PULELEHUA

Maui Oceanview LP Response to Land Use Commission Staff Comments
8/24/2018

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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 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; EXHIBIT R [PROPOSED AMENDED DECISION AND ORDER]; CERTIFICATE OF SERVICE

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.

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, 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:

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-1, L-2	Letter from Scott F. Brast/Senior Vice President of American National Insurance Company, and American National Insurance Company Annual Statement. American National Insurance Company Quarterly Statement

ITEM 5	EXHIBIT M,	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	UPDATED CBRE Market Study, Economic Impact Analysis. And Public Fiscal Assessment Of The Proposed Pulelehua 900-Unit 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	UPDATED CBRE Market Study, Economic Impact Analysis. And Public Fiscal Assessment Of The Proposed Pulelehua 900-Unit Project
ITEM 8	EXHIBIT O	UPDATED CBRE Market Study, Economic Impact Analysis. And Public Fiscal Assessment Of The Proposed Pulelehua 900-Unit Project
ITEM 9		See below
ITEM 10	EXHIBIT P	Letter from T.H. Pritchett (Flora and Fauna; Agricultural Resources)
ITEM 11	EXHIBIT Q	Annual Report
ITEM 12	EXHIBIT R	Proposed Amended Decision and Order (in ramseyer format) in paper original (with paper copy and one electronic copy).

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.

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.

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

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 898 units in split-level apartment buildings (including some live/work units in apartment buildings in close proximity to the proposed commercial areas) and will offer for sale two large estate edge lots on the northern boundaries between Kahanaiki and Mahinahina gulches. See Exhibit A-1.

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. 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 [Exhibit L-1] and the quarterly statement (as of March 31, 2018) [Exhibit L-2] 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 will enter into a Housing Agreement with the County of Maui Department of Housing and Human Concerns.

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 two large estate edge lots for sale on the northern boundaries between Kahanaiki and Mahinahina gulches, leaving 898 units for rental purposes. Reduced by the 125 Kapalua Mauka condition units, Maui Oceanview LP has a remaining density of 773 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 618 market rental units of the total density of 773 rental units and the two large estate edge fee lots). Consequently, Maui Oceanview LP proposes to develop a total of 280 Residential Workforce Housing Rental units and 618 market rental housing units, along with two large estate edge 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 a Housing Agreement to be 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'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 a Housing Agreement to be 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 contemplates development of Pulelehua in approximately five phases, anticipated to be completed over a ten-year period, as follows:

PULELEHUA PROPOSED PHASING				
PHASE	**ESTATE LOTS**	**WORKFORCE RENTAL HOUSING UNITS**	**MARKET RENTAL HOUSING UNITS**	**TOTAL**
PHASE 1		70	170	240
PHASE 2		70	150	220
PHASE 3		70	150	220
PHASE 4		70	148	220
PHASE 5	2			
TOTALS	2	280	618	900

9. Since Maui Oceanview LP is not proposing to develop single family residences for sale (other than two Estate-Edge Lots), it does not intend to construct any accessory ʻohana units as part of the Project. At some future date, Maui Oceanview may request that the County of Maui consider allowing and approving the use of the allowable number of accessory ʻohana units as additional density for apartment units.

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

11. 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).

12. RETAIL: Maui Oceanview proposes to develop retail space in multiple locations, with neighborhood island style retail along Akahele Street 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 62,000 square feet (70,000 sf maximum) of gross

leasable area spread among six development pads totaling 10.6 acres on either side of Akehele Street (the airport access drive) at Honoapiilani Highway as well as north of the Regional Sports Park. Based on the pads' relative sizes Maui Oceanview estimated the pads north of Akahele Streeet will support some 29,000 square feet of floor area, the pads south of Akahele Street will support about 24,000 square feet, and the southern-most pads will support approximately 9,000 square feet. The overall Floor Area Ratio will be approximately 0.134. 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

13. Tom Halliday from CBRE prepared for Maui Oceanview LP a Market Study, Economic Impact Analysis and Public Fiscal Assessment of the Proposed Pulelehua 900-Unit Project.

14. 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.

15. From a direct perspective, Maui Oceanview LP's proposed 900 residential units (898 apartment and 2 single family homes) and 62,000 square feet (70,000 sf 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.

16. Pulelehua will bring an estimated $249.3 million in direct development capital into Maui over the build-out period for the project.

17. 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 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.

18. 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.

19. 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.[1]

20. 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.

21. 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.

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

23. 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

[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

business/community association and maintenance worker-years will total 97 during the modeling period and 28 per year thereafter.

24. 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).

25. 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.

26. 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.

27. 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.

28. 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.

29. During build-out the 898 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.

30. 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.

31. 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.[2]

32. PUBLIC INFRASTRUCTURE: Maui Oceanview LP does not object to the Department of Public Works request that any amended Decision and Order

[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.

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.

33. The Hawaii State Department of Education (DOE) has decided on an area along Honoapiilani 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 Honoapiilani Highway will be required when the school is constructed to accommodate impacts of the school.

34. 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.

35. The proposed amended Decision and Order 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 Pulelehua.

CONCLUSION

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

DATED: Wailuku, Maui, Hawaii, _____.

_____

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 development 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-1 is a 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-1 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. Attached as Exhibit L-2 is a true and correct copy of the ANICO Quarterly Statement as of March 31, 2018.

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 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 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 Apartment 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 is a true and correct copy of the most recent annual report filed in this docket.

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

DATED: August 10, , 2018.

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. 31 AND 79	DOCKET NO. A04-751 CERTIFICATE OF SERVICE

CERTIFICATE OF SERVICE

I certify that a copy of the SUPPLEMENTAL MEMORANDUM IN SUPPORT OF MOTION OF PETITIONER MAUI OCEANVIEW LP TO AMEND DECISION AND ORDER has been duly served on the following parties at their last known address by hand delivery, electronic mail or depositing in the U.S. mail, postage prepaid on _____, 2018:

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County of Maui
200 S. High Street, 3rd Floor
Wailuku, Maui, Hawaii 96793

DATED: Wailuku, Maui, Hawaii, _____.

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

Attorneys for Petitioner MAUI OCEANVIEW LP

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 M-AHINAHINA AND KAHANA, DISTRICT OF LAHAINA, MAUI, HAWAII, TAX MAP KEY NO. 4-3-01; POR. 31 AND 79, **DOCKET NO. A04-751**: SUPPLEMENTAL MEMORANDUM IN SUPPORT OF MOTION OF PETITIONER MAUI OCEANVIEW LP TO AMEND DECISION AND ORDER

GRAPHIC SCALE IN FEET
0 150 300 600
1"=300' @ 22x34

LEGEND

LIVE / WORK UNIT

KAHANAIKI GULCH

KAPALUA AIRPORT

KAHANA RIDGE DR.

KAHANA RIDGE PL.

HOOHUI ROAD

LOTUS PL.

A'A HOKU PL.

KAHANA RIDGE SUBDIVISION

KAHANA HUI SUBDIVISION

POHAKU-KAANAPALI GULCH

AKAHELE STREET

MAHINAHINA GULCH

FUTURE SCHOOL
±13 Ac.

COMMUNITY PARK
±10 Ac.

HONOAPIILANI HIGHWAY

LIVE / WORK
BUILDING (TYP)

LIVE-WORK LOCATION PLAN

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawai'i
March 18, 2018

INFRASTRUCTURE INVESTMENTS

PRITCHARD ASSOCIATES

Kimley»Horn

PWS Architects, Inc.

bei 1 BASHKIKAH 2 ENGINEERING 3 INCORPORATED

T.H. PRITCHETT / Associates
Landscape Architects

DWG NAME K:\FRI_CIVIL\67790501 - PULELEHUA\CAD\EXHIBITS\PLANSHEETS\12-LIVE WORK LOCATION.DWG
LAST SAVED 8/9/2018 11:08 AM

ALAN M. ARAKAWA
Mayor

DAVID C. GOODE
Director

ROWENA M. DAGDAG-ANDAYA
Deputy Director

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

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

CARY YAMASHITA, P.E.
Engineering Division

JOHN R. SMITH, P.E.
Highways Division

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

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

317

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 Collings, P.C.
2100 Ross Ave., Ste. 750
Dallas, TX 75201

TG: 201611721 -C (3)
TGE: 16073344
Robyn M. Delapinia
RC

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:

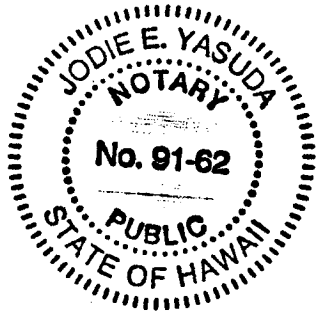
MAUI OCEANVIEW LP,
a Delaware limited partnership

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.



(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

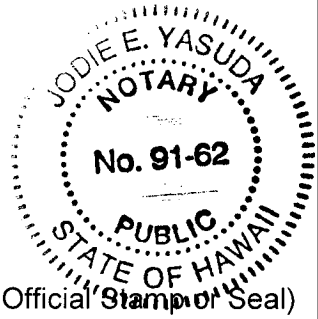
Document Identification or Description: Limited Warranty Deed with Reservations and Covenants

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

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

Jodie E. Yasuda
Signature of Notary

May 24, 2016
Date of Notarization and Certification Statement



(Official Stamp or Seal)

Jodie E. Yasuda
Printed Name of Notary

6

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 Ahrens
Its President

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

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.

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

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. 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.

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

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 Cleveland
Its President

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

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)

Signature of Notary

May 24, 2016
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)

STATE OF TEXAS)
) SS.
COUNTY OF DALLAS)

On this 27th day of MAY, 2016, before me personally appeared PAUL CHEUG, 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

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

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".

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.

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

FAMILY OF COMPANIES

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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, 2016

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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted 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 and post such files). ☒ Yes ☐ No

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

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

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, 2016 (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 $824.6 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 15, 2017, there were 26,914,516 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.

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AMERICAN NATIONAL INSURANCE COMPANY

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PART I

ITEM 1. BUSINESS

Company Overview

American National Insurance Company has over 110 years of experience. We have maintained our corporate headquarters in Galveston, Texas since our founding in 1905. 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 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 customer 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 internal 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 customer service through talented people, who are at the heart of our business.

Business Segments

Our family of companies includes six life insurance companies, eight property and casualty insurance companies, and numerous non-insurance subsidiaries. The business segments and the principal products they offer or manage follow.

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, subject to policy specific minimums.

Equity-indexed universal life products have the same features as the universal life products, but also provide an opportunity for policyholders to earn additional return through credited interest tied to the performance of a particular stock index, such as the S&P 500.

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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 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 securities held in 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.

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.

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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. Agricultural business insurance is the majority of our commercial lines. This includes property and casualty coverage tailored for a farm, ranch, vineyard or other agricultural business, contractors, and 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 offered along with our Agricultural business and encompasses property, liability 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.

Mortgage Security Insurance (“MSI”). MSI program insures a lender’s interest in residential or commercial mortgaged property by providing coverage when the mortgagor fails to insure the property subject to the mortgage, or for property that has been foreclosed by the lender. The Named Insured, i.e. Lender, may choose to purchase this coverage in their entire portfolio or specific segments of their portfolio meeting eligibility criteria under this program. Optional liability coverage is also available for real estate owned property.

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, such as our limited investment advisory services.

Marketing Channels

Product distribution is managed to satisfy specific markets, maintain brand identities and 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.

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 direct mail, internet and call centers.

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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 middle-income market. CSSD’s business model is structured to distribute new products as well as provide personalized service to the customer by agents located throughout much of the United States. CSSD has evolved its operations to offer a wider variety of products and alternative payment options to meet the changing needs of the customer.

Multiple-line—offers life insurance, health insurance, annuities, and property and casualty insurance primarily through dedicated agents. Multiple-line serves individuals, families, agricultural clients, and small business owners at all income levels. 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.

Credit Insurance Division—offers products that provide protection to borrowers and the lenders 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. Distribution includes general agents who market to financial institutions, automobile dealers, and

furniture dealers. These general agents are given non-exclusive authority to solicit insurance within a specified geographic area and to appoint and supervise subagents.

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.

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Risk Management

A conservative operating philosophy was a founding principle for our Company. We manage risks throughout the Company by employing controls in our insurance and investment functions. These controls are designed to both place limits on activities and provide 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 to ensure consistent application of the enterprise risk management process across all business segments. We also use several other senior management committees to 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 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 on any one insurance contract or any single event or series of events. 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. We purchase reinsurance from many providers and we are not dependent on any single reinsurer. We believe that our reinsurers are currently reputable and financially secure, and we regularly review the financial strength ratings of our reinsurers with the goal of ensuring they meet established thresholds. Reinsurance does not remove our liability to pay our policyholders, and we remain liable to our policyholders for the risks we insure. The operating and financial condition of our reinsurers can change between the time reinsurance is purchased and when claims become payable, which can increase our risk.

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 homeowners business in coastal 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 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, 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 maintaining our financial strength ratings.

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 agencies' quantitative and qualitative evaluation of a company and its management strategy. 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 'AA' to 'CCC' may be modified by the addition of a plus (+) or minus (-) sign to show relative standing within the major rating categories.

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Regulation 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 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, marketing and advertising practices, privacy, 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 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 U.S. federal government presence in insurance oversight was expanded by the Dodd Frank Wall Street Reform and Consumer Protection Act ("Dodd Frank"). 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 the 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. Although President Trump's administration has announced a desire to repeal or scale back Dodd-Frank, it remains uncertain at this time when and to what extent any such changes to Dodd-Frank will ultimately be implemented. Whether or not Dodd-Frank is repealed or amended, it is possible that there may be further federal incursion into the business of insurance, 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, risk management and financial matters and advance notice to, or 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.

Price Regulation. Nearly all states have laws requiring property and casualty and health insurers to file price schedules and 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 pricing 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.

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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 impact our willingness and ability to market products 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 an opinion 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 December 31, 2016, American National Insurance Company and each of its insurance subsidiaries were 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 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.

Protection of Consumer Information. U.S. federal laws, such as the Gramm-Leach-Bliley Act, and the laws and regulations 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, 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.

Cybersecurity. The NAIC is working to develop a state model law to establish standards for data security, which includes overseeing third-party service providers, establishing standards for investigating a data breach, and providing requirements for notifying regulators and consumers. While it is not mandatory for insurers to comply with an NAIC model law, nor for states to adopt the model law, state and federal legislators and regulators are likely to look to the model law for guidance in proposing new legislation and as a standard to which insurance companies could be held in decisions on whether to bring enforcement actions. In addition, the New York Department of Financial Services has adopted a regulation that will require us to establish and maintain a cybersecurity program that meets the requirements of such regulation.

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.

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.

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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 businesses, results of operations or financial condition.

Employees

As of December 31, 2016, we had approximately 4,597 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. Such reports, proxy statements and other information may be obtained by visiting the Public Reference Room of the SEC at 100 F Street, N.E., Washington D.C. 20549 or by calling the SEC at 1-800-SEC-0330. The SEC maintains a website (www.sec.gov) that contains reports, proxy statements, and other information regarding issuers that file electronically with the SEC.

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 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 continuing unemployment, declining workforce participation, consumer prices, geopolitical issues, energy prices, stagnant family incomes, consumer confidence and spending, and increased student and consumer debt can adversely affect the economy and demand for our products. For example, difficult credit conditions may adversely affect purchases of credit-related insurance products, or our policyholders may choose to defer or stop paying insurance premiums, resulting in higher lapses or surrenders of policies.

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Interest rates have a significant impact on our business and on consumer demand for our products. Some of our products, principally interest-sensitive life insurance and fixed annuities, expose us to the risk that changes in interest rates may reduce our “spread,” or the difference between the amounts we earn on investment and the amount we must pay under our contracts. Persistently low (or lower) interest rates, compound this spread compression. 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. Conversely, increases in market interest rates can also have negative effects. For example, increasing rates on other insurance or investment products offered to our customers by competitors can lead to higher surrenders at a time when fixed maturity investment asset values are lower. We may react to market conditions by increasing crediting rates, which narrows spreads. In addition, when interest rates rise, the value of our investment portfolio may decline due to decreases in the fair value of our securities. 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. Recently, 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 could generate volatility in debt and equity markets and could hamper continued economic recovery.

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 income, 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 sector can compound these risks.

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 that certain products provide, 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 regarding product pricing, the fair value and future performance of our investments, and the realization of deferred tax assets. 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.

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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 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 safeguard our data. We rely on the availability, reliability, and security of our information-processing infrastructure, system platforms, and business applications to store, process, retrieve, calculate and evaluate customer and company information. In certain lines of our business, our information technology and telecommunication systems interface with and rely upon third-party services. We are highly dependent on the 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. Furthermore, we have developed or evolved strategies and processes to maintain and enhance our existing technology and processing infrastructure and information systems and to replace certain information systems to keep pace with changes in technology, changing customer preferences and expectations, and evolving industry and regulatory standards. However, system failures, extended outages, or damage or destruction to 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. If these systems were inaccessible or inoperable due to natural or man-made disasters, or if they fail to function effectively or as designed, the resulting disruptions may impede or interrupt our business operations.

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We receive and transmit confidential data with and among customers, agents, financial institutions and selected third party vendors and service providers. We have invested significant time and resources towards preventing and mitigating data security risks through 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 cyber-attacks. A breach, whether from external or internal sources, could result in access, viewing, misappropriation, altering or deleting information in ours or a third party's systems on which we rely, including customers' and employees' personal and financial information and our proprietary business information. Like other companies, we have experienced threats to our data and systems, including malware, seeking to gain unauthorized access to systems and data or to cause disruptions; however, to date, these have not been material to our operations. Any significant attacks, unauthorized access or disclosures, disruptions or other security breaches, whether affecting us or third parties, could result in substantial business disruption, costs and consequences, including repairing systems, increased security costs, customer notifications, lost revenues, litigation, regulatory action, fines and penalties, and reputational damage.

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 document transactions properly, 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 business. 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.

The material weaknesses in our internal control over financial reporting may adversely impact our Company. As discussed below in Part II—Item 9A—Controls and Procedures, we concluded that our internal control over financial reporting was not effective as of December 31, 2016, because of material weaknesses in our internal controls over income taxes and over collateral relating to our use of option derivatives. We are currently working to remediate these material weaknesses. While we have performed additional analyses and other procedures, and either implemented or plan to implement and test remediation measures as of the filing date of this Form 10-K, these material weaknesses have not been fully remediated. Moreover, we cannot be sure when we will fully remediate these material weaknesses or whether compensating controls will be effective before then in preventing or detecting material errors.

It is necessary for us to maintain effective internal control 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. 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.

We have devoted significant resources to remediate these weaknesses, and we have been monitoring the effectiveness of our improved procedures. We also intend to continue reviewing our procedures and implementing further improvements to our internal control procedures as necessary or warranted. However, we cannot be certain that these measures will ensure the adequacy of our controls over our financial processes and reporting in the future, or that there are no additional existing, but as yet undiscovered, weaknesses that we need to address.

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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 policyholder exposure in the affected area.

Some scientists 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. 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 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 the 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. In particular, our Medicare Supplement business is subject to intense price competition, which could negatively impact future sales of these products and affect our ability to offer this product. 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.

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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, 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 risks 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 cause harm to 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.

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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, a growing number of states have adopted legislation that is similar to the Model Unclaimed Life Insurance Benefits Act. Such legislation imposes new 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 or additional enactment of similar legislation may result in additional payments to beneficiaries, additional escheatment of funds deemed abandoned under state laws, 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.

We are subject to various conditions and requirements of the Patient Protection and Affordable Care Act of 2010 ("the Healthcare Act"). The Healthcare Act may affect the small blocks of business we have offered or acquired over the years that are, or 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 or 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.

Certain federal regulation may impact our property and casualty operations. In 2013, HUD finalized a "disparate impact" regulation that may adversely impact our ability to differentiate pricing for homeowners policies using traditional risk selection analysis. Various legal challenges to this regulation are being pursued by the industry. If this regulation is implemented, whether or not modified by HUD, it is uncertain to what extent it may impact the 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. The U.S. Department of Labor ("DOL") has issued a regulation that will significantly expand 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 DOL regulation is scheduled to be implemented beginning in April 2017, and it will impact individuals and entities that offer investment advice to those who purchase qualified retirement products, such as IRA's and qualified retirement plans. This regulation applies ERISA's fiduciary standard to many insurance agents, broker-dealers, advisers and others not currently subject to the standard, when they sell annuities to IRA's and qualified retirement plans. Further, it prohibits such individuals from receiving commission-based compensation from such sales unless they comply with a prohibited transaction exemption under the rule. It is possible that the rule, or its implementation date, could be affected by pending litigation or by the change in Presidential administrations. We will be following any such developments, but we expect to be ready to comply if the rule goes into effect as currently scheduled. Compliance with the rule may result in decreased premium on certain life and annuity products as a result of more limited sales opportunities through our current distribution arrangements. We may also experience a loss of some in-force business, as well as increased regulatory burdens and litigation risk. In addition, following a study required by Dodd-Frank, the staff of the SEC recommended a uniform fiduciary duty

standard applicable to both broker-dealers and investment advisers when providing personalized investment advice to retail customers. It is not clear at the present time whether or when the SEC will ultimately implement this change. However, if implemented, it would apply a different standard of care than is currently applicable to broker-dealers and would affect how our variable insurance products are designed and sold.

International standards continue to emerge in response to the globalization of the insurance industry and evolving standards of regulation, 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, Regulation Applicable to Our Business section.

Changes in tax laws could decrease sales and profitability of certain products and increase our tax cost. 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. Lastly, changes to the tax laws, administrative rulings or court decisions affecting U.S. corporations or the insurance industry could increase our effective tax rate and lower our net income.

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 mix, product profitability, reserve and capital requirements, financial condition or results of operations. See Note 3, Recently Issued Accounting Pronouncements, of the Notes to 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.

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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 notices 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, 2016, the Moody Foundation, a charitable trust, beneficially owned approximately 22.7% 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 49.1% of our common stock as of such date. As a result, subject to applicable legal and regulatory requirements, these stockholders 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.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None

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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 business segments.
- Two buildings, one 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." The following table presents the high and low prices for our common stock and the quarterly dividends declared per share.

	Stock Price Per Share		Dividend
	High	Low	Per Share
2016			
Fourth quarter	$131.99	$111.98	$ 0.82
Third quarter	122.95	108.88	0.82
Second quarter	120.67	107.44	0.82
First quarter	118.50	91.20	0.80
			$ 3.26
2015			
Fourth quarter	$108.60	$ 94.01	$ 0.80
Third quarter	109.81	95.29	0.80
Second quarter	107.02	97.29	0.77
First quarter	114.99	92.04	0.77
			$ 3.14

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. The payment of dividends is subject to restrictions described in Note 16, Stockholders' Equity and Noncontrolling Interests, of the Notes to the Consolidated Financial Statements and as discussed in Part II, Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations – Capital Resources.

On December 31, 2016, our closing stock price was $124.61 per share, and there were 723 holders of record of our issued and outstanding shares of common stock.

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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, 2016:

	Equity Compensation Plan Information		
	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted-average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Plan category			
Equity compensation plans			
Approved by security holders	—	$ 110.73	2,237,792
Not approved by security holders	—	—	—
Total	—	$ 110.73	2,237,792

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, 2011, with all dividends reinvested.

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Value at each year-end of a $100 initial investment made on December 31, 2011:

	December 31,					
	2011	2012	2013	2014	2015	2016
American National	$100.00	$ 97.89	$167.27	$173.11	$163.15	$200.68
NASDAO Total OMX	100.00	116.43	155.42	174.78	175.62	198.47
NASDAQ Insurance OMX	100.00	118.33	167.61	190.34	188.94	227.55

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,				
	2016	2015	2014	2013	2012
Total premiums and other revenues	$ 3,228	$ 3,017	$ 3,051	$ 3,119	$ 2,987
Income from continuing operations, net of tax	183	242	247	270	193

Net income	183	242	247	270	193
Net income attributable to American National	181	243	245	266	192
Per common share					
Income from continuing operations, net of tax					
Basic	6.79	9.02	9.21	10.09	7.20
Diluted	6.77	8.99	9.17	10.05	7.16
Net income attributable to American National					
Basic	6.73	9.04	9.15	9.95	7.19
Diluted	6.71	9.02	9.11	9.90	7.15
Cash dividends per share	3.26	3.14	3.08	3.08	3.08

	December 31,				
	2016	2015	2014	2013	2012
		(As Revised)	(As Revised)	(As Revised)	(As Revised)
Total assets	$24,533	$ 23,766	$ 23,566	$ 23,330	$ 23,105
Total American National stockholders' equity	4,652	4,452	4,428	4,188	3,827
Total equity	4,661	4,462	4,440	4,200	3,838

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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 limitations 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.

Revision to Previously Reported Amounts

Immaterial Correction of an Error. During the fourth quarter of 2016, the Company revised previously reported amounts to include cash held in a bank custody account representing collateral provided to us by third parties for equity-option derivative transactions. In accordance with Staff Accounting Bulletin ("SAB") No. 99, *Materiality,* and SAB No. 108, *Considering the Effects of Prior Year Misstatements when Quantifying Misstatements in Current Year Financial Statements*, management evaluated the materiality of the error from qualitative and quantitative perspectives, and concluded the error was immaterial to the current and prior periods. The correction revised only the consolidated statements of financial position and statements of cash flows . There was no revision to the consolidated statements of operations, comprehensive income or changes in equity. Detail regarding the revision amounts is included in Part II, Item 8, Note 2—Summary of Significant Accounting Policies and Practices, of the Notes to the Consolidated Financial Statements.

Consequently, the Company revised its historical financial statements for fiscal 2015, fiscal 2014 herein, and will revise the quarters within fiscal 2016, when they are published in future filings.

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.

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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 business 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 business 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 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 remain 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 contracts. In previous years, we reduced the

guaranteed minimum crediting rates on new fixed annuity contracts and new business, 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.

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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 individuals with the right skills and retaining employees for the longer term remains a business challenge. These challenges may become more difficult as the working population ages, causing loss of valuable work knowledge and experience through attrition. The cost of higher education may result in fewer people attending college or a university, thus leaving a potential workforce that is less prepared for the higher thinking challenges of the new workplace. Competitors who develop stronger appeal to applicants who seek innovative and paradigm shifting companies will have an edge. We are increasing our talent development efforts so that we can promote from within. In addition, we are expanding the use of technology to broaden our candidate base when recruiting and to deliver targeted training to augment the current skill level of our employees.

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 mandate broad changes in the delivery of health care benefits that have impacted our current 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 had some success with the individual products in 2014 and 2015 although these products were restricted somewhat in 2015 and 2016 due to regulatory changes. We are now expanding our presence in the worksite market to generate new opportunities in the broker market, as well as designing and implementing a captive sales force. With the recent changes in the Presidency and Congress, the future of the Healthcare Acts is questionable. We continue to monitor possible changes and maintain a wait and see attitude, allowing us to be opportunistic to new markets.

We expect our Managing General Underwriter ("MGU") business to remain stable during 2017. 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 remain committed to offering our personal and commercial property and casualty lines of business primarily through exclusive independent multiple line agents. We favor a balanced, focused and collaborative approach to both growth and profitability through the

development of successful agencies. In 2013, we launched a revised Agent Career Program to enhance recruiting, selection, on-boarding and training of new agent candidates. In 2017, a New Agent Development Program for newly appointed multiple line agents was introduced to support multiple line distribution growth goals. The new program is designed to enhance the development and retention of new multiple line agents across the country.

Our primary focus is to acquire and retain profitable business. To accomplish this objective, 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.

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Demand for property and casualty credit-related insurance products continues to increase. Credit markets have improved in recent years, which is increasing sales in the auto dealer market and, in turn, demand for our GAP products. 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. Payout annuity reserves are calculated using standard industry mortality tables specified for statutory reporting. 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 deferred annuities are established equivalent to the account value held on behalf of the policyholder. Additional reserves for guaranteed minimum death benefits 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.

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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, 2016			December 31, 2015		
	Gross	Ceded	Net	Gross	Ceded	Net
Case	$501,222	$59,442	$441,780	$487,154	$30,439	$456,715
IBNR	402,961	20,052	382,909	383,429	10,751	372,678
Total	**$904,183**	**$79,494**	**$824,689**	**$870,583**	**$41,190**	**$829,393**

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 provisions for trend changes, such as those caused by inflation. Judgment reserve amounts generally 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 developments, economic conditions, and general trends in claim severity, frequency and other factors that could affect the adequacy of claims 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, 2016 and December 31, 2015, 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 a relatively less stable 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.

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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, 2016 gross loss reserve balance are as follows (amounts in thousands):

Cumulative Increase (Decrease) in Reserves	1.0% Decrease	3.0% Increase

Personal		
Automobile	$ (3,995)	$ 12,533
Homeowner	(859)	3,290
Commercial		
Agricultural Business	(8,341)	23,299
Automobile	(2,191)	6,659

The analysis of our credit insurance line 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, 2016. 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 $8.3 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, 2016 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, 2016.

Deferred Policy Acquisition Costs

We had a DAC asset of approximately $1.29 billion and $1.32 billion at December 31, 2016 and 2015, 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, 2016 (in thousands):

	Increase (Decrease) in DAC
Increase in future investment margins of 25 basis points	$ 37,360
Decrease in future investment margins of 25 basis points	(40,178)
Decrease in future life mortality by 1%	1,276
Increase in future life mortality by 1%	(1,255)

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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. In the third quarter of 2015, we recognized a loss related to a reinsurer being unable to fulfill its obligations. 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 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 securities (equity and fixed maturity 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).

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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 Note 18, Pension and Postretirement Benefits, of the Consolidated Financial Statements. Early in 2017, the Company commenced a one time window offering to terminated, vested participants of our qualified defined benefit pension plans. The offer allows participants to take a lump sum or annuity payout which will be funded from pension plan assets.

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, non-taxable and non-deductible items, statutory tax rates and tax credits. Also, management's best estimate of future events and their impact is included in our accounting estimates. 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 asset 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. Although realization is not assured, management believes it is more-likely-than-not that the deferred tax assets will be realized and that no valuation allowance is necessary at his time.

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Consolidated Results of Operations

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

	Years ended December 31,			Change over prior year	
	2016	2015	2014	2016	2015
Premiums and other revenues					
Premiums	$1,996,648	$1,838,519	$1,815,971	$158,129	$ 22,548
Other policy revenues	306,880	250,265	224,254	56,615	26,011
Net investment income	860,235	834,831	932,858	25,404	(98,027)
Realized investments gains (losses), net	28,940	59,443	41,422	(30,503)	18,021
Other income	35,248	34,397	36,085	851	(1,688)
Total premiums and other revenues	**3,227,951**	**3,017,455**	**3,050,590**	**210,496**	**(33,135)**
Benefits, losses and expenses					
Policyholder benefits	711,384	617,006	542,015	94,378	74,991
Claims incurred	1,015,047	923,367	933,768	91,680	(10,401)
Interest credited to policyholders' account balances	331,770	293,464	353,492	38,306	(60,028)
Commissions for acquiring and servicing policies	465,962	425,338	397,126	40,624	28,212

Other operating expenses	503,459	501,377	485,865	2,082	15,512
Change in deferred policy acquisition costs [1]	1,152	(11,785)	9,578	12,937	(21,363)
Total benefits and expenses	**3,028,774**	**2,748,767**	**2,721,844**	**280,007**	**26,923**
Income before other items and federal income taxes	**$ 199,177**	**$ 268,688**	**$ 328,746**	**$ (69,511)**	**$(60,058)**

(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 net change indicates less expense was deferred than amortized and represents an increase to expenses in the period indicated.

Consolidated earnings decreased during 2016 compared to 2015 primarily due to a decrease in property and casualty earnings and lower realized capital gains. Property and casualty earnings decreased as continued premium growth was outpaced by the increase in personal auto claims and as catastrophe losses reverted to what we believe is a "normal" level. The decrease in realized capital gains was attributable to a decrease in sales of certain real estate holdings compared to 2015. Consolidated earnings decreased during 2015 compared to 2014 primarily due to a decrease in margins earned on investment income.

Life

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

	Years ended December 31,			Change over prior year	
	2016	2015	2014	2016	2015
Premiums and other revenues					
Premiums	$318,953	$305,350	$307,771	$ 13,603	$ (2,421)
Other policy revenues	295,289	237,797	209,192	57,492	28,605
Net investment income	227,923	226,076	232,389	1,847	(6,313)
Other income	2,067	1,709	1,427	358	282
Total premiums and other revenues	**844,232**	**770,932**	**750,779**	**73,300**	**20,153**
Benefits, losses and expenses					
Policyholder benefits	416,467	386,785	351,271	29,682	35,514
Interest credited to policyholders' account balances	63,565	59,148	68,796	4,417	(9,648)
Commissions for acquiring and servicing policies	132,428	121,482	124,447	10,946	(2,965)
Other operating expenses	199,769	201,112	194,927	(1,343)	6,185
Change in deferred policy acquisition costs [1]	3,887	(31,048)	(32,014)	34,935	966
Total benefits and expenses	**816,116**	**737,479**	**707,427**	**78,637**	**30,052**
Income before other items and federal income taxes	**$ 28,116**	**$ 33,453**	**$ 43,352**	**$ (5,337)**	**$ (9,899)**

(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 net change indicates less expense was deferred than amortized and represents an increase to expenses in the period indicated.

Earnings decreased during 2016 compared to 2015 primarily due to a change in estimate which resulted in a net decrease in earnings of $3.7 million. Additional non-recurring expense was incurred in 2016 relating to certain policies that lapsed with insufficient value to cover their outstanding policy loan balance. Earnings decreased during 2015 compared to 2014 primarily due to the increase in policyholders benefits partially offset by an increase in other policy revenues.

Premiums and other revenues

Premiums increased during 2016 compared to 2015 primarily due to continued growth in renewal premium on our term products. Premiums were relatively flat during 2015 compared to 2014.

Other policy revenues include mortality charges, earned policy service fees and surrender charges on interest-sensitive life insurance policies. The increase in other policy revenues during 2016 compared to 2015 is due to an increase in mortality charges and the above-mentioned change in estimate. The increase in other policy revenues during 2015 compared to 2014 is attributable to an increase in mortality charges and an assumption change for universal life products.

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	
	2016	2015	2014	2016	2015
Traditional Life	$52,596	$55,280	$55,391	$ (2,684)	$ (111)
Universal Life	19,519	14,355	15,276	5,164	(921)
Indexed UL	24,606	22,888	22,458	1,718	430
Variable UL	24	25	39	(1)	(14)
Total Recurring	**$96,745**	**$92,548**	**$93,164**	**$ 4,197**	**$ (616)**
Single and excess	$ 1,932	$ 2,163	$ 2,173	$ (231)	$ (10)
Credit life	4,372	3,984	3,940	388	44

Life insurance sales are based on the total yearly premium that insurance companies would expect to receive if all recurring premium policies would remain in force, plus 10% of single and excess premiums and 15% of credit life premium. 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. Whereas 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 2016 compared to 2015 primarily driven by an increase in universal life policy sales. Life insurance sales were relatively flat during 2015 compared to 2014.

Benefits, losses and expenses

Policyholder benefits increased during 2016 compared to 2015 primarily due to the above-mentioned change in estimate. Policyholder benefits increased during 2015 compared to 2014 primarily due to an increase in claims although claims were within our product pricing measures.

Commissions increased during 2016 compared to 2015 primarily due to an increase in universal life policy sales. Commissions were relatively flat during 2015 compared to 2014.

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

	December 31,			Change over prior year	
	2016	2015	2014	2016	2015
Acquisition capitalized	$ 108,825	$108,615	$110,195	$ 210	$ (1,580)
Amortization	(112,712)	(77,567)	(78,181)	(35,145)	614
Change in DAC	**$ (3,887)**	**$ 31,048**	**$ 32,014**	**$ (34,935)**	**$ (966)**

The decrease in DAC is primarily due to the change in estimate mentioned above. DAC was relatively flat during 2015 compared to 2014.

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	
	2016	2015	2014	2016	2015
Life insurance in-force					
Traditional life	$67,649,433	$63,336,601	$59,409,750	$4,312,832	$3,926,851
Interest-sensitive life	27,971,646	26,858,051	26,166,314	1,113,595	691,737
Total life insurance in-force	**$95,621,079**	**$90,194,652**	**$85,576,064**	**$5,426,427**	**$4,618,588**

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

	December 31,			Change over prior year	
	2016	2015	2014	2016	2015
Number of policies in-force					
Traditional life	$1,841,359	$1,890,600	$1,949,119	$(49,241)	$(58,519)
Interest-sensitive life	222,845	212,851	205,805	9,994	7,046
Total number of policies	**$2,064,204**	**$2,103,451**	**$2,154,924**	**$(39,247)**	**$(51,473)**

Total life insurance in-force increased during 2016 compared to 2015 and 2015 compared to 2014, while the total number of policies decreased for the same periods, reflecting the transition to fewer but higher face amount policies.

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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,		
	2016	2015	2014	2016	2015	2014
Reinsurance assumed	$ 1,716	$ 48	$ 117	$ 2,188	$ (20)	$ 137
Reinsurance ceded	(219,375)	(219,272)	(209,853)	(104,128)	(101,636)	(96,577)
Total	**$(217,659)**	**$(219,224)**	**$(209,736)**	**$(101,940)**	**$(101,656)**	**$(96,440)**

We use reinsurance to mitigate risk to the Life segment. During 2016, our retention limits were $1.5 million for issue ages 65 and under, and $700,000 million for issue ages 66 and older for traditional and universal life. 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.

Consistent with our corporate risk management strategy, we periodically adjust our reinsurance program and retention limits as market conditions warrant. While, in the past, we have reinsured up to 90% of new business, we are currently reinsuring newly developed permanent products on a modified excess retention basis, in which we reinsure mortality risk on a yearly renewable term basis, ceding a 75% quota share of policies with a face value of at least $500,000 up to our retention and then 100% in excess of retention. Current traditionally marketed term products are reinsured on a modified excess retention basis, in which we reinsure mortality risk on a yearly renewable term basis, ceding 50% quota share of face amounts in excess of $250,000 up to our retention and then 100% in excess of retention.

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 Credit Insurance Division are written on a 100% coinsurance basis with benefit limits of $125,000 on credit life. We have entered into funds withheld reinsurance treaties, which provide for cessions to the reinsurer on a written basis.

For 2016, 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+	$ 26,402	6.2%
SCOR Global Life Reinsurance Company of Delaware	A	18,041	4.3
Munich American Reassurance Company	A+	15,155	3.6
Reinsurance Group Of America	A+	6,094	1.4
Other Reinsurers with no single company greater than 5% of the total ceded premium		38,436	9.1
Total life reinsurance ceded		**$104,128**	**24.6%**

(1) A.M. Best rating as of the most current information available January 05, 2017.

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Annuity

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

	Years ended December 31,			Change over prior year	
	2016	2015	2014	2016	2015
Premiums and other revenues					
Premiums	$248,714	$183,125	$190,357	$ 65,589	$ (7,232)
Other policy revenues	11,591	12,468	15,062	(877)	(2,594)
Net investment income	500,726	459,458	545,887	41,268	(86,429)
Other income	3,161	3,464	(1)	(303)	3,465
Total premiums and other revenues	**764,192**	**658,515**	**751,305**	**105,677**	**(92,790)**
Benefits, losses and expenses					
Policyholder benefits	294,917	230,221	234,173	64,696	(3,952)
Interest credited to policyholders' account balances	268,205	234,316	284,696	33,889	(50,380)
Commissions for acquiring and servicing policies	78,177	62,917	48,478	15,260	14,439
Other operating expenses	53,054	54,037	56,487	(983)	(2,450)
Change in deferred policy acquisition costs [(1)]	(5,780)	17,069	31,735	(22,849)	(14,666)
Total benefits and expenses	**688,573**	**598,560**	**655,569**	**90,013**	**(57,009)**
Income before other items and federal income taxes	**$ 75,619**	**$ 59,955**	**$ 95,736**	**$ 15,664**	**$(35,781)**

(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 net change indicates less expense was deferred than amortized and represents an increase to expenses in the period indicated.

Earnings increased during 2016 compared to 2015 primarily due to increased assets, as measured by account value and reserves, leading to an increase in margins earned on net investment income. The favorable decrease in DAC for 2016 was related to lower surrenders. Earnings decreased during 2015 compared to 2014 primarily due to the decrease in investment margins. Net investment income declined in 2015 primarily due to unrealized losses in income on over-the-counter-equity-indexed option derivatives and a decrease in investment income.

Premiums and other revenues

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

	Years ended December 31,			Change over prior year	
	2016	2015	2014	2016	2015
Fixed deferred annuity	$ 508,894	$ 528,623	$316,265	$ (19,729)	$212,358
Single premium immediate annuity	281,521	213,341	215,871	68,180	(2,530)
Equity-indexed deferred annuity	572,473	432,517	245,574	139,956	186,943
Variable deferred annuity	76,012	93,898	110,854	(17,886)	(16,956)
Total premium and deposits	**1,438,900**	**1,268,379**	**888,564**	**170,521**	**379,815**

Less: Policy deposits	1,190,186	1,085,254	698,207	104,932	387,047
Total earned premiums	**$ 248,714**	**$ 183,125**	**$190,357**	**$ 65,589**	**$ (7,232)**

Beginning in the third quarter of 2015, the Company enhanced crediting rates on certain annuity products resulting in increased sales through 2016.

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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,		
	2016	2015	2014
Fixed deferred and equity-indexed annuity			
Account value, beginning of period	$ 8,880,448	$ 8,873,397	$ 9,355,946
Net inflows	766,895	686,312	408,615
Surrenders	(784,666)	(893,986)	(1,158,463)
Fees	(5,821)	(6,301)	(9,007)
Interest credited	261,494	221,026	276,306
Account value, end of period	**9,118,350**	**8,880,448**	**8,873,397**
Single premium immediate annuity			
Reserve, beginning of period	1,398,481	1,274,664	1,144,616
Net inflows	117,840	68,355	82,820
Interest and mortality	50,119	55,462	47,228
Reserve, end of period	**1,566,440**	**1,398,481**	**1,274,664**
Variable deferred annuity			
Account value, beginning of period	417,821	494,516	489,305
Net inflows	71,982	91,276	108,094
Surrenders	(114,543)	(163,677)	(129,577)
Fees	(4,745)	(5,507)	(5,763)
Change in market value and other	21,830	1,213	32,457
Account value, end of period	**392,345**	**417,821**	**494,516**
Total account value, end of period	**$11,077,135**	**$10,696,750**	**$10,642,577**

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. The level of benefits for 2016, 2015, and 2014 was commensurate with increases in SPIA premium during these periods.

Commissions increased during 2016 compared to 2015 driven by the mix of business and the increase in sales of higher commissionable products, such as equity-indexed and single premium immediate annuities. Commissions increased during 2015 compared to 2014 driven by the increase in fixed deferred and equity-indexed annuity sales.

Other operating expenses were relatively flat during 2016 compared to 2015 despite the increase in annuity volume. Other operating expenses also decreased during 2015 compared to 2014.

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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	
	2016	2015	2014	2016	2015
Acquisition cost capitalized	$ 77,161	$ 64,724	$ 47,400	$ 12,437	$ 17,324
Amortization of DAC	(71,381)	(81,793)	(79,135)	10,412	(2,658)
Change in DAC	**$ 5,780**	**$(17,069)**	**$(31,735)**	**$ 22,849**	**$ 14,666**

The change in DAC increased during 2016 compared to 2015, and 2015 compared to 2014, due to an increase in capitalization which is primarily driven by the increase in commissions.

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, 2016, 2015, and 2014 were 35.5%, 42.2%, and 34.0%, respectively. The favorable decrease in the 2016 ratio was directly related to lower surrenders. The 2015 ratio is at a relatively "normal" level. The lower 2014 ratio also reflects lower than estimated surrenders.

Options and Derivatives

Net investment income without equity-indexed options or "option return" increased during 2016 compared to 2015 primarily due to higher account values and reserves as a result of increased sales. Net investment income without option return decreased during 2015 compared to 2014 primarily due to a lower net investment portfolio yield.

The S&P 500 Index increased by approximately 9.5% in 2016 and decreased by approximately 0.7% in 2015.This change in index performance led to an increase in the option return of $33.3 million during 2016 compared to 2015, partially offset by a $27.9 million increase in the related equity-indexed embedded derivative for a net increase in earnings of $5.4 million.

The following table summarizes the incremental impact of the investment performance of "option return" on net investment income, and the impact of the equity-indexed annuity embedded derivatives to interest credited to policyholder's account balances (in thousands):

	Years ended December 31,			Change over prior year	
	2016	2015	2014	2016	2015
Net investment income					
Without option return	$474,627	$466,660	$496,652	$ 7,967	$ (29,992)

Option return	26,099	(7,202)	49,235	33,301	(56,437)
Interest credited to policy account balances					
Without embedded derivatives	244,701	238,702	255,383	5,999	(16,681)
Equity-indexed annuity embedded derivatives	23,504	(4,386)	29,313	27,890	(33,699)

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Health

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

	Years ended December 31,			Change over prior year	
	2016	2015	2014	2016	2015
Premiums and other revenues					
Premiums	$175,589	$196,777	$216,868	$(21,188)	$(20,091)
Net investment income	9,942	10,135	11,692	(193)	(1,557)
Other income	17,488	17,714	20,391	(226)	(2,677)
Total premiums and other revenues	**203,019**	**224,626**	**248,951**	**(21,607)**	**(24,325)**
Benefits, losses and expenses					
Claims incurred	131,828	146,805	144,799	(14,977)	2,006
Commissions for acquiring and servicing policies	22,846	27,455	35,896	(4,609)	(8,441)
Other operating expenses	43,263	45,047	43,261	(1,784)	1,786
Change in deferred policy acquisition costs [1]	3,770	3,394	(564)	376	3,958
Total benefits and expenses	**201,707**	**222,701**	**223,392**	**(20,994)**	**(691)**
Income before other items and federal income taxes	**$ 1,312**	**$ 1,925**	**$ 25,559**	**$ (613)**	**$(23,634)**

(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 net change indicates less expense was deferred than amortized and represents an increase to expenses in the period indicated.

Earnings remained relatively constant during 2016 and 2015 and decreased from 2014 relating to separate items that reduced earnings below levels of prior years. In 2016, the Company decreased the estimate of losses that would be ceded to and paid by reinsurers on claims incurred primarily in 2001. In 2015, earnings were negatively impacted due to an increase in claims retained by the Company from a reinsurer that was unable to meet its contractual obligations.

Premiums and other revenues

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

	Years ended December 31,					
	2016		2015		2014	
Medicare Supplement	$ 68,376	38.9%	$ 76,090	38.6%	$ 85,099	39.2%
Credit accident and health	15,124	8.6	13,106	6.7	13,736	6.3
MGU	17,611	10.0	23,798	12.1	24,230	11.2
Supplemental insurance	23,876	13.6	26,546	13.5	31,769	14.7
Medical expense	14,021	8.0	16,910	8.6	21,919	10.1
Group	30,974	17.6	34,361	17.5	33,835	15.6
All other	5,607	3.3	5,966	3.0	6,280	2.9
Total	**$175,589**	**100.0%**	**$196,777**	**100.0%**	**$216,868**	**100.0%**

Earned premiums decreased during 2016 compared to 2015, primarily due to a decline in Medicare Supplement and MGU premiums. Medicare Supplement earned premiums decreased due to lapses that were greater than new sales, compounded by the continuing shift in sales from comprehensive higher premium plans to the lower premium high deductible plan. MGU premiums decreased due to the removal of lesser performing groups by several MGUs. New sources of business have originated during the current year and it is intended that premiums written for these groups will replace portions of the cancelled groups. Medical expense premiums continued to decline due to lapsation of this closed block of business. Supplemental insurance declined during 2016 compared to 2015, due to lapsation, which more than offset the increase in sales relative to 2015. Earned premiums decreased during 2015 compared to 2014 primarily due to the continued contraction of the closed medical expense blocks of business, and a decrease in Medicare Supplement sales.

Effective January 1, 2017, the majority of the Group premium, which is in runoff, did not renew. Consequently, 2017 earned premium for this component of business will be significantly lower than in prior periods.

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

	December 31,					
	2016		2015		2014	
Medicare Supplement	33,815	6.3%	35,586	6.8%	38,245	6.0%
Credit accident and health	194,194	36.1	204,080	39.0	227,790	35.8
MGU	195,936	36.4	164,626	31.4	239,537	37.6
Supplemental insurance	60,261	11.2	62,384	11.9	70,207	11.0
Medical expense	2,228	0.4	2,717	0.5	3,313	0.5
Group	17,485	3.3	16,988	3.2	16,877	2.6
All other	33,820	6.3	37,335	7.2	41,417	6.5
Total	**537,739**	**100.0%**	**523,716**	**100.0%**	**637,386**	**100.0%**

In-force policies decreased in all blocks of health business, except for group and MGU during 2016. Since the MGU policy counts include 100% reinsured certificates, the increase does not always translate into corresponding increases in premiums. Total in-force policies decreased during 2015 compared to 2014, primarily due to decreases in the MGU line, credit accident and health business, and supplemental insurance. MGU inforce certificate counts decreased during 2015 primarily as a result of removing lesser performing groups by several MGUs. Credit accident and health decreased due to contraction in that market as distributors continued to shift their marketing emphasis to property and casualty products.

Benefits, losses and expenses

Claims incurred increased during 2015 due to a receivable write-off associated with an insolvent reinsurer. The decrease in claims during 2016 reflected the non-recurrence of the aforementioned write-off which was partially offset by a $7.2 million change in estimate, decreasing the amount of ceded claim reserves in 2016.

Commissions decreased during 2016 compared to 2015 primarily due to the decrease in premiums.

Other operating expenses for 2016, 2015, and 2014 were relatively flat.

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	
	2016	2015	2014	2016	2015
Acquisition cost capitalized	$ 11,203	$ 20,249	$ 19,530	$ (9,046)	$ 719
Amortization of DAC	(14,973)	(23,643)	(18,966)	8,670	(4,677)
Change in DAC	**$ (3,770)**	**$ (3,394)**	**$ 564**	**$ (376)**	**$ (3,958)**

The change in DAC had a slightly larger impact on expenses during 2016 compared to 2015 due to declining commission expense deferral. The increase in amortization of DAC in 2015 relative to 2014 was associated with the smaller Medicare Supplement and closed Medical Expense blocks as well as greater than expected lapsation of the limited benefit medical supplemental products.

Reinsurance

For the medical expense business, we use reinsurance on an excess of loss basis. We purchase coverage for $1.5 million in excess of $500,000. 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.

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Reinsurance is also used in the credit accident and health business. In certain cases, particularly in the auto retail market, 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 accident and health contracts. A majority of the treaties entered into by our Credit Insurance Division are written on a 100% coinsurance basis with benefit limits of $1,000 per month.

For 2016, 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
Maiden Reinsurance North America, Inc.	A	$ 50,864	12.8%

Munich Reinsurance America	A+	22,900	5.8
QBE Reinsurance Corporation	A	15,707	4.0
Monitor Life	A-	15,075	3.8
Other reinsurers with no single company greater than 5.0% of the total ceded premium		116,974	29.5
Total health reinsurance ceded		**$221,520**	**55.9%**

(1) A.M.Best rating as of the most current information available February 10, 2017

Property and Casualty

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

	Years ended December 31,			Change over prior year	
	2016	2015	2014	2016	2015
Premiums and other revenues					
Net premiums written	$1,282,876	$1,187,980	$1,109,029	$ 94,896	$ 78,951
Net premiums earned	$1,253,392	$1,153,267	$1,100,975	$100,125	$ 52,292
Net investment income	57,091	55,620	58,843	1,471	(3,223)
Other income	4,588	5,534	4,735	(946)	799
Total premiums and other revenues	**1,315,071**	**1,214,421**	**1,164,553**	**100,650**	**49,868**
Benefits, losses and expenses					
Claims incurred	883,219	776,562	745,540	106,657	31,022
Commissions for acquiring and servicing policies	232,514	213,486	188,305	19,028	25,181
Other operating expenses	165,509	156,583	130,655	8,926	25,928
Change in deferred policy acquisition costs [1]	(725)	(1,200)	10,421	475	(11,621)
Total benefits and expenses	**1,280,517**	**1,145,431**	**1,074,921**	**135,086**	**70,510**
Income before other items and federal income taxes	**$ 34,554**	**$ 68,990**	**$ 89,632**	**$ (34,436)**	**$(20,642)**
Loss ratio	70.5%	67.3%	67.7%	3.2	(0.4)
Underwriting expense ratio	31.7	32.0	29.9	(0.3)	2.1
Combined ratio	102.2%	99.3%	97.6%	2.9	1.7
Impact of catastrophe events on combined ratio	6.8	5.7	5.9	1.1	(0.2)
Combined ratio without impact of catastrophe events	95.4%	93.6%	91.7%	1.8	1.9
Gross catastrophe losses	$ 85,252	$ 65,413	$ 64,479	$ 19,839	$ 934

Net catastrophe losses	84,989	62,717	65,374	22,272	(2,657)

(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 net change indicates less expense was deferred than amortized and represents an increase to expenses in the period indicated.

Property and Casualty pre-tax earnings decreased during 2016 compared to 2015, as continued premium growth and the favorable results in our commercial lines were outpaced by the increase in losses attributable to personal auto claims and higher catastrophe losses. Gross catastrophe losses for the year ended December 31, 2016 increased compared to 2015 as the losses reverted to what we believe is a more “normal” level. Property and Casualty earnings decreased during 2015 compared to 2014 due to increased non-catastrophe claims and growth related operating expenses.

Premiums and other revenues

Net premiums written and earned increased during 2016 compared to 2015 for all major lines of business. The largest increases were in the personal automobile and collateral protection lines of business. Net premiums written and earned increased during 2015 compared to 2014 due to increases in the commercial and credit lines.

Benefits, losses and expenses

Claims incurred increased during 2016 compared to 2015 as a result of increases in catastrophe losses as well as an increase in frequency and severity of claims related to the automobile lines of business. The increase in claims during 2015 compared to 2014 was primarily a result of an increase in non-catastrophe weather related losses.

Commissions for acquiring and servicing policies increased during 2016 compared to 2015, primarily as a result of the growth of the collateral protection and mortgage security insurance lines of business. Commissions for acquiring and servicing policies increased during 2015 compared to 2014 as a result of the growth of the collateral protection line of business.

The underwriting expense ratio decreased in 2016 compared to 2015. Operating expenses increased during 2016 compared to 2015, and 2015 compared to 2014, as a result of costs related to growth initiatives.

Gross catastrophe losses for the year ended December 31, 2016 increased compared to 2015 as the losses reverted to what we believe is a more “normal” level. Gross catastrophe losses for the year ended December 31, 2015 were relatively flat compared to 2014. Average severity of catastrophe losses increased by 6% in 2016 compared to 2015 but decreased by 17% in 2015 compared to 2014.

Products

Our Property and Casualty segment consists of: (i) Personal products, marketed primarily to individuals, representing 56.7% of net premiums written; (ii) Commercial products, which focus primarily on agricultural and other markets, representing 31.7% of net premiums written; and (iii) Credit-related property insurance products, which are marketed to and through financial institutions and retailers, representing 11.6% 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	
	2016	2015	2014	2016	2015
Net premiums written					
Automobile	$445,860	$412,686	$403,470	$33,174	$ 9,216
Homeowner	238,967	226,272	223,852	12,695	2,420
Other Personal	42,484	41,658	37,290	826	4,368
Total net premiums written	**$727,311**	**$680,616**	**$664,612**	**$46,695**	**$16,004**
Net premiums earned					
Automobile	$431,580	$405,891	$400,050	$25,689	$ 5,841
Homeowner	230,565	222,338	219,920	8,227	2,418
Other Personal	42,122	40,966	36,638	1,156	4,328
Total net premiums earned	**$704,267**	**$669,195**	**$656,608**	**$35,072**	**$12,587**
Loss ratio					
Automobile	85.7%	77.6%	78.0%	8.1%	(0.4)%
Homeowner	71.8	64.5	64.1	7.3	0.4
Other Personal	55.3	62.8	42.6	(7.5)	20.2
Personal line loss ratio	**79.3%**	**72.4%**	**71.4%**	**6.9%**	**1.0%**
Combined Ratio					
Automobile	110.9%	102.8%	101.1%	8.1%	1.7%
Homeowner	100.0	91.7	89.4	8.3	2.3
Other Personal	79.1	87.0	62.0	(7.9)	25.0
Personal line combined ratio	**105.5%**	**98.2%**	**95.0%**	**7.3%**	**3.2%**

Automobile: Net premiums written and earned increased in the personal automobile line during 2016 compared to 2015, due to an increase of policies in force and rate increases. The loss and combined ratio increased during 2016 compared to 2015, primarily due to an increase in the frequency and severity of claims and catastrophe losses compared to the prior year. Net premiums written and earned increased during 2015 compared to 2014, due to increases in sales volume and rates.

Homeowner: Net premiums written and earned increased during 2016 compared to 2015, primarily due to increases in sales of homeowner products to renters. The loss and combined ratio increased during 2016 compared to 2015, due to increases in catastrophe claim activity compared to the prior year. Net premiums written increased during 2015 compared to 2014 given growth in policy counts.

Other Personal: These products include watercraft, rental-owner and umbrella coverages for individuals seeking to protect their personal property and liability not covered within their home and auto policies. The loss ratio decreased during 2016 compared to 2015 primarily due to certain umbrella claim re-designations from personal lines to commercial lines. The loss ratio increased during 2015 compared to 2014 due to increased catastrophe claim activity during the first half of 2015 and lower than typical loss results in 2014.

Commercial Products

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

	Years ended December 31,			Change over prior year	
	2016	2015	2014	2016	2015
Net premiums written					
Other Commercial	$172,667	$159,834	$150,819	$ 12,833	$ 9,015
Agricultural Business	137,182	123,548	115,592	13,634	7,956
Automobile	96,939	88,767	86,603	8,172	2,164
Total net premiums written	**$406,788**	**$372,149**	**$353,014**	**$ 34,639**	**$ 19,135**
Net premiums earned					
Other Commercial	$165,828	$154,114	$146,845	$ 11,714	$ 7,269
Agricultural Business	133,436	121,031	111,599	12,405	9,432
Automobile	94,423	87,450	84,653	6,973	2,797
Total net premiums earned	**$393,687**	**$362,595**	**$343,097**	**$ 31,092**	**$ 19,498**
Loss ratio					
Other Commercial	63.1%	65.3%	77.5%	(2.2)	(12.2)
Agricultural Business	58.1	66.0	66.6	(7.9)	(0.6)
Automobile	70.8	74.4	69.5	(3.6)	4.9
Commercial line loss ratio	**63.2%**	**67.7%**	**72.0%**	**(4.5)**	**(4.3)**
Combined ratio					
Other Commercial	94.7%	93.3%	104.4%	1.4	(11.1)
Agricultural Business	95.4	106.6	106.3	(11.2)	0.3
Automobile	95.6	98.5	92.6	(2.9)	5.9
Commercial line combined ratio	**95.1%**	**99.0%**	**102.1%**	**(3.9)**	**(3.1)**

Other Commercial: Net premiums written and earned increased during 2016 compared to 2015 primarily due to increased sales of mortgage security insurance. This increase was partially offset by an increase in reinsurance premium ceded for the workers compensation and umbrella lines of business. Net premiums written and earned increased during 2015 compared to 2014, primarily due to increased premium per policy for the workers' compensation and business owners' products. Improvement in the loss and combined ratios during 2015 compared to 2014 is primarily due to favorable case reserve development on workers' compensation claims.

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 2016 compared to 2015, primarily as a result of improved rate adequacy. The loss ratio decreased during 2016 compared to 2015 primarily due to a decrease in catastrophe losses. Net premiums earned increased during 2015 compared to 2014 primarily as a result of improved rate adequacy.

Automobile: Net premiums written and earned increased during 2016 compared to 2015, due to an increase in direct written premiums coupled with a decrease in ceded premiums. The loss ratio decreased during 2016 compared to 2015, primarily due to a decrease in average severity of losses. Net premiums written increased during 2015 compared to 2014 primarily due to improved rate adequacy. The loss and combined ratios increased during 2015 compared to 2014, primarily due to an increase in 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	
	2016	2015	2014	2016	2015
Net premiums written	$148,777	$135,215	$ 91,403	$13,562	$43,812
Net premiums earned	155,437	121,477	101,270	33,960	20,207
Loss ratio	48.7%	38.4%	29.5%	10.3%	8.9%
Combined ratio	107.2%	107.9%	100.8%	(0.7)%	7.1%

Credit-related property products are offered on automobiles, residential and commercial real estate, 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 increased during 2016 compared to 2015, primarily due to increases in our collateral protection business. The loss ratio increased during 2016 compared to 2015 and 2015 compared to 2014, primarily due to an increase in claims in our Guaranteed Auto Protection (GAP) business lines. Net written and earned premiums increased during 2015 compared to 2014 primarily due to increases in our Collateral Protection business and updated pricing initiatives in our GAP business. The loss ratio increased during 2015 compared to 2014 mostly due to an increase in claims in our GAP business lines.

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 2017.

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 Mortgage Security Insurance business written by the Credit Insurance Division.

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Each per-event coverage above includes one automatic reinstatement except for a 12.5% portion of the Corporate Program (12.5% 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, which are free for the first limit and reflect a 50% reduction on the second limit. The 12.5% 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 2017 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 for a subject loss and is $35 million excess of $5 million of each catastrophe. Recoveries follow satisfaction of a $45 million annual aggregate deductible. This cover was placed at 100% on July 1, 2015, and again on July 1, 2016. It is in place until June 30, 2017. American National expects to place the cover again on July 1, 2017.

We use multiple reinsurers with each reinsurer absorbing part of the overall risk ceded. The primary reinsurers in the 2016 programs and the coverage each provides are shown in the following table:

Reinsurer	A.M. Best Rating[1]	Percent of Risk Covered	
		Non–Catastrophe	Catastrophe
Lloyd's Syndicates	A	41.9%	43.7%
Swiss Re	A+	15.8	6.3
Safety National Casualty Corporation	A+	18.2	—
Hannover Ruckversicherung-Aktiengesellschaft, Germany	A+	9.2	—
Tokio Millunnium Re Ltd.	A++	—	7.0
Other Reinsurers with no single company with greater than a 5% share		14.9	43.0
Total Reinsurance Coverage		**100.0%**	**100.0%**

(1) A.M. Best rating as of the most current information available February 1, 2017

Reserve Development

While we believe that our claims reserves at December 31, 2016 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, 2016 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.

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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	
	2016	2015	2014	2016	2015
Other revenues					
Net investment income	$ 64,553	$ 83,542	$ 84,047	$(18,989)	$ (505)
Realized investment gains (losses), net	28,940	59,443	41,422	(30,503)	18,021
Other Income	7,944	5,976	9,533	1,968	(3,557)
Total other revenues	**101,437**	**148,961**	**135,002**	**(47,524)**	**13,959**
Benefits, losses and expenses					
Commissions	(3)	(2)	—	(1)	(2)
Other operating expenses	41,864	44,598	60,535	(2,734)	(15,937)
Total benefits, losses and expenses	**41,861**	**44,596**	**60,535**	**(2,735)**	**(15,939)**
Income before other items and federal income taxes	**$ 59,576**	**$104,365**	**$ 74,467**	**$(44,789)**	**$ 29,898**

Earnings decreased during 2016 compared to 2015 primarily due to a decrease in realized investment gains. The decrease in realized investment gains is primarily attributable to a decrease in the sale of certain real estate holdings compared to 2015. Earnings increased during 2015 compared to 2014 primarily due to a decrease in operating expenses and an increase in realized investment gains. The increase in realized investment gains in 2015 was attributable to higher gains on the sale of equity securities and higher real estate sale activity.

The Corporate and Other business segment recorded other-than-temporary impairments of $17.7 million, $27.9 million, and $6.6 million in 2016, 2015, and 2014, respectively, which are in “Realized investment gains, net.”

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 the insurance subsidiaries 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 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.

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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, 2016		December 31, 2015	
Bonds held-to-maturity, at amortized cost	$ 7,251,385	35.8%	$ 7,609,420	38.7%
Bonds available-for-sale, at fair value	5,803,276	28.7	5,483,916	28.0
Equity securities, at fair value	1,541,676	7.6	1,514,979	7.7
Mortgage loans, net of allowance	4,348,046	21.5	3,483,280	17.8
Policy loans	384,376	1.9	407,491	2.1
Investment real estate, net of accumulated depreciation	593,417	2.9	581,255	3.0
Short-term investments	192,226	1.0	460,612	2.3
Other invested assets	113,550	0.6	71,943	0.4
Total investments	**$20,227,952**	**100.0%**	**$19,612,896**	**100.0%**

The increase in our total investments at December 31, 2016 compared to 2015 was primarily a result of the purchase of bonds available-for-sale and increased mortgage loan activity.

Bonds—We allocate most of our fixed maturity securities to support our insurance business. At December 31, 2016, our fixed maturity securities had an estimated fair value of $13.3 billion, which was $0.4 billion, or 2.9%, above amortized cost. At December 31, 2015, our fixed maturity securities had an estimated fair value of $13.2 billion, which was $0.2 billion, or 1.6%, above amortized cost. The estimated fair value for securities due in one year or less increased from $0.5 billion as of December 31, 2015 to $0.7 billion as of December 31, 2016, primarily as a result of maturities. 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 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 4.7% and 4.4% at December 31, 2016 and 2015, respectively.

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, 2016, we had $384.4 million in policy loans with a loan to surrender value of 64.6%, and at December 31, 2015, we had $407.5 million in policy loans with a loan to surrender value of 61.3%. 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 valuation allowances, 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.

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Net Investment Income and Net Realized Gains (Losses)

Net investment income increased $25.4 million during 2016 compared to 2015 primarily due to an increase in unrealized gains of equity-indexed options as a result of increases in the S&P 500 which are recorded at fair value with changes in fair value recorded as investment income.

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 $40.8 million during 2016 compared to 2015 primarily due to a decrease in the sale of certain real estate holdings. Other-than-temporary impairment on investment securities decreased $10.3 million during 2016 compared to 2015.

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, 2016	December 31, 2015	Change
Held-to-Maturity			
Gains	$ 285,315	$ 305,964	$ (20,649)
Losses	(40,008)	(159,831)	119,823
Net Gain	**245,307**	**146,133**	**99,174**
Available-for-Sale [1]			
Gains	986,635	891,687	94,948
Losses	(43,100)	(131,449)	88,349
Net Gain	**943,535**	**760,238**	**183,297**

Total	**$ 1,188,842**	**$ 906,371**	**$282,471**

(1) Includes bonds and equity securities

The net change in the unrealized gains on fixed maturity securities between December 31, 2015 and December 31, 2016 is primarily attributable to the decrease in interest rates. 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.

The net unrealized gains of our equity securities were $809.2 million and $704.2 million at December 31, 2016 and 2015, respectively. The increase is attributable to favorable market conditions.

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. 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 flow from operations.

Changes in interest rates during 2016 and market expectations for potentially higher rates through 2017 may lead to an increase in the volume of annuity contracts, 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. Future contributions to our defined benefit plans are not expected to significantly impact cash flow and are expected to enhance overall funded status of plans. 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 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.

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. For more information, see Note 7, Derivative Instruments, of the Notes to the Consolidated Financial Statements.

Our cash and cash equivalents and short-term investment position decreased from $771.5 million at December 31, 2015 to $481.6 million at December 31, 2016. The decrease relates primarily to a reduction in short-term investments used to fund additional investments in mortgage loans and construction loans.

A downgrade or a potential downgrade in our financial strength ratings could result in a loss of business and could adversely affect our cash flow 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,		
	2016	2015	2014
American National stockholders' equity, excluding accumulated other comprehensive income, net of tax ("AOCI")	$4,196,279	$4,099,662	$3,936,781
AOCI	455,899	352,620	490,782
Total American National stockholders' equity	**$4,652,178**	**$4,452,282**	**$4,427,563**

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 $31.8 million and $34.7 million at December 31, 2016 and 2015, respectively.

