parcel of land identified as Tax Map Key No. (2)4-3-001-082 and 083 , area approximately 304 acres, and shall consist of a total of 900 (100 single family fee simple house lots and 800 multi-family rental) dwelling units, as provided in West Maui Project District No. 5 (Pulelehua Project District), Maui County Code Chapter 19.93. Maui County Code section 19.93.050, provides that no more than one thousand two hundred dwellings or dwelling units, including accessory dwellings, may be developed at Pulelehua.

2. Term of Agreement. The term of this agreement shall commence upon execution and shall expire thirty (30) years after the Initial Occupancy of the last residential workforce housing unit, unless sooner terminated as provided herein. Notwithstanding the foregoing, if Developer has not secured building permits for and signed a construction contract for construction of the Residential Workforce Housing Units by June 30, 2020 and County has not granted an extension to such date, this Agreement shall terminate and the Property shall be released from this Agreement and all deed restrictions recorded hereunder or in connection herewith.

3. Definitions:

"Below-moderate income" means those households whose gross annual family income is more than eighty percent, but not more than one hundred percent of the area median income as established by HUD, or as adjusted by DHHC, for Hana, Lanai, and Molokai.

"Department" means the County of Maui's Department of Housing and Human Concerns.

"Director" means the Director of the County of Maui's Department of Housing and Human Concerns."HUD" means the United States Department of Housing and Urban Development."Initial Occupancy" means the effective date of the first lease for each residential workforce housing unit.

"Low income" means those households whose gross annual family income is more than fifty percent, but not more than eighty percent of the area median income as established by HUD, or as adjusted by the department, for Hana, Lanai, and Molokai.

"Moderate income" means those households whose gross annual family income is more than one hundred percent, but not more than one hundred twenty percent of the area median income as established by HUD, or as adjusted by DHHC, for Hana, Lanai, and Molokai.

"Owner" means the person(s) or entity that owns the development.

"Resident" means a person who meets one of the following criteria:

1. Currently employed in the County;
2. Retired from employment in the County, having worked in the County immediately prior to retirement;
3. A full-time student residing in the County;
4. A disabled person residing in the County who was employed in the County prior to becoming disabled;
5. The parent or guardian of a disabled person residing in the County;
6. A spouse or dependent of any such employee, retired person, student, or disabled person residing in the County; or
7. In the event of the death of the employee, retired person, student, or disabled person, the spouse or dependent of any such person residing in the County.

"Very low income" means those households whose gross annual family income is more than fifty percent or less of the area median income as established by HUD, or as adjusted by the department, for Hana, Lanai, and Molokai.

4. <u>Residential Workforce Housing Requirement For Full Build Out</u>:

a. Requirement: 25% of 620 market rate units (100 Single Family fee simple House Lots and 520 multi-family rental dwelling units), plus 125 units to fulfill Kapalua Mauka condition

b. Number of units required: 155

c. Number of total workforce housing units, including units Kapalua Mauka condition: 280. Developer will apply the total workforce housing units require on the 800 total multi-family rental dwelling units.

d. Developer is not required to identify specific units within the Development to be designated as Residential Workforce Housing Units. Developer shall be required to ensure that in the Development is in compliance with the requirements of the deed restriction. Income Group Distribution:

i. 93 units shall be for "very low income" and "low income" residents;
ii. 93 units shall be for "below-moderate income" residents;
iii. 94 shall be for "moderate income" residents.

5. Timing of Completion. Residential workforce housing units shall be made available for occupancy either prior to or concurrently with market rate units at the same ratio required of the development. Certificates of occupancy shall not be issued and/or final inspections shall not be passed for the market rate units unless certificates of occupancy are issued and/or proportionate final inspections are passed for the residential workforce housing units concurrently or sooner. For example, every 80 units of Certificate of Occupancy issued to market rate rental units must include at least 28 units of workforce housing units with Certificates of Occupancy issued concurrently.

6. Initial Occupancy. Developer shall submit a report to the Director of the County of Maui Department of Housing and Human Concerns ("DHHC") within 90 days of the date upon which the last affordable unit in the Project is leased, which shall include the number of units that have been constructed and leased, including applicable rents and utility allowances of said units. Moreover, Developer shall provide, upon request, copies of any income certification or recertification or other reports required by the Hawaii Housing Finance & Development Corporation.

7. Annual Recertification. Within sixty (60) calendar days after the close of each calendar year, Developer or its management company shall provide the DHHC with a report including the following: (a) Each tenant rented to during the preceding calendar year along with their move-in date; and (b) The income group of the tenant or family.

8. Graduated income tenants. For those tenants who have graduated to a higher income during the term of the lease but still remain within an appropriate income group, if owner or owner's representative elects to continue to lease to tenant, the monthly rental rate shall be the rate for the income group which tenant is within. For those tenants who during the term of the lease have graduated to an income level that is in excess of the income groups for rental units, if owner or owner's representative elects to continue to lease to tenant, the annual rental shall be equivalent to thirty percent of tenant's gross income. Owner or owner's representative shall be responsible for paying County, for deposit into the affordable housing fund, the difference between the actual rent paid and the rent for the appropriate income group as required under the deed restriction. Owner or owner's representative shall make its reasonable best efforts to maintain the proper distribution of rentals across the "very low income" and "low income," "below moderate income" and "moderate income" groups.

9. Credits. For each residential workforce housing unit constructed and rented to an income qualified individual, where a deed restriction in accordance with the requirements of Chapter 2.96, MCC, is properly recorded with the appropriate entity, on the underlying property, the Developer shall receive one (1) residential workforce housing credit for each residential

workforce housing unit, in excess of the number of units required, that is subject to terms of the deed restriction. The credits shall be subject to the following:

a. The credits may be used in any community plan area;

b. The credits may be used to satisfy the requirement for any type of unit required throughout County of Maui; and

c. The credits may be applied to satisfy the requirement for any income group.

10. Deed Restrictions – Rental Units. Developer shall record on the property a deed restriction which sets forth the following:

a. The 280 rental residential workforce housing units in the Development shall be subject to the requirements of Chapter 2.96, MCC, for thirty (30) years commencing upon the date of Initial Occupancy.

b. For the term of this Agreement, the owner of the Development must notify the department upon a decision to sell the rental development and the County shall have the first option to purchase the rental development from the owner; said option shall be available to the County for a period of one hundred and twenty days from receipt of written notice from the owner and shall not apply to sales by reason of foreclosure.

c. In the event of a sale to a new owner, any new owner must comply with the deed restrictions. Prior to the closing of the sale, Owner shall provide documentation to the Department that the prospective new owner acknowledges and is aware of the terms, conditions, and restrictions encumbering the Development.

d. Within 90 days of the expiration of this Agreement, the owner shall offer the County the right to purchase the property at market value as determined by the owner.

e. Owner or owner's representative shall submit to DHHC proof of compliance with income guidelines for rentals quarterly.