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

	December 31,					
	2016			2015		
	Capital and Retained Earnings	AOCI	Total	Capital and Retained Earnings	AOCI	Total
Net income attributable to American National	$ 181,003	$ —	$181,003	$ 242,988	$ —	$ 242,988
Dividends to shareholders	(87,741)	—	(87,741)	(84,446)	—	(84,446)
Change in net unrealized gains	—	93,704	93,704	—	(114,717)	(114,717)
Defined benefit pension plan adjustment	—	9,286	9,286	—	(21,815)	(21,815)
Foreign currency transaction and translation adjustment	—	289	289	—	(1,630)	(1,630)
Other	3,355	—	3,355	4,339	—	4,339
Total	**$ 96,617**	**$103,279**	**$199,896**	**$ 162,881**	**$(138,162)**	**$ 24,719**

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, 2016 and December 31, 2015, American National Insurance Company's statutory capital and surplus was $2,985,909,000 and $2,925,935,000, respectively. American National Insurance Company and each of its insurance subsidiaries had statutory capital and surplus at December 31, 2016 and December 31, 2015, 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, 2016 (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]	$ 5,394,794	$ (643)	$ 117,641	$ 305,096	$ 4,972,700
Annuity obligations[1]	13,334,931	1,313,300	3,365,580	2,565,871	6,090,180
Property and casualty insurance obligations[2]	855,974	344,166	267,168	105,843	138,797
Accident and health insurance obligations[3]	228,741	104,839	37,366	19,409	67,127
Purchase obligations					
Commitments to purchase and fund investments	83,367	49,867	11,590	11,409	10,501
Mortgage loan commitments	703,710	487,765	215,945	—	—
Operating leases	5,086	1,687	2,032	1,063	304
Defined benefit pension plans[4]	103,089	12,394	22,574	21,544	46,577
Notes payable[5]	136,080	—	8,584	37,074	90,422
Total	**$20,845,772**	**$2,313,375**	**$4,048,480**	**$3,067,309**	**$11,416,608**

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(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 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 a third-party marketing operation's 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 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.

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ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Our investments and some of our products are subject to market risks associated with changes in interest rates, credit spreads, issuer defaults and equity prices or market indices. Adverse changes due to these market risks may occur due to changes in market liquidity or to changes in market perceptions of credit worthiness or risk tolerance among other factors.

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 of capital adequacy.

We expect ongoing enterprise risk management efforts will expand the management tools used to ensure 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, convexity 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 also reviews 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.

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The carrying values of our investment in fixed maturity securities, which comprise 64.1% of our portfolio, are summarized below (in thousands):

	December 31,			
	2016		2015	
	Amount	Percent	Amount	Percent
Bonds held-to-maturity	$7,251,385	55.5%	$7,609,420	58.1 %
Bonds available-for-sale	5,803,276	44.5	5,483,916	41.9
Net unrealized gains on available-for-sale bonds	134,292	2.3	56,085	1.0

The increase in the unrealized gains on available-for-sale bonds was primarily the result of a decrease 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, 2016, 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 restriction 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 asset accumulation investment products, such as our fixed deferred annuity business. We aim to manage interest margins, which are the differences between yields on investments supporting our liabilities and amounts credited to policyholder account balances. As investment portfolio yields decline, we can reduce crediting rates on products, to a limit defined by contractual minimum guarantees. Due to these contractual minimums, declines in interest rates can ultimately

impact the profitability of this business. As of December 31, 2016, of our $9.2 billion in deferred annuities, $87.8 million have guaranteed minimum rates greater than or equal to 3.5% with no guarantees greater than 4.5%.

The profitability of some of our products could be adversely affected by low interest rates. Assuming investment yields remain at 2016 levels, the impact of investing in that lower interest rate environment would have a minimal impact in 2017 and could reduce profit by $1.6 million in 2018 and $3.1 million in 2019. In projecting this impact, we modeled projected crediting rates, considering interest spread targets and crediting rate floors.

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, 2016	$ 610,421	$ 301,819	$ (297,039)	$ (587,945)
December 31, 2015	$ 652,006	$ 321,689	$ (315,117)	$ (622,712)

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.

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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 including reinsurance agreements. 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 and other applicable parameters such as mortgage loan-to-value guidelines. 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 the risk 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 credit worthy 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. At December 31, 2016, 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 market. 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.

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Item 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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Report of Independent Registered Public Accounting Firm

The Board of Directors and Stockholders
American National Insurance Company:

We have audited the accompanying consolidated statements of financial position of American National Insurance Company and subsidiaries (the Company) as of December 31, 2016 and 2015, and 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, 2016. In connection with our audits of the consolidated financial statements, we also have audited financial statement schedules I to V. These consolidated

financial statements and financial statement schedules are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements and financial statement schedules based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of American National Insurance Company and subsidiaries as of December 31, 2016 and 2015, and the results of their operations and their cash flows for each of the years in the three-year period ended December 31, 2016, in conformity with U.S. generally accepted accounting principles. Also in our opinion, the related financial statement schedules, when considered in relation to the basic consolidated financial statements taken as a whole, present fairly, in all material respects, the information set forth therein.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the Company's internal control over financial reporting as of December 31, 2016, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO), and our report dated March 10, 2017, expressed an adverse opinion on the effectiveness of the Company's internal control over financial reporting.

/s/ KPMG LLP

Houston, Texas
March 10, 2017

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Report of Independent Registered Public Accounting Firm

The Board of Directors and Stockholders
American National Insurance Company:

We have audited American National Insurance Company's (the Company) internal control over financial reporting as of December 31, 2016, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). 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 conducted our audit in accordance with the standards of the Public Company Accounting Oversight Board (United States). 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 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.

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.

A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of the company's annual or interim financial statements will not be prevented or detected on a timely basis. Material weaknesses related to ineffective internal controls over the measurement and presentation of deferred income taxes, the recognition and disclosure of the amount of collateral under equity option derivative arrangements and the information and communication controls over these areas have been identified and included in management's assessment.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the consolidated financial position of American National Insurance Company and subsidiaries as of December 31, 2016 and 2015, and 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, 2016, and the related financial statement schedules I to V. This material weakness was considered in determining the nature, timing, and extent of audit tests applied in our audit of the 2016 consolidated financial statements, and this report does not affect our report dated March 10, 2017, which expressed an unqualified opinion on those consolidated financial statements.

In our opinion, because of the effect of the aforementioned material weaknesses on the achievement of the objectives of the control criteria, American National Insurance Company has not maintained effective internal control over financial reporting as of December 31, 2016, based on criteria established in *Internal Control—Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

We do not express an opinion or any other form of assurance on management's statements referring to corrective actions taken after December 31, 2016, relative to the aforementioned material weaknesses in internal control over financial reporting.

/s/ KPMG LLP

Houston, Texas
March 10, 2017

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

	December 31, 2016	December 31, 2015 (As Revised)
ASSETS		
Fixed maturity, bonds held-to-maturity, at amortized cost (Fair value $7,496,692 and $7,755,553)	$ 7,251,385	$ 7,609,420
Fixed maturity, bonds available-for-sale, at fair value (Amortized cost $5,668,984 and $5,427,831)	5,803,276	5,483,916
Equity securities, at fair value (Cost $732,433 and $810,826)	1,541,676	1,514,979
Mortgage loans on real estate, net of allowance	4,348,046	3,483,280

Policy loans	384,376	407,491
Investment real estate, net of accumulated depreciation of $259,578 and $212,139	593,417	581,255
Short-term investments	192,226	460,612
Other invested assets	113,550	71,943
Total investments	20,227,952	19,612,896
Cash and cash equivalents	289,338	310,930
Investments in unconsolidated affiliates	490,476	379,348
Accrued investment income	180,323	177,474
Reinsurance recoverables	401,709	413,881
Prepaid reinsurance premiums	63,026	77,907
Premiums due and other receivables	296,930	285,446
Deferred policy acquisition costs	1,294,443	1,324,669
Property and equipment, net	116,028	120,680
Current tax receivable	61,423	4,091
Other assets	169,962	140,788
Separate account assets	941,612	918,446
Total assets	**$24,533,222**	**$23,766,556**
LIABILITIES		
Future policy benefits		
Life	$ 2,939,308	$ 2,853,962
Annuity	1,277,220	1,113,057
Accident and health	60,308	65,034
Policyholders' account balances	11,068,775	10,829,173
Policy and contract claims	1,303,925	1,280,011
Unearned premium reserve	823,938	812,977
Other policyholder funds	318,620	305,836
Liability for retirement benefits	152,496	207,635
Notes payable	136,080	128,436
Deferred tax liabilities, net	367,487	219,295
Other liabilities	481,958	570,223

Separate account liabilities	941,612	918,446
Total liabilities	**19,871,727**	**19,304,085**
EQUITY		
American National stockholders' equity:		
Common stock, $1.00 par value,—Authorized 50,000,000, Issued 30,832,449 and 30,832,449 Outstanding 26,914,516 and 26,894,456 shares	30,832	30,832
Additional paid-in capital	16,406	13,689
Accumulated other comprehensive income	455,899	352,620
Retained earnings	4,250,818	4,157,184
Treasury stock, at cost	(101,777)	(102,043)
Total American National stockholders' equity	4,652,178	4,452,282
Noncontrolling interest	9,317	10,189
Total equity	**4,661,495**	**4,462,471**
Total liabilities and equity	**$24,533,222**	**$23,766,556**

See accompanying notes to the consolidated financial statements.

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

	Years ended December 31,		
	2016	2015	2014
PREMIUMS AND OTHER REVENUE			
Premiums			
Life	$ 318,953	$ 305,350	$ 307,771
Annuity	248,714	183,125	190,357
Accident and health	175,589	196,777	216,868
Property and casualty	1,253,392	1,153,267	1,100,975
Other policy revenues	306,880	250,265	224,254
Net investment income	860,235	834,831	932,858

Net realized investment gains	46,607	87,385	48,062
Other-than-temporary impairments	(17,667)	(27,942)	(6,640)
Other income	35,248	34,397	36,085
Total premiums and other revenues	3,227,951	3,017,455	3,050,590
BENEFITS, LOSSES AND EXPENSES			
Policyholder benefits			
Life	416,467	386,785	351,271
Annuity	294,917	230,221	234,173
Claims incurred			
Accident and health	131,828	146,805	144,799
Property and casualty	883,219	776,562	745,540
Interest credited to policyholders' account balances	331,770	293,464	353,492
Commissions for acquiring and servicing policies	465,962	425,338	397,126
Other operating expenses	503,459	501,377	485,865
Change in deferred policy acquisition costs	1,152	(11,785)	9,578
Total benefits, losses and expenses	3,028,774	2,748,767	2,721,844
Income before federal income tax and equity in earnings of unconsolidated affiliates	199,177	268,688	328,746
Less: Provision (benefit) for federal income taxes			
Current	(15,376)	93,979	77,547
Deferred	89,086	9,741	19,067
Total provision for federal income taxes	73,710	103,720	96,614
Equity in earnings of unconsolidated affiliates	57,200	77,408	14,694
Net income	182,667	242,376	246,826
Less**:** Net income (loss) attributable to noncontrolling interest, net of tax	1,664	(612)	1,491
Net income attributable to American National	**$ 181,003**	**$ 242,988**	**$ 245,335**
Amounts available to American National common stockholders			
Earnings per share			
Basic	6.73	$ 9.04	$ 9.15
Diluted	6.71	9.02	9.11

Cash dividends to common stockholders	3.26	3.14	3.08
Weighted average common shares outstanding	26,908,570	26,876,522	26,802,841
Weighted average common shares outstanding and dilutive potential common shares	26,967,072	26,950,066	26,918,670

See accompanying notes to the consolidated financial statements.

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

	Years ended December 31,		
	2016	2015	2014
Net income	$182,667	$ 242,376	$246,826
Other comprehensive income (loss), net of tax			
Change in net unrealized gains (losses) on securities	93,704	(114,717)	110,214
Foreign currency transaction and translation adjustments	289	(1,630)	(954)
Defined benefit pension plan adjustment	9,286	(21,815)	(32,190)
Other comprehensive income (loss), net of tax	103,279	(138,162)	77,070
Total comprehensive income	**285,946**	**104,214**	**323,896**
Less: Comprehensive income (loss) attributable to noncontrolling interest	1,664	(612)	1,491
Total comprehensive income attributable to American National	**$284,282**	**$ 104,826**	**$322,405**

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

	Years ended December 31,		
	2016	2015	2014
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,	13,689	9,248	4,650
Reissuance of treasury shares	1,825	2,129	1,635
Income tax effect from restricted stock arrangement	49	1,165	—

Amortization of restricted stock	843	1,147	2,963
Balance at end of the period	16,406	13,689	9,248
Accumulated Other Comprehensive Income			
Balance as of January 1,	352,620	490,782	413,712
Other comprehensive income (loss)	103,279	(138,162)	77,070
Balance at end of the period	455,899	352,620	490,782
Retained Earnings			
Balance as of January 1,	4,157,184	3,998,642	3,836,112
Net income attributable to American National	181,003	242,988	245,335
Cash dividends to common stockholders	(87,741)	(84,446)	(82,805)
Cumulative effect of accounting change	372	—	—
Balance at end of the period	4,250,818	4,157,184	3,998,642
Treasury Stock			
Balance as of January 1,	(102,043)	(101,941)	(97,441)
Reissuance (purchase) of treasury shares	266	(102)	(4,500)
Balance at end of the period	(101,777)	(102,043)	(101,941)
Noncontrolling Interest			
Balance as of January 1,	10,189	12,384	12,757
Contributions	—	1,859	981
Distributions	(2,536)	(3,442)	(2,845)
Net income (loss) attributable to noncontrolling interest	1,664	(612)	1,491
Balance at end of the period	9,317	10,189	12,384
Total Equity	**$4,661,495**	**$4,462,471**	**$4,439,947**

See accompanying notes to the consolidated financial statements.

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

	Years ended December 31,		
	2016	2015 (As Revised)	2014 (As Revised)
OPERATING ACTIVITIES			
Net income	$ 182,667	$ 242,376	$ 246,826
Adjustments to reconcile net income to net cash provided by operating activities			
Net realized investment gains	(46,607)	(87,385)	(48,062)
Other-than-temporary impairments	17,667	27,942	6,640
Amortization (accretion) of premiums, discounts and loan origination fees	(2,926)	2,701	7,294
Net capitalized interest on policy loans and mortgage loans	(32,813)	(31,360)	(32,122)
Depreciation	45,278	40,573	38,414
Interest credited to policyholders' account balances	331,770	293,464	353,492
Charges to policyholders' account balances	(306,880)	(250,265)	(224,254)
Deferred federal income tax expense	89,086	9,741	19,067
Equity in earnings of unconsolidated affiliates	(57,200)	(77,408)	(14,694)
Distributions from equity method investments	1,096	819	5,186
Changes in			
Policyholder liabilities	282,159	259,645	200,718
Deferred policy acquisition costs	1,152	(11,785)	9,578
Reinsurance recoverables	12,172	14,773	(13,911)
Premiums due and other receivables	(11,691)	(5,512)	(1,184)
Prepaid reinsurance premiums	14,881	(21,887)	1,850
Accrued investment income	(2,849)	8,470	8,887
Current tax receivable/payable	(57,332)	4,578	9,838
Liability for retirement benefits	(53,979)	(31,435)	(19,084)
Other, net	(4,074)	(8,587)	2,306
Net cash provided by operating activities	**401,577**	**379,458**	**556,785**
INVESTING ACTIVITIES			
Proceeds from sale/maturity/prepayment of			
Held-to-maturity securities	491,478	1,150,650	661,125
Available-for-sale securities	459,511	574,391	910,691
Investment real estate	12,833	19,788	63,030

Mortgage loans	587,355	836,443	606,738
Policy loans	59,920	56,773	55,542
Other invested assets	30,743	71,564	40,882
Disposals of property and equipment	16,240	4,681	11,269
Distributions from unconsolidated affiliates	55,311	130,742	41,779
Payment for the purchase/origination of			
Held-to-maturity securities	(156,453)	(525,950)	(439,422)
Available-for-sale securities	(683,128)	(1,343,795)	(1,044,602)
Investment real estate	(45,631)	(106,255)	(51,699)
Mortgage loans	(1,428,471)	(962,267)	(668,073)
Policy loans	(25,480)	(26,459)	(29,093)
Other invested assets	(67,571)	(38,101)	(27,705)
Additions to property and equipment	(47,301)	(32,596)	(31,951)
Contributions to unconsolidated affiliates	(135,208)	(132,004)	(12,560)
Change in short-term investments	268,386	(29,612)	64,386
Change in collateral held for derivatives	24,349	(65,160)	22,724
Other, net	27,869	12,702	15,997
Net cash provided by (used in) investing activities	**(555,248)**	**(404,465)**	**189,058**
FINANCING ACTIVITIES			
Policyholders' account deposits	1,528,107	1,405,350	1,002,420
Policyholders' account withdrawals	(1,313,394)	(1,400,661)	(1,532,023)
Change in notes payable	7,643	20,259	(5,672)
Dividends to stockholders	(87,741)	(84,446)	(82,805)
Payments to noncontrolling interest	(2,536)	(1,583)	(1,864)
Net cash provided by (used in) financing activities	**132,079**	**(61,081)**	**(619,944)**
NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS	(21,592)	(86,088)	125,899
Beginning of the period	310,930	397,018	271,119
End of the period	**$ 289,338**	**$ 310,930**	**$ 397,018**

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.

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

Revision to Previously Reported Amounts

Immaterial Correction of an Error. During the fourth quarter of 2016, the Company revised previously reported amounts to include cash held in a bank custody account representing collateral provided to us by third parties for equity-option derivative transactions. For details, see Note 7, Derivative Instruments, of the Notes to the Consolidated Financial Statements. In accordance with Staff Accounting Bulletin ("SAB") No. 99, *Materiality,* and SAB No. 108, *Considering the Effects of Prior Year Misstatements when Quantifying Misstatements in Current Year Financial Statements*, management evaluated the materiality of the error from qualitative and quantitative perspectives, and concluded the error was immaterial to the current and prior periods. The correction of the immaterial error revised the consolidated statements of financial position and statements of cash flows only. There was no revision to the consolidated statements of operations, comprehensive income or changes in equity. The Company revised its historical financial statements for fiscal 2015 and fiscal 2014 herein, and will revise the quarters within fiscal 2016, when they are published in future filings.

Financial statement amounts previously reported were revised as shown below (in thousands):

	As Reported	As Revised	Effect of Change
As of December 31, 2015			
Balance Sheet			
Other invested assets	$ 173,042	$ 71,943	$(101,099)
Cash and cash equivalents	190,237	310,930	120,693
Other liabilities	550,629	570,223	19,594
Total assets	23,746,962	23,766,556	19,594

Total liabilities	19,284,491	19,304,085	19,594
Statement of Cash Flow			
Change in collateral held for derivatives	—	(65,160)	(65,160)
Other, net	14,412	12,702	(1,710)
Net cash used in investing activities	(337,595)	(404,465)	(66,870)
Net decrease in cash and cash equivalents	(19,218)	(86,088)	(66,870)
Cash at beginning of period	209,455	397,018	187,563
Cash at end of period	190,237	310,930	120,693
As of December 31, 2014			
Balance Sheet			
Other invested assets	$ 220,255	$ 53,996	$(166,259)
Cash and cash equivalents	209,455	397,018	187,563
Other liabilities	550,843	572,147	21,304
Total assets	23,544,532	23,565,836	21,304
Total liabilities	19,104,585	19,125,889	21,304
Statement of Cash Flow			
Change in collateral held for derivatives	—	22,724	22,724
Other, net	4,331	15,997	11,666
Net cash provided by investing activities	154,668	189,058	34,390
Net increase in cash and cash equivalents	91,509	125,899	34,390
Cash at beginning of period	117,946	271,119	153,173
Cash at end of period	209,455	397,018	187,563

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

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. Equity securities are classified as available-for-sale and carried at fair value. After-tax net unrealized gains or losses on available-for-sale securities are reflected in equity as a component of “Accumulated Other Comprehensive Income” (“AOCI”).

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.

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

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 in "Realized investment gains (losses)" 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 within "Equity in earnings (losses) 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.

Other invested assets comprised primarily of equity-indexed options, which 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 interests, are carried at cost, less allowance for depletion, where applicable.

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, 2016, 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 at December 31, 2016.

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

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.

American National evaluates quarterly all equity securities in unrealized loss positions and recognizes an OTTI loss on those where a market price recovery is not expected in a reasonable period of time. All equity securities with unrealized losses are also evaluated for credit quality. OTTI is recognized if management believes the carrying value of securities will not be realized, regardless of the length of time that they have had an unrealized loss.

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 policyholder's account balances," respectively. American National does not apply hedge accounting treatment to its derivative instruments. The Company uses derivative instruments to hedge our business risk and holds collateral to offset exposure from its counterparties. Unrestricted 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. Restricted collateral is recorded as “Other liabilities” due to the uncertainty of the collateral’s availability to offset exposure losses.

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 straight-line and accelerated methods over the estimated useful lives of the assets (typically 3 to 50 years).

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

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. These are generally equal to the accumulated deposits, plus interest credited, reduced by withdrawals, payouts, and accumulated policyholder assessments.

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.

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

Separate account assets and liabilities

Separate account assets and liabilities are funds intended to meet the investment objectives of contract holders who bear the investment risk. 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.

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 6.1% of the life insurance in-force at December 31, 2016 and 18.2% of life premiums in 2016. Of the total participating business, 77.7% was written by Farm Family Life Insurance Company ("Farm Family Life"). For the participating business excluding Farm Family Life, 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.

For the Farm Family Life participating business, profits earned on participating business 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.

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

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 federal 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.

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.

Interest and penalties assessed, if applicable, are classified as current federal income taxes in the consolidated statements of operations.

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. 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 are 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 either cash or American National common stock. Effective December 31, 2012, American National's Board Compensation Committee modified the settlement provision within the outstanding restricted stock units, which changed the RSU classification from an equity to 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 February 2015, the FASB issued guidance amending the consolidation analysis. The guidance modifies the evaluation of whether limited partnerships and similar legal entities are variable interest entities (VIEs) or voting interest entities. The guidance eliminates the presumption that a general partner should consolidate a limited partnership and affects the consolidation analysis of reporting entities that are involved with VIEs. The Company adopted the standard on its required effective date of January 1, 2016. The adoption did not have a material impact to the Company's results of operations or financial position.

In May 2015, the FASB issued guidance to expand the disclosures an insurance entity would provide about its short duration contracts. The disclosure about the liability for unpaid claims and claim adjustment expenses is intended to increase the transparency of significant estimates made in the measuring of those liabilities. It is also intended to provide insight into an insurance entity's ability to underwrite and anticipate costs associated with claims. The Company adopted the standard for the annual period ending December 31, 2016 and the expanded disclosure required is included in Note 12, Liability for Unpaid Claims and Claim Adjustment Expenses, of the Notes to Consolidated Financial Statements. The adoption affected disclosure only and did not impact the Company's results of operations or financial position.

Note 3 – Recently Issued Accounting Pronouncements – (Continued)

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

In May 2014, the FASB issued guidance that will supersede 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 standard is effective for annual periods and interim periods within those annual periods beginning after December 15, 2017. The Company intends to adopt the standard effective January 1, 2018, which is not expected to be material to the Company's results of operations or financial position.

In January 2016, the FASB issued guidance that will change certain aspects of recognition, measurement, presentation, and disclosure of financial instruments. The new guidance requires that equity investments in unconsolidated entities be measured at fair value and that 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 standard is effective for annual periods and interim periods within those annual periods beginning after December 15, 2017. The Company is currently evaluating the impact of adoption to the Company's results of operations and financial position.

In February 2016, the FASB issued guidance that will require significant changes to the statement of financial position of lessees. With certain limited exceptions, lessees will need to recognize virtually all of their leases on the statement of financial position, by recording a right-of-use asset and a lease liability. Lessor accounting is 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. The Company is currently evaluating the impact of adoption, which is not expected to 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 will measure credit losses for most financial assets 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 is currently evaluating the impact of adoption to the Company's results of operations and financial position.

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Note 4 – Investment in Securities

The cost or amortized cost and fair value of investments in securities are shown below (in thousands):

	December 31, 2016			
	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	$ 301,994	$ 17,190	$ (102)	$ 319,082
Foreign governments	4,057	659	—	4,716
Corporate debt securities	6,711,508	253,191	(38,721)	6,925,978
Residential mortgage-backed securities	229,758	14,112	(1,185)	242,685
Collateralized debt securities	1,290	64	—	1,354
Other debt securities	2,778	99	—	2,877
Total bonds held-to-maturity	**7,251,385**	**285,315**	**(40,008)**	**7,496,692**
Fixed maturity securities, bonds available-for-sale				
U.S. treasury and government	25,062	594	(16)	25,640
U.S. states and political subdivisions	945,431	21,170	(6,378)	960,223
Foreign governments	5,000	1,567	—	6,567
Corporate debt securities	4,666,096	145,716	(31,049)	4,780,763
Residential mortgage-backed securities	18,588	2,267	(342)	20,513
Collateralized debt securities	5,574	821	(3)	6,392
Other debt securities	3,233	—	(55)	3,178
Total bonds available-for-sale	**5,668,984**	**172,135**	**(37,843)**	**5,803,276**
Equity securities				
Common stock	713,099	810,611	(5,195)	1,518,515

Preferred stock	19,334	3,889	(62)	23,161
Total equity securities	**732,433**	**814,500**	**(5,257)**	**1,541,676**
Total investments in securities	**$13,652,802**	**$1,271,950**	**$ (83,108)**	**$14,841,644**

	December 31, 2015			
	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	$ 324,643	$ 22,318	$ (444)	$ 346,517
Foreign governments	4,101	867	—	4,968
Corporate debt securities	6,985,844	263,927	(158,101)	7,091,670
Residential mortgage-backed securities	277,135	18,351	(1,286)	294,200
Collateralized debt securities	1,924	100	—	2,024
Other debt securities	15,773	401	—	16,174
Total bonds held-to-maturity	**7,609,420**	**305,964**	**(159,831)**	**7,755,553**
Fixed maturity securities, bonds available-for-sale				
U.S. treasury and government	24,024	702	(34)	24,692
U.S. states and political subdivisions	933,958	39,808	(1,275)	972,491
Foreign governments	5,000	1,733	—	6,733
Corporate debt securities	4,431,765	120,471	(107,614)	4,444,622
Residential mortgage-backed securities	25,629	2,155	(420)	27,364
Collateralized debt securities	7,455	629	(70)	8,014
Total bonds available-for-sale	**5,427,831**	**165,498**	**(109,413)**	**5,483,916**
Equity securities				
Common stock	794,839	718,225	(22,035)	1,491,029
Preferred stock	15,987	7,964	(1)	23,950
Total equity securities	**810,826**	**726,189**	**(22,036)**	**1,514,979**
Total investments in securities	**$13,848,077**	**$1,197,651**	**$(291,280)**	**$14,754,448**

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, 2016			
	Bonds Held-to-Maturity		Bonds Available-for-Sale	
	Amortized Cost	Fair Value	Amortized Cost	Fair Value
Due in one year or less	$ 492,792	$ 503,694	$ 228,534	$ 231,434
Due after one year through five years	3,369,648	3,556,266	1,443,585	1,514,270
Due after five years through ten years	3,209,951	3,250,902	3,396,681	3,458,366
Due after ten years	173,144	180,805	595,184	594,231
Without single maturity date	5,850	5,025	5,000	4,975
Total	**$ 7,251,385**	**$7,496,692**	**$ 5,668,984**	**$5,803,276**

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,		
	2016	2015	2014
Proceeds from sales of available-for-sale securities	$138,665	$86,793	$184,918
Gross realized gains	34,135	34,434	38,301
Gross realized losses	(7,775)	(592)	(3,635)

Gains and losses are determined using specific identification of the securities sold. During 2016 and 2015, bonds with a carrying value of $22,848,000 and $171,000, respectively were transferred from held-to-maturity to available-for-sale after a significant deterioration in the issuers' credit worthiness became evident. An unrealized loss of $723,000 and $53,000 were recorded in 2016 and 2015, respectively following the transfer at fair value.

In accordance with various regulations, American National had bonds on deposit with regulating authorities with a carrying value of $52,349,000 and $51,877,000 at December 31, 2016 and 2015, 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 $76,558,000 and $77,360,000 at December 31, 2016 and 2015, respectively.

The components of the change in net unrealized gains (losses) on securities are shown below (in thousands):

	Years ended December 31,		
	2016	2015	2014
Bonds available-for-sale	$ 78,207	$(171,006)	$ 83,809
Equity securities	105,090	(73,441)	108,066
Change in net unrealized gains (losses) on securities during the year	183,297	(244,447)	191,875
Adjustments for			
Deferred policy acquisition costs	(29,074)	59,340	(14,611)
Participating policyholders' interest	(10,282)	8,646	(9,046)

Deferred federal income tax benefit (expense)	(50,237)	61,744	(58,004)
Change in net unrealized gains (losses) on securities, net of tax	**$ 93,704**	**$(114,717)**	**$110,214**

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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, 2016					
	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	$ (102)	$ 18,886	$ —	$ —	$ (102)	$ 18,886
Corporate debt securities	(18,110)	971,361	(20,611)	186,262	(38,721)	1,157,623
Residential mortgage-backed securities	(558)	22,806	(627)	10,248	(1,185)	33,054
Total bonds held-to-maturity	**(18,770)**	**1,013,053**	**(21,238)**	**196,510**	**(40,008)**	**1,209,563**
Fixed maturity securities, bonds available-for-sale						
U.S. treasury and government	(16)	10,640	—	—	(16)	10,640
U.S. states and political subdivisions	(6,376)	282,141	(2)	122	(6,378)	282,263
Corporate debt securities	(19,828)	917,215	(11,221)	126,584	(31,049)	1,043,799
Residential mortgage-backed securities	(204)	12,420	(138)	3,982	(342)	16,402
Collateralized debt securities	—	1	(3)	146	(3)	147
Other Debt Securities	(55)	3,178	—	—	(55)	3,178
Total bonds available-for-sale	(26,479)	1,225,595	(11,364)	130,834	(37,843)	1,356,429
Equity securities						
Common stock	(5,195)	53,068	—	—	(5,195)	53,068
Preferred stock	(62)	4,324	—	—	(62)	4,324
Total equity securities	**(5,257)**	**57,392**	**—**	**—**	**(5,257)**	**57,392**
Total	**$ (50,506)**	**$2,296,040**	**$ (32,602)**	**$327,344**	**$ (83,108)**	**$2,623,384**

	December 31, 2015					
	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	$ (444)	$ 19,412	$ —	$ —	$ (444)	$ 19,412
Corporate debt securities	(93,285)	1,912,178	(64,816)	283,469	(158,101)	2,195,647
Residential mortgage-backed securities	(449)	21,275	(837)	14,721	(1,286)	35,996
Total bonds held-to-maturity	**(94,178)**	**1,952,865**	**(65,653)**	**298,190**	**(159,831)**	**2,251,055**
Fixed maturity securities, bonds available-for-sale						
U.S. treasury and government	(34)	18,802	—	—	(34)	18,802
U.S. states and political subdivisions	(1,223)	80,807	(52)	2,569	(1,275)	83,376
Corporate debt securities	(81,638)	1,796,357	(25,976)	90,784	(107,614)	1,887,141
Residential mortgage-backed securities	(228)	15,273	(192)	4,984	(420)	20,257
Collateralized debt securities	(66)	2,115	(4)	253	(70)	2,368
Total bonds available-for-sale	**(83,189)**	**1,913,354**	**(26,224)**	**98,590**	**(109,413)**	**2,011,944**
Equity securities						
Common stock	(22,035)	136,694	—	—	(22,035)	136,694
Preferred stock	—	—	(1)	—	(1)	—
Total equity securities	**(22,035)**	**136,694**	**(1)**	**—**	**(22,036)**	**136,694**
Total	**$(199,402)**	**$4,002,913**	**$ (91,878)**	**$396,780**	**$(291,280)**	**$4,399,693**

As of December 31, 2016, 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, 2016			December 31, 2015		
	Amortized Cost	Estimated Fair Value	% of Fair Value	Amortized Cost	Estimated Fair Value	% of Fair Value
AAA	$ 667,561	$ 691,296	5.2%	$ 681,918	$ 720,175	5.4%
AA	1,393,137	1,440,667	10.8	1,522,300	1,591,496	12.0

A	4,538,471	4,696,909	35.3	4,672,994	4,828,340	36.5
BBB	5,758,560	5,931,112	44.6	5,731,158	5,732,961	43.3
BB and below	562,640	539,984	4.1	428,881	366,497	2.8
Total	**$12,920,369**	**$13,299,968**	**100.0 %**	**$13,037,251**	**$13,239,469**	**100.0 %**

Equity securities by market sector distribution are shown below:

	December 31,	
	2016	2015
Consumer goods	20.4%	20.5%
Energy and utilities	11.1	10.3
Finance	22.1	20.0
Healthcare	12.7	14.6
Industrials	9.0	8.2
Information technology	17.1	17.8
Other	7.6	8.6
Total	**100.0%**	**100.0%**

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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 are is as follows:

	December 31,	
	2016	2015
East North Central	16.2%	18.8%
East South Central	3.7	4.8
Mountain	10.6	11.6
Pacific	17.6	10.7
South Atlantic	15.1	18.8
West South Central	31.0	29.0
Other	5.8	6.3

Total	**100.0%**	**100.0 %**

During 2016, American National did not foreclose on any loans, and one loan with a recorded investment of $1,940,000, was in the process of foreclosure. For the year ended December 31, 2015, American National foreclosed on three loans with a recorded investment totaling $24,333,000 and one loan was in the process of foreclosure with a recorded investment of $2,450,000. American National sold no loans during 2016 and one loan with a recorded investment of $2,702,000 resulting in a realized loss of $1,602,000 for the year ended December 31, 2015.

The age analysis of past due loans is shown below (in thousands):

December 31, 2016	30-59 Days Past Due	60-89 Days Past Due	More Than 90 Days	Total	Current	Total Amount	Total Percent
Industrial	$ —	$ 2,300	$ —	$ 2,300	$ 744,472	$ 746,772	17.1
Office	—	—	6,059	6,059	1,541,880	1,547,939	35.5
Retail	—	—	—	—	736,121	736,121	16.9
Other	20,179	9,280	—	29,459	1,300,245	1,329,704	30.5
Total	**$ 20,179**	**$ 11,580**	**$ 6,059**	**$37,818**	**$4,322,718**	**$4,360,536**	**100.0**
Allowance for loan losses						(12,490)	
Total, net of allowance						**$4,348,046**	
December 31, 2015							
Industrial	$ —	$ —	$ —	$ —	$ 704,426	$ 704,426	20.1
Office	—	5,883	2,450	8,333	1,252,484	1,260,817	36.1
Retail	19,088	—	—	19,088	583,810	602,898	17.2
Other	—	—	—	—	928,034	928,034	26.6
Total	**$ 19,088**	**$ 5,883**	**$ 2,450**	**$27,421**	**$3,468,754**	**$3,496,175**	**100.0**
Allowance for loan losses						(12,895)	
Total, net of allowance						**$3,483,280**	

Total mortgage loans are net of unamortized discounts of $233,000 and $452,000 and unamortized origination fees of $33,019,000 and $22,637,000 at December 31, 2016 and 2015, respectively. No unearned income is included in these amounts.

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Note 5 – Mortgage Loans – (Continued)

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 our 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, 2013	**407**	**$3,310,930**	**$ 11,688**	**1**	**$ 493**	**$ 493**	**408**	**$3,311,423**	**$ 12,181**
Change Due to Factor Development	—	—	127	—	—	—	—	—	127
Change in allowance	—	—	462	—	—	5,090	—	—	5,552
Change in recorded investment	(8)	39,954	—	2	26,070	—	(6)	66,024	—
Balance at December 31, 2014	**399**	**3,350,884**	**12,277**	**3**	**26,563**	**5,583**	**402**	**3,377,447**	**17,860**
Change in allowance	—	—	(1,561)	—	—	(3,404)	—	—	(4,965)
Change in recorded investment	2	129,123	—	(1)	(10,395)	—	1	118,728	—
Balance at December 31, 2015	**401**	**3,480,007**	**10,716**	**2**	**16,168**	**2,179**	**403**	**3,496,175**	**12,895**
Change in allowance	—	—	772	—	—	(1,177)	—	—	(405)
Change in recorded investment	29	878,589	—	—	(14,228)	—	29	864,361	—
Balance at December 31, 2016	**430**	**$4,358,596**	**$ 11,488**	**2**	**$ 1,940**	**$ 1,002**	**432**	**$4,360,536**	**$ 12,490**

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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,					
	2016			2015		
	Number of loans	Recorded investment pre-modification	Recorded investment post modification	Number of loans	Recorded investment pre-modification	Recorded investment post modification
Office	1	$ 6,432	$ 6,432	2	$ 12,211	$ 12,211
Retail	2	10,972	10,972	—	—	—
Total	**3**	**$ 17,404**	**$ 17,404**	**2**	**$ 12,211**	**$ 12,211**

There are $430,399 of commitments to lend additional funds to debtors whose loans have been modified in troubled debt restructuring, and there have been no defaults on modified loans 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,	
	2016	2015
Industrial	9.2%	10.9%
Office	37.8	38.1
Retail	37.2	37.0
Other	15.8	14.0
Total	**100.0%**	**100.0%**

	December 31,	
	2016	2015
East North Central	8.8%	11.4%
East South Central	3.4	3.6
Mountain	12.0	12.6
Pacific	6.1	5.6
South Atlantic	13.0	10.1
West South Central	52.2	50.7
Other	4.5	6.0
Total	**100.0%**	**100.0%**

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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 2016 or 2015.

The assets and liabilities relating to the VIEs included in the consolidated financial statements are as follows (in thousands):

	December 31,	
	2016	2015
Investment real estate	$173,816	$174,264
Short-term investments	1	1
Cash and cash equivalents	6,099	3,855
Accrued investment income	—	557
Other receivables	6,456	8,101
Other assets	8,820	8,210
Total assets of consolidated VIEs	**$195,192**	**$194,988**
Notes payable	$136,080	$128,436
Other liabilities	10,037	19,436
Total liabilities of consolidated VIEs	**$146,117**	**$147,872**

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 $31,795,000 and $34,699,000 at December 31, 2016 and 2015, respectively. The total of notes payable, $136,080,000, is long-term and consists of four notes with the following interest rates: one note at 4.0%, one note at LIBOR, one note at 90-Day LIBOR plus LIBOR margin, and one note at Prime Rate. Two notes mature in 2018, one note matures in 2021, and one note matures in 2022.

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 unanimous consent of all partners. The carrying amount and maximum exposure to loss relating to unconsolidated VIEs follows (in thousands):

	December 31,			
	2016		2015	
	Carrying Amount	Maximum Exposure to Loss	Carrying Amount	Maximum Exposure to Loss
Investment in unconsolidated affiliates	$323,933	$323,933	$236,816	$236,816
Mortgage loans	481,799	481,799	212,228	212,228
Accrued investment income	1,919	1,919	661	661

As of December 31, 2016, one real estate investment with a carrying value of $2,818,000 was classified as held for sale.

Note 6 – Real Estate and Other Investments – (Continued)

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 2016 and 2015 certain joint ventures took advantage of market opportunities to generate realized gains on the sale of real estate held or developed by the venture.

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% except for 2015 when it was determined one joint venture slightly exceeded the income test threshold of 10% at 10.89% of operating income before tax. However, 96.8% of this joint venture's income in 2015 was attributable to realized gain resulting from the sale of its operating assets. 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, which are substantially all LLC's or LLP's, were comprised of the following (in thousands):

	December 31,	
	2016	2015
Real estate	$372,393	$299,720
Equity and fixed income	79,145	50,326
Other	38,938	29,302
Total investments in unconsolidated affiliates	**$490,476**	**$379,348**

	Years ended December 31,		
	2016	2015	2014
Income from operations	$19,005	$ 815	$ 284
Net gain on sales	38,195	76,593	14,410
Equity in earnings of unconsolidated affiliates	**$57,200**	**$77,408**	**$14,694**

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):

Derivatives Not Designated as Hedging Instruments	Location in the Consolidated Statements of Financial Position	December 31, 2016 Number of Instruments	2016 Notional Amounts	2016 Estimated Fair Value	December 31, 2015 Number of Instruments	2015 Notional Amounts	2015 Estimated Fair Value
Equity-indexed options	Other invested assets	442	$1,414,100	$156,479	419	$1,200,600	$123,007
Equity-indexed embedded derivative	Policyholders' account balances	62,481	1,289,800	314,330	51,815	1,067,600	242,412

Derivatives Not Designated as Hedging Instruments	Location in the Consolidated Statements of Operations	Gains (Losses) Recognized in Income on Derivatives Years ended December 31, 2016	2015	2014

Equity-indexed options	Net investment income	$ 28,869	$(9,103)	$ 52,071
Equity-indexed embedded derivative	Interest credited to policyholders' account balances	(25,239)	6,439	(32,071)

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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 adopted a policy of only dealing with counterparties we believe are credit worthy 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. The Company maintains master netting agreements with its current active trading partners. As such, a right of offset has been applied to unrestricted 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. Restricted collateral has been recorded as "Other liabilities" because of the uncertainty of its availability to offset exposure losses. Information regarding the Company's exposure to credit loss on the options it holds is presented below (in thousands):

		December 31, 2016				
Counterparty	Moody/S&P Rating	Options Fair Value	Collateral Held	Collateral Amounts used to Offset Exposure	Excess and Restricted Collateral	Exposure Net of Collateral
Barclays	Baa2/BBB	$ 33,839	$ 35,063	$ 33,839	$ 1,224	$ —
Citigroup	Baa1/BBB+	2,249	—	—	—	2,249
Goldman-Sachs	A3/BBB+	1,452	1,400	1,400	—	52
ING	Baa1/A-	29,609	26,430	26,430	—	3,179
JP Morgan	A3/A-	163	—	—	—	163
Morgan Stanley	A3/BBB+	17,864	17,680	17,680	—	184
NATIXIS*	A2/A	24,804	26,620	—	26,620	24,804
SunTrust	Baa1/BBB+	19,559	19,960	19,559	401	—
Wells Fargo	A2/A	26,940	26,540	26,540	—	400
Total		**$156,479**	**$153,693**	**$125,448**	**$ 28,245**	**$ 31,031**

		December 31, 2015				
Counterparty	Moody/S&P Rating	Options Fair Value	Collateral Held	Collateral Amounts used to Offset Exposure	Excess and Restricted Collateral	Exposure Net of Collateral
Barclays	Baa2/BBB	$ 29,976	$ 31,383	$ 29,976	$ 1,407	$ —
Citigroup	Baa1/BBB+	2,044	—	—	—	2,044
Goldman-Sachs	A3/BBB+	1,075	1,040	1,040	—	35

ING	Baa1/A-	21,459	18,590	18,590	—	2,869
JP Morgan	A3/A-	795	—	—	—	795
Morgan Stanley	A3/BBB+	11,625	12,530	11,625	905	—
NATIXIS*	A2/A	16,165	16,230	—	16,230	16,165
SunTrust	Baa1/BBB+	18,143	18,240	18,143	97	—
Wells Fargo	A2/A	21,725	22,680	21,725	955	—
Total		**$123,007**	**$120,693**	**$101,099**	**$ 19,594**	**$ 21,908**

* Collateral Restrictions

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Note 8 – Net Investment Income and Realized Investment Gains (Losses)

Net investment income is shown below (in thousands):

	Years ended December 31,		
	2016	2015	2014
Bonds	$551,849	$558,837	$596,013
Equity securities	38,680	36,314	35,324
Mortgage loans	211,972	204,913	204,499
Real estate	6,743	12,833	10,823
Options	28,869	(9,103)	52,071
Other invested assets	22,122	31,037	34,128
Total	**$860,235**	**$834,831**	**$932,858**

Realized investment gains (losses) are shown below (in thousands):

	Years ended December 31,		
	2016	2015	2014
Bonds	$16,705	$16,300	$25,580
Equity securities	33,348	60,485	22,089
Mortgage loans	405	(220)	(5,679)
Real estate	2,188	10,872	7,035
Other invested assets	(6,039)	(52)	(963)
Total	**$46,607**	**$87,385**	**$48,062**

Other-than-temporary impairment losses are shown below (in thousands):

	Years ended December 31,		
	2016	2015	2014
Bonds	$ (94)	$ (286)	$ (41)
Equity securities	(17,573)	(27,656)	(6,599)
Total	**$(17,667)**	**$(27,942)**	**$(6,640)**

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Note 9 – Fair Value of Financial Instruments

The carrying amount and fair value of financial instruments are shown below (in thousands):

	December 31,			
	2016		2015	
	Carrying Amount	Fair Value	Carrying Amount	Fair Value
Financial assets				
Fixed maturity securities, bonds held-to-maturity	$ 7,251,385	$ 7,496,692	$ 7,609,420	$ 7,755,553
Fixed maturity securities, bonds available-for-sale	5,803,276	5,803,276	5,483,916	5,483,916
Equity securities	1,541,676	1,541,676	1,514,979	1,514,979
Equity-indexed options	156,479	156,479	123,007	123,007
Mortgage loans on real estate, net of allowance	4,348,046	4,435,530	3,483,280	3,621,978
Policy loans	384,376	384,376	407,491	407,491
Short-term investments	192,226	192,226	460,612	460,612
Separate account assets	941,612	941,612	918,446	918,446
Total financial assets	**$20,619,076**	**$20,951,867**	**$20,001,151**	**$20,285,982**
Financial liabilities				
Investment contracts	$ 8,785,412	$ 8,785,412	$ 8,787,376	$ 8,787,376
Embedded derivative liability for equity-indexed contracts	314,330	314,330	242,412	242,412
Notes payable	136,080	136,080	128,436	128,436
Separate account liabilities	941,612	941,612	918,446	918,446
Total financial liabilities	**$10,177,434**	**$10,177,434**	**$10,076,670**	**$10,076,670**

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.

Note 9 – Fair Value of Financial Instruments – (Continued)

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 options and certain fixed maturity securities, American National uses a market-based fair value analysis to validate the reasonableness of prices received from an independent broker. 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. These estimates are disclosed as Level 2 measurements. American National tests the accuracy of the information provided by reference to other services regularly.

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.

Embedded Derivative—The embedded derivative liability for equity-indexed contracts is measured at fair value and is recalculated each reporting period using equity option pricing models. To validate the assumptions used to price the embedded derivative liability, American National measures and compares embedded derivative returns against the returns of equity options held to hedge the liability cash flows.

Note 9 – Fair Value of Financial Instruments – (Continued)

The significant unobservable input used to calculate the fair value of the embedded derivatives is equity option implied volatility. An increase in implied volatility will result in an increase in the value of the equity-indexed embedded derivatives, all other things being equal. At December 31, 2016 and 2015, the one year implied volatility used to estimate embedded derivative value was 16.5% and 17.5%, respectively.

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 and 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.

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 to current rates offered 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, 2016			
	Total Fair Value	Level 1	Level 2	Level 3
Financial assets				
Fixed maturity securities, bonds held-to-maturity				
U.S. states and political subdivisions	$ 319,082	$ —	$ 319,082	$ —
Foreign governments	4,716	—	4,716	—
Corporate debt securities	6,925,978	—	6,875,015	50,963
Residential mortgage-backed securities	242,685	—	241,779	906
Collateralized debt securities	1,354	—	—	1,354
Other debt securities	2,877	—	—	2,877
Total bonds held-to-maturity	**7,496,692**	**—**	**7,440,592**	**56,100**
Fixed maturity securities, bonds available-for-sale				
U.S. treasury and government	25,640	—	25,640	—
U.S. states and political subdivisions	960,223	—	957,748	2,475
Foreign governments	6,567	—	6,567	—
Corporate debt securities	4,780,763	—	4,773,516	7,247
Residential mortgage-backed securities	20,513	—	17,909	2,604
Collateralized debt securities	6,392	—	4,454	1,938
Other debt securities	3,178	—	3,178	—
Total bonds available-for-sale	**5,803,276**	**—**	**5,789,012**	**14,264**
Equity securities				
Common stock	1,518,515	1,518,515	—	—
Preferred stock	23,161	23,161	—	—
Total equity securities	**1,541,676**	**1,541,676**	**—**	**—**
Options	156,479	—	—	156,479
Mortgage loans on real estate	4,435,530	—	4,435,530	—
Policy loans	384,376	—	—	384,376
Short-term investments	192,226	—	192,226	—
Separate account assets	941,612	—	941,612	—
Total financial assets	**$20,951,867**	**$1,541,676**	**$18,798,972**	**$ 611,219**

Financial liabilities				
Investment contracts	$ 8,785,412	$ —	$ —	$8,785,412
Embedded derivative liability for equity-indexed contracts	314,330	—	—	314,330
Notes payable	136,080	—	—	136,080
Separate account liabilities	941,612	—	941,612	—
Total financial liabilities	**$10,177,434**	**$ —**	**$ 941,612**	**$9,235,822**

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Note 9 – Fair Value of Financial Instruments – (Continued)

	Fair Value Measurement as of December 31, 2015			
	Total Fair Value	Level 1	Level 2	Level 3
Financial assets				
Fixed maturity securities, bonds held-to-maturity				
U.S. states and political subdivisions	$ 346,517	$ —	$ 346,517	$ —
Foreign governments	4,968	—	4,968	—
Corporate debt securities	7,091,670	—	7,010,165	81,505
Residential mortgage-backed securities	294,200	—	293,267	933
Collateralized debt securities	2,024	—	2,024	—
Other debt securities	16,174	—	12,355	3,819
Total bonds held-to-maturity	**7,755,553**	**—**	**7,669,296**	**86,257**
Fixed maturity securities, bonds available-for-sale				
U.S. treasury and government	24,692	—	24,692	—
U.S. states and political subdivisions	972,491	—	969,996	2,495
Foreign governments	6,733	—	6,733	—
Corporate debt securities	4,444,622	—	4,431,263	13,359
Residential mortgage-backed securities	27,364	—	24,958	2,406
Collateralized debt securities	8,014	—	6,144	1,870
Total bonds available-for-sale	**5,483,916**	**—**	**5,463,786**	**20,130**

Equity securities				
Common stock	1,491,029	1,491,029	—	—
Preferred stock	23,950	23,950	—	—
Total equity securities	**1,514,979**	**1,514,979**	**—**	**—**
Options	123,007	—	—	123,007
Mortgage loans on real estate	3,621,978	—	3,621,978	—
Policy loans	407,491	—	—	407,491
Short-term investments	460,612	—	460,612	—
Separate account assets	918,446	—	918,446	—
Total financial assets	**$20,285,982**	**$1,514,979**	**$18,134,118**	**$ 636,885**
Financial liabilities				
Investment contracts	$ 8,787,376	$ —	$ —	$8,787,376
Embedded derivative liability for equity-indexed contracts	242,412	—	—	242,412
Notes payable	128,436	—	—	128,436
Separate account liabilities	918,446	—	918,446	—
Total financial liabilities	**$10,076,670**	**$ —**	**$ 918,446**	**$9,158,224**

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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, 2013	**$ 48,304**	**$164,753**	**$148,435**
Total realized and unrealized investment losses included in other comprehensive income	(11,746)	—	—
Net fair value change included in realized gains	13,056	—	—
Net gain for derivatives included in net investment income	—	44,492	—
Net change included in interest credited	—	—	32,071

Purchases, sales and settlements or maturities			
Purchases	—	16,844	—
Sales	(37,803)	—	—
Settlements or maturities	(10)	(36,640)	—
Premiums less benefits	—	—	27,681
Gross transfers into Level 3	54,241	—	—
Gross transfers out of Level 3	(1,609)	—	—
Balance at December 31, 2014	**64,433**	**189,449**	**208,187**
Total realized and unrealized investment gains included in other comprehensive income	427	—	—
Net fair value change included in realized gains (losses)	—	—	—
Net loss for derivatives included in net investment income	—	(13,889)	—
Net change included in interest credited	—	—	(6,439)
Purchases, sales and settlements or maturities			
Purchases	—	22,369	—
Sales	(2)	(55,279)	—
Settlements or maturities	(479)	(19,643)	—
Premiums less benefits	—	—	40,664
Gross transfers into Level 3	10,228	—	—
Gross transfers out of Level 3	(54,477)	—	—
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**

Within the net gain (loss) for derivatives included in net investment income were unrealized gains of $44,615,000, unrealized losses of $50,114,000, and unrealized gains of $24,108,000 relating to assets still held at December 31, 2016, 2015, and 2014, respectively.

Note 9 – Fair Value of Financial Instruments – (Continued)

There were no transfers between Level 1 and Level 2 fair value hierarchies. The transfers into Level 3 during the years ended December 31, 2016, 2015, and 2014 were the result of existing securities no longer being priced by the third-party pricing service at the end of the period and 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 anything 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, 2016. The transfers out of Level 3 during the years ended December 31, 2016, 2015, and 2014, 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	Accident & Health	Property & Casualty	Total
Balance at December 31, 2013	**$ 684,084**	**424,158**	**47,220**	**122,271**	**$1,277,733**
Additions	110,195	47,400	19,530	213,237	390,362
Amortization	(78,181)	(79,135)	(18,966)	(223,658)	(399,940)
Effect of change in unrealized gains on available-for-sale securities	(4,629)	(9,982)	—	—	(14,611)
Net change	27,385	(41,717)	564	(10,421)	(24,189)
Balance at December 31, 2014	**711,469**	**382,441**	**47,784**	**111,850**	**1,253,544**
Additions	108,615	64,724	20,249	236,785	430,373
Amortization	(77,567)	(81,793)	(23,643)	(235,585)	(418,588)
Effect of change in unrealized gains on available-for-sale securities	13,506	45,834	—	—	59,340
Net change	44,554	28,765	(3,394)	1,200	71,125
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 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**

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 4.5%.

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 adjustments.

Note 12 – Liability for Unpaid Claims and Claim Adjustment Expenses

The liability for unpaid claims and claim adjustment expenses ("claims") for accident and 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 claims that have been reported but not settled and incurred but not reported ("IBNR") claims. 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,		
	2016	2015	2014
Unpaid claims balance, beginning	$1,104,302	$1,132,394	$1,096,301
Less reinsurance recoverables	217,337	245,906	215,164
Net beginning balance	**886,965**	**886,488**	**881,137**
Incurred related to			
Current	1,055,796	950,228	940,466
Prior years	(36,788)	(22,830)	(44,806)
Total incurred claims	**1,019,008**	**927,398**	**895,660**
Paid claims related to			
Current	654,175	580,476	561,887
Prior years	327,978	346,445	328,422
Total paid claims	**982,153**	**926,921**	**890,309**
Net balance	923,820	886,965	886,488
Plus reinsurance recoverables	216,903	217,337	245,906

Unpaid claims balance, ending	**$1,140,723**	**$1,104,302**	**$1,132,394**

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 $36,788,000 in 2016 and $22,830,000 in 2015 and $44,806,000 in 2014. This was a reflection of lower-than-anticipated losses in the multi-peril line of business in 2016 and lower-than-anticipated losses in the personal auto, other liability and multi-peril lines of business in 2015 and 2014.

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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, 2016
Net outstanding liabilities	
Auto Liability	$ 369,209
Non-Auto Liability	263,801
Commercial Multi-Peril	88,259
Homeowners	61,256
Short Tail Property	26,088
Credit	16,076
Health	23,068
Other	2,278
Liabilities for unpaid claims and claim adjustment expenses, net of reinsurance	850,035
Reinsurance recoverable on unpaid claims	
Auto Liability	8,004
Non-Auto Liability	30,923
Commercial Multi-Peril	3,348
Homeowners	1,442
Short Tail Property	20,497
Credit	15,280
Health	134,283

Other	3,648
Total reinsurance recoverable on unpaid claims	217,425
Insurance lines other than short-duration	192,517
Unallocated claims adjustment expenses	43,948
	236,465
Total gross liability for unpaid claims and claim adjustment expense	$ 1,303,925

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.

Note 12 – Liability for Unpaid Claims and Claim Adjustment Expenses – (Continued)

- 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, 2016, 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, 2007, to 2015, is presented as supplementary information.

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Note 12 – Liability for Unpaid Claims and Claim Adjustment Expenses – (Continued)

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, 2016	
	For the Years Ended December 31,											
Accident Year	2007*	2008*	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016	IBNR Plus Expected Development	Cumulative Number of Reported Claims
2007	$306,939	$281,373	$278,279	$276,801	$276,740	$275,669	$274,620	$273,938	$273,484	$ 273,039	$ 106	51,839
2008		280,131	271,759	261,683	261,555	260,015	257,097	257,915	256,158	255,600	191	47,788
2009			299,753	273,551	263,269	258,749	260,029	258,200	257,678	256,586	376	47,059
2010				288,166	270,935	266,223	265,949	264,104	263,040	261,930	1,045	47,081
2011					263,411	250,659	248,865	244,519	244,436	242,619	1,891	47,049
2012						251,593	242,255	231,312	228,013	229,426	3,333	44,546
2013							242,364	236,432	233,068	231,301	7,190	38,641
2014								232,146	223,386	217,819	13,842	35,800
2015									237,578	240,696	34,168	35,573
2016										259,173	78,756	34,276
										Total $2,468,189		

	Cumulative Paid Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance									
	For the Years Ended December 31,									
Accident Year	2007*	2008*	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016
2007	$103,283	$178,233	$223,147	$248,430	$261,908	$269,148	$270,745	$271,751	$272,602	$ 272,603
2008		92,395	163,228	203,708	228,898	244,749	249,953	251,924	253,145	255,118
2009			95,847	166,441	203,869	228,650	242,768	250,681	253,417	254,988
2010				92,589	164,298	208,531	237,540	250,647	257,021	259,173
2011					93,245	161,387	197,326	217,640	230,585	236,187
2012						82,531	150,323	183,448	204,980	214,467
2013							79,358	143,709	181,535	204,480

2014	72,838	134,376	166,947
2015		78,861	149,365
2016			86,491
Total			$2,099,819
All outstanding liabilities before 2007, net of reinsurance*			839
Liabilities for claims and claim adjustment expenses, net of reinsurance			$ 369,209

* Unaudited supplemental information

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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, 2016	
	For the Years Ended December 31,											
Accident Year	2007*	2008*	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016	IBNR Plus Expected Development	Cumulative Number of Reported Claims
2007	$87,108	$82,759	$85,138	$83,071	$79,720	$80,520	$78,496	$78,739	$79,101	$ 79,668	$ 2,532	30,182
2008		85,367	85,384	77,798	72,492	71,969	73,436	74,114	73,912	74,684	3,025	18,374
2009			83,773	75,857	70,905	72,267	72,490	72,077	71,003	71,517	3,681	13,294
2010				91,191	85,498	83,724	82,287	82,145	82,087	80,920	5,141	7,778
2011					86,409	76,038	75,390	74,372	73,647	71,423	6,088	5,673
2012						83,146	80,470	78,644	75,226	68,017	7,407	4,706
2013							74,183	75,815	70,772	67,841	9,541	4,411
2014								83,084	75,550	72,624	16,145	5,824
2015									83,897	78,968	31,995	5,116
2016										86,935	48,102	3,153
										Total $752,597		

	Cumulative Paid Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance									
	For the Years Ended December 31,									
Accident Year	2007*	2008*	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016
2007	$22,008	$37,569	$50,184	$58,978	$65,026	$68,652	$70,605	$72,044	$73,180	$ 74,880
2008		18,852	34,624	43,206	51,077	58,043	62,087	64,840	66,629	67,329
2009			15,389	28,725	41,424	49,895	55,391	61,277	63,039	64,755
2010				16,473	31,819	46,746	57,354	65,557	69,091	70,369
2011					13,848	31,943	41,814	52,003	56,791	60,706
2012						13,862	27,574	38,826	49,585	55,194

2013	12,794	22,743	32,474	42,504
2014		11,201	26,587	36,220
2015			11,979	23,488
2016				12,733
Total				$508,178
All outstanding liabilities before 2007, net of reinsurance*				19,382
Liabilities for claims and claim adjustment expenses, net of reinsurance				$263,801

* Unaudited supplemental information

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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, 2016	
	For the Years Ended December 31,											
Accident Year	2007*	2008*	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016	IBNR Plus Expected Development	Cumulative Number of Reported Claims
2007	$43,834	$40,324	$39,877	$39,215	$39,309	$38,158	$38,218	$38,078	$38,243	$ 37,861	$ 684	3,290
2008		40,640	39,231	37,105	37,825	37,034	35,594	36,141	37,605	37,298	1,061	3,831
2009			41,027	38,666	36,610	35,354	34,884	34,381	34,529	34,079	989	3,512
2010				41,116	37,736	40,243	37,520	35,914	37,839	37,215	1,294	3,583
2011					42,185	40,825	39,037	38,160	38,456	36,945	1,308	3,552
2012						35,169	28,548	26,805	23,258	23,385	1,206	2,704
2013							33,979	27,592	27,867	26,970	2,653	2,188
2014								36,852	31,220	34,911	4,962	2,229
2015									33,997	31,488	9,814	2,003
2016										38,114	20,761	3,069
									Total	$338,266		

	Cumulative Paid Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance									
	For the Years Ended December 31,									
Accident Year	2007*	2008*	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016
2007	$11,548	$17,625	$21,869	$26,682	$31,080	$34,386	$35,217	$35,738	$36,054	$ 36,474
2008		10,083	17,357	20,638	25,415	29,900	32,187	34,321	34,847	35,270
2009			11,101	17,248	21,660	25,779	30,272	32,150	32,623	32,842
2010				12,511	17,490	22,135	27,152	31,378	33,384	34,888

2011	13,092	18,390	22,616	28,291	30,458	32,692
2012		11,525	14,454	16,263	18,670	20,716
2013			9,374	12,723	15,426	18,406
2014				12,001	16,484	20,199
2015					9,820	12,956
2016						11,327
Total						$255,770
All outstanding liabilities before 2007, net of reinsurance*						5,763
Liabilities for claims and claim adjustment expenses, net of reinsurance						$ 88,259

* Unaudited supplemental information

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Note 12 – Liability for Unpaid Claims and Claim Adjustment Expenses – (Continued)

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, 2016	
	For the Years Ended December 31,											
Accident Year	2007*	2008*	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016	IBNR Plus Expected Development	Cumulative Number of Reported Claims
2007	$127,373	$125,628	$124,041	$123,879	$123,950	$123,747	$123,681	$123,619	$123,668	$ 123,624	$ —	22,811
2008		191,926	198,128	198,351	198,578	197,066	196,987	196,777	197,210	197,004	86	42,646
2009			183,437	178,420	179,249	177,534	177,798	177,989	178,372	178,073	130	31,483
2010				206,606	200,318	198,111	198,029	197,443	197,675	197,465	225	37,066
2011					203,301	200,356	198,757	197,581	197,381	197,451	335	38,748
2012						181,284	177,664	175,523	175,509	175,178	464	30,972
2013							152,208	149,080	149,272	148,231	440	19,997
2014								132,651	131,634	130,287	690	18,115
2015									125,430	124,197	1,552	17,583
2016										147,262	9,391	19,917
Total										$1,618,772		

	Cumulative Paid Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance									
	For the Years Ended December 31,									
Accident Year	2007*	2008*	2009*	2010*	2011*	2012*	2013*	2014*	2015*	2016
2007	$91,413	$116,836	$119,622	$121,596	$122,919	$123,126	$123,295	$123,570	$123,578	$ 123,591
2008		148,526	189,694	193,653	195,290	195,936	196,132	196,358	196,546	196,896
2009			142,781	170,372	173,985	175,220	176,588	176,985	177,428	177,615

2010	149,755	189,046	193,006	195,365	195,714	196,281	196,419
2011		160,625	190,946	194,237	195,327	196,575	196,628
2012			143,797	169,415	171,842	173,170	173,676
2013				115,605	140,309	145,152	146,650
2014					96,300	122,601	126,245
2015						86,617	114,696
2016							105,415
						Total	$1,557,831
						All outstanding liabilities before 2007, net of reinsurance*	315
						Liabilities for claims and claim adjustment expenses, net of reinsurance	$ 61,256

* Unaudited supplemental information

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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, 2016	
	For the Years Ended December 31,			
Accident Year	2015*	2016	IBNR Plus Expected Development	Cumulative Number of Reported Claims
2015	202,310	199,957	315	59,375
2016	—	215,492	(3,433)	61,535
	Total	$ 415,449		

	Cumulative Paid Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance	
	For the Years Ended December 31,	
Accident Year	2015*	2016
2015	182,772	198,140
2016	—	192,325
	Total	$390,465
	All outstanding liabilities before 2015, net of reinsurance*	1,104
	Liabilities for claims and claim adjustment expenses, net of reinsurance	$ 26,088

* Unaudited supplemental information

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Note 12 – Liability for Unpaid Claims and Claim Adjustment Expenses – (Continued)

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):

Accident Year	Incurred Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance For the Years Ended December 31, 2015*	2016	As of December 31, 2016 IBNR Plus Expected Development	Cumulative Number of Reported Claims
2015	46,540	46,367	—	34,211
2016	—	75,841	8,584	39,877
	Total	$ 122,208		

Accident Year	Cumulative Paid Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance For the Years Ended December 31, 2015*	2016
2015	34,499	46,367
2016	—	59,765
	Total	$106,132
All outstanding liabilities before 2015, net of reinsurance*		—
Liabilities for claims and claim adjustment expenses, net of reinsurance		$ 16,076

* Unaudited supplemental information

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Note 12 – Liability for Unpaid Claims and Claim Adjustment Expenses – (Continued)

Accident and Health Reserving Methodology

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.

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Note 12 – Liability for Unpaid Claims and Claim Adjustment Expenses – (Continued)

Accident and 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, 2016	
	For the Years Ended December 31,						
Accident Year	2012*	2013*	2014*	2015*	2016	IBNR Plus Expected Development	Cumulative Number of Reported Claims
2012	47,085	58,082	54,285	54,193	54,183	3	67,043
2013	—	40,970	51,725	46,940	46,995	5	63,614
2014	—	—	38,102	67,545	62,802	10	51,456
2015	—	—	—	34,069	45,167	3,789	44,572
2016	—	—	—	—	36,198	11,002	35,709
				Total	$245,345		

	Cumulative Paid Claims and Allocated Claim Adjustment Expenses, Net of Reinsurance				
	For the Years Ended December 31,				
Accident Year	2012*	2013*	2014*	2015*	2016
2012	32,701	54,252	54,094	54,115	54,120
2013	—	28,071	46,780	46,860	46,939
2014	—	—	25,436	62,632	62,678
2015	—	—	—	23,574	41,491

2016	—	—	—	—	24,357
				Total	$ 229,585
				All outstanding liabilities before 2012, net of reinsurance*	7,308
				Liabilities for claims and claim adjustment expenses, net of reinsurance	$ 23,068

* Unaudited supplemental information

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Note 12 – Liability for Unpaid Claims and Claim Adjustment Expenses – (Continued)

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	35.5%	28.1%	15.5%	9.6%	5.2%	2.5%	0.8%	0.5%	0.5%	1.8%
Non-Auto Liability	19.9%	19.4%	15.2%	13.1%	8.3%	5.6%	2.5%	2.2%	1.2%	12.6%
Commercial Multi-Peril	33.8%	14.3%	10.7%	12.5%	10.5%	6.4%	3.3%	1.1%	1.0%	6.4%
Homeowners	76.2%	18.5%	2.2%	0.9%	0.5%	0.2%	0.1%	0.1%	0.1%	1.2%
Short Tail Property	90.3%	9.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Credit	76.6%	23.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

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 a $500 million event. 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 $45 million annual aggregate deductible. This cover was placed on July 1, 2016. American National expects to place the cover again on July 1, 2017.

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Note 13 – Reinsurance – (Continued)

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 $401,709,000 and $413,881,000 at December 31, 2016 and 2015, respectively. None of the amount outstanding at December 31, 2016 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,		
	2016	2015	2014
Direct premiums	$2,246,595	$2,069,434	$2,049,447
Reinsurance premiums assumed from other companies	194,910	188,368	227,076
Reinsurance premiums ceded to other companies	(444,857)	(419,283)	(460,552)
Net premiums	**$1,996,648**	**$1,838,519**	**$1,815,971**

Life insurance in-force and related reinsurance amounts are shown below (in thousands):

	December 31,		
	2016	2015	2014
Direct life insurance in-force	$ 95,439,425	$ 90,194,532	$ 85,570,057
Reinsurance risks assumed from other companies	181,655	120	6,007
Reinsurance risks ceded to other companies	(29,980,485)	(29,891,183)	(30,007,131)
Net life insurance in-force	**$ 65,640,595**	**$ 60,303,469**	**$ 55,568,933**

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,					
	2016		2015		2014	
	Amount	Rate	Amount	Rate	Amount	Rate
Income tax on pre-tax income	$89,732	35.0 %	$121,134	35.0 %	$115,061	35.0 %
Tax-exempt investment income	(7,834)	(3.1)	(7,589)	(2.2)	(6,680)	(2.0)
Deferred tax change	6,699	2.6	—	—	—	—
Dividend exclusion	(8,490)	(3.3)	(8,183)	(2.4)	(7,620)	(2.3)

Miscellaneous tax credits, net	(9,993)	(3.9)	(9,103)	(2.6)	(7,888)	(2.4)
Low income housing tax credit expense	4,795	1.9	4,862	1.4	4,583	1.4
Other items, net	(3,885)	(1.5)	2,599	0.8	(842)	(0.3)
Provision for federal income tax before interest expense	71,024	27.7	103,720	30.0	96,614	29.4
Interest expense	2,686	1.1	—	—	—	—
Total	$73,710	28.8 %	$103,720	30.0 %	$ 96,614	29.4 %

American National made income tax payments of $33,367,000, $80,759,000 and $61,821,000 during 2016, 2015, and 2014, respectively.

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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,	
	2016	2015
DEFERRED TAX ASSETS		
Invested assets, principally due to impairment losses	$ 41,982	$ 84,061
Investment in real estate and other invested assets, principally due to investment valuation allowances	10,028	7,867
Policyholder funds, principally due to policy reserve discount	159,351	181,003
Policyholder funds, principally due to unearned premium reserve	35,207	33,214
Participating policyholders' surplus	54,023	50,648
Pension	57,388	77,976
Commissions and other expenses	6,563	7,003
Other assets	37,250	33,150
Tax carryforwards	278	—
Gross deferred tax assets	**402,070**	**474,922**
DEFERRED TAX LIABILITIES		
Marketable securities, principally due to net unrealized gains	329,464	265,577
Investment in bonds, principally due to differences between GAAP and tax basis	20,875	19,047
Deferred policy acquisition costs, due to difference between GAAP and tax amortization methods	342,888	355,416

Property, plant and equipment, principally due to difference between GAAP and tax depreciation methods	27,490	23,636
Other liabilities	48,840	30,541
Gross deferred tax liabilities	**769,557**	**694,217**
Total net deferred tax liability	**$367,487**	**$219,295**

Management believes that a sufficient taxable income will be achieved over time to utilize the deferred tax assets in the consolidated federal tax return; therefore, no valuation allowance was recorded as of December 31, 2016 and 2015. There are no ordinary loss tax carryforwards that will expire by December 31, 2017.

American National's federal income tax returns for years 2013 to 2015 and years 2005 to 2009 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 was established; however, management has accrued interest in the amount of $2.7 million, net of tax, during 2016 relating to a dispute with the Internal Revenue Service. Management does not believe there are any uncertain tax benefits that could be recognized within the next twelve months that would decrease American National's effective tax rate.

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Note 15 – Accumulated Other Comprehensive Income

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	AOCI
Balance at December 31, 2013	**$ 457,937**	**$ (43,884)**	**$ (341)**	**$ 413,712**
Amounts reclassified from AOCI (net of tax benefit $12,379 and expense $1,547)	(22,990)	2,873	—	(20,117)
Unrealized holding gains arising during the period (net of tax expense $79,535)	147,709	—	—	147,709
Unrealized adjustment to DAC (net of tax benefit $5,986)	(8,625)	—	—	(8,625)
Unrealized gains on investments attributable to participating policyholders' interest (net of tax benefit $3,166)	(5,880)	—	—	(5,880)
Actuarial loss arising during the period (net of tax benefit of $18,880)	—	(35,063)	—	(35,063)
Foreign currency adjustment (net of tax benefit $514)	—	—	(954)	(954)
Balance at December 31, 2014	**568,151**	**(76,074)**	**(1,295)**	**490,782**
Amounts reclassified from AOCI (net of tax benefit $12,845 and expense $3,429)	(23,856)	6,368	—	(17,488)

Unrealized holding losses arising during the period (net of tax benefit $72,711)	(135,035)	—	—	(135,035)
Unrealized adjustment to DAC (net of tax expense $20,786)	38,554	—	—	38,554
Unrealized losses on investments attributable to participating policyholders' interest (net of tax expense $3,026)	5,620	—	—	5,620
Actuarial loss arising during the period (net of tax benefit of $15,175)	—	(28,183)	—	(28,183)
Foreign currency adjustment (net of tax benefit $878)	—	—	(1,630)	(1,630)
Balance at December 31, 2015	**453,434**	**(97,889)**	**(2,925)**	**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 $156)	—	—	289	289
Balance at December 31, 2016	**$ 547,138**	**$ (88,603)**	**$ (2,636)**	**$ 455,899**

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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,		
	2016	2015	2014
Common stock			
Shares issued	30,832,449	30,832,449	30,832,449
Treasury shares	(3,917,933)	(3,937,993)	(3,960,507)
Outstanding shares	**26,914,516**	**26,894,456**	**26,871,942**
Restricted shares	(76,000)	(76,000)	(142,667)
Unrestricted outstanding shares	**26,838,516**	**26,818,456**	**26,729,275**

Stock-based compensation

American National has one 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. Incentive awards under this plan are made to officers meeting established performance objectives. 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 are made to certain officers and 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, 2013	**74,435**	**$ 114.08**	**190,667**	**$ 107.54**	**121,369**	**$ 76.23**
Granted	—	—	—	—	66,383	113.49
Exercised	(3,226)	95.54	(48,000)	108.00	(59,438)	76.53
Forfeited	—	—	—	—	(100)	113.49
Expired	(16,279)	115.11	—	—	—	—
Outstanding at December 31, 2014	**54,930**	**114.86**	**142,667**	**107.39**	**128,214**	**95.82**
Granted	—	—	—	—	83,093	104.75
Exercised	(116)	73.97	(66,667)	103.58	(75,119)	91.35
Forfeited	—	—	—	—	(463)	105.30
Expired	(16,722)	114.42	—	—	—	—
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**

Note 16 – Stockholders' Equity and Noncontrolling Interests – (Continued)

	SAR	RS Shares	RS Units
Weighted-average contractual remaining life (in years)	0.94	2.94	1.61
Exercisable shares	6,153	N/A	N/A
Weighted-average exercise price	$ 113.36	$ 110.73	$ 105.97
Weighted-average exercise price exercisable shares	113.36	N/A	N/A
Compensation expense (credit)			
Year ended December 31, 2016	$179,000	$ 843,000	$ 6,539,000
Year ended December 31, 2015	(72,000)	1,147,000	6,635,000
Year ended December 31, 2014	(23,000)	2,963,000	7,710,000
Fair value of liability award			
December 31, 2016	$213,000	N/A	$23,634,000
December 31, 2015	37,000	N/A	19,415,000

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 76,000 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 or cash. RSUs vest after a 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,		
	2016	2015	2014
Weighted average shares outstanding	26,908,570	26,876,522	26,802,841
Incremental shares from RS awards and RSUs	58,502	73,544	115,829
Total shares for diluted calculations	**26,967,072**	**26,950,066**	**26,918,670**
Net income attributable to American National (in thousands)	$ 181,003	$ 242,988	$ 245,335
Basic earnings per share	$ 6.73	$ 9.04	$ 9.15
Diluted earnings per share	6.71	9.02	9.11

Note 16 – Stockholders' Equity and Noncontrolling Interests – (Continued)

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, 2016 and 2015, American National Insurance Company's statutory capital and surplus was $2,985,909,000 and $2,925,935,000, respectively. American National Insurance Company and each of its insurance subsidiaries had statutory capital and surplus at December 31, 2016 and 2015, 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 $67,858,000 and $67,076,000 at December 31, 2016 and 2015, respectively. Additionally, 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.

Note 16 – Stockholders' Equity and Noncontrolling Interests – (Continued)

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,	
	2016	2015
Statutory capital and surplus		
Life insurance entities	$1,921,171	$1,900,939
Property and casualty insurance entities	1,074,525	1,033,942

	Years ended December 31,		
	2016	2015	2014

Statutory net income			
Life insurance entities	$82,101	$ 136,170	$ 169,823
Property and casualty insurance entities	48,378	71,823	73,076

Dividends

American National Insurance Company's payment of dividends to stockholders is restricted by statutory regulations. 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 to pay total dividends of $298,591,000 during 2017, without prior approval of the Texas Department of Insurance. 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.

Noncontrolling interests

American National County Mutual Insurance Company ("County Mutual") is a mutual insurance company that is 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, 2016 and 2015.

American National Insurance Company and its subsidiaries exercise significant 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 $2,567,000 and $3,439,000 at December 31, 2016 and 2015, respectively.

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Note 17 – Segment Information

Management organizes the business into five operating segments:

- Life—markets whole, term, universal, indexed and variable life insurance on a national basis primarily through career, multiple-line, and independent agents as well as direct marketing channels.
- Annuity—offers fixed, indexed, and variable annuity products. These products are primarily sold through independent agents, brokers, and financial institutions, along with multiple-line and career agents.
- Health—primary lines of business are Medicare supplement, stop loss, other supplemental health products and credit disability insurance. Health products are typically distributed through independent agents and managing general underwriters.
- Property and Casualty—writes personal, agricultural and targeted commercial coverages and credit-related property insurance. These products are primarily sold through multiple-line and independent agents.
- Corporate and Other—consists of net investment income from investments not allocated to the insurance segments and revenues 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 business segment.
- Expenses are allocated based upon various factors, including premium and commission ratios of the operating segments.

The following summarizes the results of operations measured as the income before federal income taxes, and equity in earnings of unconsolidated affiliates by operating segments (in thousands):

	Years ended December 31,		
	2016	2015	2014
Life	$ 28,116	$ 33,453	$ 43,352
Annuity	75,619	59,955	95,736
Health	1,312	1,925	25,559
Property and Casualty	34,554	68,990	89,632
Corporate and Other	59,576	104,365	74,467
Total	**$199,177**	**$268,688**	**$328,746**

The following summarizes total assets by operating segments (in thousands):

	Years ended December 31,		
	2016	2015	2014
Total Assets		(As Revised)	(As Revised)
Life	$ 5,921,208	$ 5,718,553	$ 5,565,791
Annuity	11,310,936	10,888,447	10,766,619
Health	472,369	463,600	489,873
Property and Casualty	2,046,303	2,040,102	1,992,741
Corporate and other	4,782,406	4,655,854	4,750,812
Total	**$24,533,222**	**$ 23,766,556**	**$ 23,565,836**

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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 $13,658,000, $12,146,000, and $12,350,000 for 2016, 2015, and 2014, 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. Early in 2017, the Company commenced a one- time window offering to terminated, vested participants of our qualified defined benefit pension plans. The offer allows participants to take a lump sum or annuity payout which will be funded from pension plan assets.

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.

Amounts recognized in the consolidated statements of financial position consist of (in thousands):

	2016	2015
Reconciliation of benefit obligation		
Obligation at January 1,	$ 524,143	$ 513,151
Service cost	59	97
Interest cost on projected benefit obligation	20,690	18,721
Actuarial loss	3,684	21,451
Benefits paid	(35,044)	(29,277)
Obligation at December 31,	513,532	524,143
Reconciliation of fair value of plan assets		
Fair value of plan assets at January 1,	322,563	324,179
Actual return on plan assets	27,305	(1,051)
Employer contributions	52,409	28,712
Benefits paid	(35,044)	(29,277)
Fair value of plan assets at December 31,	367,233	322,563
Funded status at December 31,	**$(146,299)**	**$(201,580)**

The components of net periodic benefit cost for the defined benefit pension plans are shown below (in thousands):

	Years ended December 31,		
	2016	2015	2014
Service cost	$ 59	$ 97	$ 111
Interest cost	20,690	18,721	20,612
Expected return on plan assets	(22,013)	(20,856)	(20,402)
Amortization of net actuarial loss	12,680	9,797	4,421
Net periodic benefit cost	**$ 11,416**	**$ 7,759**	**$ 4,742**

Note 18 – Pension and Postretirement Benefits – (Continued)

Amounts related to the defined benefit pension plans recognized as a component of OCI are shown below (in thousands):

	Years ended December 31,		
	2016	2015	2014
Actuarial gain (loss)	$14,286	$(33,562)	$(49,523)
Deferred tax (expense) benefit	(5,000)	11,747	17,333
Other comprehensive income (loss), net of tax	**$ 9,286**	**$(21,815)**	**$(32,190)**

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 $11,587,000. 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,	
	2016	2015
Net actuarial loss	$(136,312)	$(150,598)
Deferred tax benefit	47,709	52,709
Amounts included in AOCI	**$ (88,603)**	**$ (97,889)**

The weighted average assumptions used are shown below:

	Used for Net Benefit Cost in Fiscal Year 1/1/2016 to 12/31/2016	Used for Benefit Obligations as of 12/31/2016
Discount rate	4.08%	3.92%
Long-term rate of return	7.41	7.42

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 $40,090,000, $18,630,000, and $12,482,500 to the qualified pension plans in 2016, 2015 and 2014, respectively. American National and its affiliates expect to contribute $20,000,000 to its qualified plans in 2017. The benefits paid from the non-qualified plans were $12,319,000, $10,082,000 and $8,615,000 in 2016, 2015 and 2014, 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). The amount for 2017 includes an estimate for possible lump sum payments associated with the aforementioned one time window offering.

2017	$ 59,475
2018	30,871
2019	34,839
2020	30,340
2021	33,919
2022-2026	158,224

Note 18 – Pension and Postretirement Benefits – (Continued)

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 values of the pension plan assets by asset category are shown below (in thousands):

	December 31, 2016			
	Total	Level 1	Level 2	Level 3
Asset Category				
U.S. states and political subdivision securities	$ 1,952	$ —	$ 1,952	$ —
Corporate debt securities	58,462	—	58,462	
Residential mortgage-backed securities	616	—	616	—
Mutual fund	9,405	9,405	—	—
Equity securities by sector				
Consumer goods	53,252	53,252	—	—
Energy and utilities	28,602	28,602	—	—
Finance	51,842	51,842	—	—
Healthcare	27,501	27,501	—	—
Industrials	17,035	17,035	—	—
Information technology	33,992	33,992	—	—
Other	30,042	30,042	—	—
Commercial paper	49,111	—	49,111	—
Unallocated group annuity contract	4,742	—	4,742	—
Other	679	592	87	—
Total	**$367,233**	**$252,263**	**$114,970**	**$ —**

	December 31, 2015			
	Total	Level 1	Level 2	Level 3
Asset Category				
Corporate debt securities	$ 41,365	$ —	$41,365	$ —
Residential mortgage-backed securities	803	—	803	—
Mutual fund	9,405	9,405	—	—
Equity securities by sector				
Consumer goods	50,485	50,485	—	—

Energy and utilities	22,525	22,525	—	—
Finance	47,469	47,469	—	—
Healthcare	2,306	2,306	—	—
Industrials	29,050	29,050	—	—
Information technology	16,522	16,522	—	—
Other	65,410	65,410	—	—
Commercial paper	30,511	—	30,511	—
Unallocated group annuity contract	5,763	—	5,763	—
Other	949	862	87	—
Total	**$322,563**	**$244,034**	**$78,529**	**$ —**

Note 18 – Pension and Postretirement Benefits – (Continued)

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 $6,197,000 and $6,055,000 at December 31, 2016 and 2015, respectively. These amounts were approximately equal to the unfunded accumulated postretirement benefit obligation.

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Note 19 – Commitments and Contingencies

Commitments

American National and its subsidiaries lease insurance sales office space in various cities. The remaining long-term lease commitments at December 31, 2016 were approximately $5,086,000.

American National had aggregate commitments at December 31, 2016, to purchase, expand or improve real estate, to fund fixed interest rate mortgage loans, and to purchase other invested assets of $787,077,000 of which $538,260,000 is expected to be funded in 2017 with the remainder funded in 2018 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, 2016 and 2015, the outstanding letters of credit were $9,473,000 and $9,501,000, respectively, and there were no borrowings on this facility. This facility expires on October 30, 2017. American National expects it will be renewed on substantially equivalent terms upon expiration.

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 the bank loan, American National would be obligated to pay off the loans. 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, 2016, was approximately $206,376,000, while the total cash value of the related life insurance policies was approximately $209,785,000.

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.

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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, accident and health insurance contracts, and legal services. The impact on the consolidated financial statements of significant related party transactions is shown below (in thousands):

Related Party	Financial Statement Line Impacted	Dollar Amount of Transactions Years ended December 31, 2016	Dollar Amount of Transactions Years ended December 31, 2015	Amount due to (from) American National December 31, 2016	Amount due to (from) American National December 31, 2015
Gal-Tex Hotel Corporation	Mortgage loan on real estate	$ 1,426	$ 1,326	$ 3,756	$ 5,182
Gal-Tex Hotel Corporation	Net investment income	329	428	23	31
Greer, Herz & Adams, LLP	Other operating expenses	9,315	7,951	(283)	(274)

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 Gal-Tex, which is collateralized by a hotel property in San Antonio, Texas. This loan is current as to principal and interest payments.

Transactions with Greer, Herz & Adams, LLP: Irwin M. Herz, Jr. is an American National advisory 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, 2016	March 31, 2015	June 30, 2016	June 30, 2015	September 30, 2016	September 30, 2015	December 31, 2016	December 31, 2015
Total premiums and other revenues	$764,970	$756,567	$800,448	$717,506	$823,142	$699,859	$839,391	$843,523
Total benefits, losses and expenses	741,462	665,208	760,168	668,099	775,420	653,199	751,724	762,261
Income before federal income tax and equity in earnings of unconsolidated affiliates	23,508	91,359	40,280	49,407	47,722	46,660	87,667	81,262
Total provision (benefit) for federal income taxes	(4,070)	45,690	9,890	15,210	22,590	18,134	45,300	24,686
Equity in earnings (losses) of unconsolidated affiliates	937	56,584	1,798	462	36,530	16,339	17,935	4,023
Net income	28,515	102,253	32,188	34,659	61,662	44,865	60,302	60,599
Net income (loss) attributable to noncontrolling interest	(801)	(729)	(437)	(394)	2,373	2,852	529	(2,341)
Net income attributable to American National	29,316	102,982	32,625	35,053	59,289	42,013	59,773	62,940
Earnings per share attributable to American National								
Basic	1.09	3.84	1.21	1.30	2.20	1.56	2.23	2.34
Diluted	1.09	3.82	1.21	1.30	2.20	1.56	2.21	2.34

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.

In connection with the preparation of this Form 10-K, the Company carried out an evaluation under the supervision of and with the participation of the Company's management, including the Chief Executive Officer and Chief Financial Officer, as of December 31, 2016, of the effectiveness of the design and operation of the Company's disclosure controls and procedures. Based upon this evaluation, the Chief Executive Officer and Chief Financial Officer concluded that as of December 31, 2016, the Company's disclosure controls and procedures were not effective because of the material weaknesses in the Company's internal controls described below.

The Company identified a control deficiency related to deferred income taxes in the first quarter of 2016 and at that time it was assessed as a significant deficiency. We developed a remediation plan at the time. We have designed and implemented certain new internal controls in an effort to remediate the material weaknesses described below, but there is not yet adequate evidence over a reasonable period of time to determine that new processes, procedures, controls and oversight relating to such new controls are effective. As a result, we concluded that the material weaknesses were not fully remediated as of December 31, 2016.

In light of the material weaknesses in internal control over financial reporting, we engaged significant internal and external resources to perform supplemental procedures prior to filing this Annual Report on Form 10-K. These additional procedures allow us to conclude that, notwithstanding the material weaknesses in our internal control over financial reporting, the consolidated financial statements included in this report fairly present, in all material respects, our financial position, results of operations and cash flows for the periods presented in conformity with accounting principles generally accepted in the United States of America.

No system of controls, no matter how well designed and operated, can provide absolute assurance that the objectives of the system of controls will be met, and no evaluation of controls can provide absolute assurance that all control deficiencies or material weaknesses have been or will be detected. As described above in Item 1A: Risk Factors, if the Company's remediation efforts do not prove effective and control deficiencies and material weaknesses persist or occur in the future, the accuracy and timing of our financial reporting may be adversely affected.

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 its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. In addition, projections of any evaluation 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.

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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, 2016, 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 not effective as of December 31, 2016, because of material weaknesses in our internal controls over deferred income taxes and over collateral relating to our use of equity option derivatives. A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of the annual or interim financial statements will not be prevented or detected on a timely basis.

- The Company did not have effective processes, procedures and controls over the measurement and presentation of deferred income taxes. Specifically, the Company did not have effective manual and automated controls over the completeness and accuracy of the underlying tax basis of certain assets and liabilities contained in the information technology system.
- The Company did not have effective processes, procedures and controls over the recognition and disclosure of the amount of the collateral posted by its equity option derivatives counterparties. Specifically, relevant investment contracts and their terms were not identified and communicated to the Accounting Department so that an analysis of the accounting implications could be completed.

The control deficiencies described above resulted in no misstatements in our consolidated financial statements as of and for the fiscal year ended December 31, 2016. However, immaterial revisions were made to certain balance sheet and statement of cash flows line items for prior years as described further in Note 2 to the notes to the consolidated financial statements. Moreover, these control deficiencies create a reasonable possibility that a material misstatement to our consolidated financial statements will not be prevented or detected on a timely basis. As a result, we concluded that the deficiencies represent material weaknesses in our internal control over financial reporting and that our internal control over financial reporting is not effective as of December 31, 2016.

Our independent registered public accounting firm, KPMG LLP, has expressed an adverse report on the operating effectiveness of our internal control over financial reporting. KPMG LLP's report appears on page 61 of this Form 10-K.

Remediation

The Company is committed to remediating the material weaknesses in a timely manner. We have begun the process of developing a remediation plan and executing changes in our financial reporting processes and related internal controls to address the material weaknesses in internal control over financial reporting described above. Specifically, we have begun and intend to continue to implement and monitor the following actions to accumulate adequate evidence over a reasonable period of time to determine that new or modified processes, procedures, controls and oversight relating to such controls are operating effectively.

Deferred Income Taxes

- Engaging tax advisors to assist with enhancing internal controls over financial reporting for income taxes and developing and implementing a remediation plan;
- Hiring accountants with more expertise in federal income taxes and providing additional income tax accounting training to tax and financial personnel;
- Working with the investing and operating areas to enhance the quality of information, analysis, review and documentation provided to the tax department; and
- Reviewing the new tax processes and system, including controls, with necessary Company personnel, including relevant internal bodies responsible for testing internal controls.

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Equity Option Derivatives Collateral

- Requiring notice of relevant facts from the investment area to Corporate Controllers when new investment arrangements or types are contemplated;
- In the event of any such new investment arrangements or types, requiring the Corporate Controllers area (with outside assistance when appropriate) to determine if existing accounting processes and policies are adequate and to specify new accounting processes as appropriate; and

- Verifying that the approved accounting is installed and operational by necessary Company personnel, including relevant internal bodies responsible for testing internal controls.

Changes in Internal Control over Financial Reporting

Except for the Company's identification and assessment of the material weaknesses described above, there were no changes in our internal control over financial reporting during our fourth fiscal quarter of 2016 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

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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, 2016.

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, 2016.

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, 2016.

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, 2016.

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, 2016.

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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 July 31, 2015).
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 (incorporated by reference to Exhibit No. 10.4 to the registrant's Registration Statement on Form 10-12B filed April 10, 2009).
10.4*	Form of Stock Appreciation Rights Agreement under the Stock and Incentive Plan (grants on or after May 3, 2010) (incorporated by reference to Exhibit No. 10.5 to the registrant's Annual Report on Form 10-K filed March 2, 2011).
10.5*	Form of Stock Appreciation Rights Agreement under the Stock and Incentive Plan (grants prior to May 3, 2010) (incorporated by reference to Exhibit No. 10.5 to the registrant's Registration Statement on Form 10-12B filed April 10, 2009).

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10.6*	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).
10.7*	Amendment to the American National Insurance Company Nonqualified Retirement Plan for Certain Salaried Employees (incorporated by reference to Exhibit No. 10.2 to the registra22nt's amended Current Report on Form 8-K/A filed on November 6, 2013).

10.8*	American National Insurance Company Nonqualified Retirement Plan (incorporated by reference to Exhibit No. 10.7 to the registrant's Registration Statement on Form 10-12B filed April 10, 2009).
10.9*	Amendment No. 4 to the American National Insurance Company Nonqualified Retirement Plan (incorporated by reference to Exhibit No. 10.8 to the registrant's Annual Report on Form 10-K filed March 2, 2011).
10.10*	Amendment No. 5 to the American National Insurance Company Nonqualified Retirement Plan (incorporated by reference to Exhibit No. 10.1 to the registrant's amended Current Report on Form 8-K/A filed on November 6, 2013).
10.11*	Form of Restricted Stock Unit Agreement for Officers under the Stock and Incentive Plan (grants on or after March 4, 2011)(incorporated by reference to Exhibit No. 10.1 to the registrant's Quarterly Report on Form 10-Q filed May 6, 2011).
10.12*	Form of Restricted Stock Unit Agreement for Directors under the Stock and Incentive Plan (incorporated by reference to Exhibit No. 10.2 to the registrant's Quarterly Report on Form 10-Q filed May 6, 2011).
10.13*	Form of Restricted Stock Unit Agreement for Officers under the Stock and Incentive Plan (grants prior to March 4, 2011)(incorporated by reference to Exhibit No. 10.9 to the registrant's Annual Report on Form 10-K filed March 2, 2011).
10.14*	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).
10.15*	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).
10.16*	Form of Restricted Stock Unit Agreement for Executive Officers under the American National Insurance Company Amended and Restated 1999 Stock and Incentive Plan (grants on or after March 1, 2015) (incorporated by reference to Exhibit No. 10.16 to the registrant's Quarterly Report on Form 10-Q filed on May 8, 2015).
10.17*	Form of Restricted Stock Unit Agreement for Directors under the American National Insurance Company Amended and Restated 1999 Stock and Incentive Plan (grants on or after March 1, 2015) (incorporated by reference to Exhibit No. 10.17 to the registrant's Quarterly Report on Form 10-Q filed on May 8, 2015).
21	Subsidiaries (filed herewith).
23	Consent of KPMG LLP (filed herewith).

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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, 2016 formatted in eXtensible Business Reporting Language ("XBRL"): (i) Consolidated Statements of Financial Position, (ii) Consolidated Statements of Operations, (iii) Consolidated Statements of Comprehensive Income (Loss), (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.

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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: *Chairman of the Board, President and Chief Executive Officer (Principal Executive Officer)*

Date: March 10, 2017

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	Chairman of the Board, President and Chief Executive Officer *(Principal Executive Officer)*	March 10, 2017
/s/ John J. Dunn, Jr. John J. Dunn, Jr.	Executive Vice President, Chief Financial Officer *(Principal Financial Officer)*	March 10, 2017
/s/ William F. Carlton William F. Carlton	Senior Vice President, Corporate Controller	March 10, 2017
/s/ William C. Ansell William C. Ansell	Director	March 10, 2017
/s/ Arthur O. Dummer Arthur O. Dummer	Director	March 10, 2017
/s/ Frances A. Moody-Dahlberg Frances A. Moody-Dahlberg	Director	March 10, 2017
/s/ Ross R. Moody Ross R. Moody	Director	March 10, 2017
/s/ James P. Payne James P. Payne	Director	March 10, 2017

/s/ E.J. Pederson	Director	March 10, 2017
E.J. Pederson		
	Director	March 10, 2017
/s/ James D. Yarbrough		
James D. Yarbrough		

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AMERICAN NATIONAL INSURANCE COMPANY AND SUBSIDIARIES
SCHEDULE I—SUMMARY OF INVESTMENTS—OTHER THAN INVESTMENTS IN RELATED PARTIES
(In thousands)

	December 31, 2016		
Type of Investment	Cost or Amortized Cost [1]	Estimated Fair Value	Amount at Which Shown in the Consolidated Statement of Financial Position
Fixed maturities			
Bonds held-to-maturity			
U.S. states and political subdivisions	$ 301,994	$ 319,082	$ 301,994
Foreign governments	4,057	4,716	4,057
Corporate debt securities	6,711,508	6,925,978	6,711,508
Residential mortgage-backed securities	229,758	242,685	229,758
Collateralized debt securities	1,290	1,354	1,290
Other debt securities	2,778	2,877	2,778
Bonds available-for-sale			
U.S.treasury and government	25,062	25,640	25,640
U.S. states and political subdivisions	945,431	960,223	960,223
Foreign governments	5,000	6,567	6,567
Corporate debt securities	4,666,096	4,780,763	4,780,763
Residential mortgage-backed securities	18,588	20,513	20,513
Collateralized debt securities	5,574	6,392	6,392
Other debt securities	3,233	3,178	3,178
Equity securities			
Common stocks			

Consumer goods	145,402	314,031	314,031
Energy and utilities	102,421	166,983	166,983
Finance	154,241	321,592	321,592
Healthcare	80,320	195,828	195,828
Industrials	46,533	138,631	138,631
Information technology	113,334	264,613	264,613
Other	70,848	116,837	116,837
Preferred stocks	19,334	23,161	23,161
Other Investments			
Mortgage loans on real estate, net of allowance	4,348,046	4,435,530	4,348,046
Investment real estate, net of accumulated depreciation	536,675	—	536,675
Real estate acquired in satisfaction of debt	56,742	—	56,742
Policy loans	384,376	384,376	384,376
Options	73,312	156,479	156,479
Other long-term investments	(42,929)	—	(42,929)
Short-term investments	192,226	192,226	192,226
Total investments	**$ 19,201,250**	**$20,010,255**	**$ 20,227,952**

(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.

See accompanying Report of Independent Registered Public Accounting Firm.

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AMERICAN NATIONAL INSURANCE COMPANY (Parent Company Only)
SCHEDULE II—CONDENSED FINANCIAL INFORMATION OF REGISTRANT
(In thousands)

Condensed Statements of Financial Position	December 31, 2016	December 31, 2015 (As Revised)
Assets		
Fixed maturity securities	$ 8,969,903	$ 9,341,563
Equity securities	4,585	2,690

Mortgage loans on real estate, net of allowance	4,190,357	3,386,231
Other invested assets	1,658,771	1,852,581
Investment in subsidiaries	2,646,281	2,431,398
Deferred policy acquisition costs	1,052,357	1,091,031
Separate account assets	941,612	918,446
Other assets	787,054	754,646
Total assets	**$20,250,920**	**$19,778,586**
Liabilities		
Policy liabilities	$ 4,027,973	$ 3,841,499
Policyholders' account balances	10,006,609	9,943,694
Separate account liabilities	941,612	918,446
Other liabilities	622,548	622,665
Total liabilities	**15,598,742**	**15,326,304**
Shareholders' equity		
Common stock	30,832	30,832
Additional paid-in capital	16,406	13,689
Accumulated other comprehensive income	455,899	352,620
Retained earnings	4,250,818	4,157,184
Treasury stock, at cost	(101,777)	(102,043)
Total stockholders' equity	**4,652,178**	**4,452,282**
Total liabilities and stockholders' equity	**$20,250,920**	**$19,778,586**

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.

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AMERICAN NATIONAL INSURANCE COMPANY (Parent Company Only)
SCHEDULE II—CONDENSED FINANCIAL INFORMATION OF REGISTRANT
(In thousands)

	Years ended December 31,

Condensed Statements of Operations	2016	2015	2014
Premiums and other revenues			
Premiums and other policy revenues	$ 987,994	$ 820,194	$ 786,823
Net investment income	713,589	672,093	772,355
Net realized investment gain	16,111	21,258	18,702
Other-than-temporary impairments	(10)	(60)	(41)
Other income	15,944	15,785	10,803
Total premiums and other revenues	**1,733,628**	**1,529,270**	**1,588,642**
Benefits, losses and expenses			
Policyholder benefits	749,179	615,180	574,975
Other operating expenses	848,063	764,913	812,762
Total benefits, losses and expenses	**1,597,242**	**1,380,093**	**1,387,737**
Income from continuing operations before federal income tax and equity in earnings of subsidiaries	**136,386**	**149,177**	**200,905**
Provision for federal income taxes	50,739	47,501	63,454
Equity in earnings of subsidiaries, net of tax	95,356	141,312	107,884
Net income	**$ 181,003**	**$ 242,988**	**$ 245,335**

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.

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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, 2016	2015 (As Revised)	2014 (As Revised)
OPERATING ACTIVITIES			
Net income	$ 181,003	$ 242,988	$ 245,335
Adjustments to reconcile net income to net cash provided by operating activities			
Net realized investments gains	(16,111)	(21,258)	(18,702)

Other-than-temporary impairments	10	60	41
Amortization (accretion) of premiums, discounts and loan origination fees	(7,675)	(2,293)	3,581
Net capitalized interest on policy loans and mortgage loans	(28,943)	(27,346)	(27,922)
Depreciation	28,510	24,716	21,822
Interest credited to policyholders' account balances	297,526	263,362	324,325
Charges to policyholders' account balances	(295,000)	(238,169)	(212,690)
Deferred federal income tax (benefit) expense	89,089	8,091	16,429
Net income of subsidiaries	(122,259)	(135,678)	(106,751)
Equity in (earnings) losses of affiliates	(5,985)	(5,634)	3,800
Distributions from equity method investments	—	—	408
Changes in			
Accrued investment income	351	6,995	9,801
Reinsurance recoverables	11,545	(14,778)	2,312
Prepaid reinsurance premiums	88	3,050	2,318
Premiums due and other receivables	(8,427)	2,331	3,873
Deferred policy acquisition costs	8,684	(13,323)	7,560
Policyholder liabilities	186,472	222,928	152,923
Liability for retirement benefits	(29,678)	(23,263)	(12,552)
Current tax receivable/payable	(24,833)	7,551	8,181
Other, net	(42,758)	(20,471)	(29,831)
Net cash provided by operating activities	221,609	279,859	394,261
INVESTING ACTIVITIES			
Proceeds from sale/maturity/prepayment of			
Held-to-maturity securities	382,390	827,234	452,846
Available for sale securities	282,834	340,274	625,563
Investment real estate	6,651	18,929	53,859
Mortgage loans	547,553	809,742	578,098
Policy loans	49,260	44,257	45,732
Other invested assets	28,155	71,469	40,791
Disposals of property and equipment	13,171	2,721	43,869
Distributions from affiliates and subsidiaries	9,909	15,958	439

Payment for the purchase/origination of			
Held-to-maturity securities	(60,639)	(336,902)	(287,694)
Available for sale securities	(161,534)	(744,480)	(572,299)
Investment real estate	(31,234)	(69,145)	(23,959)
Mortgage loans	(1,327,395)	(933,879)	(633,401)
Policy loans	(21,526)	(21,106)	(23,621)
Other invested assets	(65,965)	(37,958)	(43,423)
Additions to property and equipment	(39,856)	(24,352)	(56,651)
Contributions to unconsolidated affiliates	(40,404)	(47,130)	(1,035)
Change in short-term investments	207,546	(42,258)	4,518
Change in investment in subsidiaries	20,044	(20,782)	—
Change in collateral held for derivatives	22,789	(65,160)	22,724
Other, net	17,167	(1,713)	36,302
Net cash provided by (used in) investing activities	(161,084)	(214,281)	262,658
FINANCING ACTIVITIES			
Policyholders' account deposits	1,287,366	1,280,756	941,400
Policyholders' account withdrawals	(1,229,039)	(1,337,668)	(1,479,004)
Dividends to stockholders	(87,741)	(84,446)	(82,805)
Net cash used in financing activities	(29,414)	(141,358)	(620,409)
NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS	31,111	(75,780)	36,510
Beginning of the period	160,229	236,009	199,499
End of the period	$ 191,340	$ 160,229	$ 236,009

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.

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Index to Financial Statements

AMERICAN NATIONAL INSURANCE COMPANY AND SUBSIDIARIES
SCHEDULE III—SUPPLEMENTARY INSURANCE INFORMATION
(In thousands)

	Future Policy

Segment	Deferred Policy Acquisition Cost	Benefits, Policyholders' Account Balances, Benefits, 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
2016									
Life	$ 745,840	$ 4,937,467	$ 35,133	$ 318,953	$ 227,923	$ 416,467	$ 112,712	$ 199,769	$ —
Annuity	394,208	10,821,889	—	248,714	500,726	294,917	71,381	53,054	—
Health	40,620	272,802	43,155	175,589	9,942	131,828	14,973	43,263	—
Property & Casualty	113,775	935,998	745,650	1,253,392	57,091	883,219	262,299	165,509	1,282,876
Corporate & Other	—	—	—	—	64,553	—	—	41,864	—
Total	**$ 1,294,443**	**$ 16,968,156**	**$ 823,938**	**$1,996,648**	**$ 860,235**	**$ 1,726,431**	**$ 461,365**	**$ 503,459**	**$1,282,876**
2015									
Life	$ 756,023	$ 4,860,263	$ 35,810	$ 305,350	$ 226,076	$ 386,785	$ 77,567	$ 201,112	$ —
Annuity	411,206	10,410,157	—	183,125	459,458	230,221	81,793	54,037	—
Health	44,390	293,325	43,558	196,777	10,135	146,805	23,643	45,047	—
Property & Casualty	113,050	883,328	733,610	1,153,267	55,620	776,562	235,585	156,583	1,187,980
Corporate & Other	—	—	—	—	83,542	—	—	44,598	—
Total	**$ 1,324,669**	**$ 16,447,073**	**$ 812,978**	**$1,838,519**	**$ 834,831**	**$ 1,540,373**	**$ 418,588**	**$ 501,377**	**$1,187,980**
2014									
Life	$ 711,469	$ 4,720,075	$ 35,524	$ 307,771	$ 232,389	$ 351,271	$ 78,181	$ 194,927	$ —
Annuity	382,441	10,286,205	—	190,357	545,887	234,173	79,135	56,487	—
Health	47,784	316,684	46,137	216,868	11,692	144,799	18,966	43,261	—
Property & Casualty	111,850	883,148	673,390	1,100,975	58,843	745,540	223,658	130,655	1,109,029
Corporate & Other	—	—	—	—	84,047	—	—	60,535	—
Total	**$ 1,253,544**	**$ 16,206,112**	**$ 755,051**	**$1,815,971**	**$ 932,858**	**$ 1,475,783**	**$ 399,940**	**$ 485,865**	**$1,109,029**

(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
Year 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
Accident and 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**
Year Ended December 31, 2015					
Life insurance in-force	$90,194,532	$29,891,183	$ 120	$60,303,469	0.0
Premiums earned					
Life and annuity	$ 590,131	$ 101,636	$ (20)	$ 488,475	0.0
Accident and health	241,140	224,623	180,260	196,777	91.6
Property and casualty	1,238,163	93,024	8,128	1,153,267	0.7
Total premiums	**$ 2,069,434**	**$ 419,283**	**$ 188,368**	**$ 1,838,519**	**10.2**
Year Ended December 31, 2014					
Life insurance in-force	$85,570,057	$30,007,131	$ 6,007	$55,568,933	0.0
Premiums earned					
Life and annuity	$ 594,568	$ 96,577	$ 137	$ 498,128	0.0
Accident and health	271,004	274,368	220,232	216,868	101.6
Property and casualty	1,183,875	89,607	6,707	1,100,975	0.6
Total premiums	**$ 2,049,447**	**$ 460,552**	**$ 227,076**	**$ 1,815,971**	**12.5%**

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 Expense	Written off	Change in Estimate	Balance at End of Period

2016					
Investment valuation allowances:					
Mortgage loans on real estate	$ 12,895	$ 1,281	$ (1,686)	$ —	$ 12,490
2015					
Investment valuation allowances:					
Mortgage loans on real estate	$ 17,860	$ 220	$ (5,185)	$ —	$ 12,895
2014					
Investment valuation allowances:					
Mortgage loans on real estate	$ 12,181	$ 5,679	$ —	$ —	$ 17,860

See accompanying Report of Independent Registered Public Accounting Firm.

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LIFE AND ACCIDENT AND HEALTH COMPANIES - ASSOCIATION EDITION

QUARTERLY STATEMENT

AS OF MARCH 31, 2018

OF THE CONDITION AND AFFAIRS OF THE

American National Insurance Company

NAIC Group Code 0408 (Current) 0408 (Prior) NAIC Company Code 60739 Employer's ID Number 74-0484030

Organized under the Laws of Texas, State of Domicile or Port of Entry TX

Country of Domicile United States of America

Incorporated/Organized 03/01/1905 Commenced Business 03/17/1905

Statutory Home Office One Moody Plaza (Street and Number), Galveston , TX, US 77550 (City or Town, State, Country and Zip Code)

Main Administrative Office One Moody Plaza (Street and Number)
Galveston , TX, US 77550 (City or Town, State, Country and Zip Code), 409-763-4661 (Area Code) (Telephone Number)

Mail Address One Moody Plaza (Street and Number or P.O. Box), Galveston , TX, US 77550 (City or Town, State, Country and Zip Code)

Primary Location of Books and Records One Moody Plaza (Street and Number)
Galveston , TX, US 77550 (City or Town, State, Country and Zip Code), 409-766-6027 (Area Code) (Telephone Number)

Internet Website Address www.americannational.com

Statutory Statement Contact Shawn David Benoit (Name), 409-766-6027 (Area Code) (Telephone Number)
StatutoryComp@AmericanNational.com (E-mail Address), 409-766-6936 (FAX Number)

OFFICERS

Chairman of the Board
Ross Rankin Moody

President & Chief Executive Officer: James Edward Pozzi
Vice President & Controller: Michelle Annette Gage
Secretary: John Mark Flippin
Senior Vice President & Actuary: Sara Liane Latham

OTHER

David Alan Behrens, Executive Vice President
Johnny David Johnson, Executive Vice President
James Walter Pangburn, Executive Vice President
John Frederick Simon, Executive Vice President & Chief Actuary
Shannon Lee Smith, Executive Vice President
Hoyt James Strickland Jr., Executive Vice President
Timothy Allen Walsh, Executive Vice President & Chief Financial Officer

Dwain Allen Akins, Senior Vice President
Michele Mackay Bartkowski, Senior Vice President
Scott Frank Brast, Senior Vice President
Brian Neil Bright, Senior Vice President
Scott Christopher Campbell, Senior Vice President
Lee Chadwick Ferrel, Senior Vice President
Bernard Stephen Gerwel, Senior Vice President
Deborah Kay Janson, Senior Vice President
Anne Marie LeMire, Senior Vice President
Bruce Murray LePard, Senior Vice President
Bradley Wayne Manning, Senior Vice President
Michael Scott Marquis, Senior Vice President
Meredith Myron Mitchell, Senior Vice President
Edward Bruce Pavelka, Senior Vice President
Ronald Clark Price, Senior Vice President
Wayne Allen Smith, Senior Vice President
James Patrick Stelling, Senior Vice President
John Frank White, Senior Vice President

Tracy Leigh Milina, Vice President
Michael Scott Nimmons, Vice President
Deanna Denise Snedden, Vice President
Clarence Ellsworth Tipton, Vice President & Senior Chief Health Actuary
William Henry Watson III, Vice President & Chief Health Actuary
Larry Edward Linares, Assistant Vice President

DIRECTORS OR TRUSTEES

William Crane Ansell
Arthur Oleen Dummer
Ross Rankin Moody
Frances Anne Moody-Dahlberg
James Parker Payne
Elvin Jerome Pederson
James Edward Pozzi
James Daniel Yarbrough

State of Texas SS:
County of Galveston

The officers of this reporting entity being duly sworn, each depose and say that they are the described officers of said reporting entity, and that on the reporting period stated above, all of the herein described assets were the absolute property of the said reporting entity, free and clear from any liens or claims thereon, except as herein stated, and that this statement, together with related exhibits, schedules and explanations therein contained, annexed or referred to, is a full and true statement of all the assets and liabilities and of the condition and affairs of the said reporting entity as of the reporting period stated above, and of its income and deductions therefrom for the period ended, and have been completed in accordance with the NAIC Annual Statement Instructions and Accounting Practices and Procedures manual except to the extent that: (1) state law may differ; or, (2) that state rules or regulations require differences in reporting not related to accounting practices and procedures, according to the best of their information, knowledge and belief, respectively. Furthermore, the scope of this attestation by the described officers also includes the related corresponding electronic filing with the NAIC, when required, that is an exact copy (except for formatting differences due to electronic filing) of the enclosed statement. The electronic filing may be requested by various regulators in lieu of or in addition to the enclosed statement.

James Edward Pozzi	John Mark Flippin	Michelle Annette Gage
President & Chief Executive Officer	Secretary	Vice President & Controller

Subscribed and sworn to before me this
_____ day of _____

a. Is this an original filing? ..... Yes [X] No [ ]
b. If no,
1. State the amendment number .....
2. Date filed .....
3. Number of pages attached .....

ASSETS

		Current Statement Date			4
		1	2	3	December 31
		Assets	Nonadmitted Assets	Net Admitted Assets (Cols. 1 - 2)	Prior Year Net Admitted Assets
1.	Bonds	9,386,772,562		9,386,772,562	8,967,821,147
2.	Stocks:				
	2.1 Preferred stocks	4,500,000		4,500,000	4,500,000
	2.2 Common stocks	2,687,068,850	990,915	2,686,077,935	2,687,854,904
3.	Mortgage loans on real estate:				
	3.1 First liens	4,705,701,745		4,705,701,745	4,548,347,259
	3.2 Other than first liens				
4.	Real estate:				
	4.1 Properties occupied by the company (less $ encumbrances)	24,744,856		24,744,856	24,432,400
	4.2 Properties held for the production of income (less $ encumbrances)	308,023,752		308,023,752	300,674,808
	4.3 Properties held for sale (less $ encumbrances)				
5.	Cash ($ (33,454,097)), cash equivalents ($ 441,931,818) and short-term investments ($ 4,399,974)	412,877,695		412,877,695	796,638,007
6.	Contract loans (including $ 299,799 premium notes)	324,353,146	1,454,991	322,898,155	324,208,763
7.	Derivatives	197,640,431		197,640,431	212,993,079
8.	Other invested assets	893,647,438		893,647,438	883,278,117
9.	Receivables for securities	642,187		642,187	11,764,060
10.	Securities lending reinvested collateral assets				
11.	Aggregate write-ins for invested assets				
12.	Subtotals, cash and invested assets (Lines 1 to 11)	18,945,972,662	2,445,906	18,943,526,756	18,762,512,544
13.	Title plants less $ charged off (for Title insurers only)				
14.	Investment income due and accrued	145,985,868		145,985,868	139,312,118
15.	Premiums and considerations:				
	15.1 Uncollected premiums and agents' balances in the course of collection	2,930,671	239,985	2,690,686	9,023,028
	15.2 Deferred premiums, agents' balances and installments booked but deferred and not yet due (including $ earned but unbilled premiums)	127,022,624		127,022,624	125,954,652
	15.3 Accrued retrospective premiums ($) and contracts subject to redetermination ($)				
16.	Reinsurance:				
	16.1 Amounts recoverable from reinsurers	18,403,137		18,403,137	4,561,461
	16.2 Funds held by or deposited with reinsured companies	9,983,808		9,983,808	8,952,465
	16.3 Other amounts receivable under reinsurance contracts	3,155,852		3,155,852	2,939,344
17.	Amounts receivable relating to uninsured plans				
18.1	Current federal and foreign income tax recoverable and interest thereon				8,216,472
18.2	Net deferred tax asset	109,581,649	81,715,759	27,865,890	43,246,092
19.	Guaranty funds receivable or on deposit	2,480,092		2,480,092	2,493,805
20.	Electronic data processing equipment and software	37,160,489	31,339,112	5,821,377	9,353,581
21.	Furniture and equipment, including health care delivery assets ($)	1,023,869	1,023,869		
22.	Net adjustment in assets and liabilities due to foreign exchange rates				
23.	Receivables from parent, subsidiaries and affiliates	24,405,296		24,405,296	24,003,223
24.	Health care ($) and other amounts receivable	18,504,016	18,504,016		
25.	Aggregate write-ins for other than invested assets	56,126,488	26,785,490	29,340,998	36,237,971
26.	Total assets excluding Separate Accounts, Segregated Accounts and Protected Cell Accounts (Lines 12 to 25)	19,502,736,521	162,054,137	19,340,682,384	19,176,806,756
27.	From Separate Accounts, Segregated Accounts and Protected Cell Accounts	939,605,425		939,605,425	969,764,169
28.	Total (Lines 26 and 27)	20,442,341,946	162,054,137	20,280,287,809	20,146,570,925
	DETAILS OF WRITE-INS				
1101.					
1102.					
1103.					
1198.	Summary of remaining write-ins for Line 11 from overflow page				
1199.	Totals (Lines 1101 through 1103 plus 1198)(Line 11 above)				
2501.	Miscellaneous Receivables	17,040,598	1,751,242	15,289,356	21,699,283
2502.	Credit Insurance Recoverable	12,633,909		12,633,909	12,966,532
2503.	MGU Fee Income	732,522		732,522	657,482
2598.	Summary of remaining write-ins for Line 25 from overflow page	25,719,459	25,034,248	685,211	914,674
2599.	Totals (Lines 2501 through 2503 plus 2598)(Line 25 above)	56,126,488	26,785,490	29,340,998	36,237,971

LIABILITIES, SURPLUS AND OTHER FUNDS

		1 Current Statement Date	2 December 31 Prior Year
1.	Aggregate reserve for life contracts $ 14,093,358,718 less $ included in Line 6.3 (including $ Modco Reserve)	14,093,358,718	13,876,841,536
2.	Aggregate reserve for accident and health contracts (including $ Modco Reserve)	46,921,267	47,084,259
3.	Liability for deposit-type contracts (including $ Modco Reserve)	544,592,907	549,051,440
4.	Contract claims:		
	4.1 Life	126,724,181	132,917,795
	4.2 Accident and health	17,117,431	17,401,381
5.	Policyholders' dividends $ 26,242 and coupons $ due and unpaid	26,242	28,245
6.	Provision for policyholders' dividends and coupons payable in following calendar year - estimated amounts:		
	6.1 Dividends apportioned for payment (including $ Modco)	1,083,628	941,514
	6.2 Dividends not yet apportioned (including $ Modco)		
	6.3 Coupons and similar benefits (including $ Modco)		
7.	Amount provisionally held for deferred dividend policies not included in Line 6		
8.	Premiums and annuity considerations for life and accident and health contracts received in advance less $ discount; including $ 147,091 accident and health premiums	1,430,615	1,045,018
9.	Contract liabilities not included elsewhere:		
	9.1 Surrender values on canceled contracts		
	9.2 Provision for experience rating refunds, including the liability of $ accident and health experience rating refunds of which $ is for medical loss ratio rebate per the Public Health Service Act		
	9.3 Other amounts payable on reinsurance, including $ 648,997 assumed and $ 6,927,564 ceded	7,576,561	7,484,390
	9.4 Interest Maintenance Reserve	6,673,651	7,537,728
10.	Commissions to agents due or accrued-life and annuity contracts $ 7,971,089 , accident and health $ 2,460,541 and deposit-type contract funds $	10,431,630	10,391,683
11.	Commissions and expense allowances payable on reinsurance assumed	2,456,156	2,316,932
12.	General expenses due or accrued	42,341,819	53,829,862
13.	Transfers to Separate Accounts due or accrued (net) (including $ accrued for expense allowances recognized in reserves, net of reinsured allowances)	(1,781,570)	(2,962,917)
14.	Taxes, licenses and fees due or accrued, excluding federal income taxes	4,702,208	9,358,448
15.1	Current federal and foreign income taxes, including $ 14,937,794 on realized capital gains (losses)	44,453,611	4,609,604
15.2	Net deferred tax liability		
16.	Unearned investment income	139,559	167,685
17.	Amounts withheld or retained by company as agent or trustee	48,779,470	48,322,480
18.	Amounts held for agents' account, including $ 2,344,367 agents' credit balances	2,344,367	2,346,393
19.	Remittances and items not allocated	39,977,319	31,589,169
20.	Net adjustment in assets and liabilities due to foreign exchange rates		
21.	Liability for benefits for employees and agents if not included above	2,472,621	2,535,621
22.	Borrowed money $ and interest thereon $		
23.	Dividends to stockholders declared and unpaid		
24.	Miscellaneous liabilities:		
	24.01 Asset valuation reserve	526,647,210	536,389,265
	24.02 Reinsurance in unauthorized and certified ($) companies	23,454,041	24,452,863
	24.03 Funds held under reinsurance treaties with unauthorized and certified ($) reinsurers		
	24.04 Payable to parent, subsidiaries and affiliates	10,360,830	9,500,928
	24.05 Drafts outstanding		
	24.06 Liability for amounts held under uninsured plans		
	24.07 Funds held under coinsurance	2,636,679	2,792,230
	24.08 Derivatives		
	24.09 Payable for securities	7,141,467	320,500
	24.10 Payable for securities lending		
	24.11 Capital notes $ and interest thereon $		
25.	Aggregate write-ins for liabilities	484,351,703	507,039,166
26.	Total liabilities excluding Separate Accounts business (Lines 1 to 25)	16,096,414,321	15,883,333,218
27.	From Separate Accounts Statement	939,605,425	969,764,169
28.	Total liabilities (Lines 26 and 27)	17,036,019,746	16,853,097,387
29.	Common capital stock	30,832,449	30,832,449
30.	Preferred capital stock		
31.	Aggregate write-ins for other than special surplus funds		
32.	Surplus notes		
33.	Gross paid in and contributed surplus	40,354,564	39,679,451
34.	Aggregate write-ins for special surplus funds	(460,504)	(661,407)
35.	Unassigned funds (surplus)	3,275,087,096	3,325,238,613
36.	Less treasury stock, at cost:		
	36.1 3,894,108 shares common (value included in Line 29 $ 3,894,108)	101,545,542	101,615,568
	36.2 shares preferred (value included in Line 30 $)		
37.	Surplus (Total Lines 31+32+33+34+35-36) (including $ in Separate Accounts Statement)	3,213,435,614	3,262,641,089
38.	Totals of Lines 29, 30 and 37	3,244,268,063	3,293,473,538
39.	Totals of Lines 28 and 38 (Page 2, Line 28, Col. 3)	20,280,287,809	20,146,570,925
	DETAILS OF WRITE-INS		
2501.	Restricted options collateral	193,129,208	214,029,250
2502.	Property and casualty reinsurance liabilities	158,777,336	156,985,725
2503.	Delayed FIT	59,930,541	59,930,541
2598.	Summary of remaining write-ins for Line 25 from overflow page	72,514,618	76,093,650
2599.	Totals (Lines 2501 through 2503 plus 2598)(Line 25 above)	484,351,703	507,039,166
3101.			
3102.			
3103.			
3198.	Summary of remaining write-ins for Line 31 from overflow page		
3199.	Totals (Lines 3101 through 3103 plus 3198)(Line 31 above)		
3401.	Unearned restricted stock	(460,504)	(661,407)
3402.			
3403.			
3498.	Summary of remaining write-ins for Line 34 from overflow page		
3499.	Totals (Lines 3401 through 3403 plus 3498)(Line 34 above)	(460,504)	(661,407)

SUMMARY OF OPERATIONS

		1 Current Year To Date	2 Prior Year To Date	3 Prior Year Ended December 31
1.	Premiums and annuity considerations for life and accident and health contracts	521,926,239	411,177,472	2,131,327,094
2.	Considerations for supplementary contracts with life contingencies	399,518	841,749	752,732
3.	Net investment income	182,176,699	170,406,798	727,219,402
4.	Amortization of Interest Maintenance Reserve (IMR)	888,067	1,616,623	5,431,012
5.	Separate Accounts net gain from operations excluding unrealized gains or losses			
6.	Commissions and expense allowances on reinsurance ceded	7,423,619	8,009,573	34,718,193
7.	Reserve adjustments on reinsurance ceded			
8.	Miscellaneous Income:			
	8.1 Income from fees associated with investment management, administration and contract guarantees from Separate Accounts	3,668,121	5,353,782	16,699,932
	8.2 Charges and fees for deposit-type contracts			
	8.3 Aggregate write-ins for miscellaneous income	42,454,109	46,747,926	178,792,333
9.	Totals (Lines 1 to 8.3)	758,936,372	644,153,923	3,094,940,698
10.	Death benefits	66,173,665	53,934,873	223,113,992
11.	Matured endowments (excluding guaranteed annual pure endowments)	867,010	898,280	3,043,568
12.	Annuity benefits	118,536,606	109,023,922	447,176,589
13.	Disability benefits and benefits under accident and health contracts	6,474,584	5,536,050	24,511,207
14.	Coupons, guaranteed annual pure endowments and similar benefits	4,243	5,569	41,827
15.	Surrender benefits and withdrawals for life contracts	197,492,155	243,518,551	909,643,003
16.	Group conversions			
17.	Interest and adjustments on contract or deposit-type contract funds	3,200,093	3,344,201	13,144,252
18.	Payments on supplementary contracts with life contingencies	33,741	38,626	156,454
19.	Increase in aggregate reserves for life and accident and health contracts	216,356,018	103,514,217	887,787,329
20.	Totals (Lines 10 to 19)	609,138,115	519,814,289	2,508,618,221
21.	Commissions on premiums, annuity considerations, and deposit-type contract funds (direct business only)	69,266,384	53,388,988	250,825,942
22.	Commissions and expense allowances on reinsurance assumed	5,305,232	5,503,621	25,658,132
23.	General insurance expenses	58,757,202	60,042,514	242,494,913
24.	Insurance taxes, licenses and fees, excluding federal income taxes	9,629,270	8,641,532	30,890,451
25.	Increase in loading on deferred and uncollected premiums	478,399	559,803	(2,390,689)
26.	Net transfers to or (from) Separate Accounts net of reinsurance	(19,260,710)	(33,608,793)	(96,128,638)
27.	Aggregate write-ins for deductions	39,638,614	40,123,894	161,274,680
28.	Totals (Lines 20 to 27)	772,952,506	654,465,848	3,121,243,012
29.	Net gain from operations before dividends to policyholders and federal income taxes (Line 9 minus Line 28)	(14,016,134)	(10,311,925)	(26,302,314)
30.	Dividends to policyholders	374,111	266,713	968,005
31.	Net gain from operations after dividends to policyholders and before federal income taxes (Line 29 minus Line 30)	(14,390,245)	(10,578,638)	(27,270,319)
32.	Federal and foreign income taxes incurred (excluding tax on capital gains)	(3,614,355)	(7,780,837)	(22,690,130)
33.	Net gain from operations after dividends to policyholders and federal income taxes and before realized capital gains or (losses) (Line 31 minus Line 32)	(10,775,890)	(2,797,801)	(4,580,189)
34.	Net realized capital gains (losses) (excluding gains (losses) transferred to the IMR) less capital gains tax of $ 1,948,582 (excluding taxes of $ 6,377 transferred to the IMR)	7,516,958	(2,231,024)	24,676,735
35.	Net income (Line 33 plus Line 34)	(3,258,932)	(5,028,825)	20,096,546
	CAPITAL AND SURPLUS ACCOUNT			
36.	Capital and surplus, December 31, prior year	3,293,473,538	2,985,908,901	2,985,908,901
37.	Net income (Line 35)	(3,258,932)	(5,028,825)	20,096,546
38.	Change in net unrealized capital gains (losses) less capital gains tax of $ 4,803,862	(20,795,234)	57,892,592	419,080,644
39.	Change in net unrealized foreign exchange capital gain (loss)			
40.	Change in net deferred income tax	1,584,102	1,414,967	(65,035,876)
41.	Change in nonadmitted assets	(17,198,406)	11,337,914	47,324,667
42.	Change in liability for reinsurance in unauthorized and certified companies	998,822	(95,023)	(3,227,176)
43.	Change in reserve on account of change in valuation basis, (increase) or decrease			
44.	Change in asset valuation reserve	9,742,055	(15,925,896)	(57,895,001)
45.	Change in treasury stock	70,026	182,326	161,502
46.	Surplus (contributed to) withdrawn from Separate Accounts during period			
47.	Other changes in surplus in Separate Accounts Statement			
48.	Change in surplus notes			
49.	Cumulative effect of changes in accounting principles			
50.	Capital changes:			
	50.1 Paid in			
	50.2 Transferred from surplus (Stock Dividend)			
	50.3 Transferred to surplus			
51.	Surplus adjustment:			
	51.1 Paid in	675,113	1,377,935	1,963,323
	51.2 Transferred to capital (Stock Dividend)			
	51.3 Transferred from capital			
	51.4 Change in surplus as a result of reinsurance			
52.	Dividends to stockholders	(22,089,440)	(22,080,234)	(88,332,669)
53.	Aggregate write-ins for gains and losses in surplus	1,066,419	(1,714,772)	33,428,677
54.	Net change in capital and surplus for the year (Lines 37 through 53)	(49,205,475)	27,360,984	307,564,637
55.	Capital and surplus, as of statement date (Lines 36 + 54)	3,244,268,063	3,013,269,885	3,293,473,538
	DETAILS OF WRITE-INS			
08.301.	Property and Casualty Reinsurance Income	38,262,374	42,675,265	161,580,128
08.302.	Retention Fees Collected	1,527,857	1,522,857	6,757,408
08.303.	Group Reinsurance Fee Income	1,444,395	1,515,300	6,426,278
08.398.	Summary of remaining write-ins for Line 8.3 from overflow page	1,219,483	1,034,504	4,028,519
08.399.	Totals (Lines 08.301 through 08.303 plus 08.398) (Line 8.3 above)	42,454,109	46,747,926	178,792,333
2701.	Property and Casualty Reinsurance Expenses	39,671,013	40,248,864	161,363,866
2702.	Fines and Penalties to Regulatory Authorities	(32,399)	(124,970)	(89,186)
2703.				
2798.	Summary of remaining write-ins for Line 27 from overflow page			
2799.	Totals (Lines 2701 through 2703 plus 2798)(Line 27 above)	39,638,614	40,123,894	161,274,680
5301.	Change in Minimum Pension Liability	1,364,054	1,333,794	13,574,599
5302.	Change in unearned restricted stock	200,902	207,332	823,415
5303.	Prior period adjustment to life deficiency reserves			13,446,273
5398.	Summary of remaining write-ins for Line 53 from overflow page	(498,537)	(3,255,898)	5,584,390
5399.	Totals (Lines 5301 through 5303 plus 5398)(Line 53 above)	1,066,419	(1,714,772)	33,428,677

CASH FLOW

		1 Current Year To Date	2 Prior Year To Date	3 Prior Year Ended December 31
	Cash from Operations			
1.	Premiums collected net of reinsurance	527,444,289	412,035,736	2,124,660,661
2.	Net investment income	172,817,668	163,315,422	695,237,604
3.	Miscellaneous income	48,881,824	55,807,064	209,366,310
4.	Total (Lines 1 to 3)	749,143,781	631,158,222	3,029,264,575
5.	Benefit and loss related payments	408,303,486	412,688,852	1,607,685,158
6.	Net transfers to Separate Accounts, Segregated Accounts and Protected Cell Accounts	(22,928,831)	(38,962,575)	(112,828,570)
7.	Commissions, expenses paid and aggregate write-ins for deductions	188,795,569	181,878,880	719,005,075
8.	Dividends paid to policyholders	234,000	217,582	985,884
9.	Federal and foreign income taxes paid (recovered) net of $ 1,954,959 tax on capital gains (losses)	(49,711,326)	10,940,694	(10,619,848)
10.	Total (Lines 5 through 9)	524,692,898	566,763,433	2,204,227,699
11.	Net cash from operations (Line 4 minus Line 10)	224,450,883	64,394,789	825,036,876
	Cash from Investments			
12.	Proceeds from investments sold, matured or repaid:			
	12.1 Bonds	209,489,450	285,673,503	1,166,954,654
	12.2 Stocks			5,635,169
	12.3 Mortgage loans	86,033,372	102,884,826	792,534,327
	12.4 Real estate		3,661,753	56,422,843
	12.5 Other invested assets	29,804,134	27,193,963	209,605,490
	12.6 Net gains or (losses) on cash, cash equivalents and short-term investments	(13,995)		(6,670)
	12.7 Miscellaneous proceeds		24,423,104	76,612,128
	12.8 Total investment proceeds (Lines 12.1 to 12.7)	325,312,961	443,837,149	2,307,757,941
13.	Cost of investments acquired (long-term only):			
	13.1 Bonds	628,792,734	70,834,775	1,282,238,442
	13.2 Stocks	(9,648)		5,420,367
	13.3 Mortgage loans	240,797,567	206,230,086	1,112,833,977
	13.4 Real estate	12,360,066	8,746,268	29,273,918
	13.5 Other invested assets	39,766,758	19,825,456	116,395,923
	13.6 Miscellaneous applications	839,911	8,843,150	
	13.7 Total investments acquired (Lines 13.1 to 13.6)	922,547,388	314,479,735	2,546,162,627
14.	Net increase (or decrease) in contract loans and premium notes	(6,160,147)	(5,010,430)	(22,832,509)
15.	Net cash from investments (Line 12.8 minus Line 13.7 and Line 14)	(591,074,280)	134,367,844	(215,572,177)
	Cash from Financing and Miscellaneous Sources			
16.	Cash provided (applied):			
	16.1 Surplus notes, capital notes			
	16.2 Capital and paid in surplus, less treasury stock	946,041	1,767,592	2,948,240
	16.3 Borrowed funds			
	16.4 Net deposits on deposit-type contracts and other insurance liabilities	(7,658,627)	(2,716,838)	(13,850,096)
	16.5 Dividends to stockholders	22,089,440	22,080,234	88,332,669
	16.6 Other cash provided (applied)	11,665,111	23,050,882	24,575,582
17.	Net cash from financing and miscellaneous sources (Line 16.1 through Line 16.4 minus Line 16.5 plus Line 16.6)	(17,136,915)	21,402	(74,658,943)
	RECONCILIATION OF CASH, CASH EQUIVALENTS AND SHORT-TERM INVESTMENTS			
18.	Net change in cash, cash equivalents and short-term investments (Line 11, plus Lines 15 and 17)	(383,760,312)	198,784,035	534,805,756
19.	Cash, cash equivalents and short-term investments:			
	19.1 Beginning of year	796,638,007	261,832,251	261,832,251
	19.2 End of period (Line 18 plus Line 19.1)	412,877,695	460,616,286	796,638,007

Note: Supplemental disclosures of cash flow information for non-cash transactions:

EXHIBIT 1

DIRECT PREMIUMS AND DEPOSIT-TYPE CONTRACTS

		1 Current Year To Date	2 Prior Year To Date	3 Prior Year Ended December 31
1.	Industrial life	17,185	19,882	69,538
2.	Ordinary life insurance	154,850,074	146,539,835	607,110,361
3.	Ordinary individual annuities	348,227,891	216,213,225	1,279,415,145
4.	Credit life (group and individual)	6,155,286	6,531,389	27,144,959
5.	Group life insurance	8,318,375	8,250,955	26,990,940
6.	Group annuities	22,790,918	51,335,679	245,994,556
7.	A & H - group	2,443,988	2,014,149	7,631,154
8.	A & H - credit (group and individual)	5,362,537	6,116,125	24,753,355
9.	A & H - other	2,028,053	2,123,165	8,427,703
10.	Aggregate of all other lines of business			
11.	Subtotal	550,194,307	439,144,404	2,227,537,711
12.	Deposit-type contracts	21,407,316	22,234,166	99,435,703
13.	Total	571,601,623	461,378,570	2,326,973,414
	DETAILS OF WRITE-INS			
1001.				
1002.				
1003.				
1098.	Summary of remaining write-ins for Line 10 from overflow page			
1099.	Totals (Lines 1001 through 1003 plus 1098)(Line 10 above)			

NOTES TO FINANCIAL STATEMENTS

1. Summary of Significant Accounting Policies

A. Accounting Practices

The financial statements of American National Insurance Company (the Company) are presented on the basis of accounting practices prescribed or permitted by the State of Texas Department of Insurance.

The Texas Department of Insurance recognizes only statutory accounting practices prescribed by the State of Texas for determining and reporting the financial condition and results of operations of an insurance company, for determining its solvency under the Texas insurance law. The National Association of Insurance Commissioners' (NAIC) *Accounting Practices and Procedures* manual (NAIC SAP) has been adopted as a component of prescribed or permitted practices by the state of Texas. The State may adopt certain prescribed accounting practices that differ from those found in NAIC SAP.

	SSAP #	F/S Page	F/S Line #	2017	2016
NET INCOME					
(1) State basis (Page 4, Line 35, Columns 1 & 3)	XXX	XXX	XXX	(3,258,932)	20,096,546
(2) State Prescribed Practices that increase/(decrease) NAIC SAP:					
(3) State Permitted Practices that increase/(decrease) NAIC SAP:					
(4) NAIC SAP (1-2-3=4)	XXX	XXX	XXX	(3,258,932)	20,096,546
SURPLUS					
(5) State basis (Page 3, Line 38, Columns 1 & 2)	XXX	XXX	XXX	3,244,268,063	3,293,473,538
(6) State Prescribed Practices that increase/(decrease) NAIC SAP:					
(7) State Permitted Practices that increase/(decrease) NAIC SAP:					
(8) NAIC SAP (5-6-7=8)	XXX	XXX	XXX	33,244,268,063	3,293,473,538

C. Accounting Policy

(6) Loan-backed securities are carried amortized cost using the prospective method including anticipated prepayments at the date of purchase.

D. Going concern

Based upon its evaluation of relevant conditions and events, management did not have substantial doubt about the Company's ability to continue as a going concern as of March 31, 2018.

1B-5C. No Change

5. Investments

D. Loan-backed Securities

(1) Prepayment assumptions for mortgage-backed/asset-backed securities were obtained from independent third party pricing services or internal estimates.

(2) At March 31, 2018, the Company did not have any securities within the scope of SSAP 43R with a recognized other-than-temporary impairment due to the intent to sell or an inability or lack of intent to retain the security for period of time sufficient to recover the amortized cost basis.