11. Binding Effect; Assignment to Developer's Affiliate. Subject to the limitations on transferability contained herein, each and all of the covenants, terms, and provisions contained herein shall be binding upon Developer and its successors and assigns. Developer may, without prior consent or approval of the County, assign the benefits, obligations, covenants, representations, and burdens contained in this Agreement to a wholly-owned subsidiary or affiliate of Developer (an affiliate shall be an entity in which Developer or its parent owns or control more than fifty percent (50%) of the voting rights), which subsidiary or affiliate shall assume and thereafter be responsible to perform each and every covenant, obligation, representation, and burden to be observed and performed by Developer as set forth in this Agreement. Developer shall notify the County, in writing, of its intent thirty (30) days prior to the event of any assignment of benefits, obligations, covenants, representations and burdens contained in the Agreement. Such notification shall include a description of the assignment and the name, mailing address and telephone number of the individual or organization to whom it will be assigned.

12. Residential Workforce Housing Restrictions – Rental Units. The Owner shall use reasonable best efforts to comply with the deed restriction period set forth above to ensure that during any given month, for the number of units designated as Residential Workforce Housing Units in the recorded deed restriction:

a. Any rental unit vacancy must be filled by an applicant in the appropriate income group to better maintain an equal distribution of rentals across the "very low income," "low income," "below-moderate income," and "moderate income".

b. The income qualified individual shall reside in the residential workforce housing unit.

Owner acknowledges that failure to comply with income guidelines may result in owner paying to County, for deposit into the Affordable Housing Fund, the difference between the actual rent paid or the rent for the income group which the non-qualified renter falls into, whichever is greater, and the rent for the income group required under the deed restriction.

13. Rental Rates. The monthly rental rates for the Residential Workforce Housing Units shall be set by the department based on HUD income limits on an annual basis.

14. Marketing. Developer shall be required to use its reasonable best efforts to effectively market the Residential Workforce Housing Units. Developer shall create a marketing plan, DHHC shall approve said marketing plan prior to the issuance of any building permits for the Development. Developer shall publish in at least five (5) issues of a newspaper of general circulation within the County of Maui, a public notice that shall contain all information that is relevant to the Residential Workforce Housing Units in the Development along with information regarding the establishment of the Wait List described in Section 15 below.

15. Wait List:

a. The Developer shall establish a wait list of interested applicants for the Development.

b. Prior to initiating the wait list, the Developer shall initiate the wait list process by publishing in at least five issues of a newspaper of general circulation within the County, a public notice that shall contain all information that is relevant to the establishment of the wait list. The public shall also be informed in a like manner, of any decision that would substantially affect the maintenance and use of the wait list;

c. Selection for rental units shall be made by a lottery administered by the Developer and overseen by the Department, subject to the applicant meeting the eligibility criteria established in Section 20; and

d. The Developer shall maintain the wait list for the Development after all of the units are rented, which shall be used to fill any vacancy.

e. Any rental unit vacancy shall be filled by an applicant in the same income group as the original tenant to maintain an equal distribution of rentals across the "very low income" and "low income," "below-moderate income," and "moderate income" groups.

16. Eligibility: Subject to any restrictions under HUD Housing regulations, in order to be eligible for a Residential Workforce Housing Unit, an applicant must at the time of application and upon initially occupancy of the unit meet the following criteria:

a. Be a citizen of the United States or a permanent resident alien who is a resident of the County of Maui;

b. Be eighteen (18) years of age or older;

c. Have a gross annual family income (not to include the income of minors) which does not exceed one hundred twenty percent (120%) of the County's area median income as established by HUD, or as adjusted by DHHC, for Hana, Lanai, and Molokai;

d. Have assets that do not exceed one hundred twenty percent (120%) of the County's area median income as established by HUD, or as adjusted by DHHC, for Hana, Lanai, and Molokai. Assets shall include all cash, securities, stocks, bonds and real property. Real property shall be valued at fair market value less liabilities on such real property; and

e. For a period of three (3) years before the submittal of the Rental Application, have not had an interest of fifty percent (50%) or more in real property in fee or leasehold in the United States, where the unit or land is deemed suitable for dwelling purposed, unless the applicant is selling an affordable unit and purchasing a different affordable unit that is more appropriate for the applicant's family size.

17. Notification of Change: It shall be the applicant's responsibility to notify Developer in writing of any changes in mailing address, telephone number, fax number, and/or e-mail address. If an applicant fails to properly notify Developer of such changes and Developer is unable to contact applicant, applicant's name shall be removed from the Wait List.

18. Rental Application: Prior to the selection lottery, described in Section 19 below, all interested applicants shall be required to submit a completed Rental Application to the Developer, on the form provided by the Developer.

19. Pre-Selection Verification: Initial determination for compliance with the maximum gross annual family income provision shall be made by Developer prior to the lottery for the Residential Workforce Housing Units, on the basis of the information provided in the Rental Application.

20. Initial Selection:

a. Residents on the wait list shall receive first priority for the available units. Nonresidents on the wait list may rent a residential workforce housing unit once the wait list has been exhausted of all residents.

b. The Developer may do a mass mailing of housing applications to applicants on the wait list.

c. The residential workforce housing units shall be offered to residents in the order in which their names were drawn in the lottery, provided that there is a unit available in the income group for which they qualify. Nonresidents will then be offered residential workforce housing units in the order in which their names were drawn in the lottery, provided that there is a unit available in the income group for which they qualify.

d. The Developer shall submit copies of the following information to the department to verify the rental of residential workforce housing units to eligible renters:

i. Applicant's completed final Rental Application;

ii. Executed Rental Lease; and

iii. All signed federal and state tax returns used to determine eligibility, or any other documents used to determine eligibility by the Developer.

21. Vacancy. Residents on the wait list shall receive first priority for available units. Nonresidents on the wait list may rent a residential workforce housing unit once the wait list has been exhausted of all residents. Any rental unit vacancy unit shall be filled by an applicant in the same income group as the original tenant to maintain an equal distribution of rentals across

the "very low income" and "low income," "below-moderate income," and "moderate income" groups.

22. Post-Selection Verification: The Developer shall submit copies of the following information to the Department to verify the rental of residential workforce housing units to eligible renters:

a. Applicant's completed final Rental Application;

b. Executed rental lease; and

c. All signed federal and state tax returns used to determine eligibility, or any other documents used to determine eligibility by the Developer.

23. Indemnification. Developer shall indemnify, defend, and hold harmless County and its officers, employees, and agents from and against any and all claims, including bodily injury, wrongful death and/or property damage by any persons caused by, occasioned by, arising from, or resulting from this Agreement.

24. Third Party Beneficiary. This Agreement is made exclusively for the benefit of Developer and the County, and no other persons or entities shall acquire any rights, powers, privileges, remedies, or claims thereby; provided however, that insofar as this Agreement is incorporated into or referenced by a separate but related agreement between Developer and the County but only to the extent provided in such separate and related agreement.

25. Consents, Waivers, Approvals. Whenever under this Agreement the consent, waiver or approval of any party is required or permitted, such consent, waiver or approval shall be evidenced by a writing signed by such party and shall not be unreasonably withheld or delayed. Except where otherwise provided, consent from the County shall mean the consent or approval of the Mayor and the DHHC and any others required by law. No consent or waiver, express or implied, by Developer or the County to or of any breach or default by the other party in the performance of the obligations hereunder shall be construed to be a consent or waiver to or of any other or further breach or default. Failure on the part of Developer or the County to complain of any act or omission by the other party or to declare the other party in default, irrespective of the duration of such failure, shall not constitute a waiver by such party of any of its rights hereunder.

26. Amendments: This Agreement, or any provision thereof, may not be modified, altered or changed except by written instrument executed by Developer and County.

27. Notices: All notices, demands, requests, consents, approval, or other communications ("notices") required or permitted to be given under this Agreement or which are given with respect to this Agreement shall be in writing and shall be delivered by registered or certified mail, return receipt requested, postage prepaid, addressed to the party to be notified at the following address, or to such other address as the party to be notified shall have specified most recently by like notice:

If to County, then to:
Mayor
County of Maui

200 South High Street
Wailuku, Hawaii 96793

cc:
Director of Housing and Human Concerns
County of Maui
200 South High Street
Wailuku, Hawaii 96793

If to Developer, then to:
Maui Oceanview LP
ATTN: Paul Cheng
16610 Dallas Parkway Suite 1600
Dallas, Texas 75248

Notices given as provided in this Section shall be deemed given on delivery or upon receipt if by personal delivery.

28. Severability: If any provision of this Agreement or the application thereof to any person or circumstance shall be invalid or unenforceable to any extent, the remainder of this Agreement and the application of such provision to other persons or circumstances shall not be affected thereby.

29. Recordation: As required by MCC §2.96.080(B), MCC, this Agreement shall be recorded in the Bureau of Conveyances or the Land Court of the State of Hawai'i, as the case may be, so that the terms and conditions of this Agreement run with the land and bind and constitute notice to all subsequent grantees, assignees, mortgagees, lienors, and any other persons who claim an interest in the property. By executing this Agreement, Developer agrees to record (and hereby authorizes the County to record in the event of failure by Developer to do so) this Agreement with the State of Hawaii Bureau of Conveyances, as an encumbrance on the Project Site. Once the Developer has satisfied the Residential Workforce Housing requirements specified in this Agreement, or the Agreement is terminated, the County shall, upon the request of the Developer, promptly execute a release of this Agreement, which release Developer may thereafter record.

30. Captions. Section titles or captions contained in this Agreement are inserted as a matter of convenience and for reference and do not define, limit, extend or describe the scope of this Agreement or the intent of any provision thereof.

31. Effective Date: The effective date of this Agreement shall be the date on which the last party signs this Agreement. This Agreement is made as of the day and year first above written.

32. Governing Law: This Agreement and the rights and obligations of Developer and County shall be interpreted in accordance with the laws of the State of Hawaii and any applicable federal law.

33. Term: This Agreement shall remain in full force and effect for the life of the Residential Workforce Housing Units.

IN WITNESS WHEREOF, Maui Oceanview, LP, and the County of Maui have executed this Agreement the day and year first above written.

MAUI OCEANVIEW LP,
A Delaware Limited Partnership

By: MAUI OCEANVIEW GP INC.,
A Delaware Corporation,
Its GENERAL PARTNER

By______________________________
PAUL CHENG

Its______________________________

COUNTY OF MAUI

By______________________________
MICHAEL VICTORINO
Its Mayor

RECOMMENDED APPROVAL:

____
WILLIAM SPENCE
Interim Director of Housing and Human Concerns

APPROVED AS TO FORM
AND LEGALITY:

JEFFREY UEOKA
Deputy Corporation Counsel

STATE OF TEXAS)
) SS:
COUNTY OF DALLAS)

On this 27th day of FEBRUARY, 2019, before me appeared PAUL CHENG, to me personally known, who, being by me duly sworn, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable, in the capacity(ies) shown, having been duly authorized to execute such instrument in such capacity(ies).

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

ALIS BONDA
Notary Public, State of Texas
My Commission Expires
October 10, 2019

[signature]

Notary Public, State of Texas
My commission expires: 10/10/19

NOTARY PUBLIC CERTIFICATION

Doc. Date: FEBRUARY 27, 2019 # Pages: 13

Notary Name: ALIS BONDA Judicial Circuit:

Doc. Description: RESIDENTIAL WORKFORCE HOUSING AGREEMENT - PULELEHUA MULTI-FAMILY DWELLING UNITS-RENTAL

Notary Signature: [signature]

Date: 02/27/19

STATE OF HAWAII)
) SS:
COUNTY OF MAUI)

On this 7th day of March, 2019, before me appeared **MICHAEL VICTORINO,** to me personally known, who being by me duly sworn did say that she is the Mayor of the County of Maui, a political subdivision of the State of Hawaii, and that the seal affixed to the foregoing instrument is the lawful seal of the said County of Maui, and that the said instrument was signed and sealed on behalf of said County of Maui pursuant to Section 7-6.2 and Section 9-18.1 of the Charter of the County of Maui; and the said **MICHAEL VICTORINO** acknowledged the said instrument to be the free act and deed of said County of Maui.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

MICHELLE L. SANTOS NOTARY PUBLIC No. 17-499 STATE OF HAWAII

Michelle L. Santos
Notary Public, State of Hawaii
My commission expires: 12-3-21
MICHELLE L. SANTOS