(3) At March 31, 2018, the Company did not hold any loan-backed and structured securities with a recognized credit-related OTTI.

(4)

a. The aggregate amount of unrealized losses:

1. Less than 12 Months (1,432,608)
2. 12 Months or Longer (987,568)

b. The aggregate related fair value of securities with unrealized losses:

1. Less than 12 Months 112,569,314
2. 12 Months or Longer 16,014,686

(5) All loan-backed and structured securities in an unrealized loss position were reviewed to determine whether an other-than-temporary impairment should be recognized. As of March 31, 2018, the Company believes it has the intent and ability to hold these securities long enough to allow the cost basis of these securities to be recovered. Although the investment securities above did not meet management's criteria for other-than-temporary impairment at this time, it is possible that future events or information could cause them to conclude that declines in value are other-than-temporary.

5E- 9B. No Change

NOTES TO FINANCIAL STATEMENTS

9.

C. Current income taxes incurred consist of the following major components:

	(1) As of End of Current Period	(2) 12/31/2017	(3) (Col. 1 - 2) Change
1. Current Income Tax			
(a) Federal	(3,614,355)	(22,932,054)	19,317,699
(b) Foreign		241,924	(241,924)
(c) Subtotal	(3,614,355)	(22,690,130)	19,075,775
(d) Federal income tax on net capital gains	1,954,959	13,795,429	(11,840,470)
(e) Utilization of capital loss carry-forwards			
(f) Other			
(g) Federal and foreign income taxes incurred	(1,659,396)	(8,894,701)	7,235,305

The federal government enacted the Tax Cuts and Jobs Act ("Tax Reform") on December 22, 2017. Tax Reform makes broad and complex changes to federal corporate tax law that we expect will have a significant impact on our provision for taxes. 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 are 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. In its entirety, Tax Reform will result in changes to our overall tax obligations following the effective date of the legislation which is January 1, 2018. The full effects of Tax Reform will depend on, among other things, additional regulatory and administrative guidance. Tax Reform, or any related, similar or amended legislation or other changes in federal income tax laws, could have a material impact on our business and results of operations.

9D - 11. No Change

12. Retirement Plans, Deferred Compensation, Post-employment Benefits and Compensation Absences and Other Post-retirement Benefit Plans

A. Defined Benefit Plan

	Pension Benefits		Postretirement Benefits		Postemployment & Compensated Absence Benefits	
	Mar 31, 2018	Dec. 31, 2017	Mar 31, 2018	Dec. 31, 2017	Mar 31, 2018	Dec. 31, 2017
(4) Components of net periodic benefit cost						
a. Service cost						
b. Interest cost	3,179,181	14,593,183	40,328	177,557		
c. Expected return on plan assets	(5,443,060)	-21,819,855				
d. Transition asset or obligation						
e. Gains and losses	1,726,652	21,849,094	42,697	688,662		
f. Prior service cost or credit						
g. Gain or loss recognized due to a settlement or curtailment						
h. Total net periodic benefit cost	(537,228)	14,622,422	83,025	866,219		

13-16. No Change

17. Sales, Transfer and Servicing of Financial Assets and Extinguishments of Liabilities

The Company had no sales, transfers or servicing of financial assets and extinguishment of liabilities.

18 - 19 No Change

20. Fair Value Measurement

A.

(1) Fair Value Measurements at Reporting Date

Description for each class of asset or liability	(Level 1)	(Level 2)	(Level 3)	Total	Net Asset Value (NAV) Included in Level 2
a. Assets at fair value					
Bonds		5,000,000		5,000,000	
Common Stock			205,597	205,597	
Options			197,640,431	197,640,431	
Total assets at fair value		5,000,000	197,846,028	202,846,028	

There were no transfers between Level 1 and Level 2 fair value hierarchies.

(2) Fair Value Measurements in (Level 3) of the Fair Value hierarchy

Description for each class of asset or liability	Ending Balance as of Prior Quarter End	Transfers into Level 3	Transfers out of Level 3	Total gains and (losses) included in Net Income	Total gains and (losses) included in Surplus	Purchases	Issuances	Sales	Settlements	Ending Balance for Current Quarter End
a. Assets										
Options	212,993,079			9,845,773	(23,081,129)	15,352,205		(17,469,997)		197,640,431
Common Stock	127,710		(127,710)			205,597				205,597
Total Assets	213,120,789		(127,710)	9,845,773	(23,081,129)	15,557,802		(17,469,497)		197,846,028

(3) Transfers between levels, if any, are recognized at the beginning of the reporting period.

(4) As of March 31, 2018, the fair value of the Company's investments in Level 3 totaled $197,846,028. The market values of equity and fixed income securities are obtained by the Securities Valuation Office (SVO) of the National Association of Insurance Commissioners and/or various pricing services. There has been no change in the valuation techniques and related inputs.

(5) The fair value information for derivative assets is included in the above tables.

B. N/A

NOTES TO FINANCIAL STATEMENTS

C. Aggregate fair value for all financial instruments and the level within the fair value hierarchy in which the fair value measurements in their entirety fall.

Type of Financial Instrument	Aggregate Fair Value	Admitted Assets	(Level 1)	(Level 2)	(Level 3)	Not Practicable (Carrying Value)	Net Asset Value (NAV) Included in Level 2
Bonds	9,485,678,405	9,386,772,562		9,485,678,405			
Common Stock	323,658	323,658			323,658		
Preferred Stock	4,729,200	4,500,000	4,729,200				
Surplus Debentures/BA Assets	4,401,694	4,401,694			4,401,694		
Options	197,640,431	197,640,431			197,640,431		
Mortgage Loans	4,718,248,889	4,705,701,744		4,718,248,889			
BA Mez Loans	60,124,236	56,596,647		56,596,647			
Joint Venture Interests-Real Estate	34,682,674	34,682,674			34,682,674		

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. An asset or liability's classification 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. The Company defines active markets based on average trading volume for equity securities. The size of the bid/ask spread is used as an indicator of market activity for fixed maturity securities.

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 the Company'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.

The Company has evaluated the various types of securities in its investment portfolio to determine an appropriate fair value hierarchy level based upon trading activity and the observability of market inputs. Based on the results of this evaluation and investment class analysis, each price was classified into Level 1, 2, or 3.

There are some equity and fixed income securities whose market price is obtained from the Securities Valuation Office (SVO) of the National Association of Insurance Commissioners. The price origin, classification and NAIC Designation files in the Automated Valuation Service+ (AVS) security records are utilized to determine the fair value hierarchy levels. For those securities that are not priced by the SVO, the price is obtained from independent pricing services.

The pricing service evaluates each asset class based on relevant market information, relevant 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.

The pricing service utilizes market quotations for fixed maturity securities that have quoted prices in active markets. Since fixed maturities 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, the pricing service uses an Option Adjusted Spread model to develop prepayment and interest rate scenarios.

The Company has reviewed the inputs and methodology used by the pricing service and the techniques applied by the pricing service to produce quotes that represent the fair value of a specific security. The review of the pricing service's methodology confirms the service is utilizing information from organized transactions or a technique that represents a market participant's assumptions. The Company does not adjust quotes received by the pricing service.

The pricing service utilized by the Company has indicated that they will only produce an estimate of fair value if there is objectively verifiable information available. If the pricing service discontinues pricing an investment, the Company would be required to produce an estimate of fair value using some of the same methodologies as the pricing service, but would have to make assumptions for market-based inputs that are unavailable due to market conditions.

The fair value estimates of most fixed maturity investments including municipal bonds are based on observable market information rather than market quotes. Accordingly, the estimates of fair value for such fixed maturities provided by the pricing service are included in the amount disclosed in Level 2 of the hierarchy.

Additionally, the Company holds a small amount of fixed maturities that have characteristics that make them unsuitable for matrix pricing. For these fixed securities, a quote from a broker (typically a market maker) is obtained. Due to the disclaimers on the quotes that indicate that the price is indicative only, the Company includes these fair value estimates in Level 3. The pricing of certain private placement debt also includes significant non-observable inputs, the internally determined credit rating of the security and an externally provided credit spread, and are classified in Level 3.

For public common and preferred stocks, the Company receives prices from a nationally recognized pricing service that are based on observable market transactions and these securities are disclosed in Level 1. For certain preferred stock held, current market quotes in active markets are unavailable. In these instances, the Company receives an estimate of fair value from the pricing service that provides fair value estimates for the fixed maturity securities. The service utilizes some of the same methodologies to price the preferred stocks as it does for the fixed maturities. These estimates for equity securities are disclosed in Level 2.

The market value of derivative instruments is obtained by a pricing service. Due to the disclaimers that the prices is indicative only, the Company includes these fair value estimates in Level 3.

D. N/A

21-24. No Change

25. Change in Incurred Losses and Loss Adjustment Expenses

Claim Liabilities and Reserves as of December 31, 2017 were $30.6 million. As of March 31, 2018, $0.8 million has been paid for incurred losses and loss adjustment expenses attributable to insured events of prior years. Claims liabilities and reserves remaining as of March 31, 2018 are now $3.6 million as a result of re-estimation of unpaid claims and claim adjustment expenses. Therefore, there has been a $26.2 million of favorable prior-year development from December 31, 2017 to March 31, 2018. Original estimates are increased or decreased, as additional information becomes known regarding individual claims.

26-35. No Change

GENERAL INTERROGATORIES

PART 1 - COMMON INTERROGATORIES

GENERAL

1.1 Did the reporting entity experience any material transactions requiring the filing of Disclosure of Material Transactions with the State of Domicile, as required by the Model Act? ..... Yes [ ] No [X]

1.2 If yes, has the report been filed with the domiciliary state? ..... Yes [ ] No [ ]

2.1 Has any change been made during the year of this statement in the charter, by-laws, articles of incorporation, or deed of settlement of the reporting entity? ..... Yes [X] No [ ]

2.2 If yes, date of change: 02/22/2018

3.1 Is the reporting entity a member of an Insurance Holding Company System consisting of two or more affiliated persons, one or more of which is an insurer? ..... Yes [X] No [ ]
If yes, complete Schedule Y, Parts 1 and 1A.

3.2 Have there been any substantial changes in the organizational chart since the prior quarter end? ..... Yes [X] No [ ]

3.3 If the response to 3.2 is yes, provide a brief description of those changes.
The merger of ANICONY and Farm Family Life was effective Jan. 1, 2018.

3.4 Is the reporting entity publicly traded or a member of a publicly traded group? ..... Yes [X] No [ ]

3.5 If the response to 3.4 is yes, provide the CIK (Central Index Key) code issued by the SEC for the entity/group. 904163

4.1 Has the reporting entity been a party to a merger or consolidation during the period covered by this statement? ..... Yes [ ] No [X]

4.2 If yes, provide the name of the entity, NAIC Company Code, and state of domicile (use two letter state abbreviation) for any entity that has ceased to exist as a result of the merger or consolidation.

1 Name of Entity	2 NAIC Company Code	3 State of Domicile

5. If the reporting entity is subject to a management agreement, including third-party administrator(s), managing general agent(s), attorney-in-fact, or similar agreement, have there been any significant changes regarding the terms of the agreement or principals involved? ..... Yes [ ] No [X] N/A [ ]
If yes, attach an explanation.

6.1 State as of what date the latest financial examination of the reporting entity was made or is being made. 12/31/2015

6.2 State the as of date that the latest financial examination report became available from either the state of domicile or the reporting entity. This date should be the date of the examined balance sheet and not the date the report was completed or released. 12/31/2015

6.3 State as of what date the latest financial examination report became available to other states or the public from either the state of domicile or the reporting entity. This is the release date or completion date of the examination report and not the date of the examination (balance sheet date). 10/06/2017

6.4 By what department or departments?
TEXAS DEPARTMENT OF INSURANCE

6.5 Have all financial statement adjustments within the latest financial examination report been accounted for in a subsequent financial statement filed with Departments? ..... Yes [X] No [ ] N/A [ ]

6.6 Have all of the recommendations within the latest financial examination report been complied with? ..... Yes [X] No [ ] N/A [ ]

7.1 Has this reporting entity had any Certificates of Authority, licenses or registrations (including corporate registration, if applicable) suspended or revoked by any governmental entity during the reporting period? ..... Yes [ ] No [X]

7.2 If yes, give full information:

8.1 Is the company a subsidiary of a bank holding company regulated by the Federal Reserve Board? ..... Yes [ ] No [X]

8.2 If response to 8.1 is yes, please identify the name of the bank holding company.

8.3 Is the company affiliated with one or more banks, thrifts or securities firms? ..... Yes [X] No [ ]

8.4 If response to 8.3 is yes, please provide below the names and location (city and state of the main office) of any affiliates regulated by a federal regulatory services agency [i.e. the Federal Reserve Board (FRB), the Office of the Comptroller of the Currency (OCC), the Federal Deposit Insurance Corporation (FDIC) and the Securities Exchange Commission (SEC)] and identify the affiliate's primary federal regulator.

1 Affiliate Name	2 Location (City, State)	3 FRB	4 OCC	5 FDIC	6 SEC
American National Registerd Investment Advisor Inc.	League City, TX	NO	NO	NO	NO
ANICO Financial Services, Inc.	Galveston, TX	NO	NO	NO	NO

GENERAL INTERROGATORIES

9.1 Are the senior officers (principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions) of the reporting entity subject to a code of ethics, which includes the following standards? ..... Yes [X] No [ ]
(a) Honest and ethical conduct, including the ethical handling of actual or apparent conflicts of interest between personal and professional relationships;
(b) Full, fair, accurate, timely and understandable disclosure in the periodic reports required to be filed by the reporting entity;
(c) Compliance with applicable governmental laws, rules and regulations;
(d) The prompt internal reporting of violations to an appropriate person or persons identified in the code; and
(e) Accountability for adherence to the code.

9.11 If the response to 9.1 is No, please explain:

9.2 Has the code of ethics for senior managers been amended? ..... Yes [ ] No [X]

9.21 If the response to 9.2 is Yes, provide information related to amendment(s).

9.3 Have any provisions of the code of ethics been waived for any of the specified officers? ..... Yes [ ] No [X]

9.31 If the response to 9.3 is Yes, provide the nature of any waiver(s).

FINANCIAL

10.1 Does the reporting entity report any amounts due from parent, subsidiaries or affiliates on Page 2 of this statement? ..... Yes [X] No [ ]

10.2 If yes, indicate any amounts receivable from parent included in the Page 2 amount: ..... $

INVESTMENT

11.1 Were any of the stocks, bonds, or other assets of the reporting entity loaned, placed under option agreement, or otherwise made available for use by another person? (Exclude securities under securities lending agreements.) ..... Yes [ ] No [X]

11.2 If yes, give full and complete information relating thereto:

12. Amount of real estate and mortgages held in other invested assets in Schedule BA: ..... $ 64,053,839

13. Amount of real estate and mortgages held in short-term investments: ..... $

14.1 Does the reporting entity have any investments in parent, subsidiaries and affiliates? ..... Yes [X] No [ ]

14.2 If yes, please complete the following:

		1 Prior Year-End Book/Adjusted Carrying Value	2 Current Quarter Book/Adjusted Carrying Value
14.21	Bonds	$	$
14.22	Preferred Stock	$	$
14.23	Common Stock	$ 2,690,052,747	$ 2,686,745,192
14.24	Short-Term Investments	$	$
14.25	Mortgage Loans on Real Estate	$ 687,325,398	$ 750,500,494
14.26	All Other	$ 680,243,680	$ 686,959,935
14.27	Total Investment in Parent, Subsidiaries and Affiliates (Subtotal Lines 14.21 to 14.26)	$ 4,057,621,825	$ 4,124,205,621
14.28	Total Investment in Parent included in Lines 14.21 to 14.26 above	$	$

15.1 Has the reporting entity entered into any hedging transactions reported on Schedule DB? ..... Yes [X] No [ ]

15.2 If yes, has a comprehensive description of the hedging program been made available to the domiciliary state? ..... Yes [X] No [ ]
If no, attach a description with this statement.

GENERAL INTERROGATORIES

16. For the reporting entity's security lending program, state the amount of the following as of the current statement date:

16.1 Total fair value of reinvested collateral assets reported on Schedule DL, Parts 1 and 2. ..... $ .....

16.2 Total book adjusted/carrying value of reinvested collateral assets reported on Schedule DL, Parts 1 and 2 ..... $ .....

16.3 Total payable for securities lending reported on the liability page. ..... $ .....

17. Excluding items in Schedule E - Part 3 - Special Deposits, real estate, mortgage loans and investments held physically in the reporting entity's offices, vaults or safety deposit boxes, were all stocks, bonds and other securities, owned throughout the current year held pursuant to a custodial agreement with a qualified bank or trust company in accordance with Section 1, III - General Examination Considerations, F. Outsourcing of Critical Functions, Custodial or Safekeeping Agreements of the NAIC Financial Condition Examiners Handbook? ..... Yes [X] No [ ]

17.1 For all agreements that comply with the requirements of the NAIC Financial Condition Examiners Handbook, complete the following:

1 Name of Custodian(s)	2 Custodian Address
Moody National Bank	2302 Post Office St., Galveston, TX 77550 .....

17.2 For all agreements that do not comply with the requirements of the NAIC Financial Condition Examiners Handbook, provide the name, location and a complete explanation:

1 Name(s)	2 Location(s)	3 Complete Explanation(s)

17.3 Have there been any changes, including name changes, in the custodian(s) identified in 17.1 during the current quarter? ..... Yes [ ] No [X]

17.4 If yes, give full information relating thereto:

1 Old Custodian	2 New Custodian	3 Date of Change	4 Reason

17.5 Investment management – Identify all investment advisors, investment managers, broker/dealers, including individuals that have the authority to make investment decisions on behalf of the reporting entity. For assets that are managed internally by employees of the reporting entity, note as such. ["…that have access to the investment accounts"; "…handle securities"]

1 Name of Firm or Individual	2 Affiliation
Anne Le Mire	I.....
Scott Brast	I.....
.....	.....

17.5097 For those firms/individuals listed in the table for Question 17.5, do any firms/individuals unaffiliated with the reporting entity (i.e. designated with a "U") manage more than 10% of the reporting entity's assets?..... Yes [ ] No [X]

17.5098 For firms/individuals unaffiliated with the reporting entity (i.e. designated with a "U") listed in the table for Question 17.5, does the total assets under management aggregate to more than 50% of the reporting entity's assets?..... Yes [ ] No [X]

17.6 For those firms or individuals listed in the table for 17.5 with an affiliation code of "A" (affiliated) or "U" (unaffiliated), provide the information for the table below.

1 Central Registration Depository Number	2 Name of Firm or Individual	3 Legal Entity Identifier (LEI)	4 Registered With	5 Investment Management Agreement (IMA) Filed
.....	.....	.....	.....	.....

18.1 Have all the filing requirements of the Purposes and Procedures Manual of the NAIC Investment Analysis Office been followed? ..... Yes [X] No [ ]

18.2 If no, list exceptions:

19. By self-designating 5*GI securities, the reporting entity is certifying the following elements for each self-designated 5*GI security:

a. Documentation necessary to permit a full credit analysis of the security does not exist.

b. Issuer or obligor is current on all contracted interest and principal payments.

c. The insurer has an actual expectation of ultimate payment of all contracted interest and principal.

Has the reporting entity self-designated 5*GI securities? ..... Yes [ ] No [X]

GENERAL INTERROGATORIES

PART 2 - LIFE & HEALTH

			1 Amount
1.	Report the statement value of mortgage loans at the end of this reporting period for the following categories:		
	1.1 Long-Term Mortgages In Good Standing		
	1.11 Farm Mortgages	$	
	1.12 Residential Mortgages	$	
	1.13 Commercial Mortgages	$	4,611,895,428
	1.14 Total Mortgages in Good Standing	$	4,611,895,428
	1.2 Long-Term Mortgages In Good Standing with Restructured Terms		
	1.21 Total Mortgages in Good Standing with Restructured Terms	$	88,097,897
	1.3 Long-Term Mortgage Loans Upon which Interest is Overdue more than Three Months		
	1.31 Farm Mortgages	$	
	1.32 Residential Mortgages	$	
	1.33 Commercial Mortgages	$	
	1.34 Total Mortgages with Interest Overdue more than Three Months	$	
	1.4 Long-Term Mortgage Loans in Process of Foreclosure		
	1.41 Farm Mortgages	$	
	1.42 Residential Mortgages	$	
	1.43 Commercial Mortgages	$	5,708,420
	1.44 Total Mortgages in Process of Foreclosure	$	5,708,420
1.5	Total Mortgage Loans (Lines 1.14 + 1.21 + 1.34 + 1.44) (Page 2, Column 3, Lines 3.1 + 3.2)	$	4,705,701,745
1.6	Long-Term Mortgages Foreclosed, Properties Transferred to Real Estate in Current Quarter		
	1.61 Farm Mortgages	$	
	1.62 Residential Mortgages	$	
	1.63 Commercial Mortgages	$	8,376,049
	1.64 Total Mortgages Foreclosed and Transferred to Real Estate	$	8,376,049
2.	Operating Percentages:		
	2.1 A&H loss percent		61.700 %
	2.2 A&H cost containment percent		0.000 %
	2.3 A&H expense percent excluding cost containment expenses		59.100 %
3.1	Do you act as a custodian for health savings accounts?		Yes [ ] No [X]
3.2	If yes, please provide the amount of custodial funds held as of the reporting date	$	
3.3	Do you act as an administrator for health savings accounts?		Yes [ ] No [X]
3.4	If yes, please provide the balance of the funds administered as of the reporting date	$	
4.	Is the reporting entity licensed or chartered, registered, qualified, eligible or writing business in at least two states?		Yes [X] No [ ]
4.1	If no, does the reporting entity assume reinsurance business that covers risks residing in at least one state other than the state of domicile of the reporting entity?		Yes [ ] No [ ]

SCHEDULE S - CEDED REINSURANCE

Showing All New Reinsurance Treaties - Current Year to Date

1 NAIC Company Code	2 ID Number	3 Effective Date	4 Name of Reinsurer	5 Domiciliary Jurisdiction	6 Type of Reinsurance Ceded	7 Type of Reinsurer	8 Certified Reinsurer Rating (1 through 6)	9 Effective Date of Certified Reinsurer Rating

NONE

SCHEDULE T - PREMIUMS AND ANNUITY CONSIDERATIONS

Current Year To Date - Allocated by States and Territories

States, Etc.	1 Active Status (a)	Direct Business Only: Life Contracts 2 Life Insurance Premiums	Life Contracts 3 Annuity Considerations	4 Accident and Health Insurance Premiums, Including Policy, Membership and Other Fees	5 Other Considerations	6 Total Columns 2 Through 5	7 Deposit-Type Contracts
1. Alabama AL	L	2,048,881	7,122,693	215,455		9,387,029	107,000
2. Alaska AK	L	132,056	1,255,869	(1,740)		1,386,185	
3. Arizona AZ	L	3,113,631	11,839,087	30,554		14,983,272	428,525
4. Arkansas AR	L	2,879,099	4,002,771	30,154		6,912,024	
5. California CA	L	18,669,457	43,532,330	181,254		62,383,041	4,284,962
6. Colorado CO	L	3,371,566	4,105,383	39,013		7,515,962	306,544
7. Connecticut CT	L	575,907	4,873,248	3,611		5,452,766	33,230
8. Delaware DE	L	710,831	2,736,805	(2)		3,447,634	169,690
9. District of Columbia DC	L	497,722	197,267			694,989	
10. Florida FL	L	10,124,260	35,061,213	58,237		45,243,710	1,257,383
11. Georgia GA	L	4,680,886	6,958,360	433,074		12,072,320	788,934
12. Hawaii HI	L	1,089,031	3,009,013	16,713		4,114,757	
13. Idaho ID	L	536,741	1,785,752	133,497		2,455,990	23,544
14. Illinois IL	L	3,708,049	13,844,071	138,236		17,690,356	569,422
15. Indiana IN	L	1,301,794	4,371,667	23,290		5,696,751	356,547
16. Iowa IA	L	1,462,283	3,557,760	107,114		5,127,157	240,798
17. Kansas KS	L	1,106,231	2,946,408	177,469		4,230,108	395,000
18. Kentucky KY	L	1,145,898	1,779,587	184,114		3,109,599	80,000
19. Louisiana LA	L	4,486,516	7,138,339	371,526		11,996,381	360,173
20. Maine ME	L	154,625	840,720	2,578		997,923	114,808
21. Maryland MD	L	1,809,946	7,320,666	96,808		9,227,420	39,895
22. Massachusetts MA	L	1,228,014	7,025,274	135,300		8,388,588	418,208
23. Michigan MI	L	1,642,022	13,746,076	33,206		15,421,304	562,656
24. Minnesota MN	L	6,712,385	4,987,363	104,021		11,803,769	160,618
25. Mississippi MS	L	1,883,310	4,511,152	233,028		6,627,490	863,254
26. Missouri MO	L	2,924,327	4,718,068	318,540		7,960,935	1,328,623
27. Montana MT	L	192,147	1,065,614	43,610		1,301,371	
28. Nebraska NE	L	313,151	1,476,733	14,758		1,804,642	50,000
29. Nevada NV	L	2,410,423	2,995,996	7,916		5,414,335	17,260
30. New Hampshire NH	L	297,064	1,225,973	(14)		1,523,023	
31. New Jersey NJ	L	2,798,327	17,918,797	2,010		20,719,134	613,956
32. New Mexico NM	L	4,074,647	880,955	132,354		5,087,956	
33. New York NY	N	1,827,013	92,755	720		1,920,488	
34. North Carolina NC	L	3,509,728	10,061,965	21,470		13,593,163	303,723
35. North Dakota ND	L	329,832	954,875	62,760		1,347,467	668,499
36. Ohio OH	L	2,544,090	18,801,046	50,665		21,395,801	206,479
37. Oklahoma OK	L	2,867,700	5,286,026	71,049		8,224,775	27,748
38. Oregon OR	L	1,000,881	3,093,252	23,715		4,117,848	234,172
39. Pennsylvania PA	L	2,329,702	15,563,557	7,948		17,901,207	738,369
40. Rhode Island RI	L	250,432	2,778,499			3,028,931	
41. South Carolina SC	L	2,218,694	4,082,049	139,959		6,440,702	15,000
42. South Dakota SD	L	253,782	1,044,612	19,712		1,318,106	294,930
43. Tennessee TN	L	3,247,116	6,999,754	185,553		10,432,423	531,529
44. Texas TX	L	44,896,672	37,998,561	5,626,609		88,521,842	3,224,131
45. Utah UT	L	3,712,126	6,218,769	53,151		9,984,046	399,365
46. Vermont VT	L	194,173	257,903			452,076	
47. Virginia VA	L	1,858,982	4,790,485	12,928		6,662,395	482,508
48. Washington WA	L	1,815,121	10,192,453	3,766		12,011,340	243,103
49. West Virginia WV	L	602,792	759,917	5,020		1,367,729	
50. Wisconsin WI	L	1,531,097	8,636,197	62,872		10,230,166	373,610
51. Wyoming WY	L	319,344	443,656	2,047		765,047	
52. American Samoa AS	L	20,154				20,154	
53. Guam GU	L	379,997	2,200	16,352		398,549	
54. Puerto Rico PR	L	2,628,768	4,124,560	2,808		6,756,136	93,120
55. U.S. Virgin Islands VI	N	3,693				3,693	
56. Northern Mariana Islands MP	L	37,425		16,866		54,291	
57. Canada CAN	N	92,234		193		92,427	
58. Aggregate Other Aliens OT	XXX	69,353	4,712	121		74,186	
59. Subtotal	XXX	166,622,128	371,018,813	9,651,968		547,292,909	21,407,316
90. Reporting entity contributions for employee benefits plans	XXX	1,020,952		981,545		2,002,497	
91. Dividends or refunds applied to purchase paid-up additions and annuities	XXX	1,019,130				1,019,130	
92. Dividends or refunds applied to shorten endowment or premium paying period	XXX						
93. Premium or annuity considerations waived under disability or other contract provisions	XXX	1,349,024		5,271		1,354,295	
94. Aggregate or other amounts not allocable by State	XXX						
95. Totals (Direct Business)	XXX	170,011,234	371,018,813	10,638,784		551,668,831	21,407,316
96. Plus Reinsurance Assumed	XXX	809,050		21,048,784		21,857,834	
97 Totals (All Business)	XXX	170,820,284	371,018,813	31,687,568		573,526,665	21,407,316
98. Less Reinsurance Ceded	XXX	24,558,307		21,923,582		46,481,889	
99. Totals (All Business) less Reinsurance Ceded	XXX	146,261,977	371,018,813	9,763,986		527,044,776	21,407,316
DETAILS OF WRITE-INS							
58001. USA Overseas Military	XXX	44,867	3,212			48,079	
58002. MEX Mexico	XXX	5,077		121		5,198	
58003. JPN Japan	XXX	400				400	
58998. Summary of remaining write-ins for Line 58 from overflow page	XXX	19,009	1,500			20,509	
58999. Totals (Lines 58001 through 58003 plus 58998)(Line 58 above)	XXX	69,353	4,712	121		74,186	
9401.	XXX						
9402.	XXX						
9403.	XXX						
9498. Summary of remaining write-ins for Line 94 from overflow page	XXX						
9499. Totals (Lines 9401 through 9403 plus 9498)(Line 94 above)	XXX						

(a) Active Status Counts:

L - Licensed or Chartered - Licensed Insurance carrier or domiciled RRG 54

R - Registered - Non-domiciled RRGs

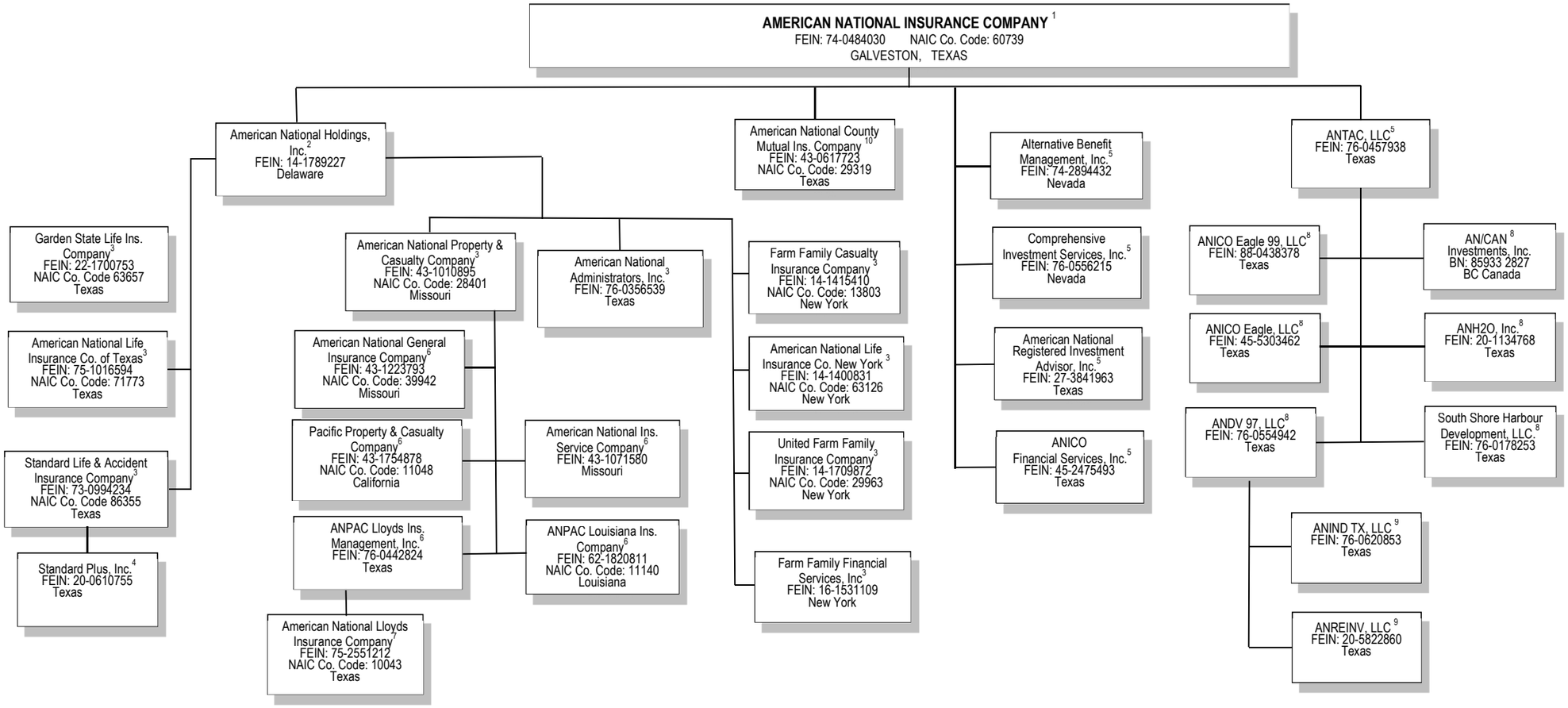
E - Eligible - Reporting entities eligible or approved to write surplus lines in the state

Q - Qualified - Qualified or accredited reinsurer

N - None of the above - Not allowed to write business in the state 3

SCHEDULE Y - INFORMATION CONCERNING ACTIVITIES OF INSURER MEMBERS OF A HOLDING COMPANY GROUP

PART 1 - ORGANIZATIONAL CHART



(1) 22.7% owned by The Moody Foundation and 36.9% owned by the Libbie S. Moody Trust.
(2) American National Insurance Company owns all outstanding Class A common stock; Comprehensive Investment Services, Inc. owns all outstanding Class B and C preferred stock..
(3) 100% owned by American National Holdings, Inc.
(4) 100% owned by Standard Life and Accident Insurance Company.
(5) 100% owned by American National Insurance Company.
(6) 100 % owned by American National Property and Casualty Company (ANPAC).
(7) Not a subsidiary company, but managed by ANPAC Lloyds Insurance Management, Inc.
(8) 100% owned by ANTAC, LLC.
(9) 100% owned by ANDV 97, LLC.
(10) Not a subsidiary company but managed by American National Insurance Company.

SCHEDULE Y

PART 1A - DETAIL OF INSURANCE HOLDING COMPANY SYSTEM

1 Group Code	2 Group Name	3 NAIC Company Code	4 ID Number	5 Federal RSSD	6 CIK	7 Name of Securities Exchange if Publicly Traded (U.S. or International)	8 Names of Parent, Subsidiaries Or Affiliates	9 Domiciliary Location	10 Relationship to Reporting Entity	11 Directly Controlled by (Name of Entity/Person)	12 Type of Control (Ownership, Board, Management, Attorney-in-Fact, Influence, Other)	13 If Control is Ownership Provide Percentage	14 Ultimate Controlling Entity(ies)/Person(s)	15 Is an SCA Filing Required? (Y/N)	16 *
0408	American National Insurance Company	60739	74-0484030	1343722	904163	NASDAQ	American National Insurance Company	TX	RE	Libbie S. Moody Trust	Ownership	0.370	Moody National Bank	N	
0408	American National Insurance Company	60739	74-0484030	1343722	904163	NASDAQ	American National Insurance Company	TX	RE	The Moody Foundation	Ownership, Board	0.227	Robert L. Moody, Ross R. Moody, Frances Moody-Dahlberg	N	
		00000	76-0556215	0	0		Comprehensive Investment Services, Inc.	NV	DS	American National Insurance Company	Ownership	1.000	American National Insurance Company	Y	
		00000	14-1789227	0	0		American National Holdings, Inc.	DE	DS	American National Insurance Company	Ownership	1.000	American National Insurance Company	Y	
		00000	14-1789227	0	0		American National Holdings, Inc.	DE	DS	Comprehensive Investment Services, Inc.	Other	0.000	American National Insurance Company	Y	1
		00000	76-0457938	0	0		ANTAC, LLC	TX	DS	American National Insurance Company	Ownership	1.000	American National Insurance Company	Y	
		00000	27-3841963	0	1518195		American National Registered Investment Advisor, Inc.	TX	DS	American National Insurance Company	Ownership	1.000	American National Insurance Company	Y	
0408	American National Insurance Company	39942	43-1223793	0	0		American National General Insurance Company	MO	IA	American National Property and Casualty Company	Ownership	1.000	American National Insurance Company	N	
		00000	43-1071580	0	0		American National Insurance Service Company	MO	NIA	American National Property and Casualty Company	Ownership	1.000	American National Insurance Company	N	
		00000	76-0356539	0	0		American National Administrators, Inc.	TX	NIA	American National Holdings, Inc.	Ownership	1.000	American National Insurance Company	N	
		00000	76-0442824	0	0		ANPAC Lloyds Insurance Management, Inc.	TX	NIA	American National Property and Casualty Company	Ownership	1.000	American National Insurance Company	N	
0408	American National Insurance Company	11140	62-1820811	0	0		ANPAC Louisiana Insurance Company	LA	IA	American National Property and Casualty Company	Ownership	1.000	American National Insurance Company	N	
0408	American National Insurance Company	11048	43-1754878	0	0		Pacific Property and Casualty Company	CA	IA	American National Property and Casualty Company	Ownership	1.000	American National Insurance Company	N	
0408	American National Insurance Company	13803	14-1415410	0	0		Farm Family Casualty Insurance Company	NY	IA	American National Holdings, Inc.	Ownership	1.000	American National Insurance Company	N	
0408	American National Insurance Company	29319	43-0617723	0	0		American National County Mutual Insurance Company	TX	DS	American National Insurance Company	Management	0.000	American National Insurance Company	N	
0408	American National Insurance Company	10043	75-2551212	0	0		American National Lloyds Insurance Company	TX	IA	ANPAC Lloyds Insurance Management, Inc.	Management	0.000	American National Insurance Company	N	
		00000	74-2894432	0	0		Alternative Benefit Management, Inc.	NV	DS	American National Insurance Company	Ownership	1.000	American National Insurance Company	Y	
		00000	76-0554942	0	0		ANDV 97, LLC	TX	NIA	ANTAC, LLC	Ownership	1.000	American National Insurance Company	N	
		00000	45-5303462	0	0		ANICO Eagle, LLC	TX	NIA	ANTAC, LLC	Ownership	1.000	American National Insurance Company	N	
		00000	88-0438378	0	0		ANICO Eagle 99, LLC	TX	NIA	ANTAC, LLC	Ownership	1.000	American National Insurance Company	N	
		00000	85-9332827	0	0		AN/CAN Investments, Inc.	CAN	NIA	ANTAC, LLC	Ownership	1.000	American National Insurance Company	N	
		00000	76-0620853	0	0		ANIND TX, LLC	TX	NIA	ANDV 97, LLC	Ownership	1.000	American National Insurance Company	N	
		00000	20-5822860	0	0		ANREINV, LLC	TX	NIA	ANDV 97, LLC	Ownership	1.000	American National Insurance Company	N	
0408	American National Insurance Company	29963	14-1709872	0	0		United Farm Family Insurance Company	NY	IA	American National Holdings, Inc.	Ownership	1.000	American National Insurance Company	N	
		00000	20-1134768	0	0		ANH2O, Inc.	TX	NIA	ANTAC, LLC	Ownership	1.000	American National Insurance Company	N	
		00000	76-0178253	0	0		South Shore Harbour Development, LLC	TX	NIA	ANTAC, LLC	Ownership	1.000	American National Insurance Company	N	
0408	American National Insurance Company	28401	43-1010895	1343946	0		American National Property and Casualty Company	MO	DS	American National Holdings, Inc.	Ownership	1.000	American National Insurance Company	Y	
0408	American National Insurance Company	71773	75-1016594	1343731	0		American National Life Insurance Company of Texas	TX	IA	American National Holdings, Inc.	Ownership	1.000	American National Insurance Company	N	
0408	American National Insurance Company	86355	73-0994234	0	0		Standard Life and Accident Insurance Company	TX	IA	American National Holdings, Inc.	Ownership	1.000	American National Insurance Company	N	
		00000	20-0610755	0	0		Standard Plus, Inc.	TX	IA	Standard Life and Accident Insurance Company	Ownership	1.000	American National Insurance Company	Y	
0408	American National Insurance Company	63657	22-1700753	0	0		Garden State Life Insurance Company	TX	IA	American National Holdings, Inc.	Ownership	1.000	American National Insurance Company	N	
0408	American National Insurance Company	63126	14-1400831	0	0		American National Life Insurance Company of New York	NY	IA	American National Holdings, Inc.	Ownership	1.000	American National Insurance Company	N	
		00000	45-2475493	0	0		ANICO Financial Services, Inc.	TX	DS	American National Insurance Company	Ownership	1.000	American National Insurance Company	Y	
		00000	16-1531109	0	0		Farm Family Financial Services	NY	NIA	American National Holdings, Inc	Ownership	1.000	American National Insurance Company	N	

Asterisk	Explanation
1	Owns all outstanding preferred stock

SUPPLEMENTAL EXHIBITS AND SCHEDULES INTERROGATORIES

The following supplemental reports are required to be filed as part of your statement filing. However, in the event that your company does not transact the type of business for which the special report must be filed, your response of NO to the specific interrogatory will be accepted in lieu of filing a "NONE" report and a bar code will be printed below. If the supplement is required of your company but is not being filed for whatever reason enter SEE EXPLANATION and provide an explanation following the interrogatory questions.

		Response
1.	Will the Trusteed Surplus Statement be filed with the state of domicile and the NAIC with this statement?	NO
2.	Will the Medicare Part D Coverage Supplement be filed with the state of domicile and the NAIC with this statement?	NO
3.	Will the Reasonableness of Assumptions Certification required by Actuarial Guideline XXXV be filed with the state of domicile and electronically with the NAIC?	NO
4.	Will the Reasonableness and Consistency of Assumptions Certification required by Actuarial Guideline XXXV be filed with the state of domicile and electronically with the NAIC?	YES
5.	Will the Reasonableness of Assumptions Certification for Implied Guaranteed Rate Method required by Actuarial Guideline XXXVI be filed with the state of domicile and electronically with the NAIC?	NO
6.	Will the Reasonableness and Consistency of Assumptions Certification required by Actuarial Guideline XXXVI (Updated Average Market Value) be filed with the state of domicile and electronically with the NAIC?	NO
7.	Will the Reasonableness and Consistency of Assumptions Certification required by Actuarial Guideline XXXVI (Updated Market Value) be filed with the state of domicile and electronically with the NAIC?	YES

Explanation:

1.

2.

3.

5.

6.

Bar Code:

1. Trusteed Surplus Statement [Document Identifier 490]

2. Medicare Part D Coverage Supplement [Document Identifier 365]

3. Reasonableness of Assumptions Certification required by Actuarial Guideline XXXV [Document Identifier 445]

5. Reasonableness of Assumptions Certification for Implied Guaranteed Rate Method required by Actuarial Guideline XXXVI [Document Identifier 447]

6. Reasonableness and Consistency of Assumptions Certification required by Actuarial Guideline XXXVI [Document Identifier 448]

OVERFLOW PAGE FOR WRITE-INS

Additional Write-ins for Assets Line 25

		Current Statement Date			4
		1 Assets	2 Nonadmitted Assets	3 Net Admitted Assets (Cols. 1 - 2)	December 31 Prior Year Net Admitted Assets
2504.	Taxes other than FIT	685,211		685,211	914,674
2505.	Debit Suspense	15,086,872	15,086,872		
2506.	Prepaid Expense	6,944,673	6,944,673		
2507.	CapCo Tax Recoverable	1,942,661	1,942,661		
2508.	Miscellaneous Nonadmitted Assets	992,171	992,171		
2509.	Advances	67,871	67,871		
2597.	Summary of remaining write-ins for Line 25 from overflow page	25,719,459	25,034,248	685,211	914,674

Additional Write-ins for Liabilities Line 25

		1 Current Statement Date	2 December 31 Prior Year
2504.	Underfunded pension liability	32,450,774	34,714,653
2505.	Pending escheat items	30,056,855	28,461,603
2506.	Retiree health benefit reserve	4,718,628	4,720,993
2507.	Miscellaneous investment liabilities	3,422,919	3,805,186
2508.	Credit Insurance Additional Liability	1,865,442	4,307,215
2509.	Credit warehouse liability		84,000
2597.	Summary of remaining write-ins for Line 25 from overflow page	72,514,618	76,093,650

Additional Write-ins for Summary of Operations Line 8.3

		1 Current Year To Date	2 Prior Year To Date	3 Prior Year Ended December 31
08.304.	Miscellaneous Income	1,219,483	1,034,504	4,028,519
08.397.	Summary of remaining write-ins for Line 8.3 from overflow page	1,219,483	1,034,504	4,028,519

Additional Write-ins for Summary of Operations Line 53

		1 Current Year To Date	2 Prior Year To Date	3 Prior Year Ended December 31
5304.	Prior period adjustment to annuity reserves			3,650,993
5305.	Prior period adjustment to loading on deferred premiums			2,918,038
5306.	Change in deferred tax on non-admitted items	(498,537)	(3,255,898)	(984,641)
5397.	Summary of remaining write-ins for Line 53 from overflow page	(498,537)	(3,255,898)	5,584,390

Additional Write-ins for Schedule T Line 58

			Direct Business Only					
		1	Life Contracts		4	5	6	7
States, Etc.		Active Status	2 Life Insurance Premiums	3 Annuity Considerations	Accident and Health Insurance Premiums, Including Policy, Membership and Other Fees	Other Considerations	Total Columns 2 Through 5	Deposit-Type Contracts
58004.	DEU Germany	XXX	5,179	1,500			6,679	
58005.	GBR United Kingdom	XXX	8,380				8,380	
58006.	BEL Belgium	XXX						
58007.	ITA Italy	XXX	1,857				1,857	
58008.	ESP Spain	XXX	980				980	
58009.	NOR Norway	XXX						
58010.	ISR Israel	XXX	594				594	
58011.	NZL New Zealand	XXX	13				13	
58012.	Luxembourg	XXX						
58013.	MMR Yangon Myanmar	XXX						
58014.	Scotland	XXX	225				225	
58015.	BMU Bermuda	XXX						
58016.	FRA France	XXX						
58017.	ABW Aruba	XXX	36				36	
58018.	CHL Chile	XXX	84				84	
58019.	BRB Barbados	XXX	131				131	
58020.	PHL Phillipines	XXX	479				479	
58021.	NLD Netherlands	XXX	444				444	
58022.	AUS Australia	XXX	607				607	
58023.	IDN Indonesia	XXX						
58997.	Summary of remaining write-ins for Line 58 from overflow page	XXX	19,009	1,500			20,509	

SCHEDULE A - VERIFICATION

Real Estate

		1 Year to Date	2 Prior Year Ended December 31
1.	Book/adjusted carrying value, December 31 of prior year	325,107,208	362,342,577
2.	Cost of acquired:		
	2.1 Actual cost at time of acquisition	8,376,049	2,284,900
	2.2 Additional investment made after acquisition	3,984,017	26,989,018
3.	Current year change in encumbrances		
4.	Total gain (loss) on disposals	(190,148)	11,249,807
5.	Deduct amounts received on disposals		56,422,843
6.	Total foreign exchange change in book/adjusted carrying value		
7.	Deduct current year's other than temporary impairment recognized	285,000	3,706,903
8.	Deduct current year's depreciation	4,223,518	17,629,348
9.	Book/adjusted carrying value at the end of current period (Lines 1+2+3+4-5+6-7-8)	332,768,608	325,107,208
10.	Deduct total nonadmitted amounts		
11.	Statement value at end of current period (Line 9 minus Line 10)	332,768,608	325,107,208

SCHEDULE B - VERIFICATION

Mortgage Loans

		1 Year to Date	2 Prior Year Ended December 31
1.	Book value/recorded investment excluding accrued interest, December 31 of prior year	4,548,347,259	4,201,112,178
2.	Cost of acquired:		
	2.1 Actual cost at time of acquisition	108,489,290	742,804,223
	2.2 Additional investment made after acquisition	132,308,277	370,029,754
3.	Capitalized deferred interest and other		15,882,263
4.	Accrual of discount		232,883
5.	Unrealized valuation increase (decrease)		
6.	Total gain (loss) on disposals		
7.	Deduct amounts received on disposals	86,033,372	792,534,327
8.	Deduct amortization of premium and mortgage interest points and commitment fees	(2,590,291)	(12,144,336)
9.	Total foreign exchange change in book value/recorded investment excluding accrued interest		
10.	Deduct current year's other than temporary impairment recognized		1,324,051
11.	Book value/recorded investment excluding accrued interest at end of current period (Lines 1+2+3+4+5+6-7-8+9-10)	4,705,701,745	4,548,347,259
12.	Total valuation allowance		
13.	Subtotal (Line 11 plus Line 12)	4,705,701,745	4,548,347,259
14.	Deduct total nonadmitted amounts		
15.	Statement value at end of current period (Line 13 minus Line 14)	4,705,701,745	4,548,347,259

SCHEDULE BA - VERIFICATION

Other Long-Term Invested Assets

		1 Year to Date	2 Prior Year Ended December 31
1.	Book/adjusted carrying value, December 31 of prior year	883,278,117	968,742,633
2.	Cost of acquired:		
	2.1 Actual cost at time of acquisition	6,980,018	332,228
	2.2 Additional investment made after acquisition	32,766,740	116,063,695
3.	Capitalized deferred interest and other	710,902	5,101,665
4.	Accrual of discount		
5.	Unrealized valuation increase (decrease)	1,538,166	10,777,002
6.	Total gain (loss) on disposals		
7.	Deduct amounts received on disposals	29,804,134	209,605,490
8.	Deduct amortization of premium and depreciation	1,822,371	8,133,616
9.	Total foreign exchange change in book/adjusted carrying value		
10.	Deduct current year's other than temporary impairment recognized		
11.	Book/adjusted carrying value at end of current period (Lines 1+2+3+4+5+6-7-8+9-10)	893,647,438	883,278,117
12.	Deduct total nonadmitted amounts		
13.	Statement value at end of current period (Line 11 minus Line 12)	893,647,438	883,278,117

SCHEDULE D - VERIFICATION

Bonds and Stocks

		1 Year to Date	2 Prior Year Ended December 31
1.	Book/adjusted carrying value of bonds and stocks, December 31 of prior year	11,662,501,604	11,174,445,666
2.	Cost of bonds and stocks acquired	628,783,086	1,287,658,809
3.	Accrual of discount	2,872,434	11,458,696
4.	Unrealized valuation increase (decrease)	(3,101,959)	380,107,833
5.	Total gain (loss) on disposals	119,525	(14,176)
6.	Deduct consideration for bonds and stocks disposed of	210,573,810	1,172,589,823
7.	Deduct amortization of premium	3,343,828	12,460,853
8.	Total foreign exchange change in book/adjusted carrying value		
9.	Deduct current year's other than temporary impairment recognized		6,104,548
10.	Total investment income recognized as a result of prepayment penalties and/or acceleration fees	1,084,360	
11.	Book/adjusted carrying value at end of current period (Lines 1+2+3+4+5-6-7+8-9+10)	12,078,341,412	11,662,501,604
12.	Deduct total nonadmitted amounts	990,915	2,325,553
13.	Statement value at end of current period (Line 11 minus Line 12)	12,077,350,497	11,660,176,051

SCHEDULE D - PART 1B

Showing the Acquisitions, Dispositions and Non-Trading Activity
During the Current Quarter for all Bonds and Preferred Stock by NAIC Designation

NAIC Designation	1 Book/Adjusted Carrying Value Beginning of Current Quarter	2 Acquisitions During Current Quarter	3 Dispositions During Current Quarter	4 Non-Trading Activity During Current Quarter	5 Book/Adjusted Carrying Value End of First Quarter	6 Book/Adjusted Carrying Value End of Second Quarter	7 Book/Adjusted Carrying Value End of Third Quarter	8 Book/Adjusted Carrying Value December 31 Prior Year
BONDS								
1. NAIC 1 (a)	4,356,340,994	3,001,515,942	3,256,637,450	28,571,169	4,129,790,655			4,356,340,994
2. NAIC 2 (a)	4,766,729,229	403,959,614	52,363,583	(63,998,119)	5,054,327,141			4,766,729,229
3. NAIC 3 (a)	339,044,695		7,048,411	15,077,734	347,074,018			339,044,695
4. NAIC 4 (a)	66,721,216		34,062,603	24,218,708	56,877,321			66,721,216
5. NAIC 5 (a)	26,541,985	(64,309)	127,884	(2,401,640)	23,948,152			26,541,985
6. NAIC 6 (a)	74,201				74,201			74,201
7. Total Bonds	9,555,452,320	3,405,411,247	3,350,239,931	1,467,852	9,612,091,488			9,555,452,320
PREFERRED STOCK								
8. NAIC 1	4,500,000				4,500,000			4,500,000
9. NAIC 2								
10. NAIC 3								
11. NAIC 4								
12. NAIC 5								
13. NAIC 6								
14. Total Preferred Stock	4,500,000				4,500,000			4,500,000
15. Total Bonds and Preferred Stock	9,559,952,320	3,405,411,247	3,350,239,931	1,467,852	9,616,591,488			9,559,952,320

(a) Book/Adjusted Carrying Value column for the end of the current reporting period includes the following amount of short-term and cash equivalent bonds by NAIC designation:

NAIC 1 $ 225,388,534 ; NAIC 2 $; NAIC 3 $ NAIC 4 $; NAIC 5 $; NAIC 6 $

SCHEDULE DA - PART 1

Short-Term Investments

	1 Book/Adjusted Carrying Value	2 Par Value	3 Actual Cost	4 Interest Collected Year-to-Date	5 Paid for Accrued Interest Year-to-Date
9199999 Totals	4,399,974	XXX	4,397,510	24,449	12,699

SCHEDULE DA - VERIFICATION

Short-Term Investments

		1 Year To Date	2 Prior Year Ended December 31
1.	Book/adjusted carrying value, December 31 of prior year	5,614,956	208,212,349
2.	Cost of short-term investments acquired	4,467,119	11,309,024,363
3.	Accrual of discount	3,904	18,019
4.	Unrealized valuation increase (decrease)		(69,608)
5.	Total gain (loss) on disposals	13,995	6,670
6.	Deduct consideration received on disposals	5,700,000	11,510,930,832
7.	Deduct amortization of premium		646,005
8.	Total foreign exchange change in book/adjusted carrying value		
9.	Deduct current year's other than temporary impairment recognized		
10.	Book/adjusted carrying value at end of current period (Lines 1+2+3+4+5-6-7+8-9)	4,399,974	5,614,956
11.	Deduct total nonadmitted amounts		
12.	Statement value at end of current period (Line 10 minus Line 11)	4,399,974	5,614,956

SCHEDULE DB - PART A - VERIFICATION

Options, Caps, Floors, Collars, Swaps and Forwards

1.	Book/Adjusted Carrying Value, December 31, prior year (Line 9, prior year)	212,993,079
2.	Cost Paid/(Consideration Received) on additions	15,352,205
3.	Unrealized Valuation increase/(decrease)	(23,081,129)
4.	Total gain (loss) on termination recognized	9,845,773
5.	Considerations received/(paid) on terminations	17,469,497
6.	Amortization	
7.	Adjustment to the Book/Adjusted Carrying Value of hedged item	
8.	Total foreign exchange change in Book/Adjusted Carrying Value	
9.	Book/Adjusted Carrying Value at End of Current Period (Lines 1+2+3+4-5+6+7+8)	197,640,431
10.	Deduct nonadmitted assets	
11.	Statement value at end of current period (Line 9 minus Line 10)	197,640,431

SCHEDULE DB - PART B - VERIFICATION

Futures Contracts

1.	Book/Adjusted carrying value, December 31 of prior year (Line 6, prior year)	
2.	Cumulative cash change (Section 1, Broker Name/Net Cash Deposits Footnote - Cumulative Cash Change column)	
3.1	Add:	
	Change in variation margin on open contracts - Highly Effective Hedges	
	3.11 Section 1, Column 15, current year to date minus	
	3.12 Section 1, Column 15, prior year	
	Change in variation margin on open contracts - All Other	
	3.13 Section 1, Column 18, current year to date minus	
	3.14 Section 1, Column 18, prior year	
3.2	Add:	
	Change in adjustment to basis of hedged item	
	3.21 Section 1, Column 17, current year to date minus	
	3.22 Section 1, Column 17, prior year	
	Change in amount recognized	
	3.23 Section 1, Column 19, current year to date minus	
	3.24 Section 1, Column 19, prior year	
3.3	Subtotal (Line 3.1 minus Line 3.2)	
4.1	Cumulative variation margin on terminated contracts during the year	
4.2	Less:	
	4.21 Amount used to adjust basis of hedged item	
	4.22 Amount recognized	
4.3	Subtotal (Line 4.1 minus Line 4.2)	
5.	Dispositions gains (losses) on contracts terminated in prior year:	
	5.1 Total gain (loss) recognized for terminations in prior year	
	5.2 Total gain (loss) adjusted into the hedged item(s) for terminations in prior year	
6.	Book/Adjusted carrying value at end of current period (Lines 1+2+3.3-4.3-5.1-5.2)	
7.	Deduct total nonadmitted amounts	
8.	Statement value at end of current period (Line 6 minus Line 7)	

NONE

Schedule DB - Part C - Section 1 - Replication (Synthetic Asset) Transactions (RSATs) Open

N O N E

Schedule DB-Part C-Section 2-Reconciliation of Replication (Synthetic Asset) Transactions Open

N O N E

SCHEDULE DB - VERIFICATION

Verification of Book/Adjusted Carrying Value, Fair Value and Potential Exposure of all Open Derivative Contracts

		Book/Adjusted Carrying Value Check	
1.	Part A, Section 1, Column 14	197,640,431	
2.	Part B, Section 1, Column 15 plus Part B, Section 1 Footnote - Total Ending Cash Balance		
3.	Total (Line 1 plus Line 2)		197,640,431
4.	Part D, Section 1, Column 5	197,640,431	
5.	Part D, Section 1, Column 6		
6.	Total (Line 3 minus Line 4 minus Line 5)		

		Fair Value Check	
7.	Part A, Section 1, Column 16	197,640,431	
8.	Part B, Section 1, Column 13		
9.	Total (Line 7 plus Line 8)		197,640,431
10.	Part D, Section 1, Column 8	197,640,431	
11.	Part D, Section 1, Column 9		
12	Total (Line 9 minus Line 10 minus Line 11)		

		Potential Exposure Check	
13.	Part A, Section 1, Column 21		
14.	Part B, Section 1, Column 20		
15.	Part D, Section 1, Column 11		
16.	Total (Line 13 plus Line 14 minus Line 15)		

SCHEDULE E - PART 2 - VERIFICATION

(Cash Equivalents)

		1 Year To Date	2 Prior Year Ended December 31
1.	Book/adjusted carrying value, December 31 of prior year	833,942,952	94,618,573
2.	Cost of cash equivalents acquired	5,840,564,707	12,428,919,902
3.	Accrual of discount	1,935,341	5,431,477
4.	Unrealized valuation increase (decrease)		
5.	Total gain (loss) on disposals		
6.	Deduct consideration received on disposals	6,234,511,182	11,695,027,000
7.	Deduct amortization of premium		
8.	Total foreign exchange change in book/adjusted carrying value		
9.	Deduct current year's other than temporary impairment recognized		
10.	Book/adjusted carrying value at end of current period (Lines 1+2+3+4+5-6-7+8-9)	441,931,818	833,942,952
11.	Deduct total nonadmitted amounts		
12.	Statement value at end of current period (Line 10 minus Line 11)	441,931,818	833,942,952

SCHEDULE A - PART 2

Showing All Real Estate ACQUIRED AND ADDITIONS MADE During the Current Quarter

1	Location		4	5	6	7	8	9
	2	3						
Description of Property	City	State	Date Acquired	Name of Vendor	Actual Cost at Time of Acquisition	Amount of Encumbrances	Book/Adjusted Carrying Value Less Encumbrances	Additional Investment Made After Acquisition
HOME OFFICE BUILDING	GALVESTON	TX	01/01/1971	Various				646,579
OFFICE BUILDING	LEAGUE CITY	TX	04/01/2002	Various				3,356
SHOPPING CENTER	BILOXI	MS	03/01/1967	Various				2,587,721
SHOPPING CENTER	KANSAS CITY	MO	03/01/1974	Various				
HOTEL	LEAGUE CITY	TX	10/01/1988	Various				17,302
OFFICE BUILDING	SANTA CLARA	CA	12/01/1987	Various				(79,733)
HEALTH CLUB	LEAGUE CITY	TX	10/01/1988	Various				19,830
OFFICE BUILDING	LEAGUE CITY	TX	12/01/1995	Various				191,671
OFFICE BUILDING	LEAGUE CITY	TX	12/01/1995	Various				78,319
OFFICE BUILDING	COSTA MESA	CA	06/01/1993	Various				40,885
OFFICE BUILDING	DALLAS	TX	09/30/2003	Various				169,733
OFFICE BUILDING	DUBLIN	OH	06/26/2009	Various				82,261
SHOPPING CENTER	LOGANVILLE	GA	10/08/2013	Various				62,000
OFFICE BUILDING	GREENWOOD VILLAGE	CO	11/20/2014	Various				834
OFFICE BUILDING	DUBLIN	OH	03/17/2015	Various				38,463
OFFICE BUILDING	DAYTON	OH	04/28/2015	Various				136,461
OFFICE BUILDING	NAPLES	FL	07/31/2015	Various				(16,208)
OFFICE BUILDING	DENVER	CO	12/08/2015	Various				4,543
0199999. Acquired by Purchase								3,984,017
OFFICE BUILDING	FLORENCE	SC	03/31/2018	Transfer	8,376,049			
0299999. Acquired by Internal Transfer					8,376,049			
0399999 - Totals					8,376,049			3,984,017

E01

SCHEDULE A - PART 3

Showing All Real Estate DISPOSED During the Quarter, Including Payments During the Final Year on “Sales Under Contract”

1	Location		4	5	6	7	8	Change in Book/Adjusted Carrying Value Less Encumbrances					14	15	16	17	18	19	20
	2	3						9	10	11	12	13							
Description of Property	City	State	Disposal Date	Name of Purchaser	Actual Cost	Expended for Additions, Permanent Improvements and Changes in Encumbrances	Book/Adjusted Carrying Value Less Encumbrances Prior Year	Current Year's Depreciation	Current Year's Other Than Temporary Impairment Recognized	Current Year's Change in Encumbrances	Total Change in Book/Adjusted Carrying Value (11-9-10)	Total Foreign Exchange Change in Book/Adjusted Carrying Value	Book/Adjusted Carrying Value Less Encumbrances on Disposal	Amounts Received During Year	Foreign Exchange Gain (Loss) on Disposal	Realized Gain (Loss) on Disposal	Total Gain (Loss) on Disposal	Gross Income Earned Less Interest Incurred on Encumbrances	Taxes, Repairs and Expenses Incurred
5008	SHOPPING CENTER		2/28/2018				192,607	2,459			(2,459)					(190,148)	(190,148)		
5162	OFFICE BUILDING		3/31/2018				285,000		285,000		(285,000)								
0199999. Property Disposed							477,607	2,459	285,000		(287,459)					(190,148)	(190,148)		
0399999 - Totals							477,607	2,459	285,000		(287,459)					(190,148)	(190,148)		

SCHEDULE B - PART 2

Showing All Mortgage Loans ACQUIRED AND ADDITIONS MADE During the Current Quarter

1	Location		4	5	6	7	8	9
	2	3					Additional	
Loan Number	City	State	Loan Type	Date Acquired	Rate of Interest	Actual Cost at Time of Acquisition	Investment Made After Acquisition	Value of Land and Buildings
1782503	GALVESTON	TX	S	11/21/2006	5.750		800,000	29,250,000
1808402	PASADENA	TX	S	07/24/2017	5.000		295,968	16,025,000
1809901	HOUSTON	TX	S	06/26/2013	4.500		254,613	47,000,000
1813401	FRESNO	CA		12/09/2013	5.000		2,371,905	6,300,000
1814902	SAN ANTONIO	TX		08/23/2017	5.000		79,634	21,800,000
1815303	RICHMOND	TX		07/06/2016	7.000		2,242,290	33,500,000
1823601	ENGLEWOOD	CO		01/28/2016	4.250		210,124	47,200,000
1824101	BLAINE	MN		03/22/2016	4.500		3,766,251	41,140,000
1826001	SAN JOSE	CA	S	09/26/2016	4.500		765,126	36,500,000
1830401	PHOENIX	AZ	S	10/16/2017	4.250		653,565	26,200,000
1831201	VALLEY PARK	MO	S	11/17/2017	4.750		7,875	9,300,000
1831301	LEANDER	TX	S	11/17/2017	4.750		54,114	13,020,000
1832101	SAN DIEGO	CA		01/17/2018	4.750	4,234,100		6,425,000
1832201	SAUGET	IL		02/06/2018	4.250	13,615,181		19,800,000
1832202	SAUGET	IL		02/06/2018	6.000	5,323,000		19,800,000
1832301	WEST ALLIS	WI	S	02/06/2018	4.500	7,808,968	22,433	17,000,000
1832401	LOS ALTOS	CA	S	02/08/2018	4.250	12,667,371	32,097	31,450,000
1832801	NEW YORK	NY		03/06/2018	4.250	21,147,000		33,200,000
1832901	SOUTH JORDAN	UT		03/20/2018	4.750	40,794,500		56,300,000
1833001	HAZELWOOD	MO		03/22/2018	4.250	2,396,295		3,900,000
1833002	HAZELWOOD	MO		03/22/2018	6.000	937,000		
1833101	AMERICAN CANYON	CA		07/26/2016	5.000		333,873	41,870,000
318204	HOUSTON	TX		05/05/2016	6.750		2,009,061	36,475,000
320701	CIBOLO	TX	S	04/22/2015	5.000		17,364	9,200,000
321101	SAN ANTONIO	TX	S	06/05/2015	4.750		2,821,225	52,130,000
321701	CONROE	TX		08/28/2015	5.200		185,693	30,869,200
322301	JEFFERSONVILLE	IN		12/17/2015	5.000		165,636	25,835,000
322403	PEARLAND	TX		11/22/2016	5.000		296,685	49,550,000
322601	LOS ANGELES	CA		03/24/2016	4.950		1,486	24,800,000
322701	NEW CANEY	TX		04/08/2016	4.950		2,106,546	115,420,000
322801	MCKINNEY	TX	S	05/03/2016	5.000		6,003,727	50,800,000
322901	MARIETTA	GA	S	05/05/2016	5.000		5,094,006	67,800,000
322902	MARIETTA	GA	S	11/10/2017	5.000		1	67,800,000
323001	MAUI	HI	S	06/03/2016	5.250		483,214	116,350,000
323101	CAMPBELL	CA	S	06/09/2016	4.500		718,918	9,700,000
323201	LANCASTER	TX	S	06/30/2016	5.000		725,742	63,700,000
323301	LIVERMORE	CA	S	07/06/2016	4.900		4,982,017	74,180,000
323601	SOUTH JORDAN	UT		08/17/2016	4.750		8,694,668	51,800,000
323701	NAPA	CA		08/18/2016	5.125		14,412,184	143,600,000
323801	AUSTIN	TX	S	08/24/2016	5.000		3,654,352	45,000,000
323802	AUSTIN	TX	S	02/06/2018	5.500	(38,125)	146,710	58,000,000
323901	CEDAR PARK	TX		08/25/2016	5.000		1,715,862	23,300,000
324001	KANSAS CITY	MO		09/09/2016	5.250		889,363	11,450,000
324101	HOUSTON	TX		10/18/2016	5.000		7,142,497	55,600,000
324201	EDGERTON	KS	S	10/27/2016	5.000		4,928,379	36,700,000
324301	DENVER	CO		10/28/2016	5.000		6,497,395	80,100,000
324401	WILMER	TX	S	11/10/2016	4.750		139,073	21,800,000
324501	PEARLAND	TX	S	11/29/2016	5.000		1,315,489	13,000,000
324601	DENVER	CO	S	12/15/2016	4.750		2,502,810	16,400,000
324701	SALT LAKE CITY	UT		02/09/2017	4.750		6,979,137	57,000,000
324801	DENVER	CO	S	03/15/2017	4.750		3,042,535	9,600,000
324901	DENVER	CO	S	03/15/2017	4.750		1,528,488	18,300,000
325001	SPRING	TX		04/27/2017	5.500		12,799,475	139,000,000
325101	AUSTIN	TX		06/07/2017	4.750		2,363,036	16,200,000
325201	GREENWOOD	IN		07/06/2017	5.250		2,254,567	18,500,000
325301	GREENWOOD	IN		07/06/2017	5.250		1,618,864	13,800,000
325501	PEARLAND	TX	S	07/27/2017	4.750		684,298	7,400,000
325701	HOUSTON	TX		09/13/2017	5.000	(72,000)	13	47,000,000
325801	AURORA	OH		10/03/2017	5.250		7,213,340	28,290,000
325802	AURORA	OH		10/03/2017	6.000		1,382,828	28,290,000
325901	AUSTIN	TX		10/10/2017	4.750		1,676,370	52,300,000
326001	FT MYERS	FL		10/17/2017	5.250		485,170	28,700,000
326101	SAN ANTONIO	TX		10/23/2017	5.000		12	20,220,000
326301	GONZALES	LA		12/14/2017	5.000		55	32,200,000
1832701	SPRING	TX		10/16/2014	5.250		120,639	32,000,000