NOTARY PUBLIC CERTIFICATION

Doc. Date: 3-7-19 # Pages: 13

Notary Name: **MICHELLE L. SANTOS** Judicial Circuit: 2nd

Doc. Description: Residential Workforce Housing Agreement

Notary Signature: Michelle L. Santos

Date: 3-7-19

MICHELLE L. SANTOS NOTARY PUBLIC No. 17-499 STATE OF HAWAII

PULELEHUA

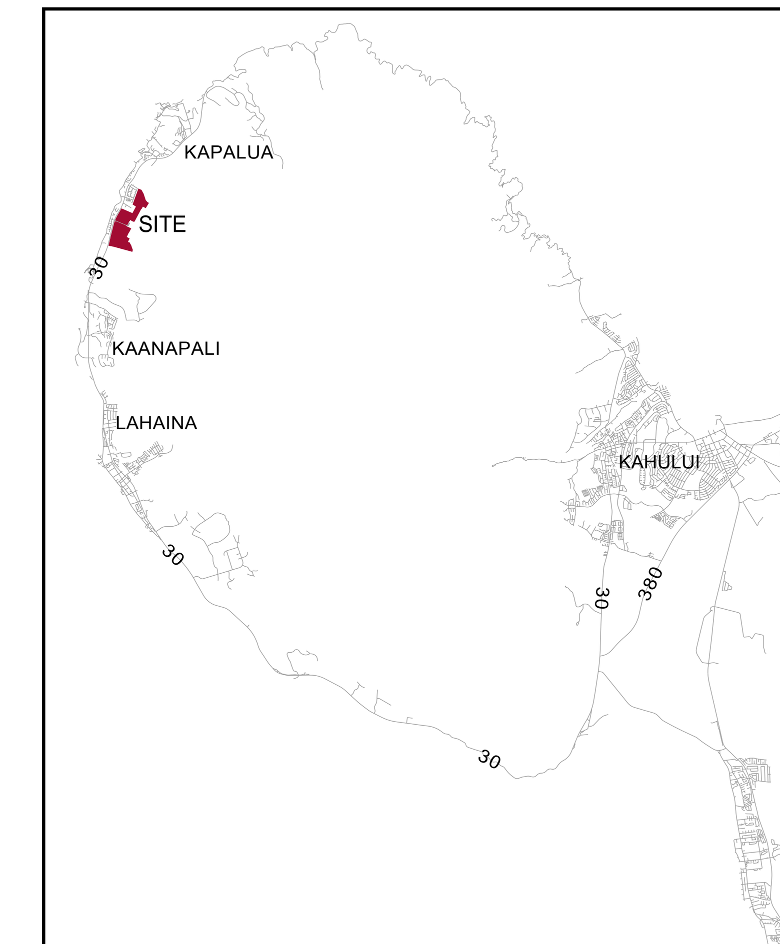
Maui Oceanview LP Response to Land Use Commission Staff Comments
5/15/2019

Volume 2

PULELEHUA
REVISED SITE PLAN

COVER SHEET

SHEET LIST



VICINITY MAP
SCALE: 1:20,000'

Pulelehua

WEST MAUI PROJECT DISTRICT 5

March 15, 2019

Mahinahina & Kahana, Lahaina
Island of Maui, Hawai'i

Maui Oceanview LP

Kimley»Horn

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PROJECT RENDERINGS

Typical Live / Work Building

Typical Multi-Family Building
Street View

PROJECT RENDERINGS

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawaii
March 15, 2019

Maui Oceanview LP
PWS Architects, Inc.
Kimley»Horn

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CONCEPTUAL SITE PLAN- AERIAL

GRAPHIC SCALE IN FEET

0 150 300 600

1"=300' @ 22x34

LEGEND

- COMMERCIAL BUILDING
- LIVE / WORK BUILDING
- WORKFORCE BUILDING
- MARKET RATE BUILDING
- SINGLE FAMILY
- ESTATE EDGE SINGLE FAMILY
- RECREATIONAL OPEN SPACE / DETENTION
- Pp POCKET PARK
- S MONUMENT SIGN
- BUS STOP - NORTH BOUND
- BUS STOP - SOUTH BOUND

Note:
See Typical Pocket Park & Sections Exhibits Sheet for Cross-Sections A, B, & C.

CONCEPTUAL SITE PLAN

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawaii
March 15, 2019

Maui Oceanview LP

Kimley»Horn

CONCEPTUAL SITE PLAN

GRAPHIC SCALE IN FEET

0 150 300 600

1"=300' @ 22x34

LEGEND

- COMMERCIAL BUILDING
- LIVE / WORK BUILDING
- WORKFORCE BUILDING
- MARKET RATE BUILDING
- SINGLE FAMILY
- ESTATE EDGE SINGLE FAMILY
- RECREATIONAL OPEN SPACE / DETENTION
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Note:
See Typical Pocket Park & Sections Exhibits Sheet for Cross-Sections A, B, & C.

CONCEPTUAL SITE PLAN

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawaii
March 15, 2019

Maui Oceanview LP

Kimley»Horn

DISTRICT LAND USE ALLOCATION MAP

District Areas

Core Neighborhood District	Acreage	Residential Units
CORE-1	7	20
Total	**7**	**20**

Center Neighborhood District		
CNTR-1	10	0
CNTR-2	6	50
CNTR-3	4	0
Total	**20**	**50**

General Neighborhood District		
GNRL-1	28	267
GNRL-2	23	280
GNRL-3	14	0
GNRL-4	8	100
GNRL-5	10	110
Total	**83**	**757**

Edge Neighborhood District		
E-1	34	58
E-2	14	14
Total	**48**	**72**

Estate Edge District		
EE-1	23	1
Total	**23**	**1**

Workplace Edge District		
WE-1	5	0
Total	**5**	**0**

Parks, Open Spaces & Buffers		
OS-1	31	0
OS-2	20	0
OS-3	2	0
OS-4	60	0
OS-5	11	0
Total	**124**	**0**

DISTRICT LAND USE ALLOCATION MAP

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawaii
March 15, 2019

Maui Oceanview LP

Kimley»Horn

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PRELIMINARY
PHASING PLAN

Residential Phasing Summary

Phase	Year	MR	WF	SF	Total
1	2019	150	90	0	240
2	2024	230	120	0	350
3	2026	140	70	0	210
4	2028	0	0	0	0
5	2030	0	0	100	100
Total		520	280	100	900