SCHEDULE B - PART 2

Showing All Mortgage Loans ACQUIRED AND ADDITIONS MADE During the Current Quarter

1	Location		4	5	6	7	8	9
Loan Number	2 City	3 State	Loan Type	Date Acquired	Rate of Interest	Actual Cost at Time of Acquisition	Additional Investment Made After Acquisition	Value of Land and Buildings
317004	SOUTH PADRE ISLAND	TX	S	12/01/2014	4.250		600,000	36,700,000
317005	SOUTH PADRE ISLAND	TX	S	03/31/2017	7.000		200,000	36,700,000
326401	BEAUMONT	CA		01/25/2018	4.750	(324,000)		22,780,000
1781501	RIVERHEAD	NY		01/30/2006	5.990		(25,000)	9,640,000
1794501	ALBUQUERQUE	NM		09/29/2010	6.300		(10,000)	10,730,000
1804801	TAMPA	FL		07/30/2012	5.750		(25,000)	15,850,000
1806001	HOUSTON	TX		10/29/2012	5.350		(120,521)	37,500,000
0599999. Mortgages in good standing - Commercial mortgages-all other						108,489,290	132,308,277	2,627,039,200
0899999. Total Mortgages in good standing						108,489,290	132,308,277	2,627,039,200
1699999. Total - Restructured Mortgages								
2499999. Total - Mortgages with overdue interest over 90 days								
3299999. Total - Mortgages in the process of foreclosure								
3399999 - Totals						108,489,290	132,308,277	2,627,039,200

SCHEDULE B - PART 3

Showing All Mortgage Loans DISPOSED, Transferred or Repaid During the Current Quarter

1	Location		4	5	6	7	Change in Book Value/Recorded Investment						14	15	16	17	18
	2	3				Book Value/ Recorded Investment Excluding Accrued Interest Prior Year	8 Unrealized Valuation Increase (Decrease)	9 Current Year's (Amortization) /Accretion	10 Current Year's Other Than Temporary Impairment Recognized	11 Capitalized Deferred Interest and Other	12 Total Change in Book Value (8+9-10+11)	13 Total Foreign Exchange Change in Book Value	Book Value/ Recorded Investment Excluding Accrued Interest on Disposal	Consid-eration	Foreign Exchange Gain (Loss) on Disposal	Realized Gain (Loss) on Disposal	Total Gain (Loss) on Disposal
Loan Number	City	State	Loan Type	Date Acquired	Disposal Date												
1797101	SOUTHFIELD	MI		02/24/2011	02/19/2018	2,981,896		758			758		2,935,567	2,982,655			
1804201	ROMULUS	MI		06/28/2012	01/11/2018	3,949,075							3,885,780	3,949,075			
1804301	NORTON SHORES	MI		06/28/2012	01/11/2018	1,987,701							1,955,843	1,987,701			
1815901	HILLIARD	OH		08/28/2014	03/01/2018	12,513,303		22,462			22,462		12,482,021	12,535,764			
322401	PEARLAND	TX		12/17/2015	03/12/2018	12,304,884		102,616			102,616		12,407,500	12,407,500			
322402	PEARLAND	TX		12/17/2015	03/12/2018	4,785,750							4,785,750	4,785,750			
322403	PEARLAND	TX		11/22/2016	03/12/2018	11,532,962		165,375			165,375		11,995,022	11,995,022			
322404	PEARLAND	TX		11/22/2016	03/12/2018	4,888,856		31,894			31,894		4,920,750	4,920,750			
0199999. Mortgages closed by repayment						54,944,427		323,105			323,105		55,368,233	55,564,217			
1705901	STONE MOUNTAIN	GA		03/31/1987		571,608							118,051	118,051			
1763101	SAN ANTONIO	TX		03/03/1999		2,217,447		1,115			1,115		400,773	400,773			
1766601	SUMMERVILLE	SC		02/21/2002		2,508,375		332			332		141,898	141,898			
1768801	BATTLE CREEK	MI		05/12/2003		2,498,416		207			207		43,211	43,211			
1769501	FARMINGTON HILLS	MI		06/12/2003		2,931,725							24,681	24,681			
1770501	GREENVILLE	SC		10/30/2003		1,117,579		60			60		18,175	18,175			
1772401	ROCHESTER	NY		06/24/2004		543,254		287			287		174,361	174,361			
1774501	BROADVIEW HEIGHTS	OH		12/15/2004		5,268,324		4,975			4,975		33,040	33,040			
1775001	CHESTERFIELD	VA	S	12/01/2004		4,776,678							138,381	138,381			
1776801	SAN ANTONIO	TX		05/24/2005		8,404,485		919			919		60,254	60,254			
1776802	SAN ANTONIO	TX		03/20/2014		1,688,958							10,622	10,622			
1778401	ALLEN	TX		11/09/2005		363,928							27,973	27,973			
1778501	SANTA CLARITA	CA		11/09/2005		4,017,686		260			260		24,833	24,833			
1778701	DAYTON	OH		11/21/2005		3,184,403		332			332		20,498	20,498			
1779301	HURST	TX		01/17/2006		1,163,218		189			189		14,173	14,173			
1781001	ROCHESTER	MI		09/28/2006		3,553,886		2,131			2,131		65,683	65,683			
1781501	RIVERHEAD	NY		01/30/2006		3,511,808		6,250			6,250		44,184	44,184			
1782507	GALVESTON	TX	S	04/07/2016		3,976,329							83,990	83,990			
1783201	CHRISTIANBURG	VA		09/17/2007		5,756,677		7,250			7,250		58,362	58,362			
1786401	QUEENSBURY	NY		06/26/2008		7,573,144		3,375			3,375		69,369	69,369			
1787001	ADDISON	IL		09/18/2008		8,369,743		5,764			5,764		74,137	74,137			
1788501	LEBANON	TN		06/11/2009		7,390,974							56,743	56,743			
1788601	SUGARLAND	TX		04/13/2007		15,646,171		3,782			3,782		133,582	133,582			

SCHEDULE B - PART 3

Showing All Mortgage Loans DISPOSED, Transferred or Repaid During the Current Quarter

1	Location		4	5	6	7	Change in Book Value/Recorded Investment						14	15	16	17	18
	2	3				Book Value/ Recorded Investment Excluding Accrued Interest Prior Year	8	9	10	11	12	13	Book Value/ Recorded Investment Excluding Accrued Interest on Disposal	Consid-eration	Foreign Exchange Gain (Loss) on Disposal	Realized Gain (Loss) on Disposal	Total Gain (Loss) on Disposal
Loan Number	City	State	Loan Type	Date Acquired	Disposal Date		Unrealized Valuation Increase (Decrease)	Current Year's (Amortization) /Accretion	Current Year's Other Than Temporary Impairment Recognized	Capitalized Deferred Interest and Other	Total Change in Book Value (8+9-10+11)	Total Foreign Exchange Change in Book Value					
1788602	SUGARLAND	TX		10/30/2014		963,033							4,767	4,767			
1788901	HOUSTON	TX		06/29/2009		10,315,817							75,343	75,343			
1789301	HOUSTON	TX		08/20/2009		5,579,443		792			792		27,751	27,751			
1790101	HUNTERSVILLE	NC		10/26/2009		11,890,845		1,514			1,514		72,431	72,431			
1790801	SANTA FE	NM		11/19/2009		18,185,288							114,138	114,138			
1791601	GLENDALE HEIGHTS	IL		02/04/2010		16,624,277							122,263	122,263			
1792101	PLANO	TX	S	02/26/2010		5,219,285							3,580,688	3,580,688			
1792301	HOFFMAN ESTATES	IL		05/13/2010		8,642,526		2,129			2,129		70,486	70,486			
1792401	CHATTANOOGA	TN		05/19/2010		12,699,532		900			900		91,132	91,132			
1792801	LAS VEGAS	NV		06/24/2010		3,711,182		1,372			1,372		24,645	24,645			
1794001	FARMINGTON HILLS	MI		08/12/2010		5,086,672		397			397		62,453	62,453			
1794501	ALBUQUERQUE	NM		09/29/2010		6,428,671		1,250			1,250		97,006	97,006			
1794701	NILES	MI		10/07/2010		8,796,071		627			627		64,517	64,517			
1794901	LEWISVILLE	TX		10/28/2010		7,380,797		1,162			1,162		93,041	93,041			
1795101	KAPAA	HI		10/28/2010		7,448,944		535			535		56,972	56,972			
1795301	SUMTER	SC		11/01/2010		1,074,935		373			373		84,870	84,870			
1795401	SUMTER	SC		11/01/2010		985,357		342			342		77,797	77,797			
1795501	PHOENIX	AZ		11/16/2010		13,692,180		952			952		93,815	93,815			
1795801	TAYLORSVILLE	UT		12/02/2010		3,103,378		248			248		22,341	22,341			
1796201	HOUSTON	TX		12/14/2010		12,272,617		1,538			1,538		88,821	88,821			
1796601	GRETNA	LA		01/25/2011		13,685,257		3,920			3,920		102,566	102,566			
1796602	GRETNA	LA		01/25/2011		10,736,929		8,295			8,295		70,138	70,138			
1796801	LAS VEGAS	NV		02/01/2011		2,270,136		568			568		17,658	17,658			
1797801	SAN ANTONIO	TX		03/29/2011		11,406,712		1,109			1,109		84,799	84,799			
1797901	ELK GROVE VILLAGE	IL		03/29/2011		4,761,102		368			368		57,227	57,227			
1798001	SMITHFIELD	NC		04/13/2011		21,280,678		1,541			1,541		182,651	182,651			
1798801	FRIENDSWOOD	TX		06/15/2011		4,876,577		695			695		36,091	36,091			
1798901	PLANO	TX		06/16/2011		12,193,900		1,217			1,217		91,240	91,240			
1799201	MILWAUKEE	WI		07/19/2011		2,907,612		2,116			2,116		21,500	21,500			
1799301	MURRELLS INLET	SC		07/21/2011		3,049,243		375			375		68,508	68,508			
1799401	COTTONWOOD HEIGHTS	UT		07/28/2011		2,117,948		150			150		15,713	15,713			
1799801	GILBERT	AZ		09/14/2011		8,297,223		832			832		60,398	60,398			
1799901	CHICAGO	IL		09/26/2011		4,677,217		161			161		32,075	32,075			
1800101	MILLSBORO	DE		09/28/2011		8,231,507		614			614		70,979	70,979			
1801301	SEATAC	WA		08/18/2009		30,392,481		48,963			48,963		172,378	172,378			
1801601	RALEIGH	NC		11/17/2011		3,649,344		258			258		27,029	27,029			
1801701	STAFFORD	TX		11/21/2011		4,778,904		338			338		35,395	35,395			
1802501	KNOXVILLE	TN		01/25/2012		8,467,561		833			833		62,130	62,130			
1802801	SANDY	UT		02/21/2012		15,580,988		1,098			1,098		114,874	114,874			
1803001	CHICAGO	IL		02/28/2012		1,157,926		145			145		60,899	60,899			
1803201	DALE CITY	VA		04/05/2012		3,382,476		285			285		112,126	112,126			
1803401	BLUE ASH	OH		05/02/2012		8,756,533		613			613		63,224	63,224			
1804501	NEW ALBANY	OH		07/24/2012		8,093,360		600			600		89,817	89,817			
1804601	BEAVERCREEK	OH		07/30/2012		11,083,026		3,872			3,872		79,003	79,003			
1804701	ROCK HILL	SC		07/30/2012		5,219,919		391			391		58,403	58,403			
1804901	JACKSON	MS		09/06/2012		5,093,769		354			354		35,776	35,776			
1805001	MONTGOMERY	AL		09/10/2012		5,723,835		397			397		40,201	40,201			
1805101	SAVANNAH	GA		09/10/2012		9,406,613		653			653		66,067	66,067			
1805801	PONTIAC	MI		10/18/2012		1,254,890		104			104		24,008	24,008			
1805901	LA CANADA FLINTRIDGE	CA		10/23/2012		3,743,635		207			207		71,099	71,099			
1806001	HOUSTON	TX		10/29/2012		24,104,119		13,391			13,391		282,152	282,152			
1806101	NORCROSS	GA		10/31/2012		7,743,367		541			541		57,206	57,206			
1806102	NORCROSS	GA		06/15/2017		492,727		234			234		1,641	1,641			
1806401	DALLAS	TX		11/01/2012		5,775,918		564			564		41,165	41,165			
1806601	ALPHARETTA	GA		11/13/2012		15,732,296		1,094			1,094		113,819	113,819			
1806701	KNOXVILLE	TN		11/14/2012		1,925,121		142			142		21,284	21,284			
1807101	CINCINNATI	OH		12/11/2012		10,036,854		740			740		112,402	112,402			
1807401	PEWAUKEE	WI		12/13/2012		12,690,749		2,456			2,456		89,916	89,916			
1807601	SHILOH	IL		01/08/2013		3,425,079		252			252		50,850	50,850			
1807801	FENTON	MO		01/15/2013		9,933,856		728			728		109,231	109,231			

SCHEDULE B - PART 3

Showing All Mortgage Loans DISPOSED, Transferred or Repaid During the Current Quarter

1	Location		4	5	6	7	Change in Book Value/Recorded Investment						14	15	16	17	18
	2	3				Book Value/ Recorded Investment Excluding Accrued Interest Prior Year	8	9	10	11	12	13	Book Value/ Recorded Investment Excluding Accrued Interest on Disposal	Consid-eration	Foreign Exchange Gain (Loss) on Disposal	Realized Gain (Loss) on Disposal	Total Gain (Loss) on Disposal
Loan Number	City	State	Loan Type	Date Acquired	Disposal Date		Unrealized Valuation Increase (Decrease)	Current Year's (Amortization) /Accretion	Current Year's Other Than Temporary Impairment Recognized	Capitalized Deferred Interest and Other	Total Change in Book Value (8+9-10+11)	Total Foreign Exchange Change in Book Value					
1808001	EAGAN	MN		01/24/2013		8,955,116		617			617		61,198	61,198			
1808201	DALLAS	TX		02/19/2013		9,513,629		654			654		64,574	64,574			
1808301	ROCHESTER HILLS	MI		02/26/2013		20,530,020		1,425			1,425		145,610	145,610			
1808401	PASADENA	TX	S	02/27/2013		7,469,882							56,872	56,872			
1808601	PLANO	TX		03/20/2013		8,242,059		1,555			1,555		66,162	66,162			
1808801	SACRAMENTO	CA		04/10/2013		7,137,869		3,484			3,484		50,869	50,869			
1809001	MACOMB	MI		05/06/2013		5,425,041		393			393		58,439	58,439			
1809101	LAKE ORION	MI		05/06/2013		4,650,035		337			337		50,091	50,091			
1809801	EL PASO	TX		06/13/2013		3,931,006		276			276		45,867	45,867			
1810101	DEKALB	IL		07/09/2013		4,593,760		1,466			1,466		23,987	23,987			
1810201	SMYRNA	GA		07/09/2013		11,344,878		1,014			1,014		80,538	80,538			
1810401	COLLEGE PARK	GA		07/18/2013		7,340,654		3,763			3,763		79,879	79,879			
1810501	LIMA	OH		07/25/2013		6,003,662		432			432		63,687	63,687			
1810701	FORT LAUDERDALE	FL		07/30/2013		4,603,380		244			244		82,089	82,089			
1810901	HOUSTON	TX		08/15/2013		5,200,034		505			505		12,529	12,529			
1811401	ALBUQUERQUE	NM		09/12/2013		2,122,953		152			152		22,277	22,277			
1811501	LAS VEGAS	NV		09/17/2013		8,110,599		556			556		58,171	58,171			
1811601	LOS ANGELES	CA		09/18/2013		8,962,183		3,320			3,320		57,806	57,806			
1811801	RALEIGH	NC		10/03/2013		19,801,249		9,717			9,717		92,625	92,625			
1812101	SUN CITY CENTER	FL		10/15/2013		2,479,076		897			897		17,480	17,480			
1812201	GALVESTON	TX		10/24/2011		15,126,121		6,042			6,042		30,627	30,627			
1812301	SOUTHFIELD	MI		10/24/2013		7,105,263		482			482		46,826	46,826			
1812401	WOODSTOCK	GA		10/29/2013		3,601,541		244			244		23,519	23,519			
1812501	SAN LUIS OBISPO	CA		11/04/2013		14,065,371		957			957		96,130	96,130			
1812601	LAS VEGAS	NV		11/06/2013		9,724,273		6,299			6,299		64,526	64,526			
1812901	SOUTH JORDAN	UT		11/22/2013		11,632,256		787			787		76,625	76,625			
1813001	LAS VEGAS	NV		12/05/2013		43,661,789		10,328			10,328		221,082	221,082			
1813201	KNOXVILLE	TN		12/06/2013		26,184,461		1,687			1,687		218,900	218,900			
1813202	KNOXVILLE	TN		12/06/2013		1,875,787							15,290	15,290			
1813401	FRESNO	CA		12/09/2013		2,948,874		1,097			1,097		11,060	11,060			
1813501	ALPHARETTA	GA		12/09/2013		3,291,476		222			222		21,541	21,541			
1813601	NOVI	MI		12/12/2013		5,299,037		364			364		41,866	41,866			
1813701	SAN FRANCISCO	CA		12/16/2013		5,851,513		395			395		38,295	38,295			
1814001	DELAWARE	OH		01/16/2014		5,683,043		579			579		93,826	93,826			
1814101	COLLEGE PARK	GA		01/30/2014		16,247,052		3,062			3,062		101,082	101,082			
1814301	VALENCIA	CA		04/03/2014		10,249,718		3,797			3,797		68,052	68,052			
1814501	STERLING	VA		04/16/2014		7,531,152		985			985		46,037	46,037			
1814701	INDIANAPOLIS	IN		05/21/2014		5,636,403		376			376		35,712	35,712			
1814801	SALT LAKE CITY	UT		06/03/2014		6,280,036		402			402		40,793	40,793			
1815001	LOUISVILLE	KY		06/05/2014		6,260,657		621			621		97,811	97,811			
1815101	ST LOUIS	MO		06/10/2014		42,156,009		21,491			21,491		213,649	213,649			
1815201	MEMPHIS	TN		06/16/2014		2,954,435		307			307		34,637	34,637			
1815301	RICHMOND	TX		06/25/2014		6,397,288							313,969	313,969			
1815302	RICHMOND	TX		07/06/2016		5,925,729		1,272			1,272		287,958	287,958			
1815303	RICHMOND	TX		07/06/2016		3,849,263		3,063			3,063		193,698	193,698			
1815401	ALPHARETTA	GA		06/26/2014		11,447,674		1,085			1,085		97,783	97,783			
1815501	WASHINGTON	DC		06/27/2014		43,556,494		5,507			5,507		265,803	265,803			
1815701	ST LOUIS	IL		07/30/2014		8,159,248		789			789		67,749	67,749			
1815801	HOUSTON	TX		08/01/2014		6,801,139		445			445		41,291	41,291			
1816001	MADISON HEIGHTS	MI		09/15/2014		5,787,933		390			390		57,538	57,538			
1816201	CINCINNATI	OH		09/29/2014		6,213,342		2,896			2,896		41,492	41,492			
1816301	CINCINNATI	OH		09/29/2014		10,449,712		4,870			4,870		69,783	69,783			
1816401	CHARLOTTE	NC		10/02/2014		10,709,522		711			711		67,851	67,851			
1816501	FORT LAUDERDALE	FL		10/23/2014		3,293,758		2,171			2,171		23,010	23,010			
1816601	MIAMI	FL		11/19/2014		27,626,536		5,092			5,092		170,047	170,047			
1817001	OMAHA	NE		12/09/2014		6,767,698		449			449		44,835	44,835			
1817101	LOGAN CITY	UT		12/09/2014		17,678,305		1,146			1,146		111,347	111,347			
1817201	ENGLEWOOD	CO		12/11/2014		12,245,109		1,732			1,732		83,144	83,144			
1817301	LOS ANGELES	CA		12/15/2014		20,897,238		2,736			2,736		144,631	144,631			
1817401	DULUTH	GA		12/16/2014		15,926,594		1,033			1,033		101,653	101,653			

SCHEDULE B - PART 3

Showing All Mortgage Loans DISPOSED, Transferred or Repaid During the Current Quarter

1	Location		4	5	6	7	Change in Book Value/Recorded Investment						14	15	16	17	18
	2	3				Book Value/ Recorded Investment Excluding Accrued Interest Prior Year	8	9	10	11	12	13	Book Value/ Recorded Investment Excluding Accrued Interest on Disposal	Consid- eration	Foreign Exchange Gain (Loss) on Disposal	Realized Gain (Loss) on Disposal	Total Gain (Loss) on Disposal
Loan Number	City	State	Loan Type	Date Acquired	Disposal Date		Unrealized Valuation Increase (Decrease)	Current Year's (Amortization) /Accretion	Current Year's Other Than Temporary Impairment Recognized	Capitalized Deferred Interest and Other	Total Change in Book Value (8+9-10+11)	Total Foreign Exchange Change in Book Value					
1817501	FINDLAY	OH		12/16/2014		17,676,140		1,276			1,276		273,477	273,477			
1817601	FAIRVIEW	TN		12/08/2011		7,191,092		904			904		75,601	75,601			
1817701	COLUMBUS	OH		01/13/2015		6,744,273		1,765			1,765		46,171	46,171			
1817901	KNOXVILLE	TN		01/29/2015		3,886,394		266			266		38,292	38,292			
1818001	TERRE HAUTE	IN		02/05/2015		3,170,897		369			369		28,819	28,819			
1818101	RIVERTON	UT		02/10/2015		4,968,056		468			468		33,792	33,792			
1818201	DALLAS	TX	S	02/12/2015		30,126,320		3,739			3,739		182,052	182,052			
1818301	HOUSTON	TX	S	02/24/2015		14,678,034		1,565			1,565		87,217	87,217			
1818302	HOUSTON	TX	S	02/24/2015		2,679,125							15,891	15,891			
1818401	NORTH LOGAN	UT		02/26/2015		4,261,161		278			278		27,110	27,110			
1818402	NORTH LOGAN	UT		05/12/2016		926,701		113			113		4,934	4,934			
1818501	RALEIGH	NC		03/16/2015		13,993,986		1,856			1,856		94,853	94,853			
1818601	LINTHICUM HEIGHTS	MD		04/01/2015		8,918,937		588			588		58,095	58,095			
1818901	FORT WORTH	TX		04/29/2015		7,557,626		498			498		49,228	49,228			
1819001	COLUMBUS	OH		11/08/2013		12,925,403		16,774			16,774		90,082	90,082			
1819002	COLUMBUS	OH		11/08/2013		749,916							20,826	20,826			
1819101	COLUMBUS	OH		11/08/2013		15,423,912		14,934			14,934		106,504	106,504			
1819102	COLUMBUS	OH		11/08/2013		828,804							23,019	23,019			
1819201	ALPHARETTA	GA		05/04/2015		3,077,704		2,013			2,013		21,348	21,348			
1819301	LIVERMORE	CA		05/21/2015		8,586,826		538			538		49,311	49,311			
1819401	THE WOODLANDS	TX		05/21/2015		2,749,484		186			186		34,787	34,787			
1819501	CONCORD	NC		05/26/2015		7,417,275		491			491		49,604	49,604			
1819601	BILLERICA	MA		06/11/2015		11,152,457		1,016			1,016		69,263	69,263			
1819701	SANDY SPRINGS	GA		06/11/2015		7,990,508		525			525		51,441	51,441			
1819801	HOUSTON	TX		06/18/2015		6,906,153		538			538		194,498	194,498			
1820001	CHARLESTON	IL		06/19/2015		4,210,159		285			285		41,576	41,576			
1820101	BOTHELL	WA		06/22/2015		4,084,666		269			269		37,459	37,459			
1820201	DALLAS	TX		06/24/2015		20,222,554		2,530			2,530		122,033	122,033			
1820301	DERBY	KS		06/24/2015		3,244,992		1,077			1,077		29,523	29,523			
1820501	DRAPER	UT		06/25/2015		21,579,195		2,776			2,776		138,930	138,930			
1820601	BAYTOWN	TX		07/15/2015		10,202,676		6,425			6,425		61,407	61,407			
1820701	PARAMOUNT	CA		07/29/2015		14,861,598		1,000			1,000		142,292	142,292			
1820901	WALDORF	MD		08/17/2015		4,437,436		291			291		29,649	29,649			
1821201	PHOENIX	AZ		09/01/2015		31,574,155		27,378			27,378		188,598	188,598			
1821301	HOUSTON	TX		09/01/2015		59,633,919		7,492			7,492		337,504	337,504			
1821401	TALLAHASSEE	FL		09/02/2015		4,324,149		201			201		62,779	62,779			
1821701	DENVER	CO	S	09/22/2015		12,814,651		1,134			1,134		73,279	73,279			
1821801	BROOKPARK	OH		09/30/2015		9,261,865		1,732			1,732		51,297	51,297			
1821901	HOUSTON	TX		09/30/2015		6,554,101		477			477		36,349	36,349			
1822001	COLLEGE PARK	GA		09/30/2015		13,725,618		999			999		76,123	76,123			
1822101	COPPELL	TX		09/30/2015		11,985,943		2,241			2,241		66,384	66,384			
1822201	PHOENIX	AZ	S	10/01/2015		15,530,033		9,599			9,599		92,531	92,531			
1822501	GLENDALE	CA		10/19/2015		23,882,423		1,377			1,377		135,384	135,384			
1822601	CINCINNATI	OH		10/23/2015		6,893,915		449			449		42,646	42,646			
1822701	COLUMBUS	OH		08/29/2013		28,160,470							173,267	173,267			
1822702	COLUMBUS	OH		08/29/2013		3,811,332							18,008	18,008			
1822901	TINLEY PARK	IL		10/28/2015		4,384,009		396			396		25,726	25,726			
1823001	HOUSTON	TX	S	11/18/2015		8,741,008		789			789		52,806	52,806			
1823101	AGOURA HILLS	CA		12/01/2015		15,496,195		1,431			1,431		99,567	99,567			
1823201	DALLAS	TX		12/07/2015		11,431,681		598			598		70,318	70,318			
1823301	TEMESCAL VALLEY	CA		01/13/2016		33,068,295		33,306			33,306		161,197	161,197			
1823401	KOLOA	HI		01/14/2016		36,981,470		5,616			5,616		135,879	135,879			
1823501	LOUISVILLE	KY		01/28/2016		6,365,112		406			406		70,474	70,474			
1823601	ENGLEWOOD	CO		01/28/2016		31,773,607		4,268			4,268		59,764	59,764			
1823701	RICHMOND	VA		02/08/2016		8,531,711		5,478			5,478		56,694	56,694			
1824201	DETROIT	MI		04/11/2016		7,187,990		926			926		44,015	44,015			
1824301	DEERFIELD	FL		04/12/2016		2,395,874		309			309		14,672	14,672			
1824801	MINNEAPOLIS	MN		04/27/2016		5,052,451		325			325		30,695	30,695			
1825301	SACRAMENTO	CA		07/21/2016		18,475,080		18,558			18,558		112,105	112,105			
1825701	CARLSBAD	CA		08/25/2016		10,572,872		674			674		62,782	62,782			

SCHEDULE B - PART 3

Showing All Mortgage Loans DISPOSED, Transferred or Repaid During the Current Quarter

1	Location		4	5	6	7	Change in Book Value/Recorded Investment						14	15	16	17	18
	2	3				Book Value/ Recorded Investment Excluding Accrued Interest Prior Year	8	9	10	11	12	13	Book Value/ Recorded Investment Excluding Accrued Interest on Disposal	Consid-eration	Foreign Exchange Gain (Loss) on Disposal	Realized Gain (Loss) on Disposal	Total Gain (Loss) on Disposal
Loan Number	City	State	Loan Type	Date Acquired	Disposal Date		Unrealized Valuation Increase (Decrease)	Current Year's (Amortization) /Accretion	Current Year's Other Than Temporary Impairment Recognized	Capitalized Deferred Interest and Other	Total Change in Book Value (8+9-10+11)	Total Foreign Exchange Change in Book Value					
1825901	MILWAUKEE	WI		09/15/2016		13,363,177		852			852		78,901	78,901			
1826201	LEXINGTON	KY		10/11/2016		14,070,109		3,564			3,564		88,644	88,644			
1826701	FORT WORTH	TX		11/17/2016		12,829,346		815			815		74,896	74,896			
1826801	LAGUNA BEACH	CA		12/06/2016		10,376,574		645			645		37,684	37,684			
1827001	BROOKFIELD	WI		12/13/2016		10,021,754		1,255			1,255		58,161	58,161			
1827301	NAPERVILLE	IL		12/16/2016		24,371,549		3,100			3,100		144,300	144,300			
1828401	COLUMBIA	SC		05/23/2017		10,857,703		688			688		59,127	59,127			
1828501	GILBERT	AZ		05/24/2017		14,323,092		2,598			2,598		81,029	81,029			
1828701	PHOENIX	AZ		06/09/2017		8,944,848		5,207			5,207		49,955	49,955			
1828901	BIRMINGHAM	MI		06/15/2017		20,769,847		875			875		109,250	109,250			
1829001	LINONIA	MI		06/20/2017		4,438,912		563			563		24,093	24,093			
1829101	SUFFOLK	VA		06/23/2017		27,193,797		2,455			2,455		147,234	147,234			
1829201	SCOTTSDALE	AZ		06/29/2017		59,319,525		3,750			3,750		327,025	327,025			
1829301	HAYWARD	CA		07/06/2017		4,316,074		2,750			2,750		24,758	24,758			
1829701	PASADENA	TX	S	07/30/2015		16,906,789		12,140			12,140		88,726	88,726			
1830001	FLORHAM PARK	NJ		08/23/2017		14,737,169		9,375			9,375		85,610	85,610			
1830101	KNOXVILLE	TN		08/30/2017		6,797,346		428			428		36,386	36,386			
1830201	NAPERVILLE	IL	S	08/30/2017		21,118,814		13,437			13,437		127,136	127,136			
1831001	RINCON	GA		11/14/2017		6,483,750		406			406		34,120	34,120			
1831101	FARMINGTON HILLS	MI		11/16/2017		6,965,000		875			875		52,790	52,790			
1831401	HUTCHINS	TX		11/21/2017		23,820,000		4,500			4,500		130,688	130,688			
1831501	HOUSTON	TX		12/04/2017		50,490,000		17,000			17,000		301,768	301,768			
1832001	NORTH SALT LAKE	UT		12/19/2017		7,196,962		301			301		25,198	25,198			
1832101	SAN DIEGO	CA		01/17/2018				133			133		7,407	7,407			
317001	SOUTH PADRE ISLAND	TX	S	06/16/2011		17,617,365							159,821	159,821			
317002	SOUTH PADRE ISLAND	TX	S	12/17/2012		1,817,828							19,618	19,618			
317801	FORT WORTH	TX		05/24/2012		11,177,627							142,309	142,309			
318201	HOUSTON	TX		10/23/2012		24,756,705							74,886	74,886			
318204	HOUSTON	TX		05/05/2016		7,941,447				(1,607,491)	(1,607,491)		20,594	20,594			
318501	SAN ANTONIO	TX	S	12/13/2012		6,461,143							34,965	34,965			
320001	SCHAUMBURG	IL	S	05/15/2014		9,081,889							46,314	46,314			
320701	CIBOLO	TX	S	04/22/2015		4,852,222							25,610	25,610			
321301	VERNON	CA	S	06/26/2015		15,218,769		6,770			6,770		80,107	80,107			
321401	DALLAS	TX	S	06/29/2015		22,531,831		21,839			21,839		76,590	76,590			
322001	MURPHY	TX	S	10/22/2015		4,928,062		4,879			4,879		33,694	33,694			
322101	AUSTIN	TX	S	11/20/2015		11,515,369							(695,578)	(695,578)			
322201	SCHERTZ	TX	S	11/20/2015		16,671,000							60,406	60,406			
322501	HONOLULU	HI		12/18/2015		47,850,000				(17,882,731)	(17,882,731)		251,291	251,291			
323401	KATY	TX		07/18/2016		39,879,745		40,014			40,014		209,559	209,559			
0299999. Mortgages with partial repayments						2,566,842,515		632,017		(19,490,222)	(18,858,205)		22,093,106	22,093,106			
1791901	FLORENCE	SC		01/15/2009	03/06/2018	8,376,049							8,376,049	8,376,049			
0499999. Mortgages transferred						8,376,049							8,376,049	8,376,049			
0599999 - Totals						2,630,162,991		955,122		(19,490,222)	(18,535,100)		85,837,388	86,033,372			

SCHEDULE BA - PART 2

Showing Other Long-Term Invested Assets ACQUIRED AND ADDITIONS MADE During the Current Quarter

1	2	Location		5	6	7	8	9	10	11	12	13
		3	4									
CUSIP Identification	Name or Description	City	State	Name of Vendor or General Partner	NAIC Designation	Date Originally Acquired	Type and Strategy	Actual Cost at Time of Acquisition	Additional Investment Made After Acquisition	Amount of Encumbrances	Commitment for Additional Investment	Percentage of Ownership
	TCCL 1 McMillan-Eagle Partners L.P.	Baton Rouge	LA	TCCL 1 McMillan-Eagle Partners L.P.	02/26/2018			3,200,000				
1099999. Fixed or Variable Rate - Mortgage Loans - Affiliated								3,200,000				XXX
	ANTAC LOC	Galveston	TX	ANTAC Inc. LOC	12/31/2009				21,040,000			
	Comprehensive Investment Services. Inc. LOC	Galveston	TX	CIS	01/19/2013				5,917,808			
	LOC to Standard Life Insurance Company	Galveston	TX	SLAICO					1,000,863			
1299999. Fixed or Variable Rate - Other Fixed Income - Affiliated									27,958,671			XXX
	Equity Fund 7045 - Black Diamond Capital Partner	Austin	TX	Black Diamond	12/29/2006				45,961			
	Equity Fund 7047 - Comvest Capital III	West Palm Beach	FL	Comvest Capital	04/10/2015				3,610,928			
	Equity Fund 7049 - AIP	West Conshohocken	PA	AIP Private markets	07/19/2015				526,823			
	Equity Fund 7055 - Greystar	Charleston	SC	Greystar Equity Partners IX	04/26/2016				89,997			
	Equity Fund 7060 - Comvest Capital IV	West Palm Beach	FL	Comvest Capital	03/29/2018			3,780,018				
2199999. Joint Venture Interests - Other - Unaffiliated								3,780,018	4,273,709			XXX
	R4 Capital	New York	NY	R4 Capital	04/24/2014				226,586			
	Summit XIV	Seattle	WA	Summit Corporate Tax Credit	12/01/2014				307,774			
3799999. Non-Guaranteed State Low Income Housing Tax Credit - Unaffiliated									534,360			XXX
4499999. Total - Unaffiliated								3,780,018	4,808,069			XXX
4599999. Total - Affiliated								3,200,000	27,958,671			XXX
4699999 - Totals								6,980,018	32,766,740			XXX

E03

SCHEDULE BA - PART 3

Showing Other Long-Term Invested Assets DISPOSED, Transferred or Repaid During the Current Quarter

1	2	Location		5	6	7	8	Change in Book/Adjusted Carrying Value						15	16	17	18	19	20
		3	4					9	10	11	12	13	14						
CUSIP Identification	Name or Description	City	State	Name of Purchaser or Nature of Disposal	Date Originally Acquired	Disposal Date	Book/ Adjusted Carrying Value Less Encum-brances, Prior Year	Unrealized Valuation Increase (De-crease)	Current Year's (Depre-ciation) or (Amorti-zation)/ Accretion	Current Year's Other Than Temporary Impair-ment Recog-nized	Capital-ized Deferred Interest and Other	Total Change in Book/ Adjusted Carrying Value (9+10-11+12)	Total Foreign Exchange Change in Book/ Adjusted Carrying Value	Book/ Adjusted Carrying Value Less Encum-brances on Disposal	Consid-eration	Foreign Exchange Gain (Loss) on Disposal	Realized Gain (Loss) on Disposal	Total Gain (Loss) on Disposal	Invest-ment Income
	Whitecap Alabama Growth Fund II	Montgometry	TX	Whitecap Alabama	04/15/2008	03/31/2018								28,084	28,084				
	IHOP Secured	Glendale	CA	IHOP	01/06/2005	03/31/2018								172,795	172,795				
1199999. Fixed or Variable Rate - Other Fixed Income - Unaffiliated														200,879	200,879				
	ANTAC, Inc. LOC	Galveston	TX	ANTAC, Inc.	12/31/2009	03/31/2018	131,847,705							5,200,000	5,200,000				
	Comprehensive Investment Services, Inc. LOC	Galveston	TX	Comprehensive Investment Services, Inc.	02/05/1998	03/31/2018	16,728,309							5,917,808	5,917,808				
	LOC to Standard Life Insurance Company	Galveston	TX	SLAICO		03/31/2018								1,000,863	1,000,863				
1299999. Fixed or Variable Rate - Other Fixed Income - Affiliated							148,576,014							12,118,671	12,118,671				
	Land - Proterra	Houston	TX	Parkside Capital	12/11/2006	03/31/2018								114,115	114,115				
	Land - Eagle IND	Houston	TX	Eagle Ind., LP	12/01/1999	03/31/2018								990,000	990,000				
	Land - Moody Rambin	Houston	TX	Parkside Capital Fund II	12/31/2014	03/31/2018								325,885	325,885				
1899999. Joint Venture Interests - Real Estate - Affiliated														1,430,000	1,430,000				
	Equity Fund 7038 - Lincolnshire II	New York	NY	Lincolnshire II	12/28/1998	03/31/2018								36,604	36,604				
	Equity Fund 7039 - Starvest Partners	New York	NY	StarVest Management Equity	08/01/1999	03/31/2018								20,102	20,102				
	Equity Fund 7043 -Lexington Capital	New York	NY	Lexington Capital	01/03/2005	03/31/2018								286,887	286,887				
	Equity Fund 7044 - Arlington Capital	Washington	DC	Arlington	01/05/2006	03/31/2018								192,538	192,538				
	Equity Fund 7046 - Maranon Capital	Chicago	IL	Maranon Capital	08/13/2009	03/31/2018								541,369	541,369				
	Equity Fund 7047 - Comvest Capital III	West Palm Beach	FL	Comvest Capital	04/10/2015	03/31/2018								2,756,674	2,756,674				
	Equity Fund 7049 - AIP Private Markets	Chicago	IL	AIP Private Markets	07/21/2015	03/31/2018								220,138	220,138				

SCHEDULE BA - PART 3

Showing Other Long-Term Invested Assets DISPOSED, Transferred or Repaid During the Current Quarter

1	2	Location		5	6	7	8	Change in Book/Adjusted Carrying Value						15	16	17	18	19	20
		3	4					9	10	11	12	13	14						
CUSIP Identification	Name or Description	City	State	Name of Purchaser or Nature of Disposal	Date Originally Acquired	Disposal Date	Book/ Adjusted Carrying Value Less Encum-brances, Prior Year	Unrealized Valuation Increase (De-crease)	Current Year's (Depre-ciation) or (Amorti-zation)/ Accretion	Current Year's Other Than Temporary Impair-ment Recog-nized	Capital-ized Deferred Interest and Other	Total Change in Book/ Adjusted Carrying Value (9+10-11+12)	Total Foreign Exchange Change in Book/ Adjusted Carrying Value	Book/ Adjusted Carrying Value Less Encum-brances on Disposal	Consid-eration	Foreign Exchange Gain (Loss) on Disposal	Realized Gain (Loss) on Disposal	Total Gain (Loss) on Disposal	Invest-ment Income
	Equity Fund 7050 - Crestline	Oaks		Crestline	10/26/2015	03/31/2018								387,618	387,618				
	Equity Fund 7055 - Greystar	Charleston	SC	Greystar	05/05/2016	03/31/2018								69,751	69,751				
	Equity Fund 7059 - Arrowhead	Paramus	NJ	Arrowhead	06/28/2017	03/31/2018								5,530	5,530				
	Equity Fund 7060 - Comvest Capital IV	West Palm Beach	FL	Comvest Capital	03/29/2018	03/31/2018								513,670	513,670				
2199999. Joint Venture Interests - Other - Unaffiliated														5,030,881	5,030,881				
857477-AF-0	State Street Corp	Boston	MA	Weller Anderson	02/15/2011	03/15/2018	10,007,757	(7,757)				(7,757)		10,000,000	10,000,000				247,800
2399999. Surplus Debentures, etc - Unaffiliated							10,007,757	(7,757)				(7,757)		10,000,000	10,000,000				247,800
	Anadarko	Woodlands	TX	Coastal Securities	12/22/2015	03/31/2018								952,989	952,989				6,187
55550D-CS-6	Dallas County School	Dallas	TX	Option 100	08/13/2015	03/31/2018								70,714	70,714				796
4299999. Any Other Class of Assets - Unaffiliated														1,023,703	1,023,703				6,983
4499999. Total - Unaffiliated							10,007,757	(7,757)				(7,757)		16,255,463	16,255,463				254,783
4599999. Total - Affiliated							148,576,014							13,548,671	13,548,671				
4699999 - Totals							158,583,771	(7,757)				(7,757)		29,804,134	29,804,134				254,783

SCHEDULE D - PART 3

Show All Long-Term Bonds and Stock Acquired During the Current Quarter

1 CUSIP Identification	2 Description	3 Foreign	4 Date Acquired	5 Name of Vendor	6 Number of Shares of Stock	7 Actual Cost	8 Par Value	9 Paid for Accrued Interest and Dividends	10 NAIC Designation or Market Indicator (a)
912828-3X-6	United States Treasury Bd 2.250% 02/15/21		02/22/2018	J.P. Morgan		497,656	500,000	249	1
912828-4B-3	United States Treasury Bd 2.375% 03/15/21		03/15/2018	J.P. Morgan		169,788	170,000	11	1
912828-N8-9	United States Treasury Bd 1.375% 01/31/21		01/22/2018	Hilltop Securities Inc.		107,319	110,000	723	1
0599999. Subtotal - Bonds - U.S. Governments						774,763	780,000	983	XXX
00036A-AB-1	AARP Bd 7.500% 05/01/31		03/01/2018	Raymond James & Assoc.		4,065,720	3,000,000	77,500	1FE
00287Y-AQ-2	Abbvie Inc Bd 3.600% 05/14/25		02/20/2018	Citigroup Global Markets Inc		2,635,162	2,661,000	26,078	2FE
00287Y-AY-5	Abbvie Inc Bd 3.200% 05/14/26		02/22/2018	Stifel, Nicolaus & Co		4,794,900	5,000,000	45,333	2FE
029163-AD-4	Munich Re America Bd 7.450% 12/15/26		03/07/2018	FTN Financial		2,467,634	1,980,000	34,419	1FE
029163-AD-4	Munich Re America Bd 7.450% 12/15/26		03/16/2018	FTN Financial		393,679	316,000	6,212	1FE
03073E-AP-0	AmerisourceBergen Corp Bd 3.450% 12/15/27		02/08/2018	FTN Financial		4,828,050	5,000,000	32,583	1FE
03349M-AD-7	Andeavor Bd 5.125% 12/15/26		02/22/2018	Stifel, Nicolaus & Co		5,300,950	5,000,000	50,538	2FE
036752-AG-8	Anthem Inc Bd 4.101% 03/01/28		02/28/2018	BOSC Inc.		5,014,500	5,000,000		2FE
036752-AG-8	Anthem Inc Bd 4.101% 03/01/28		02/28/2018	Raymond James & Assoc.		2,010,600	2,000,000		2FE
04010L-AV-5	Ares Capital Corp Bd 4.250% 03/01/25		01/09/2018	Oppenheimer & Co., Inc.		6,982,850	7,000,000		2FE
04010L-AV-5	Ares Capital Corp Bd 4.250% 03/01/25		02/01/2018	Oppenheimer & Co., Inc.		3,956,960	4,000,000	11,333	2FE
04621W-AC-4	Assured Guaranty US Hldg Bd 5.000% 07/01/24		03/14/2018	Hilltop Securities Inc.		5,329,450	5,000,000	52,083	2FE
06048W-VR-8	Bank of America Corp Bd 0.000% 01/30/38		01/26/2018	Hilltop Securities Inc.		15,000,000	15,000,000		1
06048W-VY-3	Bank of America Corp Bd 0.000% 03/28/33		03/26/2018	FTN Financial		10,000,000	10,000,000		1
10103D-AB-2	Boston Medical Ctr Corp Bd 3.912% 07/01/28		03/09/2018	Hilltop Securities Inc.		4,846,900	5,000,000	45,097	2FE
10922N-AA-1	Brighthouse Financial Inc 144A 3.700% 06/22/27		01/10/2018	Stifel, Nicolaus & Co		4,868,300	5,000,000	10,278	2FE
11271R-AA-7	Brookfield Finance LLC Bd 4.000% 04/01/24		02/21/2018	Stifel, Nicolaus & Co		2,914,600	2,870,000	45,282	1FE
118230-AQ-4	Buckeye Partners Bd 3.950% 12/01/26		02/08/2018	Morgan Stanley Dean Witter		4,823,550	5,000,000	38,951	2FE
12505B-AC-4	CBRE Services Inc Bd 5.250% 03/15/25		02/27/2018	Hilltop Securities Inc.		6,412,200	6,000,000	145,250	2FE
12505B-AC-4	CBRE Services Inc Bd 5.250% 03/15/25		03/20/2018	Hilltop Securities Inc.		5,197,426	4,876,000	4,978	2FE
12505B-AD-2	CBRE Services Inc Bd 4.875% 03/01/26		02/12/2018	Wells Fargo Advisors		5,274,950	5,000,000	110,365	2FE
125509-BU-2	Cigna Corp Bd 3.250% 04/15/25		02/21/2018	Citigroup Global Markets Inc		7,726,240	8,000,000	92,444	2FE
126650-CX-6	CVS Health Corp Bd 4.300% 03/25/28		03/07/2018	J.P. Morgan		9,941,800	10,000,000		2FE
126650-CX-6	CVS Health Corp Bd 4.300% 03/25/28		03/07/2018	J.P. Morgan		9,941,800	10,000,000		2FE
126650-CX-6	CVS Health Corp Bd 4.300% 03/25/28		03/13/2018	J.P. Morgan		4,956,450	5,000,000	3,583	2FE
134429-BG-3	Campbell Soup Co Bd 4.150% 03/15/28		03/13/2018	BOSC Inc.		5,000,000	5,000,000		2FE
14020A-AM-6	Capital Impact Partners Bd 3.600% 02/15/28		02/20/2018	Hilltop Securities Inc.		5,000,000	5,000,000		1
14020A-AQ-7	Capital Impact Partners 3.800% 03/15/28		03/19/2018	Hilltop Securities Inc.		5,000,000	5,000,000		1
14040H-BK-0	Capital One Financial Corp Bd 3.750% 07/28/26		02/07/2018	Citigroup Global Markets Inc		3,882,240	4,000,000	4,583	2FE
14040H-BW-4	Capital One Financial Corp Bd 3.800% 01/31/28		02/14/2018	Citigroup Global Markets Inc		4,847,650	5,000,000	8,444	2FE
17288X-AA-2	Citadel Lp 144A 5.375% 01/17/23		03/29/2018	Oppenheimer & Co., Inc.		5,103,500	5,000,000	99,288	2FE
19260M-AA-4	Coinstar Funding, LLC 17-1A 5.216% 04/25/47		01/11/2018	Oppenheimer & Co., Inc.		10,382,203	9,950,000	116,773	2FE
345370-BY-5	Ford Motor Co Bd 6.625% 10/01/28		03/07/2018	Oppenheimer & Co., Inc.		5,770,400	5,000,000	145,382	2FE
345397-YT-4	Ford Motor Credit Co Bd 3.815% 11/02/27		01/26/2018	FTN Financial		4,883,750	5,000,000	46,628	2FE
361448-BA-0	GATX Corp Bd 3.500% 03/15/28		03/16/2018	Citigroup Global Markets Inc		3,411,972	3,600,000	1,750	2FE
361448-BA-0	GATX Corp Bd 3.500% 03/15/28		03/16/2018	Citigroup Global Markets Inc		59,710	63,000	31	2FE
37045V-AH-3	General Motors Co Bd 5.000% 04/01/35		01/24/2018	Hilltop Securities Inc.		5,193,200	5,000,000	79,861	2FE
410867-AF-2	Hanover Insurance Group Bd 4.500% 04/15/26		02/01/2018	FTN Financial		3,129,630	3,053,000	41,979	2FE
44891A-AK-3	Hyundai Capital America 144A 2.750% 09/27/26		01/26/2018	FTN Financial		4,562,800	5,000,000	46,979	2FE
44891A-AK-3	Hyundai Capital America 144A 2.750% 09/27/26		01/30/2018	Oppenheimer & Co., Inc.		7,378,503	8,127,000	76,981	2FE
465685-AK-1	ITC Holdings Corp Bd 3.250% 06/30/26		01/09/2018	Wells Fargo Advisors		7,246,370	7,294,000	7,243	2FE
465685-AN-5	ITC Holdings Corp 144A 3.350% 11/15/27		03/05/2018	FTN Financial		1,437,300	1,500,000	15,773	2FE
48203R-AJ-3	Juniper Networks Inc Bd 4.350% 06/15/25		02/01/2018	Merrill Lynch Pierce Fenner		4,067,280	4,000,000	24,167	2FE
497266-AC-0	Kirby Corporation Bd 4.200% 03/01/28		02/12/2018	Citigroup Global Markets Inc		2,001,900	2,000,000	467	2FE
497266-AC-0	Kirby Corporation Bd 4.200% 03/01/28		02/22/2018	FTN Financial		997,930	1,000,000	1,633	2FE
497266-AC-0	Kirby Corporation Bd 4.200% 03/01/28		02/27/2018	Wells Fargo Advisors		4,980,000	5,000,000	11,083	2FE
497266-AC-0	Kirby Corporation Bd 4.200% 03/01/28		02/27/2018	FTN Financial		1,994,240	2,000,000	4,433	2FE
529043-AC-5	Lexington Realty Trust Bd 4.250% 06/15/23		03/01/2018	Hilltop Securities Inc.		4,995,800	5,000,000	47,222	2FE
53227J-AA-2	Life Storage LP Bd 3.875% 12/15/27		02/01/2018	Hilltop Securities Inc.		4,909,200	5,000,000	31,215	2FE
53227J-AA-2	Life Storage LP Bd 3.875% 12/15/27		02/07/2018	FTN Financial		3,212,972	3,275,000	21,856	2FE
53227J-AA-2	Life Storage LP Bd 3.875% 12/15/27		02/08/2018	FTN Financial		4,880,450	5,000,000	34,983	2FE
534187-BH-1	Lincoln National Corp Bd 3.800% 03/01/28		02/16/2018	Morgan Stanley Dean Witter		4,486,498	4,490,000	4,266	2FE
534187-BH-1	Lincoln National Corp Bd 3.800% 03/01/28		02/28/2018	Morgan Stanley Dean Witter		4,973,550	5,000,000	10,556	2FE
534187-BH-1	Lincoln National Corp Bd 3.800% 03/01/28		03/08/2018	Morgan Stanley Dean Witter		4,960,900	5,000,000	15,833	2FE
534187-BH-1	Lincoln National Corp Bd 3.800% 03/01/28		03/20/2018	Morgan Stanley Dean Witter		4,931,350	5,000,000	21,111	2FE
543190-AB-8	Long Train Leasing III LLC 2015 15-1A 4.060% 01/15/45		02/01/2018	Cantor Fitzgerald & Co.		6,090,938	6,000,000	13,533	1FE
582839-AH-9	Mead Johnson Nutrition Bd 4.125% 11/15/25		02/22/2018	FTN Financial		9,891,187	9,700,000	112,257	1FE
589400-AB-6	Mercury General Corp Bd 4.400% 03/15/27		02/08/2018	Cantor Fitzgerald & Co.		5,014,950	5,000,000	89,833	2FE

SCHEDULE D - PART 3

Show All Long-Term Bonds and Stock Acquired During the Current Quarter

1 CUSIP Identification	2 Description	3 Foreign	4 Date Acquired	5 Name of Vendor	6 Number of Shares of Stock	7 Actual Cost	8 Par Value	9 Paid for Accrued Interest and Dividends	10 NAIC Designation or Market Indicator (a)
58942H-AB-7	Mercy Healthcare System Bd 3.555% 08/01/27		01/26/2018	Hilltop Securities Inc.		5,218,605	5,250,000	20,219	1FE
631103-AG-3	NASDAQ OMX Group Bd 3.850% 06/30/26		03/16/2018	Stifel, Nicolaus & Co		5,321,430	5,400,000	46,200	2FE
631103-AG-3	NASDAQ OMX Group Bd 3.850% 06/30/26		03/19/2018	Merrill Lynch Pierce Fenner		4,333,868	4,400,000	38,115	2FE
636180-BM-2	National Fuel Gas Co Bd 5.200% 07/15/25		01/26/2018	FTN Financial		4,002,413	3,750,000	8,125	2FE
636180-BM-2	National Fuel Gas Co Bd 5.200% 07/15/25		01/26/2018	FTN Financial		5,337,150	5,000,000	10,833	2FE
680223-AK-0	Old Republic Intl Corp Bd 3.875% 08/26/26		02/21/2018	Cantor Fitzgerald & Co.		4,900,000	5,000,000	95,260	2FE
681936-BD-1	Omega Healthcare Invs Inc Bd 4.500% 01/15/25		02/21/2018	Hilltop Securities Inc.		6,814,080	7,000,000	33,250	2FE
694606-AA-2	Pacific Life Insurance Co Bd 7.900% 12/30/23		03/12/2018	Hilltop Securities Inc.		12,907,945	10,700,000	173,756	1
703481-AA-9	Patterson-Uti Energy Inc 144A 3.950% 02/01/28		01/10/2018	Wells Fargo Advisors		1,998,500	2,000,000		2FE
703481-AA-9	Patterson-Uti Energy Inc 144A 3.950% 02/01/28		01/22/2018	Morgan Stanley Dean Witter		4,967,600	5,000,000	2,743	2FE
703481-AA-9	Patterson-Uti Energy Inc 144A 3.950% 02/01/28		01/22/2018	Morgan Stanley Dean Witter		2,139,938	2,150,000	1,180	2FE
703481-AA-9	Patterson-Uti Energy Inc 144A 3.950% 02/01/28		01/24/2018	Stifel, Nicolaus & Co		4,972,500	5,000,000	3,840	2FE
703481-AA-9	Patterson-Uti Energy Inc 144A 3.950% 02/01/28		02/08/2018	Stifel, Nicolaus & Co		4,876,150	5,000,000	12,618	2FE
747525-AU-7	QUALCOMM Inc Bd 3.250% 05/20/27		01/29/2018	Morgan Stanley Dean Witter		4,792,850	5,000,000	32,049	1FE
80282K-AP-1	Santander Holdings USA 4.400% 07/13/27		03/01/2018	Tax Free Exchange		8,508,999	8,313,000	54,866	2FE
862121-AA-8	Store Capital Corp Bd 4.500% 03/15/28		03/20/2018	Cantor Fitzgerald & Co.		4,953,200	5,000,000	4,375	2FE
875484-AJ-6	Tanger Properties LP Bd 3.125% 09/01/26		03/19/2018	Wells Fargo Advisors		2,905,129	3,179,000	5,519	2FE
88315F-AB-7	Textainer Marine Containers 17-1A 4.850% 05/20/42		03/27/2018	Hilltop Securities Inc.		202,586	201,806	245	2FE
88315F-AG-6	Textainer Marine Containers 17-2A 4.750% 06/20/42		10/11/2017	Oppenheimer & Co., Inc.					2FE
88315F-AG-6	Textainer Marine Containers 17-2A 4.750% 06/20/42		02/16/2018	Hilltop Securities Inc.		534,616	534,393	70	2FE
88642R-AA-7	Tidewater Inc Bd 8.000% 08/01/22		01/02/2018	Direct Purchase			93,864		4
89679H-AE-5	Triton Container Finance LLC Ser 17-2A Cls A 3.620% 08/20/42		02/15/2018	Hilltop Securities Inc.		2,892,285	2,892,285		1FE
92277G-AM-9	Ventas Realty LP Bd 4.000% 03/01/28		02/13/2018	Merrill Lynch Pierce Fenner		4,961,650	5,000,000		2FE
92343V-EN-0	Verizon Communications Inc 144A 3.376% 02/15/25		01/19/2018	Tax Free Exchange		4,439,788	4,486,000	66,469	2FE
929089-AB-6	Voya Financial Inc Bd 3.650% 06/15/26		03/19/2018	Citigroup Global Markets Inc		10,161,456	10,425,000	101,470	2FE
96949L-AD-7	Williams Partners LP Bd 3.750% 06/15/27		02/28/2018	J.P. Morgan		4,846,950	5,000,000	40,104	2FE
45174*-AA-3	ILP Holdings, LLC Sr Nt 11.000% 09/21/23		09/21/2017	Arrowhead		(64,309)	(64,309)		5
11271L-AC-6	Brookfield Finance Inc Bd 3.900% 01/25/28	A	01/11/2018	Merrill Lynch Pierce Fenner		4,982,700	5,000,000		1FE
11271L-AC-6	Brookfield Finance Inc Bd 3.900% 01/25/28	A	01/26/2018	BOSC Inc.		4,967,150	5,000,000	7,042	1FE
11271L-AC-6	Brookfield Finance Inc Bd 3.900% 01/25/28	A	02/02/2018	Bank of America Merrill Lynch		3,908,360	4,000,000	8,233	1FE
136385-AX-9	Canadian Natural Resources Ltd Bd 3.850% 06/01/27	A	02/12/2018	J.P. Morgan		4,863,610	4,975,000	38,840	2FE
00080Q-AF-2	ABN Amro Bank NV 144A 4.750% 07/28/25	D	03/20/2018	Hilltop Securities Inc.		8,337,445	8,169,000	58,204	2FE
00182E-BJ-7	Anz National Intl NZ 144A 3.450% 01/21/28	D	01/22/2018	Oppenheimer & Co., Inc.		4,950,800	5,000,000	479	1FE
00185A-AK-0	Aon PLC Bd 3.875% 12/15/25	D	01/24/2018	Morgan Stanley Dean Witter		5,271,656	5,113,000	22,565	2FE
00507U-AS-0	Allergan Funding SCS Bd 3.800% 03/15/25	D	03/08/2018	Citigroup Global Markets Inc		6,264,127	6,377,000	119,144	2FE
01609W-AT-9	Alibaba Group Holding Bd 3.400% 12/06/27	D	01/24/2018	J.P. Morgan		4,894,650	5,000,000	23,611	1FE
035242-AP-1	Anheuser Busch Inbev Fin Bd 3.650% 02/01/26	D	02/14/2018	Stifel, Nicolaus & Co		4,969,900	5,000,000	7,604	2FE
035242-AP-1	Anheuser Busch Inbev Fin Bd 3.650% 02/01/26	D	03/21/2018	Oppenheimer & Co., Inc.		4,912,300	5,000,000	26,361	2FE
04686J-AA-9	Athene Holding Bd 4.125% 01/12/28	C	01/18/2018	Wells Fargo Advisors		9,986,100	10,000,000	11,458	2FE
04686J-AA-9	Athene Holding Bd 4.125% 01/12/28	C	01/26/2018	Cantor Fitzgerald & Co.		5,908,588	5,925,000	12,220	2FE
04686J-AA-9	Athene Holding Bd 4.125% 01/12/28	C	01/31/2018	Morgan Stanley Dean Witter		4,946,850	5,000,000	11,458	2FE
04686J-AA-9	Athene Holding Bd 4.125% 01/12/28	C	03/08/2018	J.P. Morgan		3,841,960	4,000,000	27,500	2FE
05578A-AJ-7	BPCE SA 144A 3.250% 01/11/28	D	02/12/2018	RBC Capital Markets		9,549,000	10,000,000	29,792	1FE
05578A-AJ-7	BPCE SA 144A 3.250% 01/11/28	D	03/09/2018	Merrill Lynch Pierce Fenner		6,634,530	7,000,000	39,181	1FE
09659W-2C-7	BNP Paribas 144A 3.500% 11/16/27	D	02/08/2018	FTN Financial		3,500,712	3,600,000	30,100	1FE
09659W-2C-7	BNP Paribas 144A 3.500% 11/16/27	D	02/09/2018	FTN Financial		1,354,850	1,400,000	11,842	1FE
225401-AF-5	Credit Suisse Group AG 144A 3.869% 01/12/29	C	02/12/2018	FTN Financial		9,760,600	10,000,000	34,391	2FE
37952U-AD-5	Seaco 2014 1A A1 2014-1A A1 3.190% 07/17/29	D	01/19/2018	Oppenheimer & Co., Inc.		3,239,139	3,272,750	1,740	1FE
37952U-AD-5	Seaco 2014 1A A1 2014-1A A1 3.190% 07/17/29	D	01/19/2018	Hilltop Securities Inc.		3,215,849	3,250,000	1,728	1FE
37956A-AA-1	Seaco 2017 1A A 2017 1A A 3.850% 04/15/37	D	01/05/2018	Oppenheimer & Co., Inc.		9,071,992	8,942,053	21,039	1FE
37956A-AA-1	Seaco 2017 1A A 2017 1A A 3.850% 04/15/37	D	03/07/2018	Oppenheimer & Co., Inc.		8,089,093	8,094,152	19,044	1FE
404280-BH-1	HSBC Holdings PLC Bd 4.375% 11/23/26	D	02/27/2018	Morgan Stanley Dean Witter		4,407,943	4,375,000	52,105	1FE
55608J-AK-4	Macquarie Group Ltd Bd 3.763% 11/28/28	D	01/18/2018	J.P. Morgan		2,469,500	2,500,000	14,111	1FE
75625Q-AE-9	Reckitt Benckiser TSY 144A 3.000% 06/26/27	D	01/24/2018	Morgan Stanley Dean Witter		11,520,120	12,000,000	30,000	1FE
75625Q-AE-9	Reckitt Benckiser TSY 144A 3.000% 06/26/27	D	01/26/2018	FTN Financial		1,916,220	2,000,000	5,667	1FE
86562M-AY-6	Sumitomo Mitsui Finl Group Bd 3.544% 01/17/28	D	01/18/2018	Morgan Stanley Dean Witter		9,967,500	10,000,000	4,922	1FE
90351D-AB-3	UBS Group Funding Switzerland 144A 4.125% 09/24/25	D	03/21/2018	Merrill Lynch Pierce Fenner		4,091,464	4,080,000	83,683	1FE
90351D-AF-4	UBS Group Funding Switzerland 144A 4.125% 04/15/26	D	01/24/2018	J.P. Morgan		10,340,000	10,000,000	115,729	1FE
91311Q-AC-9	United Utilities PLC Bd 6.875% 08/15/28	D	02/27/2018	Hilltop Securities Inc.		7,195,140	6,000,000	18,333	2FE
91311Q-AC-9	United Utilities PLC Bd 6.875% 08/15/28	D	02/28/2018	Hilltop Securities Inc.		4,812,200	4,000,000	12,986	2FE
91311Q-AC-9	United Utilities PLC Bd 6.875% 08/15/28	D	03/09/2018	Hilltop Securities Inc.		2,999,900	2,500,000	13,368	2FE
961214-DW-0	Westpac Banking Corp Bd 3.400% 01/25/28	D	01/29/2018	Oppenheimer & Co., Inc.		9,888,900	10,000,000	5,667	1FE

SCHEDULE D - PART 3

Show All Long-Term Bonds and Stock Acquired During the Current Quarter

1 CUSIP Identification	2 Description	3 Foreign	4 Date Acquired	5 Name of Vendor	6 Number of Shares of Stock	7 Actual Cost	8 Par Value	9 Paid for Accrued Interest and Dividends	10 NAIC Designation or Market Indicator (a)
961214-DW-0	Westpac Banking Corp Bd 3.400% 01/25/28	D	02/21/2018	Oppenheimer & Co., Inc.		1,562,988	1,610,000	4,258	1FE
961214-DW-0	Westpac Banking Corp Bd 3.400% 01/25/28	D	02/21/2018	Oppenheimer & Co., Inc.		4,847,950	5,000,000	13,222	1FE
961214-DW-0	Westpac Banking Corp Bd 3.400% 01/25/28	D	02/21/2018	Oppenheimer & Co., Inc.		683,850	705,000	1,865	1FE
961214-DW-0	Westpac Banking Corp Bd 3.400% 01/25/28	D	02/27/2018	Oppenheimer & Co., Inc.		2,603,912	2,685,000	9,130	1FE
3899999. Subtotal - Bonds - Industrial and Miscellaneous (Unaffiliated)						628,017,971	625,038,994	3,668,378	XXX
8399997. Total - Bonds - Part 3						628,792,734	625,818,994	3,669,361	XXX
8399998. Total - Bonds - Part 5						XXX	XXX	XXX	XXX
8399999. Total - Bonds						628,792,734	625,818,994	3,669,361	XXX
8999997. Total - Preferred Stocks - Part 3							XXX		XXX
8999998. Total - Preferred Stocks - Part 5						XXX	XXX	XXX	XXX
8999999. Total - Preferred Stocks							XXX		XXX
88642R-13-3	Tidewater Inc Wts		01/02/2018	Direct Purchase	7,643.000				L
45174*-AA-3	ILP Holdings, LLC CS		09/21/2017	Arrowhead	(150.750)	(9,648)			U
9099999. Subtotal - Common Stocks - Industrial and Miscellaneous (Unaffiliated)						(9,648)	XXX		XXX
9799997. Total - Common Stocks - Part 3						(9,648)	XXX		XXX
9799998. Total - Common Stocks - Part 5						XXX	XXX	XXX	XXX
9799999. Total - Common Stocks						(9,648)	XXX		XXX
9899999. Total - Preferred and Common Stocks						(9,648)	XXX		XXX
9999999 - Totals						628,783,086	XXX	3,669,361	XXX

(a) For all common stock bearing the NAIC market indicator "U" provide: the number of such issues 1

SCHEDULE D - PART 4

Show All Long-Term Bonds and Stock Sold, Redeemed or Otherwise Disposed of During the Current Quarter

1	2	3	4	5	6	7	8	9	10	Change In Book/Adjusted Carrying Value					16	17	18	19	20	21	22
										11	12	13	14	15							
CUSIP Identification	Description	Foreign	Disposal Date	Name of Purchaser	Number of Shares of Stock	Consideration	Par Value	Actual Cost	Prior Year Book/Adjusted Carrying Value	Unrealized Valuation Increase/(Decrease)	Current Year's (Amortization)/Accretion	Current Year's Other Than Temporary Impairment Recognized	Total Change in Book/Adjusted Carrying Value (11 + 12 - 13)	Total Foreign Exchange Change in Book/Adjusted Carrying Value	Book/Adjusted Carrying Value at Disposal Date	Foreign Exchange Gain (Loss) on Disposal	Realized Gain (Loss) on Disposal	Total Gain (Loss) on Disposal	Bond Interest/Stock Dividends Received DuringYear	Stated Contractual Maturity Date	NAIC Designation or Market Indicator (a)
831628-CY-6	Small Business Administration SBA Pool 100087 (25) 4.575% 09/25/36		01/25/2018	Paydown		553,341	553,341	606,600	595,665		(42,324)		(42,324)		553,341				2,112	09/25/2036	1FE
831628-CY-6	Small Business Administration SBA Pool 100087 (25) 4.575% 09/25/36		02/25/2018	Paydown		3,766	3,766	4,129	4,054		(288)		(288)		3,766				29	09/25/2036	1FE
831628-CY-6	Small Business Administration SBA Pool 100087 (25) 4.575% 09/25/36		03/25/2018	Paydown		3,781	3,781	4,144	4,070		(289)		(289)		3,781				43	09/25/2036	1FE
83190A-EF-6	Small Business Administration SBA Pool 504 4.018% 08/01/22		01/01/2018	Paydown		2,022	2,022	2,158	2,087		(65)		(65)		2,022				7	08/01/2022	1FE
83190A-EF-6	Small Business Administration SBA Pool 504 4.018% 08/01/22		02/01/2018	Paydown		2,031	2,031	2,168	2,097		(66)		(66)		2,031				14	08/01/2022	1FE
912828-H9-4	United States Treasury Nt 1.000% 02/15/18		02/15/2018	Maturity		400,000	400,000	400,406	400,043		(43)		(43)		400,000				2,000	02/15/2018	1
912828-P2-0	United States Treasury Bd 0.750% 01/31/18		01/31/2018	Maturity		110,000	110,000	110,155	110,009		(9)		(9)		110,000				413	01/31/2018	1
912828-UR-9	United States Treasury Nt 0.750% 02/28/18		02/28/2018	Maturity		100,000	100,000	100,085	100,008		(8)		(8)		100,000				375	02/28/2018	1
912828-UU-2	United States Treasury Nt 0.750% 03/31/18		03/31/2018	Maturity		170,000	170,000	169,894	169,981		19		19		170,000				638	03/31/2018	1
0599999. Subtotal - Bonds - U.S. Governments						1,344,941	1,344,941	1,399,739	1,388,014		(43,073)		(43,073)		1,344,941				5,631	XXX	XXX
02765U-DR-2	American Mun Pwr Ohio Ser A Rev 5.072% 02/15/18		02/15/2018	Maturity		1,800,000	1,800,000	1,800,000	1,800,000						1,800,000				45,648	02/15/2018	1FE
31340Y-DS-5	FHLMC 14-B (15) 9.000% 12/15/19		01/01/2018	Paydown		91	91	90	91		1		1		91				1	12/15/2019	1
31340Y-DS-5	FHLMC 14-B (15) 9.000% 12/15/19		02/01/2018	Paydown		116	116	114	115		1		1		116				2	12/15/2019	1
31340Y-DS-5	FHLMC 14-B (15) 9.000% 12/15/19		03/01/2018	Paydown		66	66	65	66						66				2	12/15/2019	1
31358F-CQ-0	FNMA 1990 117 E (25) 8.950% 10/25/20		01/01/2018	Paydown		732	732	687	716		16		16		732				5	10/25/2020	1
31358F-CQ-0	FNMA 1990 117 E (25) 8.950% 10/25/20		02/01/2018	Paydown		682	682	640	667		15		15		682				10	10/25/2020	1
31358F-CQ-0	FNMA 1990 117 E (25) 8.950% 10/25/20		03/01/2018	Paydown		1,472	1,472	1,381	1,440		32		32		1,472				33	10/25/2020	1
313602-EB-6	FNMA 1988- 16 B (25) 9.500% 06/25/18		01/01/2018	Paydown		3	3	3	3						3					06/25/2018	1
313602-EB-6	FNMA 1988- 16 B (25) 9.500% 06/25/18		02/01/2018	Paydown		2	2	2	2						2					06/25/2018	1
313602-EB-6	FNMA 1988- 16 B (25) 9.500% 06/25/18		03/01/2018	Paydown		3	3	3	3						3					06/25/2018	1
3137A3-AF-6	FHR 3754 MB (15) 4.000% 01/15/39		01/01/2018	Paydown		226,726	226,726	218,540	219,327		7,399		7,399		226,726				756	01/15/2039	1
3137A3-AF-6	FHR 3754 MB (15) 4.000% 01/15/39		02/01/2018	Paydown		149,680	149,680	144,276	144,795		4,885		4,885		149,680				998	01/15/2039	1
3137A3-AF-6	FHR 3754 MB (15) 4.000% 01/15/39		03/01/2018	Paydown		161,663	161,663	155,826	156,388		5,276		5,276		161,663				1,617	01/15/2039	1
3137A3-WD-7	FHR 3774 DW (15) 3.500% 12/15/25		01/01/2018	Paydown		255,010	255,010	232,378	240,473		14,538		14,538		255,010				744	12/15/2025	1
3137A3-WD-7	FHR 3774 DW (15) 3.500% 12/15/25		02/01/2018	Paydown		278,256	278,256	253,561	262,393		15,863		15,863		278,256				1,623	12/15/2025	1
3137A3-WD-7	FHR 3774 DW (15) 3.500% 12/15/25		03/01/2018	Paydown		265,290	265,290	241,746	250,166		15,124		15,124		265,290				2,321	12/15/2025	1
3137A5-4H-4	FHR 3784 GW (15) 3.500% 01/15/26		01/01/2018	Paydown		275,694	275,694	251,410	260,404		15,290		15,290		275,694				804	01/15/2026	1
3137A5-4H-4	FHR 3784 GW (15) 3.500% 01/15/26		02/01/2018	Paydown		234,712	234,712	214,037	221,695		13,017		13,017		234,712				1,369	01/15/2026	1
3137A5-4H-4	FHR 3784 GW (15) 3.500% 01/15/26		03/01/2018	Paydown		192,987	192,987	175,987	182,284		10,703		10,703		192,987				1,689	01/15/2026	1
3137A5-HP-2	FHR 3787 AY (15) 3.500% 01/15/26		01/01/2018	Paydown		140,351	140,351	129,913	133,626		6,725		6,725		140,351				409	01/15/2026	1
3137A5-HP-2	FHR 3787 AY (15) 3.500% 01/15/26		02/01/2018	Paydown		130,015	130,015	120,345	123,785		6,230		6,230		130,015				758	01/15/2026	1
3137A5-HP-2	FHR 3787 AY (15) 3.500% 01/15/26		03/01/2018	Paydown		210,713	210,713	195,041	200,616		10,097		10,097		210,713				1,844	01/15/2026	1
3137A5-NZ-3	FHR 3795 VB (15) 4.000% 07/15/29		01/01/2018	Paydown		267,506	267,506	255,635	258,257		9,249		9,249		267,506				892	07/15/2029	1
3137A5-NZ-3	FHR 3795 VB (15) 4.000% 07/15/29		02/01/2018	Paydown		237,180	237,180	226,655	228,980		8,200		8,200		237,180				1,581	07/15/2029	1
3137A5-NZ-3	FHR 3795 VB (15) 4.000% 07/15/29		03/01/2018	Paydown		212,982	212,982	203,531	205,619		7,364		7,364		212,982				2,130	07/15/2029	1
3137A7-DZ-0	FHR 3804 CY (15) 3.500% 02/15/26		01/01/2018	Paydown		35,261	35,261	32,082	33,238		2,023		2,023		35,261				103	02/15/2026	1
3137A7-DZ-0	FHR 3804 CY (15) 3.500% 02/15/26		02/01/2018	Paydown		54,197	54,197	49,311	51,087		3,110		3,110		54,197				316	02/15/2026	1
3137A7-DZ-0	FHR 3804 CY (15) 3.500% 02/15/26		03/01/2018	Paydown		42,788	42,788	38,930	40,333		2,455		2,455		42,788				374	02/15/2026	1
3137AK-M9-9	FHR 3979 AD (15) 3.500% 08/15/38		01/01/2018	Paydown		6,366	6,366	6,545	6,534		(168)		(168)		6,366				19	08/15/2038	1
3137AK-M9-9	FHR 3979 AD (15) 3.500% 08/15/38		02/01/2018	Paydown		7,319	7,319	7,524	7,511		(193)		(193)		7,319				43	08/15/2038	1
3137AK-M9-9	FHR 3979 AD (15) 3.500% 08/15/38		03/01/2018	Paydown		31,687	31,687	32,578	32,522		(835)		(835)		31,687				277	08/15/2038	1
3137GA-JB-4	FHR 3748 D (15) 4.000% 11/15/39		01/01/2018	Paydown		50,679	50,679	49,076	49,247		1,432		1,432		50,679				169	11/15/2039	1
3137GA-JB-4	FHR 3748 D (15) 4.000% 11/15/39		02/01/2018	Paydown		48,395	48,395	46,864	47,027		1,368		1,368		48,395				323	11/15/2039	1
3137GA-JB-4	FHR 3748 D (15) 4.000% 11/15/39		03/01/2018	Paydown		47,679	47,679	46,170	46,331		1,348		1,348		47,679				477	11/15/2039	1
31392R-VE-8	FHR 2492 PG (15) 6.000% 08/15/22		01/01/2018	Paydown		37,770	37,770	37,268	37,565		205		205		37,770				189	08/15/2022	1
31392R-VE-8	FHR 2492 PG (15) 6.000% 08/15/22		02/01/2018	Paydown		35,124	35,124	34,657	34,933		191		191		35,124				351	08/15/2022	1
31392R-VE-8	FHR 2492 PG (15) 6.000% 08/15/22		03/01/2018	Paydown		38,352	38,352	37,842	38,144		208		208		38,352				575	08/15/2022	1
31392T-YB-7	FHR 2478 BH (15) 6.000% 08/15/22		01/01/2018	Paydown		36,064	36,064	35,759	35,919		145		145		36,064				180	08/15/2022	1
31392T-YB-7	FHR 2478 BH (15) 6.000% 08/15/22		02/01/2018	Paydown		29,627	29,627	29,377	29,508		119		119		29,627				296	08/15/2022	1
31392T-YB-7	FHR 2478 BH (15) 6.000% 08/15/22		03/01/2018	Paydown		35,236	35,236	34,939	35,094		142		142		35,236				529	08/15/2022	1
31393N-QT-9	FHR 2599 VB (15) 5.500% 02/15/23		01/01/2018	Paydown		10,192	10,192	10,283	10,203		(11)		(11)		10,192				47	02/15/2023	1

SCHEDULE D - PART 4

Show All Long-Term Bonds and Stock Sold, Redeemed or Otherwise Disposed of During the Current Quarter

1	2	3	4	5	6	7	8	9	10	Change In Book/Adjusted Carrying Value					16	17	18	19	20	21	22
										11	12	13	14	15							
CUSIP Identification	Description	Foreign	Disposal Date	Name of Purchaser	Number of Shares of Stock	Consideration	Par Value	Actual Cost	Prior Year Book/Adjusted Carrying Value	Unrealized Valuation Increase/(Decrease)	Current Year's (Amortization)/Accretion	Current Year's Other Than Temporary Impairment Recognized	Total Change in Book/Adjusted Carrying Value (11 + 12 - 13)	Total Foreign Exchange Change in Book/Adjusted Carrying Value	Book/Adjusted Carrying Value at Disposal Date	Foreign Exchange Gain (Loss) on Disposal	Realized Gain (Loss) on Disposal	Total Gain (Loss) on Disposal	Bond Interest/Stock Dividends Received DuringYear	Stated Contractual Maturity Date	NAIC Designation or Market Indicator (a)
31393N-QT-9	FHR 2599 VB (15) 5.500% 02/15/23		02/01/2018	Paydown		11,538	11,538	11,640	11,550		(12)		(12)		11,538				106	02/15/2023	1.
31393N-QT-9	FHR 2599 VB (15) 5.500% 02/15/23		03/01/2018	Paydown		12,862	12,862	12,976	12,875		(14)		(14)		12,862				177	02/15/2023	1.
31393V-F9-7	FHR 2629 DC 5.000% 06/15/23		01/01/2018	Paydown		31,991	31,991	32,391	32,068		(77)		(77)		31,991				133	06/15/2023	1.
31393V-F9-7	FHR 2629 DC 5.000% 06/15/23		02/01/2018	Paydown		20,361	20,361	20,616	20,410		(49)		(49)		20,361				170	06/15/2023	1.
31393V-F9-7	FHR 2629 DC 5.000% 06/15/23		03/01/2018	Paydown		19,523	19,523	19,767	19,570		(47)		(47)		19,523				244	06/15/2023	1.
31395G-2K-7	FHR 2864 NW (15) 5.250% 06/15/21		01/01/2018	Paydown		20,851	20,851	20,779	20,798		53		53		20,851				91	06/15/2021	1.
31395G-2K-7	FHR 2864 NW (15) 5.250% 06/15/21		02/01/2018	Paydown		15,700	15,700	15,646	15,660		40		40		15,700				137	06/15/2021	1.
31395G-2K-7	FHR 2864 NW (15) 5.250% 06/15/21		03/01/2018	Paydown		15,772	15,772	15,718	15,732		40		40		15,772				207	06/15/2021	1.
31396V-6S-2	FNR 2007-50 DM (25) 5.500% 06/25/37		01/01/2018	Paydown		4,949	4,949	4,809	4,838		111		111		4,949				23	06/25/2037	1.
31396V-6S-2	FNR 2007-50 DM (25) 5.500% 06/25/37		02/01/2018	Paydown		3,577	3,577	3,476	3,497		80		80		3,577				33	06/25/2037	1.
31396V-6S-2	FNR 2007-50 DM (25) 5.500% 06/25/37		03/01/2018	Paydown		3,825	3,825	3,717	3,739		86		86		3,825				53	06/25/2037	1.
31397Q-JH-2	FNMA 2011-8 AV (25) 4.000% 01/25/30		01/01/2018	Paydown		694,477	694,477	678,254	681,321		13,156		13,156		694,477				2,315	01/25/2030	1.
31397Q-JH-2	FNMA 2011-8 AV (25) 4.000% 01/25/30		02/01/2018	Paydown		505,467	505,467	493,660	495,892		9,575		9,575		505,467				3,370	01/25/2030	1.
31397Q-JH-2	FNMA 2011-8 AV (25) 4.000% 01/25/30		03/01/2018	Paydown		393,290	393,290	384,103	385,840		7,450		7,450		393,290				3,933	01/25/2030	1.
31398M-PG-5	FNMA 2010-13 JB (25) 4.000% 03/25/25		01/01/2018	Paydown		134,084	134,084	127,668	130,181		3,903		3,903		134,084				447	03/25/2025	1.
31398M-PG-5	FNMA 2010-13 JB (25) 4.000% 03/25/25		02/01/2018	Paydown		138,859	138,859	132,214	134,817		4,042		4,042		138,859				926	03/25/2025	1.
31398M-PG-5	FNMA 2010-13 JB (25) 4.000% 03/25/25		03/01/2018	Paydown		92,997	92,997	88,547	90,290		2,707		2,707		92,997				930	03/25/2025	1.
31398N-F7-4	FNMA 2010-112 (24) 4.000% 10/25/25		01/01/2018	Paydown		48,767	48,767	48,750	48,706		61		61		48,767				163	10/25/2025	1.
31398N-F7-4	FNMA 2010-112 (24) 4.000% 10/25/25		02/01/2018	Paydown		64,050	64,050	64,027	63,970		80		80		64,050				427	10/25/2025	1.
31398N-F7-4	FNMA 2010-112 (24) 4.000% 10/25/25		03/01/2018	Paydown		54,590	54,590	54,571	54,522		68		68		54,590				546	10/25/2025	1.
31398P-GZ-6	FNR 2010-35 BV (25) 4.500% 10/25/28		02/01/2018	Paydown		615,942	615,942	617,193	616,561		(619)		(619)		615,942				4,620	10/25/2028	1.
31398P-GZ-6	FNR 2010-35 BV (25) 4.500% 10/25/28		03/01/2018	Paydown		894,268	894,268	896,084	895,166		(898)		(898)		894,268				10,061	10/25/2028	1.
31398Q-5P-8	FHR 3669 BU (14) 4.500% 05/01/30		01/01/2018	Paydown		45,886	45,886	45,915	45,878		8		8		45,886				172	05/01/2030	1.
31398Q-5P-8	FHR 3669 BU (14) 4.500% 05/01/30		02/01/2018	Paydown		36,587	36,587	36,610	36,580		6		6		36,587				274	05/01/2030	1.
31398Q-5P-8	FHR 3669 BU (14) 4.500% 05/01/30		03/01/2018	Paydown		49,858	49,858	49,889	49,849		9		9		49,858				561	05/01/2030	1.
31398R-FZ-3	FNR 2010-60 JY (24) 5.000% 03/25/39		01/01/2018	Paydown		47,739	47,739	49,776	49,250		(1,511)		(1,511)		47,739				199	03/25/2039	1.
31398R-FZ-3	FNR 2010-60 JY (24) 5.000% 03/25/39		02/01/2018	Paydown		21,915	21,915	22,850	22,608		(693)		(693)		21,915				183	03/25/2039	1.
38377F-MF-5	GNMA 2010 56 MD (20) 5.000% 03/20/39		01/01/2018	Paydown		93,244	93,244	97,585	96,587		(3,344)		(3,344)		93,244				389	03/20/2039	1.
38377F-MF-5	GNMA 2010 56 MD (20) 5.000% 03/20/39		02/01/2018	Paydown		70,136	70,136	73,402	72,651		(2,515)		(2,515)		70,136				584	03/20/2039	1.
38377F-MF-5	GNMA 2010 56 MD (20) 5.000% 03/20/39		03/01/2018	Paydown		78,498	78,498	82,153	81,313		(2,815)		(2,815)		78,498				981	03/20/2039	1.
3199999. Subtotal - Bonds - U.S. Special Revenues						9,830,271	9,830,271	9,555,857	9,639,826		190,445		190,445		9,830,271				101,959	XXX	XXX
025816-AY-5	American Express Co Sr Nt 7.000% 03/19/18		03/19/2018	Maturity		5,000,000	5,000,000	5,403,350	5,011,512		(11,512)		(11,512)		5,000,000				175,000	03/19/2018	1FE
030955-AM-0	Ameritech Capital Funding Corp Nt 6.450% 01/15/18		01/15/2018	Maturity		3,000,000	3,000,000	2,825,940	2,999,324		676		676		3,000,000				96,750	01/15/2018	2FE
055482-AJ-2	BJ Services Co Bd 6.000% 06/01/18		01/10/2018	Call 101.6050		10,160,500	10,000,000	9,407,900	9,964,540		2,128		2,128		9,966,668		33,332	33,332	225,500	06/01/2018	1FE
12189T-BA-1	Burlington Northern Santa Fe Bd 5.750% 03/15/18		03/15/2018	Maturity		12,260,000	12,260,000	12,309,341	12,261,483		(1,483)		(1,483)		12,260,000				352,475	03/15/2018	1FE
12665U-AA-2	CVS Pass-Through Trust 144A 4.704% 01/10/36		12/10/2017	Redemption 100.0000		25,941	25,941	27,629	27,607		3		3		27,610		(1,669)	(1,669)		01/10/2036	
12665U-AA-2	CVS Pass-Through Trust 144A 4.704% 01/10/36		01/10/2018	Redemption 100.0000		26,043	26,043	27,737	27,715		(3)		(3)		27,712		(1,669)	(1,669)	102	01/10/2036	2FE
12665U-AA-2	CVS Pass-Through Trust 144A 4.704% 01/10/36		02/10/2018	Redemption 100.0000		26,145	26,145	27,846	27,824		(10)		(10)		27,813		(1,668)	(1,668)	205	01/10/2036	2FE
12665U-AA-2	CVS Pass-Through Trust 144A 4.704% 01/10/36		03/10/2018	Redemption 100.0000		26,247	26,247	27,955	27,933		(17)		(17)		27,915		(1,668)	(1,668)	308	01/10/2036	2FE
12667F-4F-9	Countrywide Alt Loan Trust 2005-7CB 1A4 (25) 5.500% 02/25/20		01/01/2018	Paydown		5,721	11,158	11,461	11,187						11,187		(5,467)	(5,467)	51	02/25/2020	3FM
12667F-4F-9	Countrywide Alt Loan Trust 2005-7CB 1A4 (25) 5.500% 02/25/20		02/01/2018	Paydown		14,717	16,340	16,783	16,382		(4)		(4)		16,379		(1,662)	(1,662)	150	02/25/2020	3FM
12667F-4F-9	Countrywide Alt Loan Trust 2005-7CB 1A4 (25) 5.500% 02/25/20		03/01/2018	Paydown		20,112	20,801	21,365	20,855		(9)		(9)		20,846		(734)	(734)	286	02/25/2020	3FM
16162X-AH-0	Chase 2006-S3 2A1 2006 S3 2A1 (25) 5.500% 11/25/21		03/01/2018	Paydown		775	775	767	769						770		5	5	2	11/25/2021	5FM
17307G-L2-2	Citigroup Mortgage Loan Trust 2005-9 21A2 (25) 5.500% 11/25/35		01/01/2018	Paydown		9,575	26,111	24,707	24,941						24,941		(15,366)	(15,366)	120	11/25/2035	2FM
17307G-L2-2	Citigroup Mortgage Loan Trust 2005-9 21A2 (25) 5.500% 11/25/35		02/01/2018	Paydown		7,886	10,566	9,998	10,092		1		1		10,094		(2,208)	(2,208)	97	11/25/2035	2FM

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Show All Long-Term Bonds and Stock Sold, Redeemed or Otherwise Disposed of During the Current Quarter

1	2	3	4	5	6	7	8	9	10	Change In Book/Adjusted Carrying Value					16	17	18	19	20	21	22
										11	12	13	14	15							
CUSIP Ident-ification	Description	For-eign	Disposal Date	Name of Purchaser	Number of Shares of Stock	Consid-eration	Par Value	Actual Cost	Prior Year Book/ Adjusted Carrying Value	Unrealized Valuation Increase/ (Decrease)	Current Year's (Amor-tization)/ Accretion	Current Year's Other Than Temporary Impairment Recog-nized	Total Change in Book/ Adjusted Carrying Value (11 + 12 - 13)	Total Foreign Exchange Change in Book /Adjusted Carrying Value	Book/ Adjusted Carrying Value at Disposal Date	Foreign Exchange Gain (Loss) on Disposal	Realized Gain (Loss) on Disposal	Total Gain (Loss) on Disposal	Bond Interest/ Stock Dividends Received DuringYear	Stated Con-tractual Maturity Date	NAIC Desig-nation or Market In-dicator (a)
17307G-L2-2	Citigroup Mortgage Loan Trust 2005-9 21A2 (25) 5.500% 11/25/35		03/01/2018	Paydown		47,382	50,868	48,134	48,590		11		11		48,600		(1,218)	(1,218)	699	11/25/2035	2FM
19260M-AA-4	Coinstar Funding, LLC 17-1A 5.216% 04/25/47		01/25/2018	Paydown		129,748	129,748	135,384			(5,636)		(5,636)		129,748				326	04/25/2047	
202795-HJ-7	Commonwealth Edison Co Bd 5.800% 03/15/18		03/15/2018	Maturity		11,820,000	11,820,000	11,488,022	11,810,235		9,765		9,765		11,820,000				342,780	03/15/2018	1FE
22822R-AR-1	Crown Castle Towers LLC 144A 6.113% 01/15/20		01/16/2018	Call 100.0000		5,000,000	5,000,000	5,228,000	5,058,177		(1,124)		(1,124)		5,057,053		(57,053)	(57,053)	296,136	01/15/2020	1FE
25468P-CB-0	Disney Walt Co Nt 5.875% 12/15/17		12/15/2017	Maturity		5,000,000	5,000,000	5,107,500	5,000,000						5,000,000				146,875	12/15/2017	1FE
25468P-CB-0	Disney Walt Co Nt 5.875% 12/15/17		01/01/2018	Maturity		(5,000,000)	(5,000,000)	(5,107,500)	(5,000,000)						(5,000,000)					12/15/2017	1FE
28932M-AA-3	Elm Rd Generating Station 144A 5.209% 02/11/30		02/14/2018	Redemption 100.0000		197,788	197,788	197,788	197,788						197,788				5,151	02/11/2030	1FE
31331F-AY-7	Federal Express Corp ABS 6.845% 01/15/19		01/15/2018	Paydown		1,422,733	1,422,733	1,572,633	1,435,520		(12,786)		(12,786)		1,422,733				48,693	01/15/2019	2FE
313747-AR-8	Federal Realty Investments Tr Bd 5.900% 04/01/20		12/31/2017	Call 107.9530		8,614,649	7,980,000	8,225,601	8,048,220						8,048,220		(68,220)	(68,220)	752,354	04/01/2020	1FE
313747-AR-8	Federal Realty Investments Tr Bd 5.900% 04/01/20		01/01/2018	Call 100.0000		(7,980,000)	(7,980,000)	(8,225,601)	(8,048,220)						(8,048,220)		68,220	68,220	(634,649)	04/01/2020	1FE
362341-6V-6	GSR Mortgage Loan Trust 2006 1F 1A13 (25) 5.500% 02/25/36		01/01/2018	Paydown		8,393	9,728	9,627	9,644						9,644		(1,251)	(1,251)	45	02/25/2036	4FM
362341-6V-6	GSR Mortgage Loan Trust 2006 1F 1A13 (25) 5.500% 02/25/36		02/01/2018	Paydown		985	1,547	1,531	1,534						1,534		(549)	(549)	14	02/25/2036	4FM
362341-6V-6	GSR Mortgage Loan Trust 2006 1F 1A13 (25) 5.500% 02/25/36		03/01/2018	Paydown		2,694	3,255	3,221	3,227						3,227		(533)	(533)	45	02/25/2036	4FM
362341-7N-3	GSR Mortgage Loan Trust 2006 1F 2A14 (25) 6.000% 02/25/36		01/01/2018	Paydown		56,817	65,389	65,798	65,608						65,608		(8,790)	(8,790)	327	02/25/2036	5FM
362341-7N-3	GSR Mortgage Loan Trust 2006 1F 2A14 (25) 6.000% 02/25/36		02/01/2018	Paydown		18,567	20,457	20,585	20,526						20,526		(1,958)	(1,958)	205	02/25/2036	5FM
362341-7N-3	GSR Mortgage Loan Trust 2006 1F 2A14 (25) 6.000% 02/25/36		03/01/2018	Paydown		21,550	40,845	41,101	40,982		(1)		(1)		40,981		(19,431)	(19,431)	613	02/25/2036	5FM
36242D-EK-5	GSR Mortgage Loan Trust 2004-10F 1A3 (25) 4.500% 08/25/19		01/01/2018	Paydown		45,169	45,169	43,380	44,736		433		433		45,169				169	08/25/2019	1FM
36242D-EK-5	GSR Mortgage Loan Trust 2004-10F 1A3 (25) 4.500% 08/25/19		02/01/2018	Paydown		22,592	22,592	21,697	22,375		216		216		22,592				169	08/25/2019	1FM
36242D-EK-5	GSR Mortgage Loan Trust 2004-10F 1A3 (25) 4.500% 08/25/19		03/01/2018	Paydown		53,592	53,592	51,469	53,079		513		513		53,592				603	08/25/2019	1FM
416515-AU-8	Hartford Financial Services Bd 6.300% 03/15/18		03/15/2018	Maturity		16,000,000	16,000,000	16,456,720	16,012,363		(12,363)		(12,363)		16,000,000				504,000	03/15/2018	2FE
46628Y-AS-9	JP Morgan Trust 2006-S2 1A17 2006-S2 1A17 (25) 6.000% 07/25/36		01/01/2018	Paydown		13,273	17,910	17,742	17,751						17,751		(4,478)	(4,478)	90	07/25/2036	4FM
46628Y-AS-9	JP Morgan Trust 2006-S2 1A17 2006-S2 1A17 (25) 6.000% 07/25/36		02/01/2018	Paydown		19,324	19,877	19,691	19,701						19,701		(377)	(377)	199	07/25/2036	4FM
46628Y-AS-9	JP Morgan Trust 2006-S2 1A17 2006-S2 1A17 (25) 6.000% 07/25/36		03/01/2018	Paydown		1,211	1,275	1,263	1,264						1,264		(53)	(53)	19	07/25/2036	4FM
46630W-AV-2	JP Morgan Mortgage Trust 2007-S2 2A3 (25) 5.500% 06/25/37		01/01/2018	Paydown		15,402	12,165	12,021	12,038						12,038		3,364	3,364	70	06/25/2037	1FM
46630W-AV-2	JP Morgan Mortgage Trust 2007-S2 2A3 (25) 5.500% 06/25/37		02/01/2018	Paydown		4,102	4,102	4,053	4,059						4,059		43	43	37	06/25/2037	1FM
46630W-AV-2	JP Morgan Mortgage Trust 2007-S2 2A3 (25) 5.500% 06/25/37		03/01/2018	Paydown		2,455	2,455	2,425	2,429						2,429		26	26	34	06/25/2037	1FM
46630W-AX-8	JP Morgan Mortgage Trust 2007-S2 2A5 (25) 6.500% 06/25/37		01/01/2018	Paydown		8,457	8,650	8,705	8,681						8,681		(224)	(224)	47	06/25/2037	1FM
46630W-AX-8	JP Morgan Mortgage Trust 2007-S2 2A5 (25) 6.500% 06/25/37		02/01/2018	Paydown		8,780	8,861	8,918	8,893						8,893		(112)	(112)	96	06/25/2037	1FM
46630W-AX-8	JP Morgan Mortgage Trust 2007-S2 2A5 (25) 6.500% 06/25/37		03/01/2018	Paydown		27,535	30,003	30,196	30,111		(1)		(1)		30,110		(2,576)	(2,576)	488	06/25/2037	1FM
501810-AA-6	Lcor Alexandria 144A 6.625% 09/15/19		03/15/2018	Call 100.0000		529,507	529,507	528,210	529,297		24		24		529,321		186	186	17,540	09/15/2019	1FE
534187-AL-3	Lincoln National Corp Nt 7.000% 03/15/18		03/15/2018	Maturity		1,000,000	1,000,000	1,023,830	1,000,496		(496)		(496)		1,000,000				35,000	03/15/2018	2FE
61980A-AC-7	Motiva Enterprises LLC 144A 5.750% 01/15/20		03/15/2018	Call 105.7003		1,479,804	1,400,000	1,397,256	1,399,311		66		66		1,399,377		623	623	133,470	01/15/2020	2FE

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Show All Long-Term Bonds and Stock Sold, Redeemed or Otherwise Disposed of During the Current Quarter

1	2	3	4	5	6	7	8	9	10	Change In Book/Adjusted Carrying Value					16	17	18	19	20	21	22
										11	12	13	14	15							
CUSIP Identification	Description	Foreign	Disposal Date	Name of Purchaser	Number of Shares of Stock	Consideration	Par Value	Actual Cost	Prior Year Book/Adjusted Carrying Value	Unrealized Valuation Increase/(Decrease)	Current Year's (Amortization)/Accretion	Current Year's Other Than Temporary Impairment Recognized	Total Change in Book/Adjusted Carrying Value (11 + 12 - 13)	Total Foreign Exchange Change in Book/Adjusted Carrying Value	Book/Adjusted Carrying Value at Disposal Date	Foreign Exchange Gain (Loss) on Disposal	Realized Gain (Loss) on Disposal	Total Gain (Loss) on Disposal	Bond Interest/Stock Dividends Received DuringYear	Stated Contractual Maturity Date	NAIC Designation or Market Indicator (a)
	Santander Holdings USA 144A 4.400% 07/13/27																				
80282K-AN-6			03/01/2018	Tax Free Exchange		8,508,999	8,313,000	8,512,761	8,512,093		(3,094)		(3,094)		8,508,999				237,752	07/13/2027	2FE
833034-AJ-0	Snap-On Inc Bd 4.250% 01/15/18		01/15/2018	Maturity		16,000,000	16,000,000	15,969,120	15,999,810		190		190		16,000,000				340,000	01/15/2018	1FE
	Textainer Marine Containers 17-1A 4.850%																				
88315F-AB-7	05/20/42		01/20/2018	Paydown		37,452	37,452	38,108	38,103		(651)		(651)		37,452				151	05/20/2042	2FE
	Textainer Marine Containers 17-1A 4.850%																				
88315F-AB-7	05/20/42		02/20/2018	Paydown		37,226	37,226	37,878	37,873		(647)		(647)		37,226				301	05/20/2042	2FE
	Textainer Marine Containers 17-1A 4.850%																				
88315F-AB-7	05/20/42		03/20/2018	Paydown		32,571	32,571	33,141	33,138		(566)		(566)		32,571				395	05/20/2042	2FE
	Textainer Marine Containers 17-2A 4.750%																				
88315F-AG-6	06/20/42		09/20/2017	Paydown		21,661	21,661	22,108	22,087		(426)		(426)		21,661					06/20/2042	2FE
	Textainer Marine Containers 17-2A 4.750%																				
88315F-AG-6	06/20/42		10/01/2017	Paydown		52,171	52,171	53,247	53,196		(1,025)		(1,025)		52,171					06/20/2042	2FE
	Textainer Marine Containers 17-2A 4.750%																				
88315F-AG-6	06/20/42		11/01/2017	Paydown		55,260	55,260	56,182	22,389		(900)		(900)		55,260					06/20/2042	2FE
	Textainer Marine Containers 17-2A 4.750%																				
88315F-AG-6	06/20/42		12/01/2017	Paydown		56,396	56,396	57,336	22,850		(918)		(918)		56,396					06/20/2042	2FE
	Textainer Marine Containers 17-2A 4.750%																				
88315F-AG-6	06/20/42		01/01/2018	Paydown		(21,661)	(21,661)	(22,108)	(21,661)						(21,661)					06/20/2042	2FE
	Textainer Marine Containers 17-2A 4.750%																				
88315F-AG-6	06/20/42		01/01/2018	Paydown		(52,171)	(52,171)	(53,247)	(52,171)						(52,171)					06/20/2042	2FE
	Textainer Marine Containers 17-2A 4.750%																				
88315F-AG-6	06/20/42		01/01/2018	Paydown		(55,260)	(55,260)	(56,182)	(55,260)						(55,260)					06/20/2042	2FE
	Textainer Marine Containers 17-2A 4.750%																				
88315F-AG-6	06/20/42		01/01/2018	Paydown		(56,396)	(56,396)	(57,336)	(56,396)						(56,396)					06/20/2042	2FE
	Textainer Marine Containers 17-2A 4.750%																				
88315F-AG-6	06/20/42		01/20/2018	Paydown		56,864	56,864	57,811	23,039		(926)		(926)		56,864				225	06/20/2042	2FE
	Textainer Marine Containers 17-2A 4.750%																				
88315F-AG-6	06/20/42		02/01/2018	Paydown		56,763	56,763	57,710	22,998		(924)		(924)		56,763				449	06/20/2042	2FE
	Textainer Marine Containers 17-2A 4.750%																				
88315F-AG-6	06/20/42		03/01/2018	Paydown		53,068	53,068	53,898	20,141		(811)		(811)		53,068				604	06/20/2042	2FE
	Triton Container Finance LLC Ser 17-2A Cls A																				
89679H-AE-5	3.620% 08/20/42		01/20/2018	Paydown		46,153	46,153	46,499	46,487		(334)		(334)		46,153				139	08/20/2042	1FE
	Triton Container Finance LLC Ser 17-2A Cls A																				
89679H-AE-5	3.620% 08/20/42		02/01/2018	Paydown		46,284	46,285	46,632	46,619		(335)		(335)		46,284				278	08/20/2042	1FE
	Triton Container Finance LLC Ser 17-2A Cls A																				
89679H-AE-5	3.620% 08/20/42		03/01/2018	Paydown		60,141	60,141	60,440	40,253		(289)		(289)		60,141				422	08/20/2042	1FE
	Verizon Communications Inc 144A 3.376%																				
92343V-EB-6	02/15/25		01/19/2018	Tax Free Exchange		4,439,788	4,486,000	4,437,285	4,439,421		367		367		4,439,788				66,469	02/15/2025	2FE
89346D-AC-1	Transalta Corp Bd 6.650% 05/15/18	A	03/15/2018	Call 100.8220		5,041,100	5,000,000	4,458,500	4,969,292		16,958		16,958		4,986,250		13,750	13,750	156,100	05/15/2018	2FE
	Aust & NZ Banking Group 144A 1.063%																				
05252A-CG-4	01/16/18	D	01/16/2018	Maturity		10,000,000	10,000,000	10,019,400	10,000,301		(301)		(301)		10,000,000				45,979	01/16/2018	1FE
	British Sky Broadcasting 144a 6.100%																				
111013-AG-3	02/15/18	D	02/15/2018	Maturity		2,000,000	2,000,000	1,997,780	1,999,964		36		36		2,000,000				61,000	02/15/2018	2FE
	Daimler Finance NA LLC 144A 1.043% 03/02/18																				
233851-BM-5		D	03/02/2018	Maturity		8,100,000	8,100,000	8,112,150	8,100,733		(733)		(733)		8,100,000				37,765	03/02/2018	1FE
	Seaco 2014 1A A1 2014-1A A1 3.190% 07/17/29																				
37952U-AD-5		D	02/16/2018	Paydown		83,625	83,625	82,756			869		869		83,625				221	07/17/2029	
	Seaco 2014 1A A1 2014-1A A1 3.190% 07/17/29																				
37952U-AD-5		D	03/17/2018	Paydown		83,625	83,625	82,756			868		868		83,625				444	07/17/2029	
37956A-AA-1	Seaco 2017 1A A 2017 1A A 3.850% 04/15/37	D	01/17/2018	Paydown		74,417	74,418	75,499			(1,081)		(1,081)		74,416				238	04/15/2037	
37956A-AA-1	Seaco 2017 1A A 2017 1A A 3.850% 04/15/37	D	02/17/2018	Paydown		74,675	74,676	75,760			(1,085)		(1,085)		74,675				478	04/15/2037	
37956A-AA-1	Seaco 2017 1A A 2017 1A A 3.850% 04/15/37	D	03/17/2018	Paydown		124,921	124,922	125,830			(908)		(908)		124,922				817	04/15/2037	
	Ingersoll-Rand GI Hdl Co Bd 6.875% 08/15/18																				
45687A-AA-0		D	03/15/2018	Call 101.8618		9,208,307	9,040,000	8,514,957	8,992,648		15,409		15,409		9,008,057		31,943	31,943	530,847	08/15/2018	2FE
53944V-AD-1	LLoyds Bank PLC Bd 1.143% 03/16/18	D	03/16/2018	Maturity		24,880,000	24,880,000	24,932,248	24,883,775		(3,775)		(3,775)		24,880,000				128,959	03/16/2018	1FE
629568-AQ-9	Nabors Industries Ltd Bd 6.150% 02/15/18	D	02/15/2018	Maturity		7,000,000	7,000,000	7,170,310	7,002,744		(2,744)		(2,744)		7,000,000				215,250	02/15/2018	3FE
65504L-AC-1	Noble Holding Intl Ltd Bd 4.900% 08/01/20	D	01/30/2018	Tender Offer		27,741,448	27,131,000	28,170,022	27,480,364		(10,656)		(10,656)		27,469,708		271,740	271,740	664,710	08/01/2020	4FE

SCHEDULE D - PART 4

Show All Long-Term Bonds and Stock Sold, Redeemed or Otherwise Disposed of During the Current Quarter

1	2	3	4	5	6	7	8	9	10	Change In Book/Adjusted Carrying Value					16	17	18	19	20	21	22
										11	12	13	14	15							
CUSIP Ident-ification	Description	For-eign	Disposal Date	Name of Purchaser	Number of Shares of Stock	Consid-eration	Par Value	Actual Cost	Prior Year Book/ Adjusted Carrying Value	Unrealized Valuation Increase/ (Decrease)	Current Year's (Amor-tization)/ Accretion	Current Year's Other Than Temporary Impairment Recog-nized	Total Change in Book/ Adjusted Carrying Value (11 + 12 - 13)	Total Foreign Exchange Change in Book /Adjusted Carrying Value	Book/ Adjusted Carrying Value at Disposal Date	Foreign Exchange Gain (Loss) on Disposal	Realized Gain (Loss) on Disposal	Total Gain (Loss) on Disposal	Bond Interest/ Stock Dividends Received DuringYear	Stated Con-tractual Maturity Date	NAIC Desig-nation or Market In-dicator (a)
65504L-AF-4	Noble Holding Intl Ltd Bd 4.625% 03/01/21	D	01/30/2018	Tender Offer		6,435,000	6,500,000	6,600,280	6,540,784		(1,012)		(1,012)		6,539,773		(104,773)	(104,773)	125,260	03/01/2021	4FE
3899999. Subtotal - Bonds - Industrial and Miscellaneous (Unaffiliated)						199,398,598	197,686,432	198,351,710	197,456,193		(31,053)		(31,053)		198,194,714		119,525	119,525	5,117,944	XXX	XXX
8399997. Total - Bonds - Part 4						210,573,810	208,861,644	209,307,306	208,484,033		116,319		116,319		209,369,926		119,525	119,525	5,225,534	XXX	XXX
8399998. Total - Bonds - Part 5						XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
8399999. Total - Bonds						210,573,810	208,861,644	209,307,306	208,484,033		116,319		116,319		209,369,926		119,525	119,525	5,225,534	XXX	XXX
8999997. Total - Preferred Stocks - Part 4							XXX													XXX	XXX
8999998. Total - Preferred Stocks - Part 5						XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
8999999. Total - Preferred Stocks							XXX													XXX	XXX
9799997. Total - Common Stocks - Part 4							XXX													XXX	XXX
9799998. Total - Common Stocks - Part 5						XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
9799999. Total - Common Stocks							XXX													XXX	XXX
9899999. Total - Preferred and Common Stocks							XXX													XXX	XXX
9999999 - Totals						210,573,810	XXX	209,307,306	208,484,033		116,319		116,319		209,369,926		119,525	119,525	5,225,534	XXX	XXX

(a) For all common stock bearing the NAIC market indicator "U" provide: the number of such issues

SCHEDULE DB - PART A - SECTION 1

Showing all Options, Caps, Floors, Collars, Swaps and Forwards Open as of Current Statement Date

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Description	Description of Item(s) Hedged, Used for Income Generation or Replicated	Schedule/ Exhibit Identifier	Type(s) of Risk(s) (a)	Exchange, Counterparty or Central Clearinghouse	Trade Date	Date of Maturity or Expiration	Number of Contracts	Notional Amount	Strike Price, Rate or Index Received (Paid)	Cumulative Prior Year(s) Initial Cost of Premium (Received) Paid	Current Year Initial Cost of Premium (Received) Paid	Current Year Income	Book/ Adjusted Carrying Value	Code	Fair Value	Unrealized Valuation Increase/ (Decrease)	Total Foreign Exchange Change in B./A.C.V.	Current Year's (Amorti-zation)/ Accretion	Adjustment to Carrying Value of Hedged Item	Potential Exposure	Credit Quality of Refer-ence Entity	Hedge Effectiveness at Inception and at Quarter-end (b)
0079999. Subtotal - Purchased Options - Hedging Effective														XXX							XXX	XXX
S&P 500 Indexed 1 YR Digital W/ Specified Rate 853SPA414	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	02/16/2018	02/15/2019	1,867	5,100,000	2,732		131,580		93,982		93,982	(37,598)						0/0
S&P 500 Indexed 1 YR Euro Call Spread 853SPA416	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	02/16/2018	02/15/2019	2,342	6,400,000	2,732		350,080		262,168		262,168	(87,912)						0/0
S&P 500 Indexed 1 YR Euro Call Spread 853SPA415	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	02/16/2018	02/15/2019	4,099	11,200,000	2,732		281,120		226,857		226,857	(54,263)						0/0
S&P 500 Indexed 1 YR Euro Call Spread 853SPA413	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	02/16/2018	02/15/2019	988	2,700,000	2,732		61,290		49,649		49,649	(11,641)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA123	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	04/07/2017	04/06/2018	1,571	3,700,000	2,356	111,370			322,707		322,707	(78,805)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA130	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	04/13/2017	04/13/2018	1,546	3,600,000	2,329	104,760			272,422		272,422	(144,576)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA138	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	04/24/2017	04/24/2018	2,148	5,100,000	2,374	156,060			252,777		252,777	(249,670)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA143	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	05/01/2017	05/01/2018	1,298	3,100,000	2,388	93,620			204,677		204,677	(114,716)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA152	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	05/08/2017	05/08/2018	1,792	4,300,000	2,399	130,720			171,447		171,447	(210,838)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA160	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	05/16/2017	05/16/2018	4,166	10,000,000	2,401	299,000			699,282		699,282	(180,639)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA167	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	05/24/2017	05/24/2018	1,872	4,500,000	2,404	123,750			162,544		162,544	(206,806)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA174	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	06/01/2017	06/01/2018	1,358	3,300,000	2,430	92,070			149,096		149,096	(116,524)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA182	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	06/08/2017	06/08/2018	1,602	3,900,000	2,434	111,540			107,285		107,285	(173,757)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA188	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	06/16/2017	06/15/2018	1,027	2,500,000	2,433	70,750			131,848		131,848	(45,153)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA205	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	06/30/2017	06/29/2018	1,279	3,100,000	2,423	80,910			82,829		82,829	(132,918)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA214	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	07/07/2017	07/06/2018	1,155	2,800,000	2,425	72,520			123,168		123,168	(62,257)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA222	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	07/14/2017	07/13/2018	1,789	4,400,000	2,459	116,160			159,431		159,431	(113,730)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA228	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	07/24/2017	07/24/2018	2,875	7,100,000	2,470	176,790			85,444		85,444	(255,208)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA235	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	08/01/2017	08/01/2018	1,938	4,800,000	2,476	118,560			119,962		119,962	(148,189)						0/0

SCHEDULE DB - PART A - SECTION 1

Showing all Options, Caps, Floors, Collars, Swaps and Forwards Open as of Current Statement Date

1 Description	2 Description of Item(s) Hedged, Used for Income Generation or Replicated	3 Schedule/ Exhibit Identifier	4 Type(s) of Risk(s) (a)	5 Exchange, Counterparty or Central Clearinghouse	6 Trade Date	7 Date of Maturity or Expiration	8 Number of Contracts	9 Notional Amount	10 Strike Price, Rate or Index Received (Paid)	11 Cumulative Prior Year(s) Initial Cost of Premium (Received) Paid	12 Current Year Initial Cost of Premium (Received) Paid	13 Current Year Income	14 Book/ Adjusted Carrying Value	15 Code	16 Fair Value	17 Unrealized Valuation Increase/ (Decrease)	18 Total Foreign Exchange Change in B./A.C.V.	19 Current Year's (Amorti-zation)/ Accretion	20 Adjustment to Carrying Value of Hedged Item	21 Potential Exposure	22 Credit Quality of Refer-ence Entity	23 Hedge Effectiveness at Inception and at Quarter-end (b)
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA242	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	08/08/2017	08/08/2018	1,293	3,200,000	2,475	76,480			40,159		40,159	(113,404)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA249	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	08/16/2017	08/16/2018	2,066	5,100,000	2,468	130,560			174,684		174,684	(86,443)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA256	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	08/24/2017	08/24/2018	2,419	5,900,000	2,439	146,910			96,400		96,400	(218,280)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA262	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	09/05/2017	09/05/2018	1,872	4,600,000	2,458	115,460			123,279		123,279	(115,587)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA270	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	09/08/2017	09/07/2018	1,016	2,500,000	2,461	61,750			38,406		38,406	(89,682)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA286	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	09/22/2017	09/21/2018	1,679	4,200,000	2,502	107,100			60,812		60,812	(106,213)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA293	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	09/29/2017	09/28/2018	1,786	4,500,000	2,519	112,500			58,451		58,451	(143,703)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA299	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	10/06/2017	10/05/2018	1,216	3,100,000	2,549	80,910			59,750		59,750	(67,364)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA306	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	10/16/2017	10/16/2018	2,502	6,400,000	2,558	166,400			123,666		123,666	(82,209)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA313	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	10/24/2017	10/24/2018	1,946	5,000,000	2,569	131,000			32,364		32,364	(124,715)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA320	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	11/01/2017	11/01/2018	1,551	4,000,000	2,579	106,800			46,746		46,746	(85,855)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA328	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	11/08/2017	11/08/2018	1,773	4,600,000	2,594	122,820			32,483		32,483	(110,844)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA344	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	12/01/2017	11/30/2018	3,936	10,400,000	2,642	284,960			53,740		53,740	(209,534)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA352	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	12/08/2017	12/07/2018	2,338	6,200,000	2,652	177,320			78,195		78,195	(67,309)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA363	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	12/15/2017	12/14/2018	2,467	6,600,000	2,676	190,080			65,095		65,095	(68,747)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA370	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	12/27/2017	12/27/2018	2,647	7,100,000	2,683	207,320			16,684		16,684	(121,065)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA379	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	01/08/2018	01/08/2019	2,256	6,200,000	2,748		190,340		19,699		19,699	(170,641)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA417	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	02/16/2018	02/15/2019	1,501	4,100,000	2,732		126,280		48,806		48,806	(77,474)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA424	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	02/23/2018	02/22/2019	2,475	6,800,000	2,747		216,240		43,194		43,194	(173,046)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA431	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	03/01/2018	03/01/2019	1,158	3,100,000	2,678		96,100		42,045		42,045	(54,055)						0/0

SCHEDULE DB - PART A - SECTION 1

Showing all Options, Caps, Floors, Collars, Swaps and Forwards Open as of Current Statement Date

1 Description	2 Description of Item(s) Hedged, Used for Income Generation or Replicated	3 Schedule/ Exhibit Identifier	4 Type(s) of Risk(s) (a)	5 Exchange, Counterparty or Central Clearinghouse	6 Trade Date	7 Date of Maturity or Expiration	8 Number of Contracts	9 Notional Amount	10 Strike Price, Rate or Index Received (Paid)	11 Cumulative Prior Year(s) Initial Cost of Premium (Received) Paid	12 Current Year Initial Cost of Premium (Received) Paid	13 Current Year Income	14 Book/ Adjusted Carrying Value	15 Code	16 Fair Value	17 Unrealized Valuation Increase/ (Decrease)	18 Total Foreign Exchange Change in B./A.C.V.	19 Current Year's (Amorti-zation)/ Accretion	20 Adjustment to Carrying Value of Hedged Item	21 Potential Exposure	22 Credit Quality of Refer-ence Entity	23 Hedge Effectiveness at Inception and at Quarter-end (b)
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA438	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	03/08/2018	03/08/2019	2,118	5,800,000	2,739		181,540		55,552		55,552	(125,988)						0/0
S&P 500 Indexed 1 Yr Cliquet w/ Monthly Cap 853SPA393	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	01/24/2018	01/24/2019	2,537	7,200,000	2,838		203,760		53,146		53,146	(150,614)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA113	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	04/03/2017	04/03/2018	1,569	3,700,000	2,359	94,350			152,645		152,645	8,958						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA121	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	04/07/2017	04/06/2018	1,571	3,700,000	2,356	93,240			152,661		152,661	8,817						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA127	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	04/13/2017	04/13/2018	2,533	5,900,000	2,329	151,040			241,808		241,808	11,994						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA135	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	04/24/2017	04/24/2018	2,401	5,700,000	2,374	150,480			234,283		234,283	9,666						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA141	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	05/01/2017	05/01/2018	1,549	3,700,000	2,388	96,940			148,972		148,972	4,444						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA149	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	05/08/2017	05/08/2018	1,125	2,700,000	2,399	69,390			104,166		104,166	1,955						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA157	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	05/16/2017	05/16/2018	3,832	9,200,000	2,401	230,920			350,485		350,485	3,085						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA164	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	05/24/2017	05/24/2018	2,038	4,900,000	2,404	126,910			184,386		184,386	(36)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA171	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	06/01/2017	06/01/2018	1,481	3,600,000	2,430	69,840			99,482		99,482	(1,570)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA179	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	06/08/2017	06/08/2018	1,644	4,000,000	2,434	96,800			137,076		137,076	(3,171)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA185	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	06/16/2017	06/15/2018	2,096	5,100,000	2,433	123,930			170,343		170,343	(4,788)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA202	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	06/30/2017	06/29/2018	1,816	4,400,000	2,423	106,920			146,365		146,365	(4,858)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA211	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	07/07/2017	07/06/2018	1,773	4,300,000	2,425	105,780			142,565		142,565	(5,144)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA219	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	07/14/2017	07/13/2018	2,440	6,000,000	2,459	145,200			188,157		188,157	(9,150)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA225	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	07/24/2017	07/24/2018	1,984	4,950,000	2,470	116,620			151,882		151,882	(8,351)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA232	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	08/01/2017	08/01/2018	2,181	5,400,000	2,476	131,760			164,001		164,001	(9,688)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA239	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	08/08/2017	08/08/2018	1,535	3,800,000	2,473	91,200			114,315		114,315	(6,754)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA246	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	08/16/2017	08/16/2018	1,985	4,950,000	2,468	117,110			146,887		146,887	(8,594)						0/0

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Description	Description of Item(s) Hedged, Used for Income Generation or Replicated	Schedule/ Exhibit Identifier	Type(s) of Risk(s) (a)	Exchange, Counterparty or Central Clearinghouse	Trade Date	Date of Maturity or Expiration	Number of Contracts	Notional Amount	Strike Price, Rate or Index Received (Paid)	Cumulative Prior Year(s) Initial Cost of Premium (Received) Paid	Current Year Initial Cost of Premium (Received) Paid	Current Year Income	Book/ Adjusted Carrying Value	Code	Fair Value	Unrealized Valuation Increase/ (Decrease)	Total Foreign Exchange Change in B./A.C.V.	Current Year's (Amorti-zation)/ Accretion	Adjustment to Carrying Value of Hedged Item	Potential Exposure	Credit Quality of Refer-ence Entity	Hedge Effectiveness at Inception and at Quarter-end (b)
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA253	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	08/24/2017	08/24/2018	2,337	5,700,000	2,439	135,090			175,247		175,247	(8,767)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA259	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	09/05/2017	09/05/2018	1,872	4,600,000	2,458	116,380			141,476		141,476	(8,062)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA267	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	09/08/2017	09/07/2018	1,584	3,900,000	2,461	95,940			116,691		116,691	(6,821)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA283	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	09/22/2017	09/21/2018	1,399	3,500,000	2,502	87,150			99,886		99,886	(7,577)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA290	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	09/29/2017	09/28/2018	1,548	3,900,000	2,519	93,210			107,878		107,878	(8,874)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA296	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	10/06/2017	10/05/2018	1,491	3,800,000	2,549	91,504			100,980		100,980	(9,554)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA303	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	10/16/2017	10/16/2018	1,759	4,500,000	2,558	111,600			120,151		120,151	(10,907)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA310	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	10/24/2017	10/24/2018	1,868	4,800,000	2,569	120,000			126,000		126,000	(11,516)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA317	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	11/01/2017	11/01/2018	1,861	4,800,000	2,579	118,560			123,065		123,065	(11,318)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA325	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	11/08/2017	11/08/2018	1,812	4,700,000	2,594	118,440			117,586		117,586	(11,030)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA341	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	12/01/2017	11/30/2018	3,028	8,000,000	2,642	200,000			185,142		185,142	(18,570)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA349	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	12/08/2017	12/07/2018	1,584	4,200,000	2,652	106,336			93,143		93,143	(153,359)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA360	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	12/15/2017	12/14/2018	1,532	4,100,000	2,676	102,090			89,949		89,949	(9,359)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA367	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	12/27/2017	12/27/2018	2,088	5,600,000	2,683	142,240			121,467		121,467	(12,433)						0/0
S&P 500 Indexed 1 Yr Digital W/ Specified Rate 853SPA376	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	01/08/2018	01/08/2019	1,565	4,300,000	2,748		110,080		85,347		85,347	(24,733)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA112	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	04/03/2017	04/03/2018	1,102	2,600,000	2,359	55,380			103,767		103,767	7,219						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA114	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	04/03/2017	04/03/2018	4,960	11,700,000	2,359	286,650			557,507		557,507	39,866						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA115	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	04/03/2017	04/03/2018	1,060	2,500,000	2,359	118,500			284,762		284,762	8,309						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA120	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	04/07/2017	04/06/2018	1,316	3,100,000	2,356	66,030			123,127		123,127	8,120						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA122	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	04/07/2017	04/06/2018	4,203	9,900,000	2,356	245,520			470,701		470,701	31,543						0/0

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S&P 500 Indexed 1 Yr Euro Call Spread 853SPA129	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	04/13/2017	04/13/2018	1,202	2,800,000	2,329	142,240			355,426		355,426	(5,137)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA126	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	04/13/2017	04/13/2018	1,632	3,800,000	2,329	81,320			149,454		149,454	8,292						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA128	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	04/13/2017	04/13/2018	4,680	10,900,000	2,329	271,410			513,077		513,077	28,596						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA137	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	04/24/2017	04/24/2018	3,075	7,300,000	2,374	179,580			324,668		324,668	10,993						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA134	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	04/24/2017	04/24/2018	1,221	2,900,000	2,374	61,770			109,247		109,247	3,929						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA136	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	04/24/2017	04/24/2018	3,328	7,900,000	2,374	208,560			383,140		383,140	12,333						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA140	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	05/01/2017	05/01/2018	1,298	3,100,000	2,388	65,100			113,899		113,899	2,343						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA142	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	05/01/2017	05/01/2018	4,480	10,700,000	2,388	270,710			483,371		483,371	7,927						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA148	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	05/08/2017	05/08/2018	1,334	3,200,000	2,399	67,520			114,632		114,632	642						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA150	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	05/08/2017	05/08/2018	4,168	10,000,000	2,399	252,500			440,804		440,804	230						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA151	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	05/08/2017	05/08/2018	1,042	2,500,000	2,399	118,750			246,545		246,545	(24,977)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA156	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	05/16/2017	05/16/2018	1,125	2,700,000	2,401	56,970			95,019		95,019	(547)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA159	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	05/16/2017	05/16/2018	2,999	7,200,000	2,401	356,400			728,625		728,625	(86,890)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA158	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	05/16/2017	05/16/2018	8,331	20,000,000	2,401	483,000			821,582		821,582	(7,834)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA163	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	05/24/2017	05/24/2018	1,248	3,000,000	2,404	63,600			103,896		103,896	(1,646)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA165	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	05/24/2017	05/24/2018	5,324	12,800,000	2,404	322,560			538,987		538,987	(11,116)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA166	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	05/25/2017	05/24/2018	1,788	4,300,000	2,404	212,850			423,478		423,478	(47,505)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA173	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	06/01/2017	06/01/2018	988	2,400,000	2,430	120,000			219,558		219,558	(29,415)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA170	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	06/01/2017	06/01/2018	1,235	3,000,000	2,430	64,500			100,020		100,020	(3,412)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA172	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	06/01/2017	06/01/2018	3,827	9,300,000	2,430	221,340			347,633		347,633	(12,927)						0/0

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S&P 500 Indexed 1 Yr Euro Call Spread 853SPA178	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	06/08/2017	06/08/2018	1,027	2,500,000	2,434	53,750			82,216		82,216	(3,379)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA180	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	06/08/2017	06/08/2018	4,684	11,400,000	2,434	269,040			424,106		424,106	(18,882)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA181	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	06/08/2017	06/08/2018	1,027	2,500,000	2,434	125,250			227,008		227,008	(29,859)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA184	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	06/16/2017	06/15/2018	1,110	2,700,000	2,433	58,320			88,154		88,154	(4,002)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA187	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	06/16/2017	06/15/2018	1,726	4,200,000	2,433	209,160			374,629		374,629	(45,351)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA186	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	06/16/2017	06/15/2018	3,411	8,300,000	2,433	199,200			305,853		305,853	(14,846)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA201	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	06/30/2017	06/29/2018	1,279	3,100,000	2,423	66,960			100,944		100,944	(4,934)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA203	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	06/30/2017	06/29/2018	4,126	10,000,000	2,423	240,000			366,799		366,799	(18,705)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA204	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	06/30/2017	06/29/2018	1,197	2,900,000	2,423	141,810			263,397		263,397	(27,949)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA213	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	07/07/2017	07/06/2018	1,031	2,500,000	2,425	124,000			227,245		227,245	(24,369)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA210	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	07/07/2017	07/06/2018	1,567	3,800,000	2,425	82,080			122,545		122,545	(6,367)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA212	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	07/07/2017	07/06/2018	2,721	6,600,000	2,425	159,720			240,361		240,361	(13,021)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA218	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	07/14/2017	07/13/2018	1,017	2,500,000	2,459	53,500			77,111		77,111	(5,177)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA220	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	07/14/2017	07/13/2018	4,270	10,500,000	2,459	250,950			366,084		366,084	(25,684)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA221	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	07/14/2017	07/13/2018	1,017	2,500,000	2,459	118,000			204,635		204,635	(24,632)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA226	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	07/24/2017	07/24/2018	4,899	12,100,000	2,470	289,190			410,795		410,795	(31,654)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA227	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	07/24/2017	07/24/2018	1,134	2,800,000	2,470	130,760			222,997		222,997	(26,947)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA224	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	07/24/2017	07/24/2018	1,012	2,500,000	2,470	53,500			75,455		75,455	(5,653)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA231	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	08/01/2017	08/01/2018	1,010	2,500,000	2,476	53,250			74,369		74,369	(5,871)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA233	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	08/01/2017	08/01/2018	5,290	13,100,000	2,476	306,540			432,072		432,072	(34,886)						0/0

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S&P 500 Indexed 1 Yr Euro Call Spread 853SPA234	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	08/01/2017	08/01/2018	1,777	4,400,000	2,476	198,440			339,615		339,615	(40,704)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA240	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	08/08/2017	08/08/2018	3,798	9,400,000	2,475	219,960			306,303		306,303	(24,783)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA241	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	08/08/2017	08/08/2018	1,172	2,900,000	2,475	133,690			225,938		225,938	(26,492)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA245	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	08/16/2017	08/16/2018	1,134	2,800,000	2,468	61,600			83,405		83,405	(6,496)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA248	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	08/16/2017	08/16/2018	1,742	4,300,000	2,468	204,250			340,825		340,825	(38,581)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA247	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	08/16/2017	08/16/2018	5,672	14,000,000	2,468	333,200			457,261		457,261	(36,204)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA255	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	08/24/2017	08/24/2018	2,050	5,000,000	2,439	242,000			423,323		423,323	(43,501)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA252	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	08/24/2017	08/24/2018	1,599	3,900,000	2,439	85,800			119,380		119,380	(7,984)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA254	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	08/24/2017	08/24/2018	6,314	15,400,000	2,439	365,750			513,713		513,713	(35,338)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA261	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	09/05/2017	09/05/2018	1,261	3,100,000	2,458	155,930			256,432		256,432	(27,316)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA260	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	09/05/2017	09/05/2018	5,086	12,500,000	2,458	300,000			409,151		409,151	(31,853)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA258	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	09/05/2017	09/05/2018	1,017	2,500,000	2,458	55,000			74,505		74,505	(5,644)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA268	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	09/08/2017	09/07/2018	3,331	8,200,000	2,461	196,800			267,953		267,953	(21,183)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA269	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	09/08/2017	09/07/2018	1,016	2,500,000	2,461	126,000			205,484		205,484	(21,876)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA282	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	09/22/2017	09/21/2018	999	2,500,000	2,502	55,750			70,250		70,250	(6,411)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA285	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	09/22/2017	09/21/2018	1,559	3,900,000	2,502	192,660			290,836		290,836	(30,757)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA284	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	09/22/2017	09/21/2018	5,395	13,500,000	2,502	326,700			418,938		418,938	(39,059)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA292	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	09/29/2017	09/28/2018	1,707	4,300,000	2,519	208,550			307,904		307,904	(31,090)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA291	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	09/29/2017	09/28/2018	5,279	13,300,000	2,519	315,210			397,278		397,278	(38,864)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA289	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	09/29/2017	09/28/2018	992	2,500,000	2,519	54,750			68,467		68,467	(6,638)						0/0

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Description	Description of Item(s) Hedged, Used for Income Generation or Replicated	Schedule/ Exhibit Identifier	Type(s) of Risk(s) (a)	Exchange, Counterparty or Central Clearinghouse	Trade Date	Date of Maturity or Expiration	Number of Contracts	Notional Amount	Strike Price, Rate or Index Received (Paid)	Cumulative Prior Year(s) Initial Cost of Premium (Received) Paid	Current Year Initial Cost of Premium (Received) Paid	Current Year Income	Book/ Adjusted Carrying Value	Code	Fair Value	Unrealized Valuation Increase/ (Decrease)	Total Foreign Exchange Change in B./A.C.V.	Current Year's (Amorti-zation)/ Accretion	Adjustment to Carrying Value of Hedged Item	Potential Exposure	Credit Quality of Refer-ence Entity	Hedge Effectiveness at Inception and at Quarter-end (b)
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA298	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	10/06/2017	10/05/2018	1,883	4,800,000	2,549	226,080			319,192		319,192	(30,144)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA295	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	10/06/2017	10/05/2018	981	2,500,000	2,549	55,250			65,483		65,483	(6,759)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA297	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	10/06/2017	10/05/2018	4,825	12,300,000	2,549	293,970			352,853		352,853	(37,114)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA304	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	10/16/2017	10/16/2018	5,317	13,600,000	2,558	316,880			370,263		370,263	(38,558)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA305	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	10/16/2017	10/16/2018	1,994	5,100,000	2,558	243,270			328,452		328,452	(138,611)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA311	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	10/24/2017	10/24/2018	5,761	14,800,000	2,569	358,160			409,975		409,975	(42,986)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA312	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	10/24/2017	10/24/2018	1,829	4,700,000	2,569	221,840			290,805		290,805	(26,052)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA316	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	11/01/2017	11/01/2018	1,202	3,100,000	2,579	68,820			76,838		76,838	(8,027)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA319	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	11/01/2017	11/01/2018	1,900	4,900,000	2,579	226,870			286,441		286,441	(25,934)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA327	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	11/08/2017	11/08/2018	1,773	4,600,000	2,594	217,580			259,698		259,698	(21,891)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA326	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	11/08/2017	11/08/2018	5,319	13,800,000	2,594	322,920			349,048		349,048	(37,135)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA342	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	12/01/2017	11/30/2018	8,326	22,000,000	2,642	528,000			509,770		509,770	(53,987)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA340	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	12/01/2017	11/30/2018	1,817	4,800,000	2,642	110,400			105,846		105,846	(11,248)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA343	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	12/01/2017	11/30/2018	3,066	8,100,000	2,642	403,380			400,454		400,454	(26,704)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA348	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	12/08/2017	12/07/2018	943	2,500,000	2,652	57,000			54,163		54,163	(5,632)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA350	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	12/08/2017	12/07/2018	4,149	11,000,000	2,652	262,900			250,369		250,369	(25,957)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA351	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	12/08/2017	12/07/2018	1,471	3,900,000	2,652	189,930			187,869		187,869	(11,649)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA359	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	12/15/2017	12/14/2018	934	2,500,000	2,676	57,000			51,392		51,392	(5,197)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA362	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	12/15/2017	12/14/2018	1,831	4,950,000	2,676	235,690			219,135		219,135	(11,100)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA369	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	12/27/2017	12/27/2018	1,901	5,100,000	2,683	250,920			224,001		224,001	(11,028)						0/0

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1 Description	2 Description of Item(s) Hedged, Used for Income Generation or Replicated	3 Schedule/ Exhibit Identifier	4 Type(s) of Risk(s) (a)	5 Exchange, Counterparty or Central Clearinghouse	6 Trade Date	7 Date of Maturity or Expiration	8 Number of Contracts	9 Notional Amount	10 Strike Price, Rate or Index Received (Paid)	11 Cumulative Prior Year(s) Initial Cost of Premium (Received) Paid	12 Current Year Initial Cost of Premium (Received) Paid	13 Current Year Income	14 Book/ Adjusted Carrying Value	15 Code	16 Fair Value	17 Unrealized Valuation Increase/ (Decrease)	18 Total Foreign Exchange Change in B./A.C.V.	19 Current Year's (Amorti-zation)/ Accretion	20 Adjustment to Carrying Value of Hedged Item	21 Potential Exposure	22 Credit Quality of Refer-ence Entity	23 Hedge Effectiveness at Inception and at Quarter-end (b)
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA366	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	12/27/2017	12/27/2018	1,156	3,100,000	2,683	71,300			63,006		63,006	(6,167)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA368	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	12/27/2017	12/27/2018	8,350	22,400,000	2,683	533,120			473,968		473,968	(46,119)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA375	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	01/08/2018	01/08/2019	946	2,600,000	2,748		58,760		44,575		44,575	(14,185)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA377	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	01/08/2018	01/08/2019	4,113	11,300,000	2,748		279,110		211,752		211,752	(67,358)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA378	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	01/08/2018	01/08/2019	3,639	10,000,000	2,748		492,000		358,596		358,596	(133,404)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA391	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	01/24/2018	01/24/2019	3,242	9,200,000	2,838		231,380		127,292		127,292	(104,088)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA392	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	01/24/2018	01/24/2019	2,009	5,700,000	2,838		293,550		133,163		133,163	(160,387)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA408	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	02/08/2018	02/08/2019	3,138	8,100,000	2,581		475,470		527,300		527,300	51,830						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA423	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	02/23/2018	02/22/2019	2,038	5,600,000	2,747		305,760		218,639		218,639	(87,121)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA420	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	02/23/2018	02/22/2019	910	2,500,000	2,747		57,750		44,309		44,309	(13,441)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA430	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	03/01/2018	03/01/2019	1,830	4,950,000	2,678		282,730		246,564		246,564	(36,166)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA434	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	03/02/2018	03/01/2019	5,462	14,700,000	2,691		820,260		692,324		692,324	(127,936)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA435	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	03/02/2018	03/01/2019	929	2,500,000	2,691		95,250		100,472		100,472	5,222						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA441	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	03/08/2018	03/08/2019	949	2,600,000	2,739		60,320		47,493		47,493	(12,827)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA436	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	03/08/2018	03/08/2019	4,929	13,500,000	2,739		346,275		272,377		272,377	(73,897)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA437	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	03/08/2018	03/08/2019	2,519	6,900,000	2,739		393,990		286,254		286,254	(107,736)						0/0
S&P 500 Indexed 10 Year Asian 12/07/2022 853SPV415	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	12/07/2012	12/07/2022	1,763	2,500,000	1,418	254,750			1,455,063		1,455,063	(33,880)						0/0
S&P 500 Indexed 10 Year Asian 12/21/2022 853SPV430	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	12/21/2012	12/21/2022	2,937	4,200,000	1,430	447,300			2,410,586		2,410,586	(55,234)						0/0
S&P 500 Indexed 10 yr Asian mo avg 02/14/2024 853SPW215	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	02/14/2014	02/14/2024	1,360	2,500,000	1,839	287,000			766,201		766,201	(16,898)						0/0
S&P 500 Indexed 10 yr Asian mo avg 1/16/2024 853SPW150	Multiple	N/A	Equity/Index	ING ZOMI2JT14K8OXYZWX446	01/16/2014	01/16/2024	1,354	2,500,000	1,846	295,750			751,214		751,214	(15,730)						0/0