Commercial Phasing Summary

4	2028	±	70,000	sf

PRELIMINARY
PHASING PLAN

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawaii
March 15, 2019

Maui Oceanview LP

Kimley»Horn

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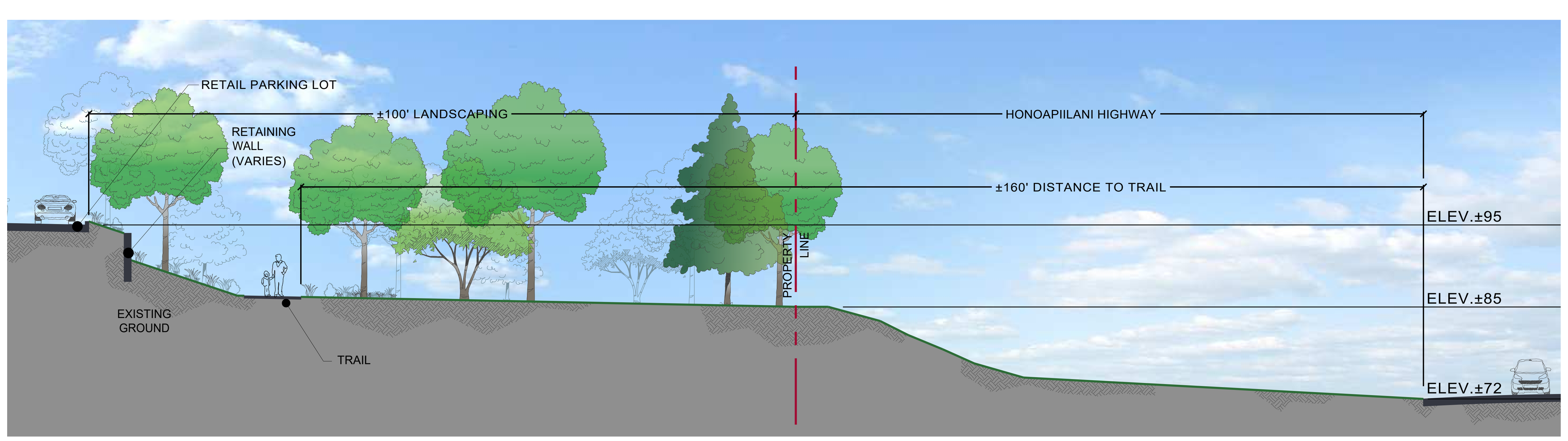
TRAIL SYSTEM & CONNECTIVITY PLAN

LEGEND

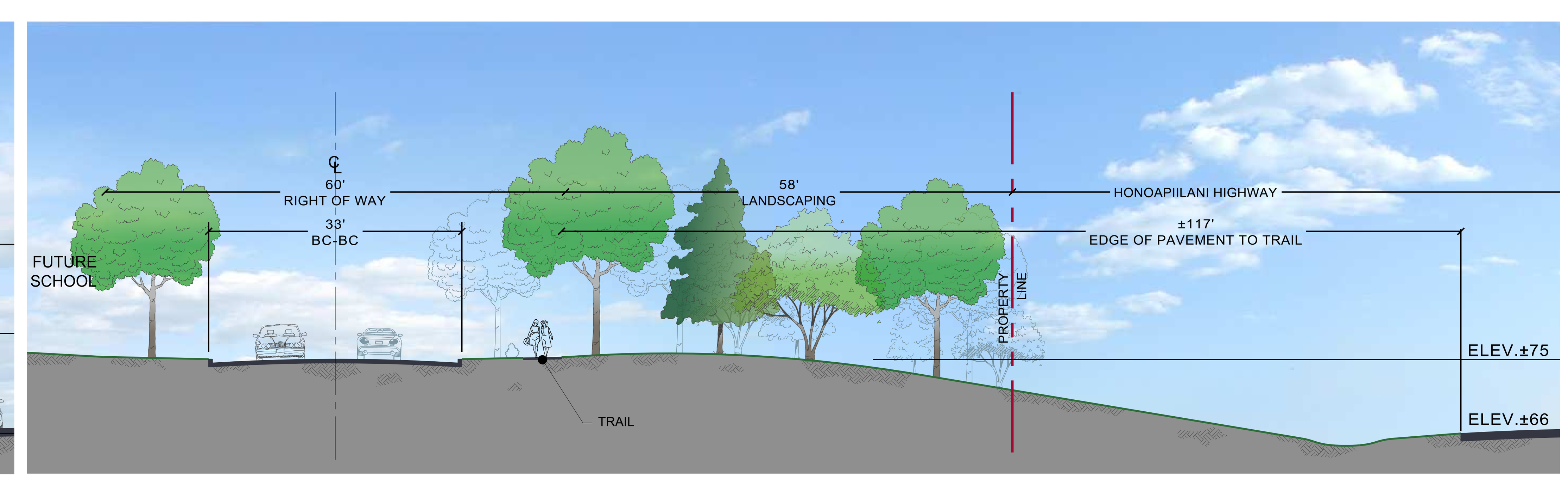
- 8' MULTI-USE TRAIL
- 6' TRAIL
- COMMERCIAL SIDEWALKS
- 5' SIDEWALK
- LOCAL SIDEWALK/PATH (HARD AND SOFT SURFACE)
- RETAIL
- RECREATIONAL OPEN SPACE & DETENTION
- POCKET PARK
- BUS STOP - NORTH BOUND
- BUS STOP - SOUTH BOUND

NOTE:
1. ADDITIONAL TRAIL SYSTEM MAY BE INCLUDED IN CONJUNCTION WITH THE DEVELOPMENT OF THE COMMUNITY PARK AND FUTURE SCHOOL.

2. THIS PLAN IS CONCEPTUAL AND IS USED TO ILLUSTRATE PEDESTRIAN AND BIKE CONNECTIVITY. THE EXACT LOCATION OF TRAILS AND OTHER ELEMENTS MAY CHANGE DUE TO FINAL DESIGN AND ENGINEERING NEEDS.



TRAIL SECTION AT RETAIL PARKING



TRAIL SECTION AT SCHOOL

TRAIL SYSTEM & CONNECTIVITY PLAN

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawaii
March 15, 2019

Maui Oceanview LP
Kimley»Horn

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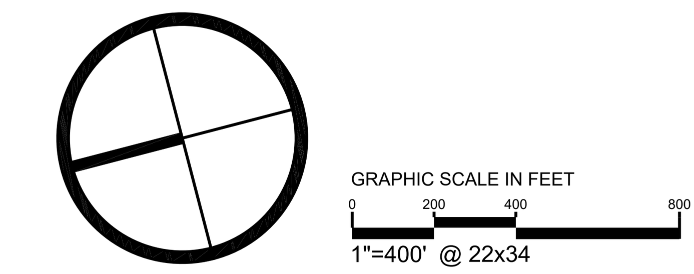
WALKABILITY PLAN



LEGEND

5-MINUTE WALK TO DESTINATION	PERCENTAGE OF UNITS WITHIN ZONE
SHOPPING & SERVICES	97%
RECREATION	100%
PUBLIC TRANSPORTATION	85%
SCHOOL	80%

NOTE:

1. WALK TIMES ARE BASED ON COVERING A DISTANCE OF 1320 LF (¼ MILE) EVERY 5 MINUTES.

WALKABILITY PLAN

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawaii
March 15, 2019

Maui Oceanview LP

Kimley»Horn

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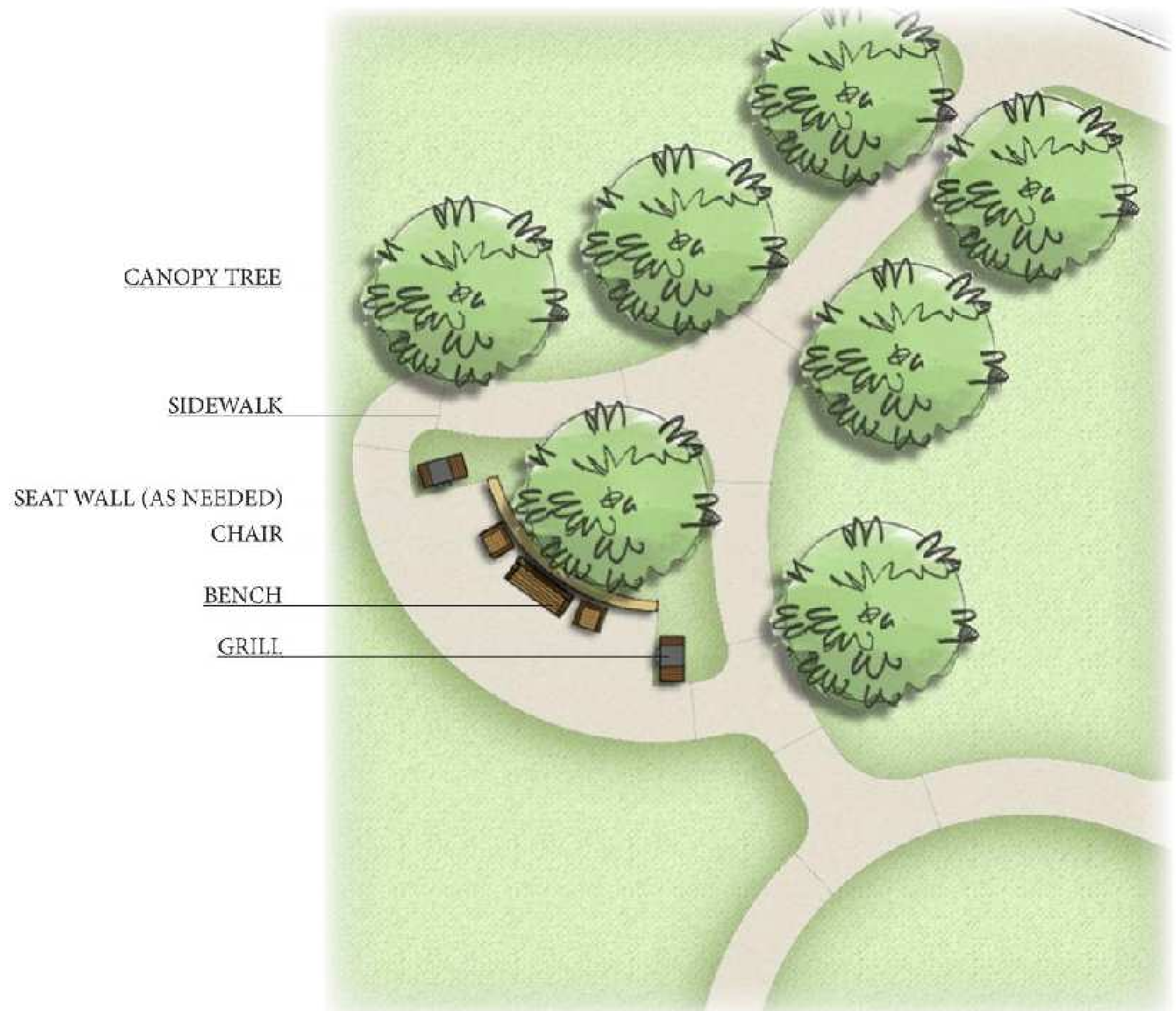
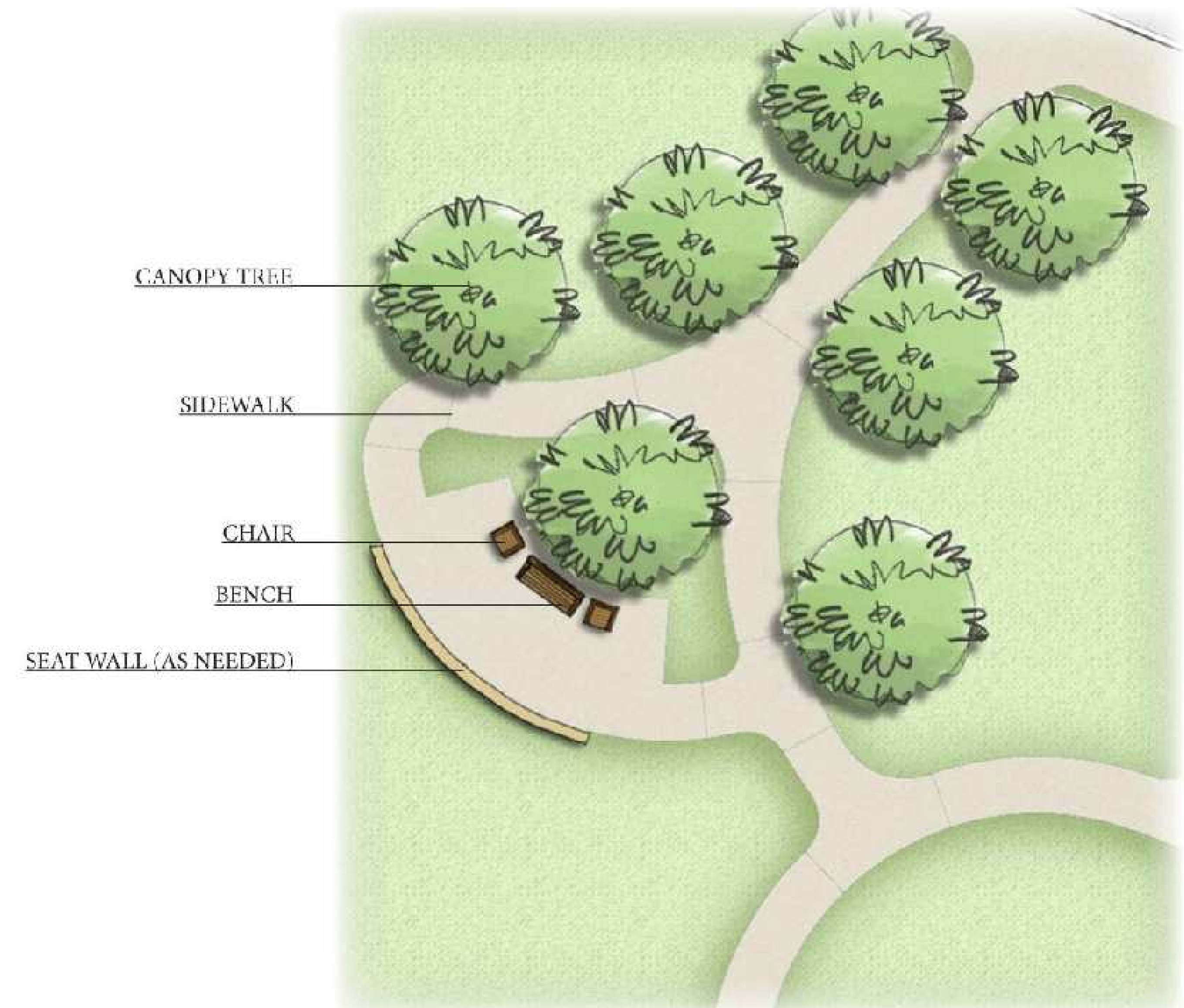
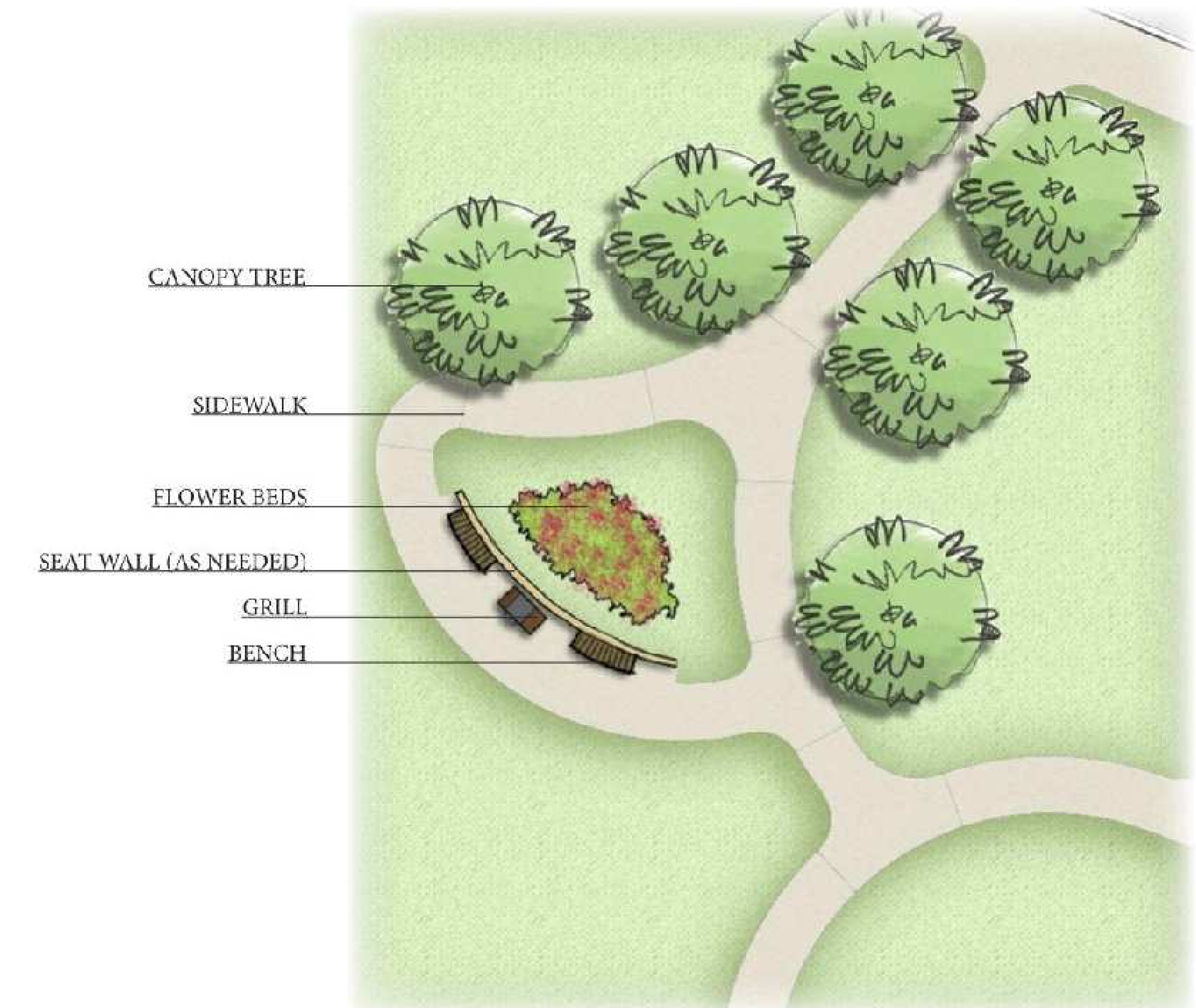
TYPICAL POCKET PARK & SECTIONS EXHIBITS