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S&P 500 Indexed 10 yr Asian mo avg 1/8/2024 853SPW130	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	01/08/2014	01/08/2024	2,776	5,100,000	1,837	617,610			1,549,818		1,549,818	(38,775)						0/0
S&P 500 Indexed 10 yr Asian mo avg 10/24/2023 853SPW005	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	10/24/2013	10/24/2023	1,427	2,500,000	1,752	278,000			876,205		876,205	(22,739)						0/0
S&P 500 Indexed 10 yr Asian mo avg 10/6/2023 853SPV980	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	10/08/2013	10/06/2023	1,510	2,500,000	1,655	291,750			1,040,277		1,040,277	(27,410)						0/0
S&P 500 Indexed 10 yr Asian mo avg 11/1/23 853SPW025	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	11/01/2013	11/01/2023	1,419	2,500,000	1,762	284,750			861,599		861,599	(22,015)						0/0
S&P 500 Indexed 10 yr Asian mo avg 11/22/2023 853SPW070	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	11/22/2013	11/22/2023	1,496	2,700,000	1,805	313,470			864,710		864,710	(21,249)						0/0
S&P 500 Indexed 10 yr Asian mo avg 12/22/2023 853SPW115	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	12/23/2013	12/22/2023	1,915	3,500,000	1,828	423,500			1,084,065		1,084,065	(23,521)						0/0
S&P 500 Indexed 10 yr Asian mo avg 12/6/2023 853SPW085	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	12/06/2013	12/06/2023	1,496	2,700,000	1,805	315,900			863,700		863,700	(22,044)						0/0
S&P 500 Indexed 10 yr Asian mo avg 2/1/2023 853SPV580	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	02/01/2013	02/01/2023	1,983	3,000,000	1,513	303,600			1,501,215		1,501,215	(36,271)						0/0
S&P 500 Indexed 10 yr Asian mo avg 3/22/2023 853SPV645	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	03/22/2013	03/22/2023	1,606	2,500,000	1,557	253,000			1,178,686		1,178,686	(28,913)						0/0
S&P 500 Indexed 10 yr Asian mo avg 3/22/2024 853SPW295	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	03/24/2014	03/22/2024	1,346	2,500,000	1,857	287,250			753,717		753,717	(17,644)						0/0
S&P 500 Indexed 10 yr Asian mo avg 3/7/2024 853SPW260	Multiple	N/A	Equity/Index	ING ZOMI2JT14K8OXYZWX446	03/07/2014	03/07/2024	1,331	2,500,000	1,878	286,250			716,494		716,494	(17,112)						0/0
S&P 500 Indexed 10 yr Asian mo avg 4/16/24 853SPW360	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	04/16/2014	04/16/2024	1,342	2,500,000	1,862	276,750			729,486		729,486	(15,336)						0/0
S&P 500 Indexed 10 yr Asian mo avg 4/3/2023 853SPV665	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	04/01/2013	04/03/2023	1,600	2,500,000	1,562	256,250			1,157,934		1,157,934	(29,044)						0/0
S&P 500 Indexed 10 yr Asian mo avg 4/6/2023 853SPV675	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	04/08/2013	04/06/2023	1,599	2,500,000	1,563	257,250			1,165,118		1,165,118	(29,189)						0/0
S&P 500 Indexed 10 yr Asian mo avg 5/24/2023 853SPV755	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	05/24/2013	05/24/2023	1,516	2,500,000	1,650	286,000			1,002,155		1,002,155	(25,635)						0/0
S&P 500 Indexed 10 yr Asian mo avg 5/30/2024 853SPW460	Multiple	N/A	Equity/Index	ING ZOMI2JT14K8OXYZWX446	05/30/2014	05/30/2024	1,300	2,500,000	1,924	261,750			677,441		677,441	(12,663)						0/0
S&P 500 Indexed 10 yr Asian mo avg 5/31/2023 853SPV770	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	05/31/2013	05/31/2023	1,533	2,500,000	1,631	275,000			1,047,292		1,047,292	(27,129)						0/0
S&P 500 Indexed 10 yr Asian mo avg 6/30/2023 853SPV805	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	07/01/2013	06/30/2023	1,548	2,500,000	1,615	300,000			1,088,798		1,088,798	(28,243)						0/0
S&P 500 Indexed 10 yr Asian mo avg 6/7/2023 853SPV780	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	06/07/2013	06/07/2023	1,521	2,500,000	1,643	295,250			1,023,657		1,023,657	(26,992)						0/0
S&P 500 Indexed 10 yr Asian mo avg 7/14/2023 853SPV840	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	07/16/2013	07/14/2023	1,491	2,500,000	1,676	296,250			973,405		973,405	(24,294)						0/0

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S&P 500 Indexed 10 yr Asian mo avg 8/1/2023 853SPV865	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	08/01/2013	08/01/2023	2,519	4,300,000	1,707	504,820			1,594,192		1,594,192	(41,303)						0/0
S&P 500 Indexed 10 yr Asian mo avg 8/16/2023 853SPV885	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	08/16/2013	08/16/2023	1,933	3,200,000	1,656	382,080			1,306,341		1,306,341	(35,177)						0/0
S&P 500 Indexed 10 yr Asian mo avg 8/30/2023 853SPV920	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	08/30/2013	08/30/2023	1,531	2,500,000	1,633	302,250			1,073,110		1,073,110	(28,257)						0/0
S&P 500 Indexed 10yr ASIAN W/Monthly Averaging 853SPZ240	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	04/15/2016	04/15/2026	1,202	2,500,000	2,081	299,500			645,611		645,611	(2,123)						0/0
S&P 500 Indexed 10yr ASIAN w/monthly averaging 853SPY170	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	04/16/2015	04/16/2025	1,188	2,500,000	2,105	328,000			538,321		538,321	(1,162)						0/0
S&P 500 Indexed 10yr ASIAN w/monthly averaging 853SPY720	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	11/16/2015	11/14/2025	1,218	2,500,000	2,053	328,500			637,739		637,739	(4,383)						0/0
S&P 500 Indexed 10yr ASIAN w/monthly averaging 853SPY995	Multiple	N/A	Equity/Index	ING ZOMI2JT14K8OXYZWX446	02/08/2016	02/06/2026	1,349	2,500,000	1,853	320,000			907,393		907,393	(16,234)						0/0
S&P 500 Indexed 10yr ASIAN w/monthly averaging 853SPZ925	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	10/24/2016	10/23/2026	1,162	2,500,000	2,151	293,750			617,109		617,109	4,181						0/0
S&P 500 Indexed 10yr ASIAN w/monthly avg 853SPZ695	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	08/16/2016	08/14/2026	1,148	2,500,000	2,178	305,000			576,686		576,686	4,497						0/0
S&P 500 Indexed 10yr Asian mo avg 7/24/2024 853SPW590	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	07/24/2014	07/24/2024	1,258	2,500,000	1,988	286,000			609,162		609,162	(9,301)						0/0
S&P 500 Indexed 10yr Asian mo avg 11/7/2024 853SPW835	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	11/07/2014	11/07/2024	1,230	2,500,000	2,032	312,250			580,230		580,230	(6,736)						0/0
S&P 500 Indexed 10yr Asian mo avg 2/22/2023 853SPV605	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	02/22/2013	02/22/2023	2,177	3,300,000	1,516	331,320			1,659,468		1,659,468	(41,554)						0/0
S&P 500 Indexed 10yr Asian mo avg 5/8/2024 853SPW420	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	05/08/2014	05/08/2024	1,333	2,500,000	1,876	265,750			735,919		735,919	(16,911)						0/0
S&P 500 Indexed 10yr Asian mo avg 7/1/2024 853SPW550	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	07/01/2014	07/01/2024	1,267	2,500,000	1,973	275,000			620,484		620,484	(10,314)						0/0
S&P 500 Indexed 10yr Asian mo avg 8/15/2024 853SPW650	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	08/15/2014	08/15/2024	1,279	2,500,000	1,955	297,750			652,737		652,737	(10,277)						0/0
S&P 500 Indexed 10yr Asian mo avg 9/24/2024 853SPW725	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	09/24/2014	09/24/2024	1,251	2,500,000	1,998	310,250			610,525		610,525	(8,380)						0/0
S&P 500 Indexed 10yr Asian w/mo Avg 06/2025 853SPY345	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	06/24/2015	06/24/2025	1,186	2,500,000	2,109	332,000			547,526		547,526	(1,139)						0/0
S&P 500 Indexed 10yr Asian w/mo Avg 07/2025 853SPY435	Multiple	N/A	Equity/Index	ING ZOMI2JT14K8OXYZWX446	07/24/2015	07/24/2025	1,202	2,500,000	2,080	322,750			584,578		584,578	(2,682)						0/0
S&P 500 Indexed 10yr Asian w/mo avg 01/23/2025 853SPW999	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	01/23/2015	01/23/2025	1,218	2,500,000	2,052	329,250			576,123		576,123	(5,958)						0/0
S&P 500 Indexed 10yr Asian w/mo avg 02/27/2025 853SPY050	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	02/27/2015	02/27/2025	1,188	2,500,000	2,105	331,750			526,866		526,866	(2,497)						0/0

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S&P 500 Indexed 10yr Asian w/mo avg 03/24/2025 853SPY100	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	03/24/2015	03/24/2025	1,195	2,500,000	2,092	329,750			545,454		545,454	(4,117)						0/0
S&P 500 Indexed 10yr Asian w/mo avg 04/01/2025 853SPY135	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	04/01/2015	04/01/2025	1,214	2,500,000	2,060	334,750			580,895		580,895	(5,907)						0/0
S&P 500 Indexed 10yr Asian w/mo avg 05/15/2025 853SPY250	Multiple	N/A	Equity/Index	ING ZOMI2JT14K8OXYZWX446	05/15/2015	05/15/2025	1,178	2,500,000	2,123	327,500			525,748		525,748	(586)						0/0
S&P 500 Indexed 10yr Asian w/mo avg 09/2/2025 853SPY535	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	09/02/2015	09/02/2025	1,283	2,500,000	1,949	326,500			744,896		744,896	(11,102)						0/0
S&P 500 Indexed 10yr Asian w/mo avg 10/23/25 853SPY655	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	10/23/2015	10/23/2025	1,205	2,500,000	2,075	310,750			610,750		610,750	(4,127)						0/0
S&P 500 Indexed 10yr Asian w/mo avg 12/23/2024 853SPW915	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	12/23/2014	12/23/2024	1,201	2,500,000	2,082	339,750			537,626		537,626	(2,709)						0/0
S&P 500 Indexed 10yr Asian w/mo avg 12/3/2024 853SPW875	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	12/01/2014	12/03/2024	1,217	2,500,000	2,053	317,500			559,151		559,151	(5,163)						0/0
S&P 500 Indexed 1Yr Cliquet W/ Monthly Cap 853SPA116	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	04/03/2017	04/03/2018	2,035	4,800,000	2,359	139,200			519,248		519,248	(44,295)						0/0
S&P 500 Indexed 1Yr Cliquet W/ Monthly Cap 853SPA456	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	03/23/2018	03/22/2019	2,589	6,700,000	2,588	201,000			124,909		124,909	(76,090)						0/0
S&P 500 Indexed 1Yr Cliquet W/ Monthly Cap 853SPA463	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	03/29/2018	03/29/2019	1,855	4,950,000	2,641	135,730			77,754		77,754	(57,975)						0/0
S&P 500 Indexed 1Yr Digital W/ Specified Rate 853SPA453	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	03/23/2018	03/22/2019	2,550	6,600,000	2,588	168,300			168,189		168,189	(110)						0/0
S&P 500 Indexed 1Yr Digital W/ Specified Rate 853SPA465	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	03/29/2018	03/29/2019	947	2,500,000	2,641	115,750			113,478		113,478	(2,272)						0/0
S&P 500 Indexed 1Yr Digital W/ Specified Rate 853SPA460	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	03/29/2018	03/29/2019	1,439	3,800,000	2,641	96,140			92,223		92,223	(3,917)						0/0
S&P 500 Indexed 1Yr Euro Call Spread 853SPA309	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	10/24/2017	10/24/2018	1,246	3,200,000	2,569	71,040			80,815		80,815	(8,429)						0/0
S&P 500 Indexed 1Yr Euro Call Spread 853SPA318	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	11/01/2017	11/01/2018	5,738	14,800,000	2,579	350,760			394,575		394,575	(41,314)						0/0
S&P 500 Indexed 1Yr Euro Call Spread 853SPA454	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	03/23/2018	03/22/2019	6,259	16,200,000	2,588	411,480			435,094		435,094	23,614						0/0
S&P 500 Indexed 1Yr Euro Call Spread 853SPA455	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	03/23/2018	03/22/2019	3,284	8,500,000	2,588	609,450			714,015		714,015	104,565						0/0
S&P 500 Indexed 1Yr Euro Call Spread 853SPA452	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	03/23/2018	03/22/2019	1,275	3,300,000	2,588	75,240			79,967		79,967	4,727						0/0
S&P 500 Indexed 1Yr Euro Call Spread 853SPA462	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	03/29/2018	03/29/2019	2,045	5,400,000	2,641	387,180			385,300		385,300	(1,880)						0/0
S&P 500 Indexed 1Yr Euro Call Spread 853SPA459	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	03/29/2018	03/29/2019	947	2,500,000	2,641	57,000			56,156		56,156	(844)						0/0

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S&P 500 Indexed 1Yr Euro Call Spread 853SPA466	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	03/29/2018	03/29/2019	947	2,500,000	2,641		66,250		65,546		65,546	(704)						0/0
S&P 500 Indexed 1Yr Euro Call Spread 853SPA464	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	03/29/2018	03/29/2019	5,263	13,900,000	2,641		775,620		768,878		768,878	(6,741)						0/0
S&P 500 Indexed 1Yr Euro Call Spread 853SPA461	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	03/29/2018	03/29/2019	4,544	12,000,000	2,641		301,200		297,955		297,955	(3,245)						0/0
S&P 500 Indexed 1yr Cliquet w/Monthly Cap 853SPA401	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	02/01/2018	02/01/2019	2,162	6,100,000	2,822		187,880		25,831		25,831	(162,049)						0/0
S&P 500 Indexed 1yr Cliquet w/Monthly Cap 853SPA448	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	03/16/2018	03/15/2019	2,871	7,900,000	2,752		237,000		78,543		78,543	(158,457)						0/0
S&P 500 Indexed 1yr Cliquet w/monthly cap 853SPA196	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	06/23/2017	06/22/2018	2,379	5,800,000	2,438	163,560			138,746		138,746	(248,466)						0/0
S&P 500 Indexed 1yr Cliquet w/monthly cap 853SPA387	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	01/16/2018	01/16/2019	1,693	4,700,000	2,776		138,180		39,449		39,449	(98,731)						0/0
S&P 500 Indexed 1yr Cliquet with monthly cap 853SPA276	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	09/15/2017	09/14/2018	1,640	4,100,000	2,500	103,320			64,942		64,942	(147,658)						0/0
S&P 500 Indexed 1yr Cliquet with monthly cap 853SPA338	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	11/16/2017	11/16/2018	2,823	7,300,000	2,586	190,530			116,628		116,628	(83,949)						0/0
S&P 500 Indexed 1yr Digital w/ spec rate 853SPA384	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	01/16/2018	01/16/2019	900	2,500,000	2,776		64,000		46,182		46,182	(17,818)						0/0
S&P 500 Indexed 1yr Digital w/ spec rate 853SPA390	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	01/24/2018	01/24/2019	1,621	4,600,000	2,838		119,140		71,642		71,642	(47,498)						0/0
S&P 500 Indexed 1yr Digital w/Specified Rate 853SPA398	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	02/01/2018	02/01/2019	1,736	4,950,000	2,822		127,400		66,865		66,865	(60,535)						0/0
S&P 500 Indexed 1yr Digital w/Specified Rate 853SPA406	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	02/08/2018	02/08/2019	1,860	4,800,000	2,581		125,760		126,601		126,601	841						0/0
S&P 500 Indexed 1yr Digital w/Specified Rate 853SPA421	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	02/23/2018	02/22/2019	1,929	5,300,000	2,747		138,330		107,515		107,515	(30,815)						0/0
S&P 500 Indexed 1yr Digital w/Specified Rate 853SPA442	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	03/08/2018	03/08/2019	1,387	3,800,000	2,739		99,560		69,412		69,412	(30,148)						0/0
S&P 500 Indexed 1yr Digital w/Specified Rate 853SPA445	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	03/16/2018	03/15/2019	2,180	600,000	2,752		157,200		121,191		121,191	(36,009)						0/0
S&P 500 Indexed 1yr Digital w/specified rate 853SPA193	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	06/23/2017	06/22/2018	1,846	4,500,000	2,438	108,900			148,551		148,551	(5,103)						0/0
S&P 500 Indexed 1yr Digital w/specified rate 853SPA273	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	09/15/2017	09/14/2018	1,720	4,300,000	2,500	104,490			121,139		121,139	(9,028)						0/0
S&P 500 Indexed 1yr Digital w/specified rate 853SPA335	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	11/16/2017	11/16/2018	1,895	4,950,000	2,586	121,030			123,821		123,821	(11,171)						0/0
S&P 500 Indexed 1yr Euro CAll Spread 853SPA399	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	02/01/2018	02/01/2019	3,048	8,600,000	2,822		217,580		129,552		129,552	(88,028)						0/0

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1 Description	2 Description of Item(s) Hedged, Used for Income Generation or Replicated	3 Schedule/ Exhibit Identifier	4 Type(s) of Risk(s) (a)	5 Exchange, Counterparty or Central Clearinghouse	6 Trade Date	7 Date of Maturity or Expiration	8 Number of Contracts	9 Notional Amount	10 Strike Price, Rate or Index Received (Paid)	11 Cumulative Prior Year(s) Initial Cost of Premium (Received) Paid	12 Current Year Initial Cost of Premium (Received) Paid	13 Current Year Income	14 Book/ Adjusted Carrying Value	15 Code	16 Fair Value	17 Unrealized Valuation Increase/ (Decrease)	18 Total Foreign Exchange Change in B./A.C.V.	19 Current Year's (Amorti-zation)/ Accretion	20 Adjustment to Carrying Value of Hedged Item	21 Potential Exposure	22 Credit Quality of Refer-ence Entity	23 Hedge Effectiveness at Inception and at Quarter-end (b)
S&P 500 Indexed 1yr Euro Call Spread 853SPA194	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	06/23/2017	06/22/2018	6,603	16,100,000	2,438	381,570			582,158		582,158	(31,484)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA195	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	06/23/2017	06/22/2018	1,558	3,800,000	2,438	184,300			335,544		335,544	(40,637)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA192	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	06/23/2017	06/22/2018	1,148	2,800,000	2,438	59,920			90,282		90,282	(4,605)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA272	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	09/15/2017	09/14/2018	1,480	3,700,000	2,500	81,770			104,478		104,478	(9,463)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA275	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	09/15/2017	09/14/2018	1,160	2,900,000	2,500	139,490			213,244		213,244	(23,271)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA274	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	09/15/2017	09/14/2018	6,359	15,900,000	2,500	381,600			492,545		492,545	(45,547)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA334	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	11/16/2017	11/16/2018	1,547	4,000,000	2,586	90,800			98,099		98,099	(9,986)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA336	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	11/16/2017	11/16/2018	4,641	12,000,000	2,586	284,400			309,014		309,014	(31,546)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA337	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	11/16/2017	11/16/2018	2,011	5,200,000	2,586	255,840			302,079		302,079	(26,145)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA386	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	01/16/2018	01/16/2019	1,405	3,900,000	2,776	195,000			49,651		49,651	(145,349)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA385	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	01/16/2018	01/16/2019	2,773	7,700,000	2,776	187,880			131,833		131,833	(56,048)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA383	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	01/16/2018	01/16/2019	900	2,500,000	2,776	55,750			39,321		39,321	(16,429)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA403	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	02/01/2018	02/01/2019	1,630	4,600,000	2,822	122,360			72,125		72,125	(50,235)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA404	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	02/01/2018	02/01/2019	886	2,500,000	2,822	42,250			25,781		25,781	(16,469)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA400	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	02/01/2018	02/01/2019	2,020	5,700,000	2,822	303,240			152,470		152,470	(150,770)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA402	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	02/01/2018	02/01/2019	6,237	17,600,000	2,822	908,160			465,426		465,426	(442,734)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA397	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	02/01/2018	02/01/2019	886	2,500,000	2,822	57,250			34,253		34,253	(22,997)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA429	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	03/01/2018	03/01/2019	1,905	5,100,000	2,678	129,540			117,086		117,086	(12,454)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA446	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	03/16/2018	03/15/2019	6,286	17,300,000	2,752	444,610			337,006		337,006	(107,604)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA443	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	03/16/2018	03/15/2019	908	2,500,000	2,752	39,250			30,179		30,179	(9,071)						0/0

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Description	Description of Item(s) Hedged, Used for Income Generation or Replicated	Schedule/ Exhibit Identifier	Type(s) of Risk(s) (a)	Exchange, Counterparty or Central Clearinghouse	Trade Date	Date of Maturity or Expiration	Number of Contracts	Notional Amount	Strike Price, Rate or Index Received (Paid)	Cumulative Prior Year(s) Initial Cost of Premium (Received) Paid	Current Year Initial Cost of Premium (Received) Paid	Current Year Income	Book/ Adjusted Carrying Value	Code	Fair Value	Unrealized Valuation Increase/ (Decrease)	Total Foreign Exchange Change in B./A.C.V.	Current Year's (Amorti-zation)/ Accretion	Adjustment to Carrying Value of Hedged Item	Potential Exposure	Credit Quality of Refer-ence Entity	Hedge Effectiveness at Inception and at Quarter-end (b)
S&P 500 Indexed 1yr Euro Call Spread 853SPA444	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	03/16/2018	03/15/2019	1,163	3,200,000	2,752		74,560		56,677		56,677	(17,883)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA447	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	03/16/2018	03/15/2019	3,815	10,500,000	2,752		698,250		478,184		478,184	(220,066)						0/0
S&P 500 Indexed 3 Yr Euro Call Spread 853SPA039	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	12/30/2016	12/30/2019	1,117	2,500,000	2,239	242,250			418,384		418,384	(19,280)						0/0
S&P 500 Indexed 3yr Euro Call Sp Opt Sep 2018 853SPY575	Multiple	N/A	Equity/Index.	ING ZOMI2JT14K8OXYZWX446	09/16/2015	09/14/2018	1,253	2,500,000	1,995	231,500			578,502		578,502	(14,766)						0/0
S&P 500 Indexed 3yr Euro Call Spread 853SPY205	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	04/24/2015	04/24/2018	1,181	2,500,000	2,118	115,750			247,148		247,148	8,066						0/0
S&P 500 Indexed 3yr Euro Call Spread 853SPY830	Multiple	N/A	Equity/Index.	Goldman #N/A	12/16/2015	12/14/2018	1,206	2,500,000	2,073	112,750			214,933		214,933	(4,413)						0/0
S&P 500 Indexed 3yr Euro Call Spread 853SPZ500	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	06/24/2016	06/24/2019	1,227	2,500,000	2,037	276,500			681,250		681,250	(31,506)						0/0
S&P 500 Indexed 3yr Euro Call Spread 853SPZ625	Multiple	N/A	Equity/Index.	ING ZOMI2JT14K8OXYZWX446	07/22/2016	07/22/2019	1,149	2,500,000	2,175	113,750			190,290		190,290	(6,227)						0/0
S&P 500 Indexed 3yr Euro Call Spread 853SPZ970	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	11/01/2016	11/01/2019	1,184	2,500,000	2,112	116,250			189,534		189,534	(5,450)						0/0
S&P 500 Indexed 5 yr Euro Call Sp Feb 2020 853SPY030	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	02/24/2015	02/24/2020	1,182	2,500,000	2,115	218,000			399,611		399,611	(14,646)						0/0
S&P 500 Indexed 5 yr Euro Call Sp May 2019 853SPW380	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	05/01/2014	05/01/2019	1,327	2,500,000	1,884	318,250			908,035		908,035	(35,788)						0/0
S&P 500 Indexed 5 yr Euro Call Sp Nov 2019 853SPW815	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	11/07/2014	11/07/2019	1,230	2,500,000	2,032	263,250			535,778		535,778	(19,219)						0/0
S&P 500 Indexed 5yr Euro Cal ISpread 05/2020 853SPY285	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	05/22/2015	05/22/2020	1,176	2,500,000	2,126	303,750			558,828		558,828	(24,018)						0/0
S&P 500 Indexed 5yr Euro Call Opt Dec 2019 853SPW920	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	12/23/2014	12/23/2019	1,201	2,500,000	3,166	90,000			57,447		57,447	4,890						0/0
S&P 500 Indexed 5yr Euro Call Sp Opt 3/14/2019 853SPW270	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	03/14/2014	03/14/2019	1,358	2,500,000	1,841	250,250			630,217		630,217	(14,360)						0/0
S&P 500 Indexed 5yr Euro Call Sp Opt 6-17-20 853SPY320	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	06/17/2015	06/17/2020	1,190	2,500,000	2,100	340,000			634,967		634,967	(26,764)						0/0
S&P 500 Indexed 5yr Euro Call Sp Opt 8/29/2019 853SPW685	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	08/29/2014	08/29/2019	1,248	2,500,000	2,003	261,250			555,131		555,131	(19,848)						0/0
S&P 500 Indexed 5yr Euro Call Sp Opt Jun 2019 853SPW505	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	06/24/2014	06/24/2019	1,282	2,500,000	1,950	252,250			582,203		582,203	(19,700)						0/0
S&P 500 Indexed 5yr Euro Call Spread 853SPZ470	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	06/16/2016	06/16/2021	1,203	2,500,000	2,078	188,750			322,811		322,811	(11,115)						0/0
S&P 500 Indexed 5yr Euro Call Spread 853SPZ480	Multiple	N/A	Equity/Index.	Goldman #N/A	06/24/2016	06/24/2021	1,227	2,500,000	2,037	342,500			712,309		712,309	(24,554)						0/0

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S&P 500 Indexed 6 yr Annual Reset Sept 2018 853SPV295	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	09/07/2017	09/07/2018	1,739	2,500,000	2,465	246,250			56,422		56,422	(2,700)						0/0
S&P 500 Indexed 7 yr Asian mo avg 5/8/2020 853SPV725	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	05/08/2013	05/08/2020	1,531	2,500,000	1,633	216,250			925,262		925,262	(15,205)						0/0
S&P 500 Indexed Asian 10 yr SP Opt Nov 2022 853SPV410	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	11/30/2012	11/30/2022	1,765	2,500,000	1,416	253,500			1,458,133		1,458,133	(33,051)						0/0
S&P 500 Indexed Asian Call Opt Apr 2018 853SPQ425	Multiple	N/A	Equity/Index.	JPMorgan #N/A	04/08/2008	04/06/2018	732	1,000,000	1,392	162,000			190,148		190,148	1,447						0/0
S&P 500 Indexed Asian Call Opt Apr 2018 853SPQ466	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	04/24/2008	04/24/2018	720	1,000,000	1,416	163,000			173,877		173,877	1,372						0/0
S&P 500 Indexed Asian Call Opt Apr 2021 853SPU410	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	04/01/2011	04/01/2021	1,876	2,500,000	1,332	322,500			1,365,865		1,365,865	(22,600)						0/0
S&P 500 Indexed Asian Call Opt Apr 2021 853SPU460	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	04/15/2011	04/15/2021	2,122	2,800,000	1,320	361,760			1,574,044		1,574,044	(24,148)						0/0
S&P 500 Indexed Asian Call Opt April 2020 853SPT213	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	04/01/2010	04/01/2020	2,971	3,500,000	1,201	472,500			2,166,596		2,166,596	(20,407)						0/0
S&P 500 Indexed Asian Call Opt April 2020 853SPT320	Multiple	N/A	Equity/Index.	ING ZOMI2JT14K8OXYZWX446	04/23/2010	04/23/2020	2,054	2,500,000	1,241	348,000			1,437,522		1,437,522	(14,490)						0/0
S&P 500 Indexed Asian Call Opt April 2022 853SPV075	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	04/16/2012	04/14/2022	2,410	3,300,000	1,370	410,850			1,938,503		1,938,503	(41,722)						0/0
S&P 500 Indexed Asian Call Opt April 2022 853SPV090	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	04/24/2012	04/22/2022	1,822	2,500,000	1,372	313,750			1,474,476		1,474,476	(30,968)						0/0
S&P 500 Indexed Asian Call Opt Aug 2018 853SPQ730	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	08/01/2008	08/01/2018	793	1,000,000	1,285	162,000			321,268		321,268	693						0/0
S&P 500 Indexed Asian Call Opt Aug 2018 853SPR274	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	10/03/2008	08/29/2018	780	1,000,000	1,332	104,628			289,613		289,613	893						0/0
S&P 500 Indexed Asian Call Opt Aug 2020 853SPT775	Multiple	N/A	Equity/Index.	ING ZOMI2JT14K8OXYZWX446	08/16/2010	08/14/2020	2,316	2,500,000	1,150	340,750			1,903,197		1,903,197	(20,886)						0/0
S&P 500 Indexed Asian Call Opt Aug 2021 853SPU685	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	08/08/2011	08/06/2021	2,233	2,500,000	1,119	368,000			2,138,948		2,138,948	(35,604)						0/0
S&P 500 Indexed Asian Call Opt Aug 2021 853SPU710	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	08/24/2011	08/24/2021	3,651	4,300,000	1,178	571,470			3,308,207		3,308,207	(55,538)						0/0
S&P 500 Indexed Asian Call Opt Aug 2022 853SPV270	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	08/16/2012	08/16/2022	1,766	2,500,000	1,416	306,500			1,413,750		1,413,750	(30,946)						0/0
S&P 500 Indexed Asian Call Opt Dec 2019 853SPS686	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	12/16/2009	12/16/2019	2,254	2,500,000	1,141	390,000			1,688,726		1,688,726	(10,736)						0/0
S&P 500 Indexed Asian Call Opt Dec 2020 853SPU111	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	12/16/2010	12/16/2020	2,655	3,300,000	1,243	445,500			2,067,562		2,067,562	(27,558)						0/0
S&P 500 Indexed Asian Call Opt Feb 2020 853SPS926	Multiple	N/A	Equity/Index.	ING ZOMI2JT14K8OXYZWX446	02/16/2010	02/14/2020	2,649	2,900,000	1,116	398,750			2,096,289		2,096,289	(15,826)						0/0

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S&P 500 Indexed Asian Call Opt Jan 2019 853SPR522	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	01/08/2009	01/08/2019	2,748	2,500,000	927	483,750			2,245,101		2,245,101	(3,970)						0/0
S&P 500 Indexed Asian Call Opt Jan 2019 853SPR563	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	01/30/2009	01/30/2019	3,027	2,500,000	867	480,000			2,682,875		2,682,875	(813)						0/0
S&P 500 Indexed Asian Call Opt Jan 2020 853SPS793	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	01/15/2010	01/15/2020	2,201	2,500,000	1,181	327,500			1,585,378		1,585,378	(11,243)						0/0
S&P 500 Indexed Asian Call Opt Jan 2021 853SPU210	Multiple	N/A	Equity/Index.	ING ZOMI2JT14K8OXYZWX446	01/24/2011	01/22/2021	1,937	2,500,000	1,291	323,750			1,446,216		1,446,216	(21,630)						0/0
S&P 500 Indexed Asian Call Opt Jan 2022 853SPU925	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	01/24/2012	01/24/2022	1,902	2,500,000	1,315	328,750			1,585,988		1,585,988	(31,841)						0/0
S&P 500 Indexed Asian Call Opt Jan 2023 853SPV555	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	01/16/2013	01/13/2023	1,698	2,500,000	1,473	260,000			1,334,214		1,334,214	(30,481)						0/0
S&P 500 Indexed Asian Call Opt Jul 2018 853SP0672	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	07/16/2008	07/16/2018	1,044	1,300,000	1,270	211,250			433,501		433,501	2,085						0/0
S&P 500 Indexed Asian Call Opt July 2019 853SPS181	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	07/16/2009	07/15/2019	2,657	2,500,000	978	399,750			2,256,168		2,256,168	(7,199)						0/0
S&P 500 Indexed Asian Call Opt July 2020 853SPT627	Multiple	N/A	Equity/Index.	ING ZOMI2JT14K8OXYZWX446	07/08/2010	07/08/2020	2,710	2,900,000	1,117	446,600			2,280,285		2,280,285	(26,137)						0/0
S&P 500 Indexed Asian Call Opt July 2021 853SPU677	Multiple	N/A	Equity/Index.	ING ZOMI2JT14K8OXYZWX446	08/01/2011	07/30/2021	1,943	2,500,000	1,287	305,250			1,561,949		1,561,949	(27,029)						0/0
S&P 500 Indexed Asian Call Opt July 2022 853SPV215	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	07/06/2012	07/06/2022	1,845	2,500,000	1,355	307,500			1,555,075		1,555,075	(34,230)						0/0
S&P 500 Indexed Asian Call Opt June 2020 853SPT486	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	06/01/2010	06/01/2020	2,335	2,500,000	1,092	416,250			1,991,227		1,991,227	(20,077)						0/0
S&P 500 Indexed Asian Call Opt June 2021 853SPU585	Multiple	N/A	Equity/Index.	ING ZOMI2JT14K8OXYZWX446	06/16/2011	06/16/2021	1,972	2,500,000	1,268	310,000			1,596,919		1,596,919	(25,694)						0/0
S&P 500 Indexed Asian Call Opt June 2022 853SPV170	Multiple	N/A	Equity/Index.	ING ZOMI2JT14K8OXYZWX446	06/08/2012	06/08/2022	1,961	2,600,000	1,326	336,180			1,686,635		1,686,635	(38,050)						0/0
S&P 500 Indexed Asian Call Opt Mar 2021 853SPU370	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	03/16/2011	03/16/2021	1,989	2,500,000	1,257	326,250			1,577,262		1,577,262	(22,801)						0/0
S&P 500 Indexed Asian Call Opt March 2020 853SPT114	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	03/08/2010	03/06/2020	2,547	2,900,000	1,161	386,570			1,931,062		1,931,062	(17,064)						0/0
S&P 500 Indexed Asian Call Opt March 2020 853SPT197	Multiple	N/A	Equity/Index.	ING ZOMI2JT14K8OXYZWX446	03/24/2010	03/24/2020	2,100	2,500,000	1,190	335,000			1,546,997		1,546,997	(14,156)						0/0
S&P 500 Indexed Asian Call Opt March 2022 853SPV015	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	03/16/2012	03/16/2022	1,780	2,500,000	1,404	340,000			1,368,334		1,368,334	(27,810)						0/0
S&P 500 Indexed Asian Call Opt May 2018 853SP0490	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	05/01/2008	05/01/2018	710	1,000,000	1,437	159,500			158,997		158,997	1,076						0/0
S&P 500 Indexed Asian Call Opt May 2018 853SP0516	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	05/16/2008	05/16/2018	702	1,000,000	1,453	159,000			150,248		150,248	1,524						0/0

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S&P 500 Indexed Asian Call Opt May 2018 853SPR332	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	10/03/2008	05/30/2018	714	1,000,000	1,428	81,299			181,816		181,816	1,436						0/0
S&P 500 Indexed Asian Call Opt May 2020 853SPT460	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	05/24/2010	05/22/2020	2,608	2,800,000	1,095	477,400			2,213,120		2,213,120	(21,334)						0/0
S&P 500 Indexed Asian Call Opt May 2021 853SPU550	Multiple	N/A	Equity/Index	ING ZOMI2JT14K8OXYZWX446	05/16/2011	05/14/2021	1,880	2,500,000	1,329	305,000			1,392,857		1,392,857	(22,305)						0/0
S&P 500 Indexed Asian Call Opt May 2022 853SPV140	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	05/16/2012	05/16/2022	1,887	2,500,000	1,325	316,250			1,615,712		1,615,712	(32,606)						0/0
S&P 500 Indexed Asian Call Opt Nov 2019 853SPS496	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	11/16/2009	11/15/2019	2,254	2,500,000	1,139	402,000			1,664,146		1,664,146	(9,635)						0/0
S&P 500 Indexed Asian Call Opt Nov 2022 853SPV375	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	11/08/2012	11/08/2022	2,323	3,200,000	1,378	334,400			1,981,808		1,981,808	(48,681)						0/0
S&P 500 Indexed Asian Call Opt Oct 2019 853SPS389	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	10/08/2009	10/18/2019	2,346	2,500,000	1,081	416,250			1,830,331		1,830,331	(13,193)						0/0
S&P 500 Indexed Asian Call Opt Oct 2020 853SPT940	Multiple	N/A	Equity/Index	ING ZOMI2JT14K8OXYZWX446	10/15/2010	10/15/2020	2,126	2,500,000	1,234	322,500			1,625,103		1,625,103	(20,401)						0/0
S&P 500 Indexed Asian Call Opt Oct 2021 853SPU795	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	10/14/2011	10/14/2021	2,042	2,500,000	1,225	350,000			1,801,833		1,801,833	(31,900)						0/0
S&P 500 Indexed Asian Call Opt Oct 2022 853SPV345	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	10/16/2012	10/14/2022	1,856	2,700,000	1,455	283,230			1,444,040		1,444,040	(33,225)						0/0
S&P 500 Indexed Asian Call Opt Oct 2022 853SPV355	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	10/24/2012	10/24/2022	1,775	2,500,000	1,409	269,250			1,462,066		1,462,066	(33,876)						0/0
S&P 500 Indexed Asian Call Opt Sep 2021 853SPU750	Multiple	N/A	Equity/Index	ING ZOMI2JT14K8OXYZWX446	09/23/2011	09/23/2021	2,200	2,500,000	1,136	343,750			2,110,995		2,110,995	(36,118)						0/0
S&P 500 Indexed Asian Call Opt Sept 2019 853SPS314	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	09/16/2009	09/16/2019	2,433	2,600,000	1,079	439,140			1,888,787		1,888,787	(8,560)						0/0
S&P 500 Indexed Asian Call Opt Sept 2020 853SPT908	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	09/24/2010	09/24/2020	2,176	2,500,000	1,230	304,750			1,660,892		1,660,892	(21,029)						0/0
S&P 500 Indexed Asian Call Opt Sept 2022 853SPV325	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	10/01/2012	09/30/2022	1,731	2,500,000	1,444	280,000			1,359,085		1,359,085	(30,968)						0/0
S&P 500 Indexed Asian Call Opt. June 2019 853SPS116	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWY9T8XKCSX06	06/08/2009	06/07/2019	2,662	2,500,000	976	447,500			2,220,840		2,220,840	(8,001)						0/0
S&P 500 Indexed Digital Call Opt 8/23/2019 853SPV895	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	08/23/2017	08/23/2019	1,503	2,500,000	2,444	265,750			101,723		101,723	(4,337)						0/0
S&P 500 Indexed Digital Call Opt Apr 2019 853SPV695	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	04/28/2017	04/24/2019	1,583	2,500,000	2,374	233,750			102,144		102,144	927						0/0
S&P 500 Indexed Digital Call Opt Dec 2018 853SPV450	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	12/29/2017	12/31/2018	1,753	2,500,000	2,674	249,500			39,463		39,463	(3,002)						0/0
S&P 500 Indexed Digital Call Opt July 2018 853SPV205	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	07/06/2017	07/06/2018	1,845	2,500,000	2,410	291,250			72,839		72,839	(1,819)						0/0

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Description	Description of Item(s) Hedged, Used for Income Generation or Replicated	Schedule/ Exhibit Identifier	Type(s) of Risk(s) (a)	Exchange, Counterparty or Central Clearinghouse	Trade Date	Date of Maturity or Expiration	Number of Contracts	Notional Amount	Strike Price, Rate or Index Received (Paid)	Cumulative Prior Year(s) Initial Cost of Premium (Received) Paid	Current Year Initial Cost of Premium (Received) Paid	Current Year Income	Book/ Adjusted Carrying Value	Code	Fair Value	Unrealized Valuation Increase/ (Decrease)	Total Foreign Exchange Change in B./A.C.V.	Current Year's (Amorti-zation)/ Accretion	Adjustment to Carrying Value of Hedged Item	Potential Exposure	Credit Quality of Refer-ence Entity	Hedge Effectiveness at Inception and at Quarter-end (b)
S&P 500 Indexed Digitial Call Opt July 2018 853SPV230	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	07/24/2017	07/24/2018	1,868	2,500,000	2,495	295,000			65,292		65,292	(2,601)						0/0
S&P 500 Indexed European Call Opt May 2018 853SPV130	Multiple	N/A	Equity/Index	Morgan Stanley 4PQUHN3JPFGFNF3BB653	05/16/2017	05/16/2018	1,887	2,500,000	2,401	293,750			79,112		79,112	1,491						0/0
S&P 500 Indexed IUL 1 Yr Call 853SPA215	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	07/07/2017	07/06/2018	1,031	2,500,000	2,540	73,500			170,808		170,808	(24,960)						0/0
S&P 500 Indexed IUL 1 Yr Call Spread 853SPA117	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	04/03/2017	04/03/2018	4,027	9,500,000	2,359	445,550			1,071,288		1,071,288	38,916						0/0
S&P 500 Indexed IUL 1 Yr Call Spread 853SPA144	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	05/01/2017	05/01/2018	3,894	9,300,000	2,388	422,220			901,142		901,142	(50,861)						0/0
S&P 500 Indexed IUL 1 Yr Call Spread 853SPA175	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	06/01/2017	06/01/2018	4,321	10,500,000	2,430	496,650			891,259		891,259	(99,559)						0/0
S&P 500 Indexed IUL 1 Yr Call Spread 853SPA176	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	06/01/2017	06/01/2018	1,029	2,500,000	2,467	82,000			145,432		145,432	(13,016)						0/0
S&P 500 Indexed IUL 1 Yr Call Spread 853SPA206	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	06/30/2017	06/29/2018	3,879	9,400,000	2,423	446,500			809,832		809,832	(81,497)						0/0
S&P 500 Indexed IUL 1 Yr Call Spread 853SPA238	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	08/02/2017	08/02/2018	5,166	12,800,000	2,478	567,040			966,882		966,882	(115,500)						0/0
S&P 500 Indexed IUL 1 Yr Call Spread 853SPA264	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWIY9T8XKCSX06	09/05/2017	09/05/2018	1,017	2,500,000	2,458	64,000			87,523		87,523	(6,893)						0/0
S&P 500 Indexed IUL 1 Yr Call Spread 853SPA263	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	09/05/2017	09/05/2018	4,394	10,800,000	2,458	529,200			853,999		853,999	(89,913)						0/0
S&P 500 Indexed IUL 1 Yr Call Spread 853SPA300	Multiple	N/A	Equity/Index	Natixis KX1WK48MPD4Y2NCUIZ63	10/06/2017	10/05/2018	5,452	13,900,000	2,549	642,180			895,618		895,618	(87,749)						0/0
S&P 500 Indexed IUL 1 Yr Call Spread 853SPA329	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	11/08/2017	11/08/2018	5,204	13,500,000	2,594	646,650			778,556		778,556	(64,062)						0/0
S&P 500 Indexed IUL 1 Yr Call Spread 853SPA330	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWIY9T8XKCSX06	11/08/2017	11/08/2018	964	2,500,000	2,633	84,750			98,576		98,576	(9,766)						0/0
S&P 500 Indexed IUL 1 Yr Call Spread 853SPA353	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	12/08/2017	12/07/2018	4,865	12,900,000	2,652	639,840			635,058		635,058	(37,437)						0/0
S&P 500 Indexed IUL 1 Yr Call Spread 853SPA354	Multiple	N/A	Equity/Index	Wells Fargo KB1H1DSPRFMYMCUFXT09	12/08/2017	12/07/2018	943	2,500,000	2,691	86,750			84,508		84,508	(6,125)						0/0
S&P 500 Indexed IUL 1 Yr Call Spread 853SPA371	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWIY9T8XKCSX06	12/27/2017	12/27/2018	5,032	13,500,000	2,683	683,100			611,166		611,166	(26,563)						0/0
S&P 500 Indexed LEgacy Cap 1Yr Euro Call 853SPA147	Multiple	N/A	Equity/Index	Barclays G5GSEF7VJP5I7OUK5573	05/08/2017	05/08/2018	1,042	2,500,000	2,399	36,750			59,844		59,844	657						0/0
S&P 500 Indexed Legacy Cap 1Y Euro Call Spread 853SPA357	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWIY9T8XKCSX06	12/15/2017	12/14/2018	934	2,500,000	2,676	43,750			39,279		39,279	(3,988)						0/0
S&P 500 Indexed Legacy Cap 1Yr Euro Call 853SPA324	Multiple	N/A	Equity/Index	SunTrust IYDOJBGJWIY9T8XKCSX06	11/08/2017	11/08/2018	964	2,500,000	2,594	38,250			40,188		40,188	(4,126)						0/0

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S&P 500 Indexed Legacy Cap 1yr Call Spread 853SPA200	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	06/30/2017	06/29/2018	1,032	2,500,000	2,423	40,750			59,779		59,779	(2,633)						0/0
S&P 500 Indexed Legacy Cap 2Y Euro Call Spread 853SPA358	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	12/15/2017	12/13/2019	934	2,500,000	2,676	37,000			33,619		33,619	(3,467)						0/0
S&P 500 Indexed LegacyCap 1Yr Euro Call Spread 853SPA281	Multiple	N/A	Equity/Index.	Barclays G5GSEF7VJP5I7OUK5573	09/22/2017	09/21/2018	999	2,500,000	2,502	40,750			50,142		50,140	(4,400)						0/0
S&P 500 Indexed 1 Yr Cliquet W/ Monthly Cap 853SPA409	Multiple	N/A	Equity/Index.	Morgan Stanley 4PQUHN3JPFGFNF3BB653	02/08/2018	02/08/2019	2,983	7,700,000	2,581	231,770			110,850		110,850	(120,920)						0/0
S&P 500 Indexed 1 Yr Euro Call Spread 853SPA361	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	12/15/2017	12/14/2018	5,494	14,700,000	2,676	349,860			317,009		317,000	(31,775)						0/0
S&P 500 Indexed 1yr Digital w/Specified Rate 853SPA428	Multiple	N/A	Equity/Index.	SunTrust IYDOJBGJWY9T8XKCSX06	03/01/2018	03/01/2019	971	2,600,000	2,678	67,600			59,265		59,265	(8,335)						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA407	Multiple	N/A	Equity/Index.	Wells Fargo KB1H1DSPRFMYMCUFXT09	02/08/2018	02/08/2019	4,921	12,700,000	2,581	323,850			345,866		345,866	22,016						0/0
S&P 500 Indexed 1yr Euro Call Spread 853SPA422	Multiple	N/A	Equity/Index.	Natixis KX1WK48MPD4Y2NCUIZ63	02/23/2018	02/22/2019	4,550	12,500,000	2,747	317,500			244,900		244,900	(72,600)						0/0
0089999. Subtotal - Purchased Options - Hedging Other - Call Options and Warrants										74,232,917	15,352,205		197,640,431	XXX	197,640,431	(13,821,757)					XXX	XXX
0149999. Subtotal - Purchased Options - Hedging Other										74,232,917	15,352,205		197,640,431	XXX	197,640,431	(13,821,757)					XXX	XXX
0219999. Subtotal - Purchased Options - Replications														XXX							XXX	XXX
0289999. Subtotal - Purchased Options - Income Generation														XXX							XXX	XXX
0359999. Subtotal - Purchased Options - Other														XXX							XXX	XXX
0369999. Total Purchased Options - Call Options and Warrants										74,232,917	15,352,205		197,640,431	XXX	197,640,431	(13,821,757)					XXX	XXX
0379999. Total Purchased Options - Put Options														XXX							XXX	XXX
0389999. Total Purchased Options - Caps														XXX							XXX	XXX
0399999. Total Purchased Options - Floors														XXX							XXX	XXX
0409999. Total Purchased Options - Collars														XXX							XXX	XXX
0419999. Total Purchased Options - Other														XXX							XXX	XXX
0429999. Total Purchased Options										74,232,917	15,352,205		197,640,431	XXX	197,640,431	(13,821,757)					XXX	XXX
0499999. Subtotal - Written Options - Hedging Effective														XXX							XXX	XXX
0569999. Subtotal - Written Options - Hedging Other														XXX							XXX	XXX
0639999. Subtotal - Written Options - Replications														XXX							XXX	XXX
0709999. Subtotal - Written Options - Income Generation														XXX							XXX	XXX
0779999. Subtotal - Written Options - Other														XXX							XXX	XXX
0789999. Total Written Options - Call Options and Warrants														XXX							XXX	XXX
0799999. Total Written Options - Put Options														XXX							XXX	XXX
0809999. Total Written Options - Caps														XXX							XXX	XXX
0819999. Total Written Options - Floors														XXX							XXX	XXX
0829999. Total Written Options - Collars														XXX							XXX	XXX
0839999. Total Written Options - Other														XXX							XXX	XXX
0849999. Total Written Options														XXX							XXX	XXX
0909999. Subtotal - Swaps - Hedging Effective														XXX							XXX	XXX
0969999. Subtotal - Swaps - Hedging Other														XXX							XXX	XXX
1029999. Subtotal - Swaps - Replication														XXX							XXX	XXX
1089999. Subtotal - Swaps - Income Generation														XXX							XXX	XXX
1149999. Subtotal - Swaps - Other														XXX							XXX	XXX
1159999. Total Swaps - Interest Rate														XXX							XXX	XXX
1169999. Total Swaps - Credit Default														XXX							XXX	XXX

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1179999. Total Swaps - Foreign Exchange														XXX							XXX	XXX
1189999. Total Swaps - Total Return														XXX							XXX	XXX
1199999. Total Swaps - Other														XXX							XXX	XXX
1209999. Total Swaps														XXX							XXX	XXX
1269999. Subtotal - Forwards														XXX							XXX	XXX
1399999. Subtotal - Hedging Effective														XXX							XXX	XXX
1409999. Subtotal - Hedging Other										74,232,917	15,352,205		197,640,431	XXX	197,640,431	(13,821,757)					XXX	XXX
1419999. Subtotal - Replication														XXX							XXX	XXX
1429999. Subtotal - Income Generation														XXX							XXX	XXX
1439999. Subtotal - Other														XXX							XXX	XXX
1449999 - Totals										74,232,917	15,352,205		197,640,431	XXX	197,640,431	(13,821,757)					XXX	XXX

(a)

Code	Description of Hedged Risk(s)

(b)

Code	Financial or Economic Impact of the Hedge at the End of the Reporting Period

Schedule DB - Part B - Section 1 - Futures Contracts Open

N O N E

Schedule DB - Part B - Section 1B - Brokers with whom cash deposits have been made

N O N E

SCHEDULE DB - PART D - SECTION 1

Counterparty Exposure for Derivative Instruments Open as of Current Statement Date

1 Description of Exchange, Counterparty or Central Clearinghouse		2 Master Agreement (Y or N)	3 Credit Support Annex (Y or N)	4 Fair Value of Acceptable Collateral	Book/Adjusted Carrying Value			Fair Value			11 Potential Exposure	12 Off-Balance Sheet Exposure
					5 Contracts With Book/Adjusted Carrying Value >0	6 Contracts With Book/Adjusted Carrying Value <0	7 Exposure Net of Collateral	8 Contracts With Fair Value >0	9 Contracts With Fair Value <0	10 Exposure Net of Collateral		
0199999 - Aggregate Sum of Exchange Traded Derivatives		XXX	XXX	XXX								
Barclays	G5GSEF7VJP5I7OUK5573	Y	Y	49,443,208	49,065,929			49,065,929				
Goldman Sachs	W22LROWP2IHZNBB6K528	Y	Y	1,030,000	927,242			927,242				
ING	ZOMI2JT14K8OXYZWX446	Y	Y	25,890,000	25,616,623			25,616,623				
JPMorgan Chase	7H6GLXDRUGQFU57RNE97	Y	Y		190,148			190,148				
Morgan Stanley	4PQUHN3JPFGFNF3BB653	Y	Y	14,396,000	14,534,945		138,945	14,534,945		138,945		
Natixis	KX1WK48MPD4Y2NCUIZ63	Y	Y	36,980,000	38,153,199		1,173,199	38,153,199		1,173,199		
Suntrust	IYDOJBGJWY9T8XKCSX06	Y	Y	30,860,000	33,156,497		2,296,497	33,156,497		2,296,497		
Wells Fargo	KB1H1DSPRFMYMCUFXT09	Y	Y	34,530,000	35,995,848		1,465,848	35,995,848		1,465,848		
0299999. Total NAIC 1 Designation				193,129,208	197,640,431		5,264,637	197,640,431		5,264,637		
0899999. Aggregate Sum of Central Clearing houses												
0999999 - Gross Totals				193,129,208	197,640,431		5,264,637	197,640,431		5,264,637		
1. Offset per SSAP No. 64												
2. Net after right of offset per SSAP No. 64					197,640,431							

SCHEDULE DB - PART D - SECTION 2

Collateral for Derivative Instruments Open as of Current Statement Date

Collateral Pledged by Reporting Entity

1 Exchange, Counterparty or Central Clearinghouse	2 Type of Asset Pledged	3 CUSIP Identification	4 Description	5 Fair Value	6 Par Value	7 Book/Adjusted Carrying Value	8 Maturity Date	9 Type of Margin (I, V or IV)
0199999 - Total							XXX	XXX

NONE

Collateral Pledged to Reporting Entity

1 Exchange, Counterparty or Central Clearinghouse	2 Type of Asset Pledged	3 CUSIP Identification	4 Description	5 Fair Value	6 Par Value	7 Book/Adjusted Carrying Value	8 Maturity Date	9 Type of Margin (I, V or IV)
Barclays G5GSEF7VJP5I70UK5573	Other	000000-00-0	Money Market Fund	49,443,208	49,443,208	XXX	01/01/2020	V
Goldman-Sachs W22LROWP2IHZNBB6K528	Other	000000-00-0	Money Market Fund	1,030,000	1,030,000	XXX	01/01/2020	V
ING ZOMI2JT14K8OXYZWX446	Other	000000-00-0	Money Market Fund	25,890,000	25,890,000	XXX	01/01/2020	V
Morgan Stanley 4PQUHN3JPFGFNF3BB653	Other	000000-00-0	Money Market Fund	14,396,000	14,396,000	XXX	01/01/2020	V
NATIXIS KX1WK48MPD4Y2NCUIZ63	Other	000000-00-0	Money Market Fund	36,980,000	36,980,000	XXX	01/01/2020	V
SunTrust Capital IYDOJBGJWY9T8XKCSX06	Other	000000-00-0	Money Market Fund	30,860,000	30,860,000	XXX	01/01/2020	V
Wells Fargo KB1H1DSPRFMYMCUFXT09	Other	000000-00-0	Money Market Fund	34,530,000	34,530,000	XXX	01/01/2020	V
0299999 - Total				193,129,208	193,129,208	XXX	XXX	XXX

Schedule DL - Part 1 - Reinvested Collateral Assets Owned

N O N E

Schedule DL - Part 2 - Reinvested Collateral Assets Owned

N O N E

SCHEDULE E - PART 1 - CASH

Month End Depository Balances

1	2	3	4	5	Book Balance at End of Each Month During Current Quarter			9
					6	7	8	
Depository	Code	Rate of Interest	Amount of Interest Received During Current Quarter	Amount of Interest Accrued at Current Statement Date	First Month	Second Month	Third Month	*
Fifth Third Bank ..... Naples, FL					83,768	138,438	324,193	XXX
JP Morgan Chase ..... Houston, TX					587,707	735,050	622,783	XXX
Mechanics ..... Galveston, TX					227,985	265,829	470,250	XXX
Moody National Bank ..... Galveston, TX					6,283,584	7,368,183	7,989,451	XXX
Synovus Bank ..... Montgomery, AL					217,853	279,982	253,244	XXX
Texas Capital Bank, N.A. ..... Dallas, TX					458,785	231,208	449,253	XXX
Wells Fargo ..... Houston, TX					(49,807,517)	(52,057,354)	(45,389,678)	XXX
West America ..... Santa Rosa, CA					242,417	201,201	337,521	XXX
0199998. Deposits in ... 27 depositories that do not exceed the allowable limit in any one depository (See instructions) - Open Depositories	XXX	XXX			1,747,553	1,583,395	1,463,986	XXX
0199999. Totals - Open Depositories	XXX	XXX			(39,957,865)	(41,254,068)	(33,478,997)	XXX
0299998. Deposits in ... depositories that do not exceed the allowable limit in any one depository (See instructions) - Suspended Depositories	XXX	XXX						XXX
0299999. Totals - Suspended Depositories	XXX	XXX						XXX
0399999. Total Cash on Deposit	XXX	XXX			(39,957,865)	(41,254,068)	(33,478,997)	XXX
0499999. Cash in Company's Office	XXX	XXX	XXX	XXX	24,900	24,900	24,900	XXX
0599999. Total - Cash	XXX	XXX			(39,932,965)	(41,229,168)	(33,454,097)	XXX

SCHEDULE E - PART 2 - CASH EQUIVALENTS

Show Investments Owned End of Current Quarter

1 CUSIP	2 Description	3 Code	4 Date Acquired	5 Rate of Interest	6 Maturity Date	7 Book/Adjusted Carrying Value	8 Amount of Interest Due and Accrued	9 Amount Received During Year
0599999. Total - U.S. Government Bonds								
1099999. Total - All Other Government Bonds								
1799999. Total - U.S. States, Territories and Possessions Bonds								
2499999. Total - U.S. Political Subdivisions Bonds								
3199999. Total - U.S. Special Revenues Bonds								
	Atlantic City Electric Co CP		03/26/2018	2.300	04/02/2018	32,954,894		12,633
	Atlantic City Electric Co CP		03/29/2018	2.300	04/05/2018	15,233,105		2,920
	Duke Energy CP		03/28/2018	2.220	04/05/2018	9,974,538		2,460
	McCormick and Co Inc CP		03/29/2018	2.200	04/05/2018	18,303,524		3,356
	Nextera Energy Capital Holding CP		03/23/2018	2.250	04/03/2018	39,994,997		22,497
	Rockwell Collins Inc CP		03/22/2018	2.350	04/05/2018	14,996,081		9,789
	Sempra Energy Global CP		03/27/2018	2.250	04/04/2018	22,750,732		7,110
	Sempra Energy Global CP		03/28/2018	2.250	04/05/2018	15,995,999		3,999
	Sempra Energy Global CP		03/22/2018	2.300	04/05/2018	10,540,304		6,734
	Southern Power Co. CP		03/27/2018	2.300	04/04/2018	16,307,873		5,209
	VF Corp CP		03/23/2018	2.250	04/06/2018	23,936,513		13,464
3299999. Subtotal - Bonds - Industrial and Miscellaneous (Unaffiliated) - Issuer Obligations						220,988,560		90,171
3899999. Total - Industrial and Miscellaneous (Unaffiliated) Bonds						220,988,560		90,171
4899999. Total - Hybrid Securities								
5599999. Total - Parent, Subsidiaries and Affiliates Bonds								
6099999. Subtotal - SVO Identified Funds								
7799999. Total - Issuer Obligations						220,988,560		90,171
7899999. Total - Residential Mortgage-Backed Securities								
7999999. Total - Commercial Mortgage-Backed Securities								
8099999. Total - Other Loan-Backed and Structured Securities								
8199999. Total - SVO Identified Funds								
8399999. Total Bonds						220,988,560		90,171
00142W-84-3	Aim Premier Portfolio MM		03/29/2018	0.000	XXX	2,053,230		
94975H-29-6	Wells Fargo Adv Tr Pl MM		01/31/2016	0.000	XXX	35,000		
	Wells Fargo MM		03/29/2018	0.000	XXX	25,725,820		61,187
	Morgan Stanley Institutional Liquidity MM		03/29/2018	0.000	XXX	193,129,208		
8599999. Subtotal - Exempt Money Market Mutual Funds - as Identified by the SVO						220,943,258		61,187
8899999 - Total Cash Equivalents						441,931,818		151,358

Medicare Part D Coverage Supplement

N O N E

Trusteed Surplus - Cover

N O N E

Trusteed Surplus Statement - Assets

N O N E

Trusteed Surplus Statement - Liabilities and Trusteed Surplus

N O N E

Trusteed Surplus Overflow Page

N O N E

TRAFFIC IMPACT ANALYSIS REPORT
PULELEHUA DEVELOPMENT

Lahaina, Maui, Hawaii

FINAL DRAFT

August 9, 2018

Prepared for:

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TRAFFIC IMPACT ANALYSIS REPORT

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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.
IVAN K. NAKATSUKA, P.E.
ADRIENNE W. L. H. WONG, P.E., LEED AP
DEANNA HAYASHI, P.E.
PAUL K. ARITA, P.E.
ERIK S. KANESHIRO, L.P.L.S, LEED AP
MATT NAKAMOTO, P.E.

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 898 multi-family (MF) residential units, 2 single-family residential lots (for future residential development), an elementary school, a 10-acre park and three (3) retail centers, totaling 62,000 square feet (SF). 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 six (6) phases, but for purposes of this TIAR, will be analyzed as four (4) scenarios.

The Project's 2 single-family residential lots at the north end of the site may be redeveloped in the future to provide additional residential units. However, this is not being considered at this time.

Figure 1.2 shows the Project site plan.

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OFFICES IN:
HONOLULU, HAWAII
WAILUKU, MAUI, HAWAII
HILO, HAWAII

Scenario 1 – Develop Phase 1 with a build-out of early 2022 that includes the following:

- 240 MF residential units north of Akahele Street, with direct access provided by two (2) new Project roadways, Road A and Road C, bisecting Akahele Street.

Scenario 2 - Develop Phase 2 and Retail component with a build-out of early 2022 that includes the following:

- 30 MF residential units north of Akahele Street with direct access provided by Road A and a new right-in, right-out (RIRO) access via Honoapiilani Highway.
- 190 MF residential units south of Akahele Street with direct access provided by Road A and Road C.
- Retail Area A consisting of 29,000 square feet (SF) of space located on the northeast corner of the Honoapiilani Highway/Akahele Street intersection.
- Retail Area B consisting of 24,000 SF of space located adjacent to Retail Area A on the southeast corner of the Honoapiilani Highway/Akahele Street intersection.
    - Access to Retail Area A and B will be provided by Road A. Retail Area A will also be accessible by the new RIRO access.
    - Based on the developer forecast absorption for the Retail Area A and B components, approximately 15,000 SF of retail space will be occupied by Year 2022, with subsequent occupancy occurring at a pace of 5,000 SF of retail space every 2 years thereafter. Therefore, full build-out and occupancy of Retail Areas A and B will likely occur well beyond Year 2022, but was assumed to be fully built out by Year 2022 for this TIAR.

Scenario 3 – Develop Phases 3-5 with a build-out of late 2022 that include the following:

- 70 MF residential units (Phase 3) north of Akahele Street, with access provided by Road C.
- 150 MF residential units (Phase 3) south of Akahele Street, with access provided by Road C.
- 218 MF residential units (Phase 4) south of Mahinahina Gulch, with access provided by a new Project roadway, Road J, intersecting Honoapiilani Highway south of Mahinahina Gulch.
- 2 single-family residential lots north of Akahele Street, with access provided by Road A and Road C.
- Retail Area C consisting of 9,000 SF of space located on the northeast corner of the new Honoapiilani Highway/Road J intersection, with access provided by Road J.
- 10-acre park with two (2) practice fields 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 2027 was assumed for the TIAR.

- 750-student elementary school, with access provided by Road A.

NORTH

NOT TO SCALE

PACIFIC OCEAN

NAPILIHAU ST.

HONOAPIILANI HWY.

1

2 HOOHUI RD.

ALA HOKU PL.

3 AKAHELE ST.

PROJECT SITE

LOWER HONOAPIILANI RD.

HONOAPIILANI HWY.

4

KAI MALINA PKWY.

5 HALAWAI DR.

KAI ALA DR.

KAKAALANEO DR.

6

PUUKOLII RD.

OIL RD.

KAANAPALI PKWY.

7 HALELO ST.

HONOAPIILANI HWY.

OID STUART RD.

8 LEIALII PKWY.

FLEMING RD.

9

FRONT ST.

10 KAPUNAKEA ST.

11 KEAWE ST.

ULUPONO ST.

LAHAINA CANNERY MALL

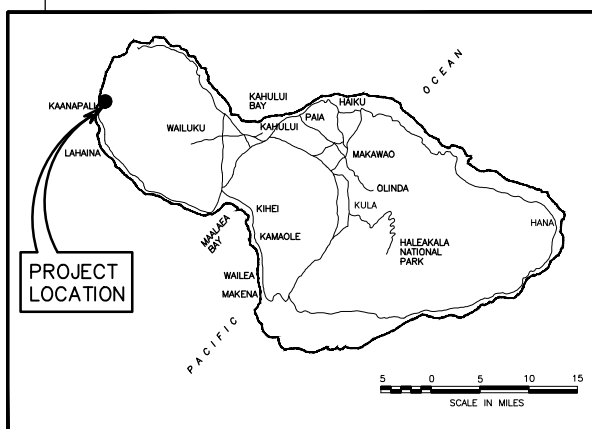
FRONT ST.

LAHAINALUNA RD.

LAHAINA BYPASS

STUDY INTERSECTIONS

1. HONOAPIILANI HWY. & NAPILIHAU ST.
2. HONOAPIILANI HWY. & HOOHUI RD.
3. HONOAPIILANI HWY. & AKAHELE ST.
4. HONOAPIILANI HWY. & LOWER HONOAPIILANI RD.
5. HONOAPIILANI HWY. & HALAWAI DR. & KAI MALINA PKWY.
6. HONOAPIILANI HWY. & PUUKOLII DR. & KAI ALA DR.
7. HONOAPIILANI HWY. & KAANAPALI PKWY. & HALELO ST.
8. HONOAPIILANI HWY. & LEIALII PKWY.
9. HONOAPIILANI HWY. & FLEMING RD. & FRONT ST.
10. HONOAPIILANI HWY. & KAPUNAKEA ST.
11. HONOAPIILANI HWY. & KEAWE ST. & LAHAINA CANNERY MALL



ISLAND OF MAUI

PULELEHUA

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

LOCATION MAP

FIGURE 1.1

PULELEHUA

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

FIGURE 1.2

SITE PLAN

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 and 2027 (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 (with the Project Scenario 1, 2 and 3) and Future Year 2027 (with the Project Scenario 4), 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), dated 2010, 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 unidivided 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)

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. However, with the exception of the southbound left-turn movement at the Honoapiilani Highway/Keawe Street intersection described below, 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, except for the following:

[1] Honoapiilani Highway/Napilihau Street

This intersection operated at overall LOS B during all peak hours of traffic. However, the southbound left-turn movement experienced LOS F during the AM and PM peak hours due to low left-turn turning volumes (≤ 10 vehicles) and long cycle length.

[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 the AM and PM 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 southbound left-turn operated at LOS F and over-capacity during the PM peak hour. Observations indicated the southbound left-turn movement can queue beyond its storage lane and require two signal cycle lengths to clear. This intersection currently serves as the northern terminus connection to Honoapiilani Highway to/from the Lahaina Bypass Road.

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

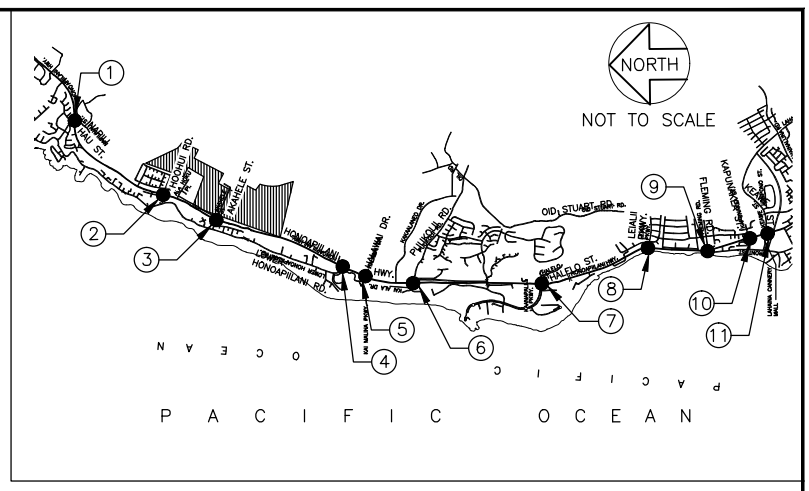
NOTE:
THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. DO NOT USE FOR CONSTRUCTION.