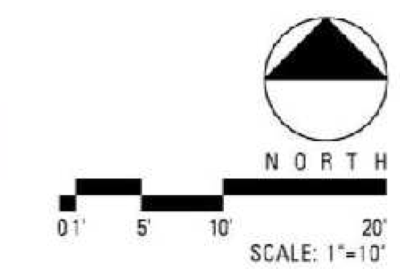
TYPICAL POCKET PARK CONCEPT A



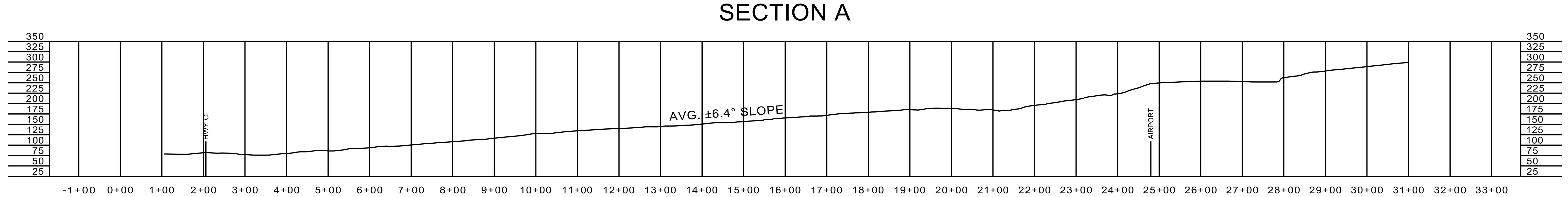
TYPICAL POCKET PARK CONCEPT B



TYPICAL POCKET PARK CONCEPT C



SECTION A



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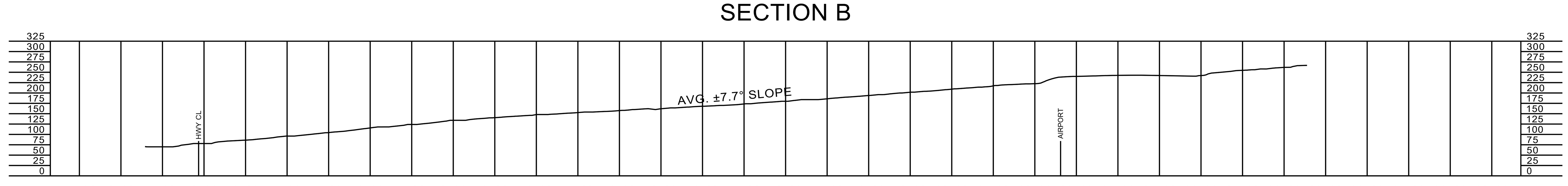
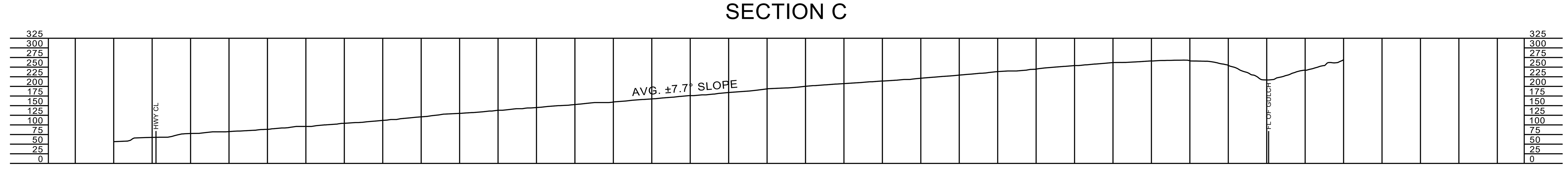


SECTION C



SECTIONS PROFILES
SCALE 1":200'

TYPICAL POCKET PARK & SECTIONS EXHIBITS

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawaii
March 15, 2019

Maui Oceanview LP
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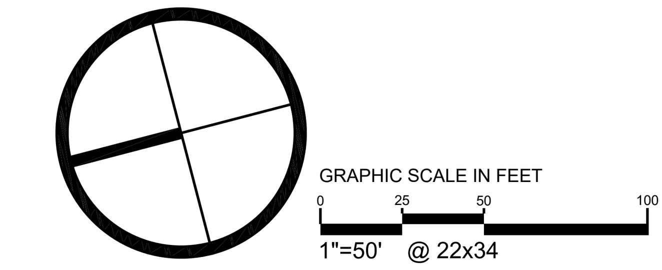
COMMUNITY
PARK EXHIBIT



COMMUNITY PARK

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
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March 15, 2019

Maui Oceanview LP

Kimley»Horn

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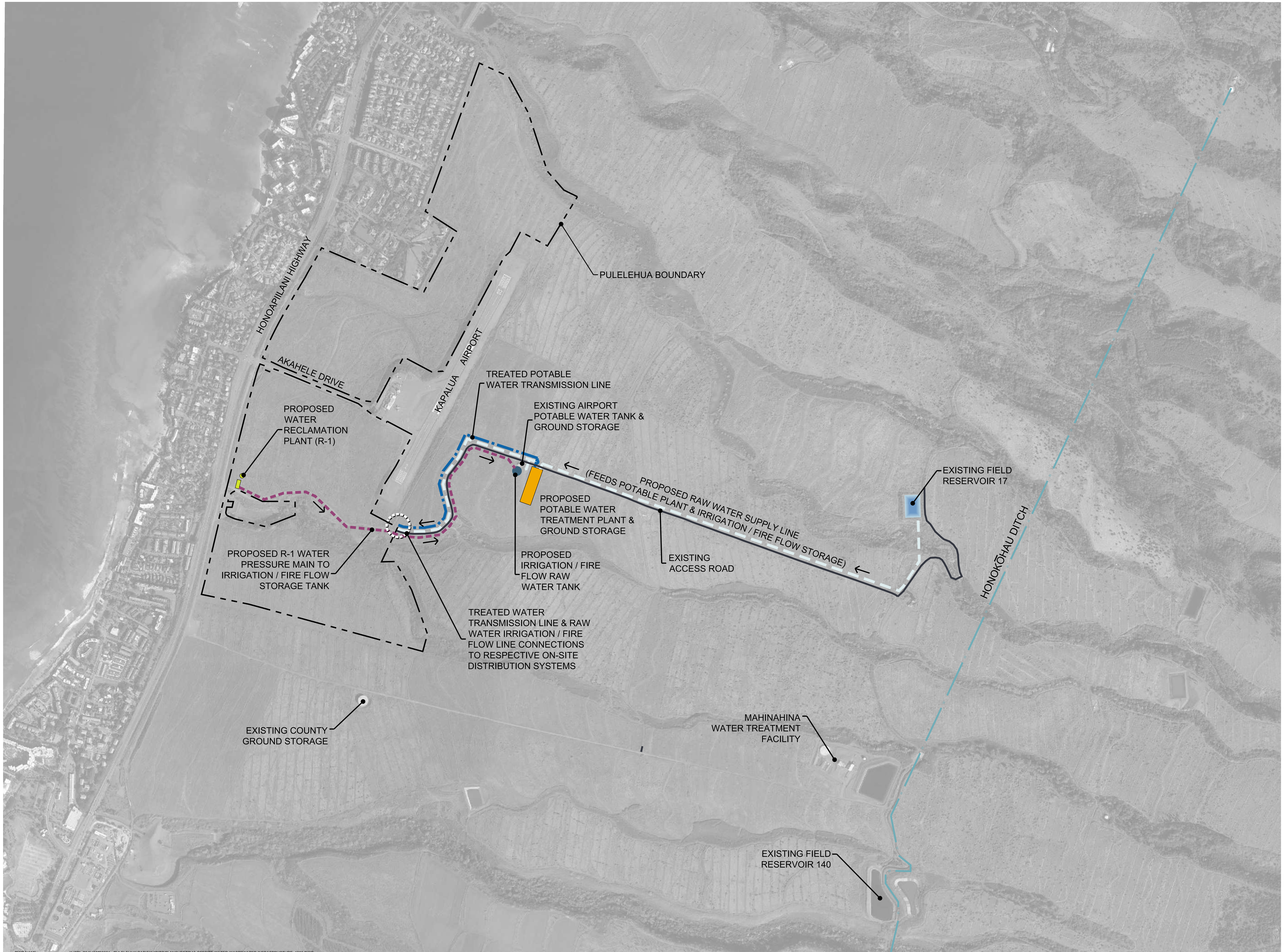
OFFSITE WATER INFRASTRUCTURE PLAN



GRAPHIC SCALE IN FEET
0 300 600 1200
1"=600' @ 22x34

NOTE:

1) ALIGNMENT AND LOCATIONS ARE CONCEPTUAL..
2) AERIAL IMAGE FROM GOOGLE EARTH(c) 2016.

OFFSITE WATER & WASTEWATER INFRASTRUCTURE MAP

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
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March 15, 2019

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Kimley»Horn