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



NORTH
NOT TO SCALE

HONOAPIILANI HWY.
271(345)[305] – B(B)[B]
48(53)[39] – B(B)[B]
37(8)[22]
30(72)[87] – B(B)[B]
117(252)[251] – B(B)[B]
5(2)[10] – F(F)[E]
1 B/B/B
[B](B)B – [250](352)202
[A](A)A – [276](194)204
[19](22)84
NAPILIHAU ST.
[25](36)52
[28](14)28
[12](3)10
[B](B)B –

MATCH LINE
FOR CONTINUATION, SEE LEFT

61(75)[55] – A(A)[A]
432(496)[414] – B(B)[B]
9(21)[12] – A(A)[A]
13(7)[5]
18(14)[15] – B(B)[B]
84(41)[35] – B(B)[B]
2 B/B/B
HOOHUI RD.
[B](B)B – [52](68)58
[16](18)3
[B](B)B – [176](135)163
[A](A)A – [118](179)123
[A](B)B – [375](493)453
[A](A)A – [22](40)13
10(16)[47] – A(B)[A]
691(708)[632] – B(C)[B]
8(1)[0] – D(E)[A]
0(7)[1]
3(10)[0]
17(75)[9] – C(C)[C]
4 B/B/B
LOWER HONOAPIILANI RD.
[C](C)C – [48](70)30
[9](4)7
[A](A)A – [536](546)433
28(73)[45] – A(B)[A]
612(773)[581] – B(B)[B]
5(2)[4] – F(F)[F]
4(6)[10] – C(A)[C]
1(5)[2] – C(C)[C]
5(10)[10] – E(E)[D]
3 B/B/B
AKAHELE ST.
[D](D)D – [37](53)39
[C](C)C – [5](3)1
[74](107)113
[D](D)D – [70](151)52
[A](B)B – [462](703)527
[A](A)A – [11](7)11
38(33)[39] – A(A)[A]
1129(1332)[1141] – A(A)[A]
14(8)[9] – D(E)[D]
[B](C)B – [356](548)287
[501](757)592
[A](A)A – [5](6)38
KAI MALINA PKWY.
6(4)[12]
1(0)[2]
8(14)[14] – C(C)[C]
5 A/A/A
HALAWAI DR.
[C](C)C – [26](20)16
[2](1)0
[C](C)C – [66](63)33
[D](D)C – [43](68)64
[826](1272)974
[A](A)A – [15](10)16
HONOAPIILANI HWY.

MATCH LINE
FOR CONTINUATION, SEE RIGHT

MATCH LINE
FOR CONTINUATION, SEE FIGURE 3.1B

PULELEHUA

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FIGURE 3.1A

EXISTING LANE CONFIGURATION, VOLUMES AND LOS

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

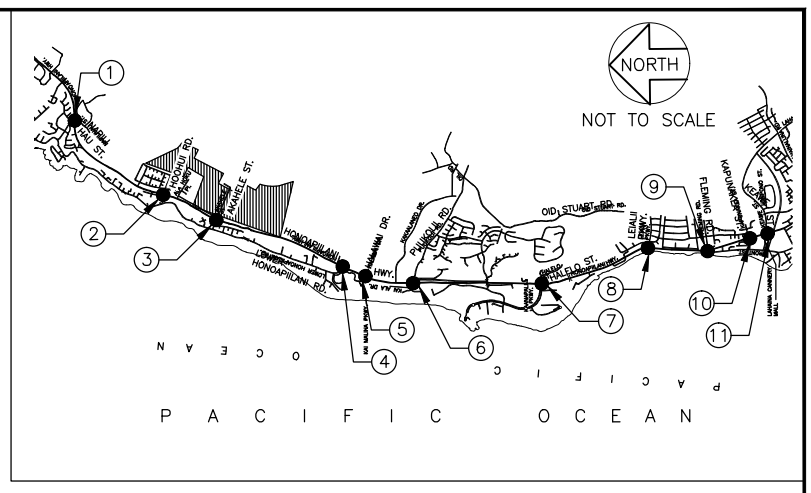
NOTE:
THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. DO NOT USE FOR CONSTRUCTION.

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

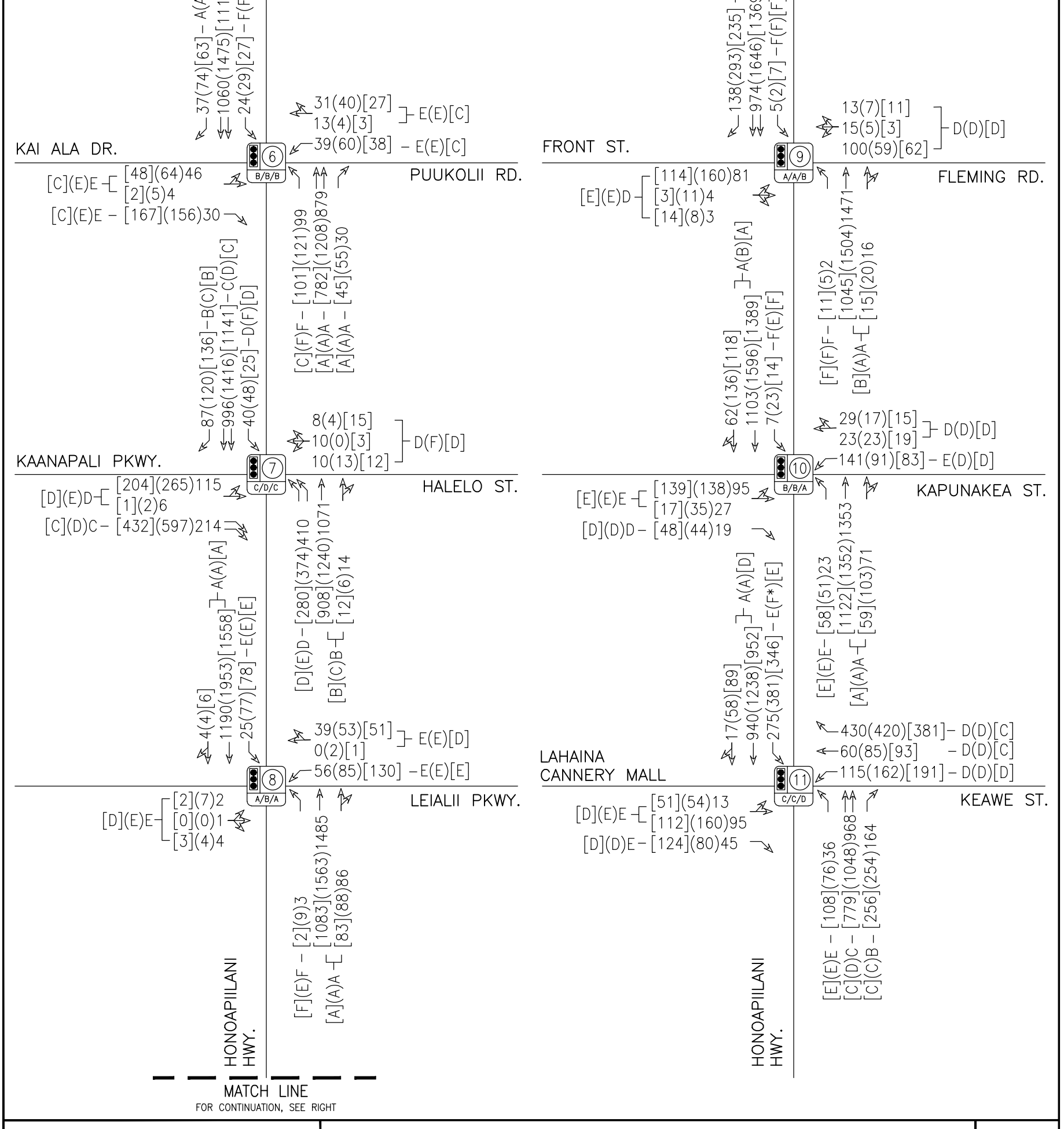
WE PEAK HOUR:
11:30 WE – 12:30 WE



MATCH LINE
FOR CONTINUATION, SEE FIGURE 3.1A

MATCH LINE
FOR CONTINUATION, SEE LEFT

NORTH
NOT TO SCALE



MATCH LINE
FOR CONTINUATION, SEE RIGHT

PULELEHUA

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FIGURE 3.1B

EXISTING LANE CONFIGURATION, VOLUMES AND LOS

Table 3.1: Existing Conditions Level of Service Summary

Intersection	Existing Conditions								
	AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Honoapiilani Highway & Napilihau Street									
NB LT	18.5	0.74	B	18.3	0.80	B	18.3	0.76	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	18.4	0.20	B	16.2	0.19	B
EB RT	14.5	0.16	B	18.0	0.13	B	16.1	0.15	B
WB LT/TH/RT	15.5	0.28	B	18.5	0.19	B	16.2	0.19	B
SB LT	97.0	0.69	F	95.1	0.50	F	67.1	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	14.0	-	B
2: Honoapiilani Highway & Hoohui Road									
NB LT	8.8	0.30	A	8.0	0.41	A	8.0	0.28	A
NB TH	10.4	0.61	B	8.6	0.60	A	8.8	0.53	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	16.6	0.06	B	14.0	0.09	B
WB LT	17.6	0.25	B	19.5	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	14.2	0.73	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	42.1	0.79	D	36.4	0.78	D	35.4	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	6.3	0.01	A	6.9	0.01	A
EB LT	36.9	0.68	D	49.2	0.78	D	36.0	0.66	D
EB TH/RT	20.3	0.07	C	27.1	0.05	C	20.3	0.05	C
WB LT	64.3	0.53	E	59.3	0.56	E	46.2	0.55	D
WB TH	21.4	0.01	C	29.0	0.03	C	21.2	0.01	C
WB RT	21.4	0.01	C	0.0	0.00	A	21.2	0.01	C
SB LT	106.1	0.70	F	114.5	0.40	F	117.6	0.70	F
SB TH	14.3	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	15.2	-	B	18.7	-	B	15.0	-	B
4: Honoapiilani Highway & Lower Honoapiilani Road									
NB LT	19.3	0.80	B	24.5	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	21.2	0.15	C	32.3	0.31	C	22.4	0.24	C
EB RT	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A
WB LT/TH/RT	20.8	0.08	C	33.1	0.39	C	21.2	0.04	C
SB LT	48.5	0.72	D	74.6	0.42	E	0.0	0.00	A
SB TH	11.7	0.53	B	21.8	0.64	C	12.9	0.53	B
SB RT	8.7	0.00	A	16.1	0.01	B	10.0	0.03	A
Overall	10.9	-	B	17.2	-	B	11.2	-	B
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive									
NB LT	29.7	0.79	C	38.4	0.78	D	36.3	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	22.8	0.11	C
EB RT	23.7	0.02	C	28.4	0.01	C	22.8	0.01	C
WB LT/TH/RT	23.9	0.06	C	28.7	0.06	C	22.7	0.07	C
SB LT	43.5	0.75	D	62.5	0.74	E	50.5	0.73	D
SB TH	5.5	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	6.1	-	A	8.7	-	A	6.9	-	A
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road									
NB LT	84.5	0.84	F	86.0	0.86	F	33.8	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	68.2	0.35	E	24.5	0.15	C
EB RT	64.5	0.01	E	64.1	0.02	E	24.0	0.07	C
WB LT	75.0	0.38	E	77.8	0.49	E	26.7	0.14	C
WB TH/RT	65.3	0.10	E	64.2	0.02	E	23.8	0.02	C
SB LT	82.7	0.67	F	90.9	0.77	F	35.3	0.53	D
SB TH	8.2	0.44	A	13.3	0.58	B	12.0	0.64	B
SB RT	5.3	0.02	A	7.7	0.06	A	7.6	0.04	A
Overall	13.7	-	B	17.3	-	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	35.8	0.72	D	75.6	0.83	E	42.2	0.67	D
NB TH/RT	16.1	0.62	B	22.0	0.61	C	15.4	0.51	B
EB LT/TH	37.9	0.57	D	71.4	0.83	E	39.5	0.69	D
EB RT	23.1	0.10	C	47.3	0.49	D	26.9	0.30	C
WB LT/TH/RT	38.9	0.16	D	82.1	0.18	F	46.5	0.22	D
SB LT	40.2	0.31	D	84.8	0.57	F	44.5	0.22	D
SB TH	22.7	0.72	C	37.5	0.83	D	22.1	0.74	C
SB RT	15.6	0.07	B	21.8	0.11	C	14.9	0.14	B
Overall	23.0	-	C	40.0	-	D	23.6	-	C
8: Honoapiilani Highway & Leialii Parkway									
NB LT	81.1	0.43	F	71.1	0.49	E	83.4	0.42	F
NB TH/RT	7.2	0.60	A	9.2	0.65	A	2.0	0.49	A
EB LT/TH/RT	58.7	0.02	E	57.1	0.05	E	50.4	0.01	D
WB LT	62.2	0.36	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	0.43	E	66.4	0.76	E	69.6	0.76	E
SB TH/RT	4.3	0.43	A	8.7	0.72	A	7.7	0.60	A
Overall	7.8	-	A	11.6	-	B	9.4	-	A
9: Honoapiilani Highway & Front Street/Flemming Road									
NB LT	122.6	0.70	F	101.6	0.74	F	95.2	0.83	F
NB TH/RT	6.2	0.57	A	1.5	0.60	A	13.0	0.40	B
EB LT/TH/RT	52.2	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	93.5	0.76	F	119.3	0.70	F	93.2	0.78	F
SB TH	4.3	0.41	A	8.8	0.67	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	79.2	0.80	E	67.5	0.78	E	70.9	0.79	E
NB TH/RT	1.2	0.56	A	1.2	0.60	A	0.9	0.48	A
EB LT/TH	60.1	0.56	E	60.5	0.70	E	57.6	0.67	E
EB RT	51.1	0.01	D	47.1	0.02	D	46.9	0.02	D
WB LT	59.2	0.59	E	51.0	0.34	D	49.9	0.30	D
WB TH/RT	52.1	0.11	D	47.7	0.09	D	47.4	0.08	D
SB LT	104.5	0.79	F	77.3	0.80	E	90.6	0.85	F
SB TH/RT	7.8	0.47	A	14.8	0.74	B	3.3	0.64	A
Overall	10.5	-	B	14.0	-	B	8.6	-	A
11: Honoapiilani Highway & Keawe Street									
NB LT	74.9	0.78	E	67.2	0.79	E	62.4	0.82	E
NB TH	24.1	0.57	C	41.0	0.81	D	34.7	0.63	C
NB RT	17.8	0.14	B	29.3	0.32	C	29.4	0.31	C
EB LT/TH	61.3	0.53	E	64.0	0.77	E	53.4	0.61	D
EB RT	55.7	0.01	E	47.2	0.04	D	46.7	0.08	D
WB LT	50.0	0.50	D	51.7	0.72	D	44.0	0.66	D
WB TH	44.8	0.16	D	36.4	0.17	D	34.0	0.18	C
WB RT	47.5	0.37	D	38.7	0.34	D	34.4	0.21	C
SB LT	62.1	0.94	E	74.1	1.02	F*	73.6	0.92	E
SB TH/RT	0.9	0.43	A	2.2	0.69	A	42.8	0.60	D
Overall	24.3	-	C	32.1	-	C	44.4	-	D

* Denotes overcapacity condition, v/c ≥ 1.

4. BASE YEAR TRAFFIC CONDITIONS

The Base Year 2022 was selected to reflect the completion years of Scenarios 1, 2 and 3 of the Project and Base Year 2027 was selected to reflect the completion year of Scenario 4 of the Project as described in Section 1.2. The Base Year 2022 and 2027 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 2022 and 2027 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 2020, 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 and 2027.

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, and completion is expected to occur at the end of 2018.
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. There is currently no expected completion date, however, was included in the Project TIAR.
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. Completion and full occupancy of the project is expected by 2017.
4. Kai A Ulu 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 2017.
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. Completion of the project is expected in the summer of 2017.

6. 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. Completion of the project is expected in 2018.
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, medical office buildings and a behavioral health center. Completion of the project is expected in late 2018.
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 assumed to be completed by Year 2022.

Forecasts for Base Year 2027 include all background developments assumed to be completed by Year 2022. In addition, the known development that is projected to be complete by Year 2027 and generate traffic within the Project study area is illustrated in Figure 4.1 and listed below based on 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 2027.

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, 9th 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.

NORTH

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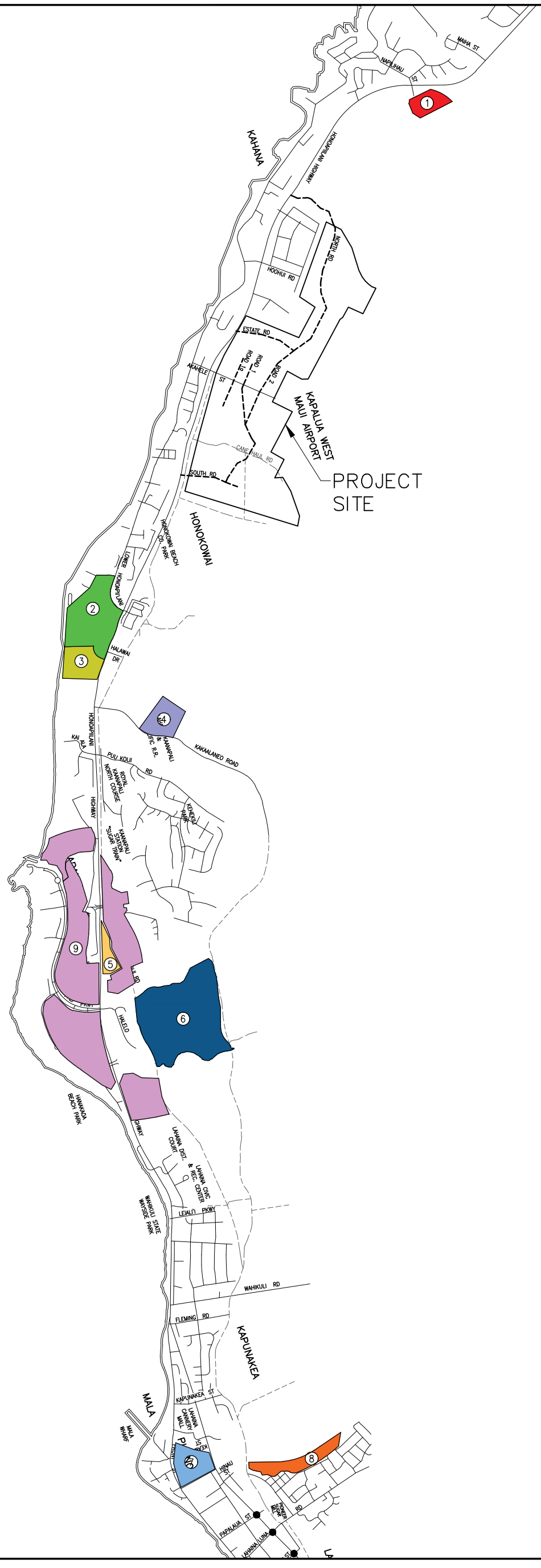

BACKROUND PROJECTS

1. WEST MAUI VILLAGE
2. HONUA KAI
3. WESTIN NANEA OCEAN VILLAS
4. WEST MAUI HOSPITAL
5. KAI A ULU AFFORDABLE HOMES
6. LANIKEHA KAANAPALI
7. KAHOMA VILLAGE
8. KAHOMA RESIDENTIAL SUBDIVISION
9. KAANAPALI GOLF COURSE

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FIGURE 4.1

BACKGROUND PROJECTS

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 and were assumed to be completed by Year 2022 and 2027 without the Project.

Lahaina Bypass Road Phase 1B-2

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 ends at Hokiokio Place. Phase 1B-2 will extend LBR from Hokiokio Place to its southern terminus with Honoapiilani Highway and is expected to be completed in January 2018. 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.

Completion of Phase 1B-2 of the LBR is expected to reduce traffic along Honoapiilani Highway by diverting traffic to the LBR and impact traffic patterns south of the Honoapiilani Highway/Keawe Street/Lahaina Cannery Mall intersection. With the LBR Phase 1B-2, there will be five (5) connections between the LBR and Honoapiilani Highway and include Keawe Street, Lahainaluna Road, Hokiokio Place, Kai Hele Ku Street, and the southern terminus. At the southern terminus of the LBR, all regional northbound traffic will be rerouted to the LBR while regional southbound traffic will be able to utilize both Honolapiilani Highway and the LBR. The extension is expected to decrease the north and southbound through movement volumes along Honoapiilani Highway because of an increase in regional throughput traffic using the LBR and intersection improvements at the Honoapiilani Highway/Keawe Street/Lahaina Cannery Mall intersection that will help route more southbound traffic to LBR. Rerouted traffic was generally based on forecast capacity thresholds at the southern terminus and Keawe Street intersection with Honoapiilani Highway.

Honoapiilani Highway/Keawe Street/Lahaina Cannery Mall

An additional southbound left-turn lane is planned for the Honoapiilani Highway/Keawe Street/Lahaina Cannery Mall intersection, resulting in dual southbound left-turn lanes. Based on existing conditions, the existing single southbound left-turn lane movement operates at over-capacity conditions. The addition of a second left-turn storage lane is expected to increase capacity and reduce queue spillback. Completion of the double left-turn is expected by 2018.

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 West Maui Village roadway improvements. These changes are expected to mitigate potential traffic problems from the proposed development. Completion of the roadway improvements is expected to occur in 2018 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.

[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 over-capacity. 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.

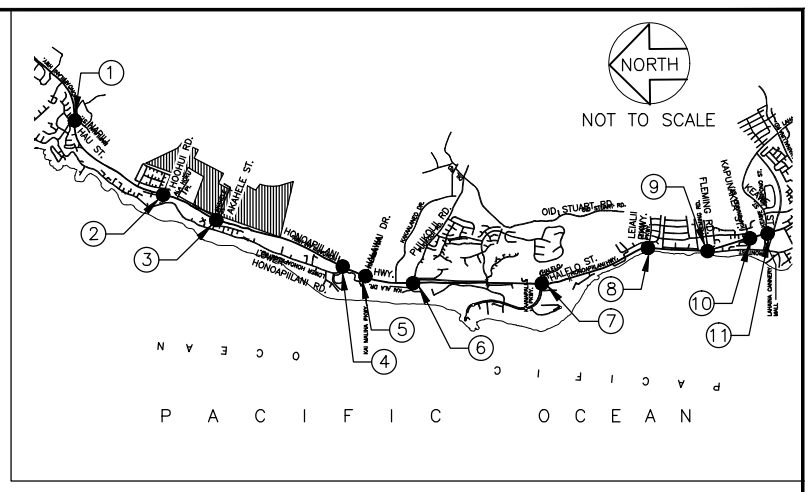
LEGEND

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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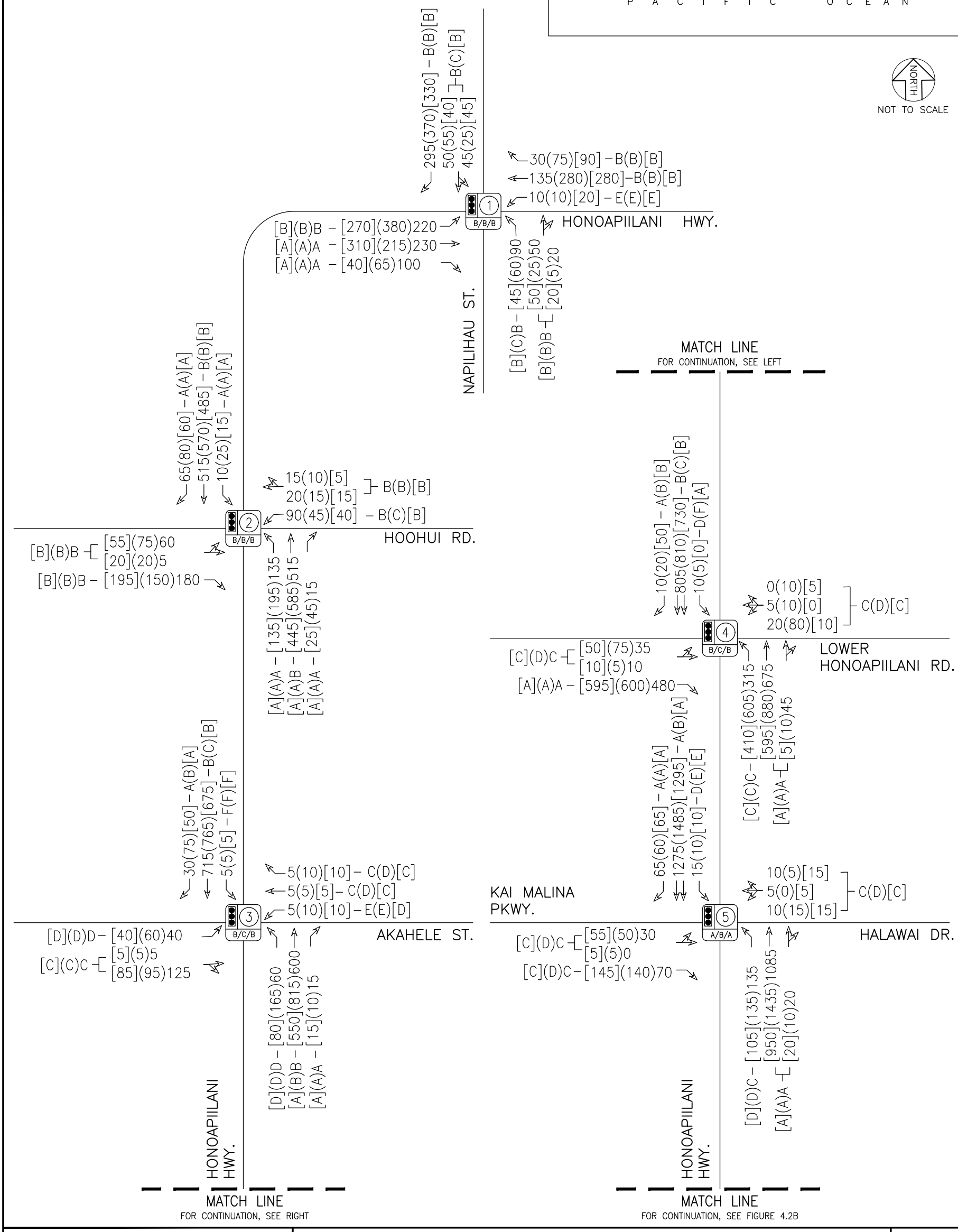

PULELEHUA	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII **BASE YEAR 2022 LANE CONFIGURATION, VOLUMES AND LOS**	FIGURE 4.2A

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:
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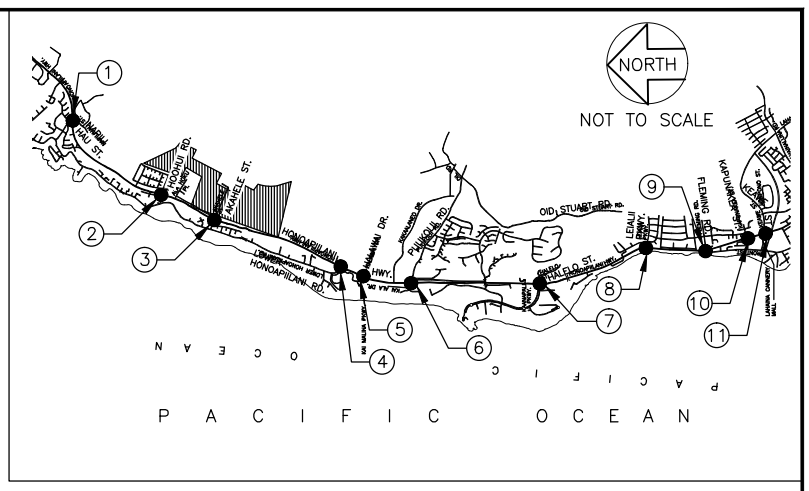
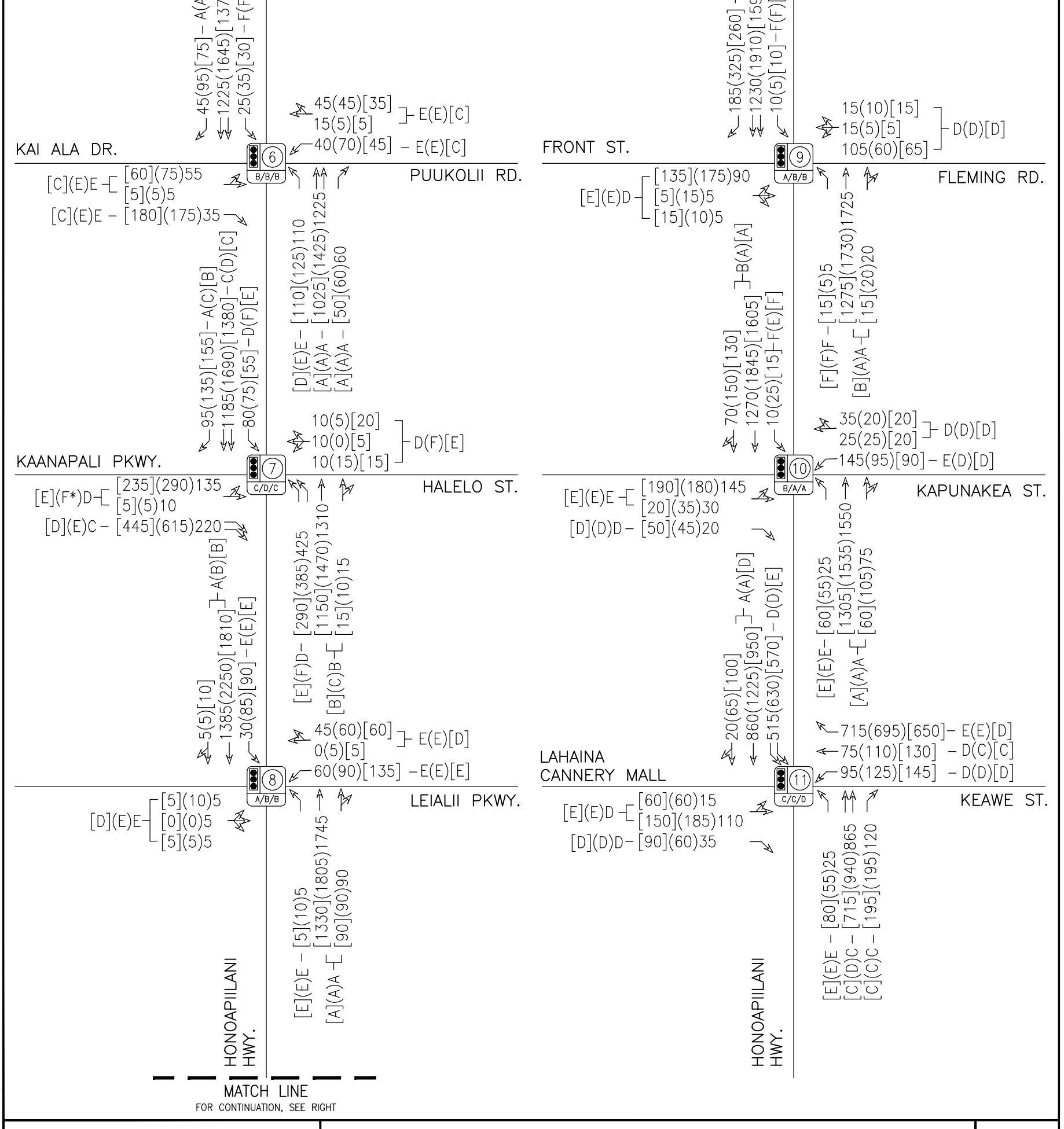


MATCH LINE
FOR CONTINUATION, SEE FIGURE 4.2A

MATCH LINE
FOR CONTINUATION, SEE LEFT

NORTH
NOT TO SCALE



MATCH LINE
FOR CONTINUATION, SEE RIGHT

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FIGURE 4.2B

BASE YEAR 2022 LANE CONFIGURATION, VOLUMES AND LOS

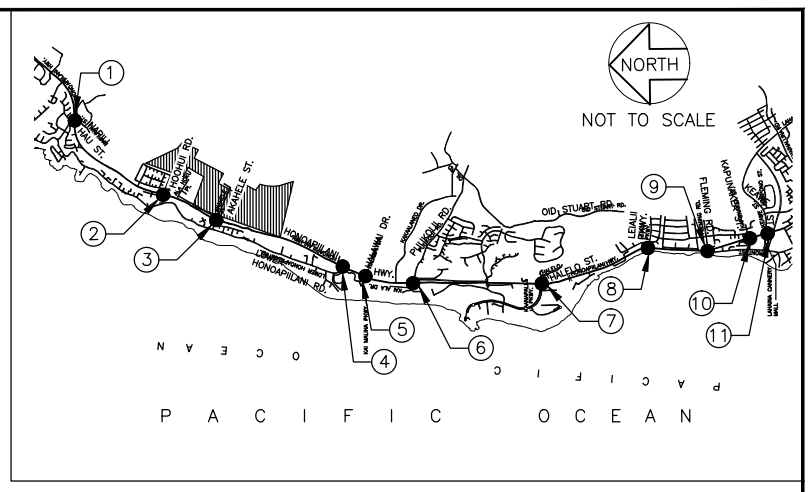
LEGEND

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.



NORTH
NOT TO SCALE

HONOAPIILANI HWY.
295(370)[330] – B(B)[B]
50(55)[40] – B(C)[B]
45(25)[45]
30(75)[90] – B(B)[B]
135(280)[280] – B(B)[B]
10(10)[20] – E(E)[E]
[B](B)B – [270](380)220
[A](A)A – [310](215)230
[A](A)A – [40](65)100
1 B/B/B
[B](C)B – [45](60)90
[50](25)50
[B](B)B – [20](5)20
NAPILIHAU ST.

MATCH LINE
FOR CONTINUATION, SEE LEFT

HOOHUI RD.
65(80)[60] – A(A)[A]
515(570)[485] – B(B)[B]
10(25)[15] – A(A)[A]
15(10)[5]
20(15)[15] – B(B)[B]
90(45)[40] – B(C)[B]
2 B/B/B
[B](B)B – [55](75)60
[20](20)5
[B](B)B – [195](150)180
[A](A)A – [135](195)135
[A](A)B – [445](585)515
[A](A)A – [25](45)15

10(20)[50] – A(B)[B]
805(810)[730] – B(C)[B]
10(5)[0] – D(F)[A]
0(10)[5]
5(10)[0]
20(80)[10] – C(D)[C]
4 B/c/B
[C](D)C – [50](75)35
[10](5)10
[A](A)A – [595](600)480
LOWER HONOAPIILANI RD.

30(75)[50] – A(B)[A]
715(765)[675] – B(C)[B]
5(5)[5] – F(F)[F]
5(10)[10] – C(D)[C]
5(5)[5] – C(D)[C]
5(10)[10] – E(E)[D]
3 B/C/B
[D](D)D – [40](60)40
[C](C)C – [5](5)5
[85](95)125
[D](D)D – [80](165)60
[A](B)B – [550](815)600
[A](A)A – [15](10)15
AKAHELE ST.

65(60)[65] – A(A)[A]
1275(1485)[1295] – A(B)[A]
15(10)[10] – D(E)[E]
[C](C)C – [410](605)315
[595](880)675
[A](A)A – [5](10)45
10(5)[15]
5(0)[5]
10(15)[15] – C(D)[C]
KAI MALINA PKWY.
5 A/B/A
[C](D)C – [55](50)30
[5](5)0
[C](D)C – [145](140)70
[D](D)C – [105](135)135
[950](1435)1085
[A](A)A – [20](10)20
HALAWAI DR.

HONOAPIILANI HWY.

MATCH LINE
FOR CONTINUATION, SEE RIGHT

MATCH LINE
FOR CONTINUATION, SEE FIGURE 4.3B

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FIGURE 4.3A

BASE YEAR 2022 WITH MITIGATION LANE CONFIGURATION, VOLUMES AND LOS

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:
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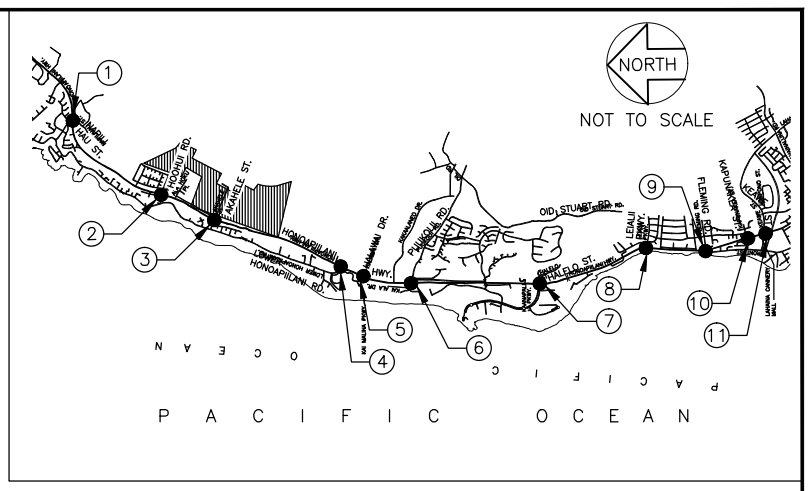

MATCH LINE
FOR CONTINUATION, SEE FIGURE 4.3A

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NOT TO SCALE

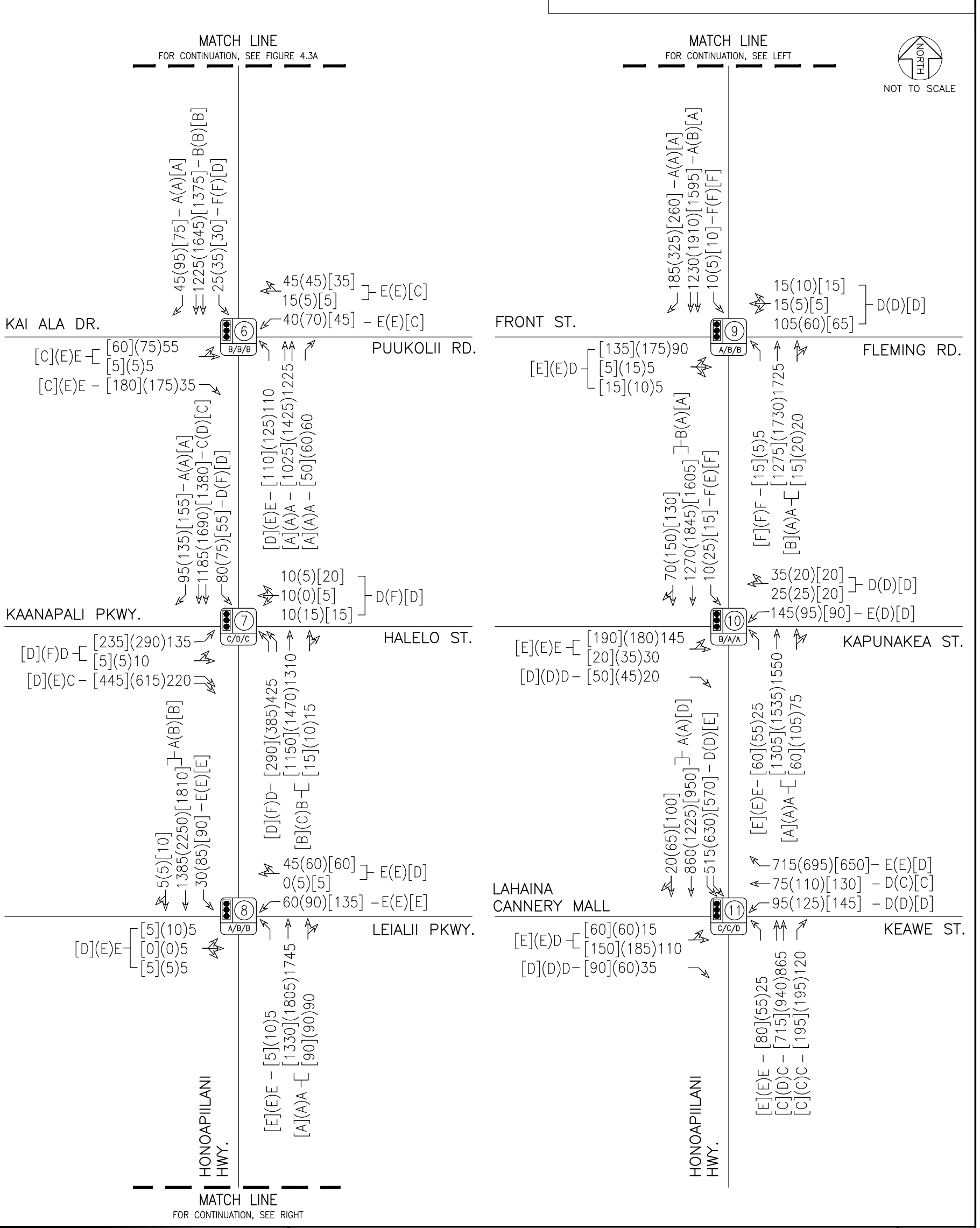

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FIGURE 4.3B

BASE YEAR 2022 WITH MITIGATION LANE CONFIGURATION, VOLUMES AND LOS

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	18.3	0.80	B	18.3	0.76	B	18.9	0.75	B	19.7	0.82	B	19.5	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	18.4	0.20	B	16.2	0.19	B	15.0	0.26	B	20.4	0.29	C	17.8	0.28	B									
EB RT	14.5	0.16	B	18.0	0.13	B	16.1	0.15	B	14.5	0.16	B	19.5	0.13	B	17.2	0.18	B									
WB LT	-	-	-	-	-	-	-	-	-	17.4	0.30	B	22.8	0.28	C	19.5	0.18	B									
WB TH/RT	-	-	-	-	-	-	-	-	-	14.7	0.22	B	19.4	0.13	B	17.7	0.27	B									
WB LT/TH/RT	15.5	0.28	B	18.5	0.19	B	16.2	0.19	B	-	-	-	-	-	-	-	-	-									
SB LT	97.0	0.69	F	95.1	0.50	F	67.1	0.72	E	66.8	0.72	E	73.0	0.73	E	55.6	0.77	E									
SB TH	11.5	0.26	B	16.6	0.57	B	14.2	0.53	B	12.9	0.31	B	17.9	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	11.4	0.06	B									
Overall	13.5	-	B	15.2	-	B	14.0	-	B	14.2	-	B	16.7	-	B	15.1	-	B									
2: Honoapiilani Highway & Hoohui Road																											
NB LT	8.8	0.30	A	8.0	0.41	A	8.0	0.28	A	9.8	0.36	A	9.2	0.47	A	8.4	0.33	A									
NB TH	10.4	0.61	B	8.6	0.60	A	8.8	0.53	A	10.8	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	17.3	0.17	B	19.9	0.31	B	16.3	0.22	B									
EB RT	14.6	0.07	B	16.6	0.06	B	14.0	0.09	B	16.3	0.06	B	18.4	0.07	B	15.6	0.10	B									
WB LT	17.6	0.25	B	19.5	0.17	B	15.6	0.11	B	19.9	0.28	B	22.0	0.20	C	17.7	0.14	B									
WB TH/RT	14.5	0.06	B	16.6	0.07	B	13.9	0.06	B	16.3	0.07	B	18.3	0.07	B	15.5	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	14.2	0.73	B	12.3	0.73	B	11.9	0.69	B	15.1	0.77	B	13.2	0.77	B	12.5	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	13.3	-	B	11.8	-	B	11.1	-	B									
3: Honoapiilani Highway & Akahele Street																											
NB LT	42.1	0.79	D	36.4	0.78	D	35.4	0.77	D	42.7	0.77	D	42.6	0.81	D	37.1	0.76	D									
NB TH	10.8	0.64	B	11.6	0.71	B	9.9	0.56	A	10.6	0.65	B	13.0	0.76	B	10.0	0.60	A									
NB RT	7.0	0.01	A	6.3	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	36.9	0.68	D	49.2	0.78	D	36.0	0.66	D	44.0	0.72	D	52.9	0.77	D	42.6	0.71	D									
EB TH/RT	20.3	0.07	C	27.1	0.05	C	20.3	0.05	C	24.0	0.08	C	32.8	0.04	C	23.8	0.06	C									
WB LT	64.3	0.53	E	59.3	0.56	E	46.2	0.55	D	69.5	0.53	E	65.8	0.58	E	51.3	0.55	D									
WB TH	21.4	0.01	C	29.0	0.03	C	21.2	0.01	C	25.3	0.03	C	35.5	0.03	D	24.8	0.03	C									
WB RT	21.4	0.01	C	0.0	0.00	A	21.2	0.01	C	25.2	0.01	C	35.4	0.01	D	24.7	0.01	C									
SB LT	106.1	0.70	F	114.5	0.40	F	117.6	0.70	F	112.0	0.71	F	126.5	0.72	F	110.8	0.70	F									
SB TH	14.3	0.80	B	19.4	0.85	B	14.3	0.79	B	15.3	0.84	B	22.9	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	0.05	B	8.3	0.03	A									
Overall	15.2	-	B	18.7	-	B	15.0	-	B	15.7	-	B	21.5	-	C	15.8	-	B									
4: Honoapiilani Highway & Lower Honoapiilani Road																											
NB LT	19.3	0.80	B	24.5	0.91	C	18.5	0.83	B	22.4	0.83	C	30.0	0.94	C	21.2	0.87	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	21.2	0.15	C	32.3	0.31	C	22.4	0.24	C	25.0	0.19	C	41.7	0.38	D	26.8	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	20.8	0.08	C	33.1	0.39	C	21.2	0.04	C	24.4	0.10	C	42.5	0.47	D	25.3	0.05	C									
SB LT	48.5	0.72	D	74.6	0.42	E	0.0	0.00	A	50.7	0.74	D	87.3	0.72	F	0.0	0.00	A									
SB TH	11.7	0.53	B	21.8	0.64	C	12.9	0.53	B	13.0	0.58	B	27.4	0.70	C	14.7	0.58	B									
SB RT	8.7	0.00	A	16.1	0.01	B	10.0	0.03	A	9.2	0.00	A	19.5	0.01	B	11.0	0.03	B									
Overall	10.9	-	B	17.2	-	B	11.2	-	B	12.0	-	B	20.9	-	C	12.6	-	B									

Same as Base Year 2022

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
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive																											
NB LT	29.7	0.79	C	38.4	0.78	D	36.3	0.82	D	31.8	0.79	C	43.8	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	7.1	0.60	A	4.9	0.41	A										
EB LT/TH	23.4	0.08	C	28.3	0.08	C	22.8	0.11	C	30.4	0.16	C	37.0	0.22	D	30.2	0.25	C										
EB RT	23.7	0.02	C	28.4	0.01	C	22.8	0.01	C	30.3	0.01	C	36.2	0.03	D	29.5	0.04	C										
WB LT/TH/RT	23.9	0.06	C	28.7	0.06	C	22.7	0.07	C	30.9	0.11	C	38.1	0.08	D	29.5	0.10	C	**Same as Base Year 2022**								
SB LT	43.5	0.75	D	62.5	0.74	E	50.5	0.73	D	53.5	0.78	D	73.1	0.78	E	59.7	0.75	E										
SB TH	5.5	0.54	A	8.4	0.64	A	6.3	0.56	A	7.7	0.61	A	12.5	0.72	B	8.8	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	6.1	-	A	8.7	-	A	6.9	-	A	8.1	-	A	12.1	-	B	9.3	-	A										
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road																											
NB LT	84.5	0.84	F	86.0	0.86	F	33.8	0.77	C	74.0	0.85	E	78.1	0.86	E	39.8	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	9.8	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	5.4	0.04	A	5.5	0.03	A										
EB LT/TH	69.2	0.33	E	68.2	0.35	E	24.5	0.15	C	68.7	0.38	E	67.2	0.37	E	31.3	0.23	C										
EB RT	64.5	0.01	E	64.1	0.02	E	24.0	0.07	C	63.3	0.01	E	63.7	0.13	E	30.1	0.05	C										
WB LT	75.0	0.38	E	77.8	0.49	E	26.7	0.14	C	75.0	0.39	E	78.4	0.54	E	34.6	0.21	C	**Same as Base Year 2022**								
WB TH/RT	65.3	0.10	E	64.2	0.02	E	23.8	0.02	C	64.1	0.10	E	62.5	0.03	E	29.9	0.03	C										
SB LT	82.7	0.67	F	90.9	0.77	F	35.3	0.53	D	82.9	0.69	F	89.0	0.78	F	42.4	0.58	D										
SB TH	8.2	0.44	A	13.3	0.58	B	12.0	0.64	B	10.0	0.52	B	18.1	0.73	B	13.6	0.73	B										
SB RT	5.3	0.02	A	7.7	0.06	A	7.6	0.04	A	6.0	0.03	A	8.5	0.07	A	7.4	0.05	A										
Overall	13.7	-	B	17.3	-	B	12.4	-	B	13.9	-	B	19.9	-	B	13.6	-	B										
7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street																											
NB LT	35.8	0.72	D	75.6	0.83	E	42.2	0.67	D	45.6	0.77	D	93.1	0.85	F	60.2	0.74	E	40.7	0.75	D	91.4	0.85	F	49.6	0.71	D
NB TH/RT	16.1	0.62	B	22.0	0.61	C	15.4	0.51	B	19.0	0.70	B	22.9	0.67	C	18.4	0.59	B	16.2	0.68	B	22.0	0.66	C	13.7	0.56	B
EB LT/TH	37.9	0.57	D	71.4	0.83	E	39.5	0.69	D	48.2	0.67	D	195.8	1.16	F*	60.0	0.79	E	44.2	0.46	D	86.1	0.60	F	48.6	0.58	D
EB RT	23.1	0.10	C	47.3	0.49	D	26.9	0.30	C	28.7	0.08	C	66.4	0.58	E	38.3	0.34	D	28.3	0.08	C	63.9	0.51	E	36.4	0.34	D
WB LT/TH/RT	38.9	0.16	D	82.1	0.18	F	46.5	0.22	D	50.1	0.18	D	101.9	0.23	F	66.3	0.36	E	44.7	0.18	D	100.0	0.23	F	54.7	0.32	D
SB LT	40.2	0.31	D	84.8	0.57	F	44.5	0.22	D	51.8	0.59	D	115.3	0.73	F	65.4	0.55	E	46.2	0.57	D	112.3	0.72	F	53.9	0.50	D
SB TH	22.7	0.72	C	37.5	0.83	D	22.1	0.74	C	25.7	0.77	C	42.7	0.88	D	27.6	0.79	C	22.1	0.75	C	41.1	0.88	D	20.8	0.76	C
SB RT	15.6	0.07	B	21.8	0.11	C	14.9	0.14	B	9.6	0.08	A	20.1	0.12	C	16.7	0.15	B	9.8	0.08	A	8.2	0.11	A	6.9	0.13	A
Overall	23.0	-	C	40.0	-	D	23.6	-	C	27.0	-	C	53.8	-	D	30.7	-	C	23.7	-	C	44.8	-	D	24.1	-	C
8: Honoapiilani Highway & Leialii Parkway																											
NB LT	81.1	0.43	F	71.1	0.49	E	83.4	0.42	F	75.8	0.45	E	69.1	0.50	E	72.4	0.44	E										
NB TH/RT	7.2	0.60	A	9.2	0.65	A	2.0	0.49	A	8.8	0.70	A	2.4	0.75	A	2.9	0.60	A										
EB LT/TH/RT	58.7	0.02	E	57.1	0.05	E	50.4	0.01	D	58.6	0.06	E	57.0	0.07	E	50.0	0.03	D										
WB LT	62.2	0.36	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	50.3	0.05	D										
SB LT	67.8	0.43	E	66.4	0.76	E	69.6	0.76	E	68.8	0.52	E	66.2	0.78	E	76.2	0.79	E										
SB TH/RT	4.3	0.43	A	8.7	0.72	A	7.7	0.60	A	5.2	0.51	A	13.3	0.83	B	10.2	0.70	B										
Overall	7.8	-	A	11.6	-	B	9.4	-	A	9.1	-	A	10.8	-	B	11.0	-	B										
9: Honoapiilani Highway & Front Street/Flemming Road																											
NB LT	122.6	0.70	F	101.6	0.74	F	95.2	0.83	F	89.8	0.73	F	96.3	0.74	F	87.9	0.84	F										
NB TH/RT	6.2	0.57	A	1.5	0.60	A	13.0	0.40	B	7.6	0.67	A	1.9	0.71	A	16.3	0.50	B										
EB LT/TH/RT	52.2	0.43	D	59.0	0.70	E	58.8	0.62	E	52.6	0.48	D	59.5	0.72	E	57.7	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	49.7	0.24	D	52.3	0.32	D	**Same as Base Year 2022**								
SB LT	93.5	0.76	F	119.3	0.70	F	93.2	0.78	F	88.2	0.81	F	87.4	0.74	F	88.0	0.82	F										
SB TH	4.3	0.41	A	8.8	0.67	A	5.6	0.53	A	4.9	0.48	A	11.8	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	10.4	-	B	14.8	-	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
10: Honoapiilani Highway & Kapunakea Street																											
NB LT	79.2	0.80	E	67.5	0.78	E	70.9	0.79	E	74.7	0.79	E	67.6	0.79	E	71.9	0.79	E									
NB TH/RT	1.2	0.56	A	1.2	0.60	A	0.9	0.48	A	1.3	0.66	A	1.3	0.71	A	2.8	0.58	A									
EB LT/TH	60.1	0.56	E	60.5	0.70	E	57.6	0.67	E	64.2	0.72	E	62.3	0.75	E	59.7	0.74	E									
EB RT	51.1	0.01	D	47.1	0.02	D	46.9	0.02	D	48.3	0.01	D	43.6	0.03	D	42.6	0.04	D									
WB LT	59.2	0.59	E	51.0	0.34	D	49.9	0.30	D	55.1	0.51	E	46.9	0.29	D	45.3	0.26	D									
WB TH/RT	52.1	0.11	D	47.7	0.09	D	47.4	0.08	D	49.3	0.10	D	44.1	0.08	D	42.9	0.07	D									
SB LT	104.5	0.79	F	77.3	0.80	E	90.6	0.85	F	101.8	0.83	F	72.4	0.80	E	85.2	0.84	F									
SB TH/RT	7.8	0.47	A	14.8	0.74	B	3.3	0.64	A	10.3	0.56	B	5.5	0.89	A	3.6	0.78	A									
Overall	10.5	-	B	14.0	-	B	8.6	-	A	11.9	-	B	9.7	-	A	9.7	-	A									
11: Honoapiilani Highway & Keawe Street																											
NB LT	74.9	0.78	E	67.2	0.79	E	62.4	0.82	E	79.8	0.79	E	69.3	0.78	E	64.0	0.79	E									
NB TH	24.1	0.57	C	41.0	0.81	D	34.7	0.63	C	32.3	0.62	C	39.4	0.75	D	31.0	0.55	C									
NB RT	17.8	0.14	B	29.3	0.32	C	29.4	0.31	C	23.6	0.08	C	28.6	0.21	C	25.9	0.20	C									
EB LT/TH	61.3	0.53	E	64.0	0.77	E	53.4	0.61	D	47.7	0.35	D	63.6	0.79	E	61.5	0.77	E									
EB RT	55.7	0.01	E	47.2	0.04	D	46.7	0.08	D	43.9	0.02	D	42.9	0.03	D	44.5	0.04	D									
WB LT	50.0	0.50	D	51.7	0.72	D	44.0	0.66	D	38.3	0.29	D	40.7	0.58	D	42.2	0.62	D									
WB TH	44.8	0.16	D	36.4	0.17	D	34.0	0.18	C	35.5	0.14	D	33.9	0.20	C	34.6	0.25	C									
WB RT	47.5	0.37	D	38.7	0.34	D	34.4	0.21	C	65.7	0.92	E	64.4	0.92	E	43.2	0.68	D									
SB LT	62.1	0.94	E	74.1	1.02	F*	73.6	0.92	E	51.4	0.91	D	46.4	0.95	D	62.2	0.88	E									
SB TH/RT	0.9	0.43	A	2.2	0.69	A	42.8	0.60	D	1.0	0.45	A	1.3	0.70	A	41.1	0.58	D									
Overall	24.3	-	C	32.1	-	C	44.4	-	D	32.1	-	C	32.2	-	C	43.9	-	D									

Same as Base Year 2022

Same as Base Year 2022

* Denotes overcapacity condition, v/c ≥ 1.

4.5 Base Year 2027 Analysis

It is anticipated that by Base Year 2027, 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 2027 Intersection Analysis

By Base Year 2027 without the Project, traffic at the study intersections along Honoapiilani Highway is estimated to generally increase by an additional 5-10% for most parts along the corridor during the AM, PM and WE peak hours of traffic over Base Year 2022 conditions. 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 from Base Year 2022 conditions. The majority of intersection movements operating at LOS E/F conditions during Base Year 2022 will continue to operate similarly in Base Year 2027.

[3] Honoapiilani Highway/Akahele Street

During the PM peak hour, the westbound left-turn movement is expected to experience a significant increase in delay with the increase in through traffic along Honoapiilani Highway. However, because the turning volume is low (10 vehicles), no mitigation is proposed.

[7] Honoapiilani Highway/Kaanapali Parkway/Halelo Street

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 2022 to LOS C(E)[C] during Base Year 2027. However, the major through movements will continue operating at LOS D or better during all peak hours. No mitigation is proposed beyond Base Year 2022 mitigation.

Figure 4.4 illustrates the Base Year 2027 forecast traffic volumes and LOS for the study intersection movements. Table 4.4 summarizes the Base Year 2027 LOS at the study intersections compared to Base Year 2022 conditions. LOS worksheets are provided in Appendix C. Full Base Year 2022 and 2027 roadway improvements are listed in Appendix D.

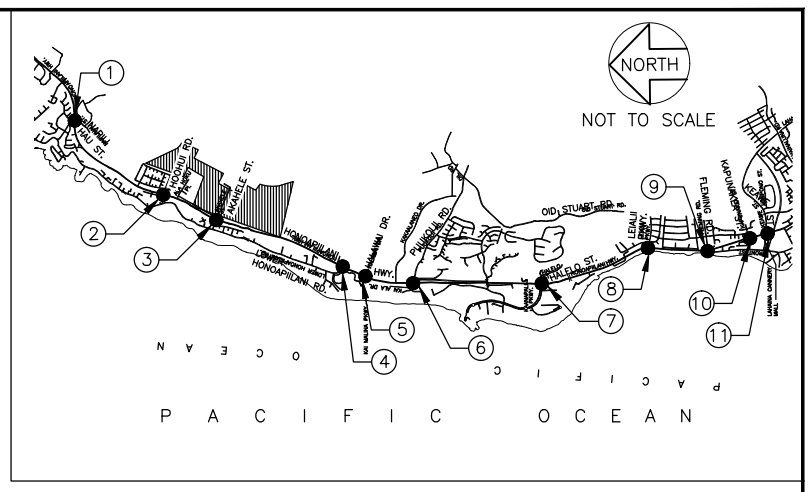
LEGEND

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.



NORTH
NOT TO SCALE

295(370)[330] – B(C)[B]
50(55)[40] – B(C)[C]
45(25)[45]

30(75)[90] – B(B)[B]
205(375)[365] – B(B)[B]
10(10)[20] – E(E)[E]

[C](C)B – [270](380)220
[A](A)A – [385](275)255
[A](A)A – [40](65)100

1 B/B/B

HONOAPIILANI HWY.

NAPILIHAU ST.

[C](C)B – [45](60)90
[50](25)50
[20](5)20

[C](C)B – [55](75)60
[20](20)5

[B](C)B – [195](150)180

65(80)[60] – A(A)[A]
590(675)[575] – B(B)[B]
10(25)[15] – A(A)[A]

15(10)[5]
20(15)[15] – B(C)[B]
90(45)[40] – C(C)[B]

2 B/B/B

HOOHUI RD.

[A](B)B – [135](195)135
[A](A)B – [525](655)550
[A](A)A – [25](45)15

MATCH LINE
FOR CONTINUATION, SEE LEFT

10(20)[50] – A(C)[B]
890(920)[830] – B(C)[B]
10(5)[0] – D(F)[A]

0(10)[5]
5(10)[0]
20(80)[10] – C(D)[C]

4 B/C/B

LOWER HONOAPIILANI RD.

[C](D)C – [50](75)35
[10](5)10
[A](A)A – [595](600)480

[C](D)C – [410](605)315
[660](935)695
[A](A)A – [5](10)45

30(75)[50] – A(A)[A]
795(870)[770] – B(C)[B]
5(5)[5] – F(F)[F]

5(10)[10] – C(D)[C]
5(5)[5] – C(D)[C]
5(10)[10] – E(F)[E]

3 B/C/B

AKAHELE ST.

[D](E)D – [40](60)40
[C](D)C – [5](5)5
[85](95)125

[D](D)D – [80](165)60
[A](B)B – [630](890)635
[A](A)A – [15](10)15

HONOAPIILANI HWY.

65(60)[65] – A(A)[A]
1370(1610)[1400] – A(B)[A]
15(10)[10] – E(E)[E]

10(5)[15]
5(0)[5]
10(15)[15] – C(D)[C]

5 A/B/A

KAI MALINA PKWY.

HALAWAI DR.

[C](D)C – [55](50)30
[5](5)0
[C](D)C – [145](140)70

[D](D)C – [105](135)135
[1020](1490)1105
[A](A)A – [20](10)20

HONOAPIILANI HWY.

MATCH LINE
FOR CONTINUATION, SEE RIGHT

MATCH LINE
FOR CONTINUATION, SEE FIGURE 4.4B

PULELEHUA

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

FIGURE 4.4A

BASE YEAR 2027 LANE CONFIGURATION, VOLUMES AND LOS

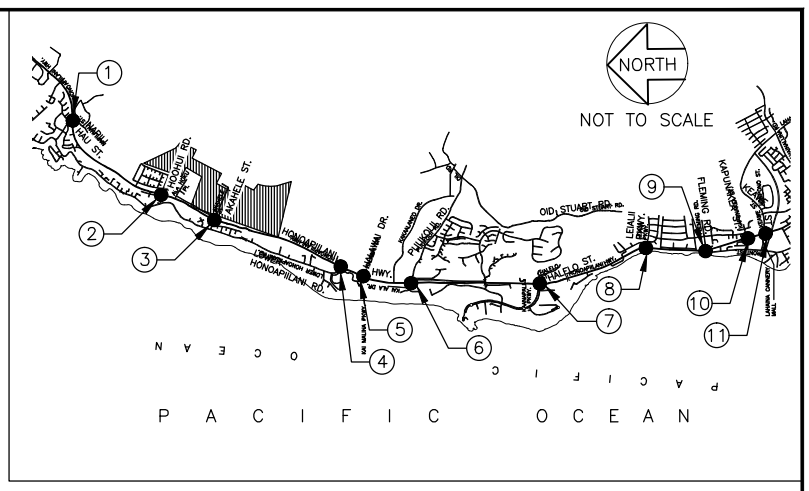
LEGEND

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.



MATCH LINE
FOR CONTINUATION, SEE FIGURE 4.4A

MATCH LINE
FOR CONTINUATION, SEE LEFT

NORTH
NOT TO SCALE

KAI ALA DR.

6 B/C/B

PUUKOLII RD.

45(95)[75] – A(A)[A]
1320(1770)[1480] – B(C)[B]
25(35)[30] – F(F)[D]
45(45)[35]
15(5)[5]
40(70)[45] – E(E)[C] / E(E)[D]
[C](E)E – [60](75)55 / [5](5)5
[C](E)E – [180](175)35
110(190)[220] – B(B)[A]
1280(1760)[1425] – C(D)[C]
80(75)[55] – D(F)[E]
[D](E)E – [110](125)110
[A](B)A – [1115](1510)1270
[A](A)A – [50](60)60

KAANAPALI PKWY.

7 C/E/C

HALELO ST.

10(5)[20]
10(0)[5]
10(15)[15] – D(F)[E]
[E](F)D – [300](350)140 / [5](5)10
[D](E)C – [590](740)235
5(5)[10]
1475(2465)[2020] – A(B)[B]
30(85)[90] – E(E)[C]
[E](F)D – [440](500)460
[B](C)B – [1175](1505)1345 / [15](10)15

LEIALII PKWY.

8 A/B/B

45(60)[60]
0(5)[5]
60(90)[135] – E(E)[D] / E(E)[E]
[D](E)E – [5](10)5 / [0](0)5 / [5](5)5
[E](E)E – [5](10)5
[A](A)A – [1520](1975)1825 / [90](90)90

HONOAPIILANI HWY.

FRONT ST.

9 B/B/B

FLEMING RD.

185(325)[260] – A(A)[A]
1315(2115)[1795] – A(B)[A]
10(5)[10] – F(E)[F]
15(10)[15]
15(5)[5]
105(60)[65] – D(D)[D]
[135](175)90 / [5](15)5 / [15](10)5 – E(D)[D]
[E](E)D
70(150)[130]
1355(2050)[1810] – B(B)[A]
10(25)[15] – F(E)[F]
[F](F)F – [15](5)5
[1465](1900)1805
[A](A)A – [15](20)20

KAPUNAKEA ST.

10 B/B/B

35(20)[20]
25(25)[20] – D(D)[D]
145(95)[90] – E(D)[D]
[190](180)145 / [20](35)30 / [50](45)20 – E(E)[E]
20(65)[100]
935(1415)[1140] – A(A)[C]
515(630)[570] – D(D)[E]
[E](E)E – [60](55)25
[1495](1700)1625
[B](A)A – [60](105)75

LAHAINA CANNERY MALL

11 C/C/D

KEAWE ST.

715(695)[650] – E(E)[D]
75(110)[130] – D(D)[C]
95(125)[145] – D(D)[D]
[60](60)15 / [150](185)110 – E(D)[D]
[90](60)35
[E](E)E – [80](55)25
[C](D)C – [890](1090)925
[C](C)C – [195](195)120

HONOAPIILANI HWY.

MATCH LINE
FOR CONTINUATION, SEE RIGHT

PULELEHUA

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

FIGURE 4.4B

BASE YEAR 2027 LANE CONFIGURATION, VOLUMES AND LOS

Table 4.4: Base Year 2022 with Mitigation and Base Year 2027 Level of Service Summary

Intersection	Base Year 2022 with Mitigation									Base Year 2027								
	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	18.9	0.75	B	19.7	0.82	B	19.5	0.77	B	18.9	0.75	B	23.2	0.84	C	22.0	0.79	C
NB TH	8.1	0.32	A	6.0	0.23	A	7.6	0.37	A	8.3	0.35	A	5.7	0.27	A	7.4	0.42	A
NB RT	6.9	0.08	A	5.2	0.05	A	5.9	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	20.4	0.29	C	17.8	0.28	B	15.0	0.26	B	24.2	0.32	C	20.7	0.32	C
EB RT	14.5	0.16	B	19.5	0.13	B	17.2	0.18	B	14.5	0.15	B	22.8	0.12	C	19.7	0.16	B
WB LT	17.4	0.30	B	22.8	0.28	C	19.5	0.18	B	17.4	0.30	B	27.2	0.32	C	22.7	0.21	C
WB TH/RT	14.7	0.22	B	19.4	0.13	B	17.7	0.27	B	14.7	0.22	B	22.9	0.14	C	20.3	0.29	C
SB LT	66.8	0.72	E	73.0	0.73	E	55.6	0.77	E	66.8	0.72	E	78.4	0.74	E	60.2	0.78	E
SB TH	12.9	0.31	B	17.9	0.60	B	15.2	0.57	B	14.2	0.47	B	18.7	0.66	B	15.5	0.62	B
SB RT	11.2	0.02	B	13.1	0.05	B	11.4	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	14.3	-	B	18.1	-	B	15.7	-	B
2: Honoapiilani Highway & Hoohui Road																		
NB LT	9.8	0.36	A	9.2	0.47	A	8.4	0.33	A	10.7	0.39	B	11.1	0.53	B	8.8	0.36	A
NB TH	10.8	0.64	B	9.3	0.66	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	19.9	0.31	B	16.3	0.22	B	19.1	0.18	B	22.7	0.33	C	18.3	0.24	B
EB RT	16.3	0.06	B	18.4	0.07	B	15.6	0.10	B	18.0	0.06	B	20.9	0.06	C	17.4	0.08	B
WB LT	19.9	0.28	B	22.0	0.20	C	17.7	0.14	B	22.0	0.30	C	25.1	0.22	C	19.9	0.15	B
WB TH/RT	16.3	0.07	B	18.3	0.07	B	15.5	0.06	B	18.0	0.07	B	20.9	0.07	C	17.4	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	8.1	0.07	A	7.7	0.04	A
SB TH	15.1	0.77	B	13.2	0.77	B	12.5	0.73	B	15.7	0.81	B	13.9	0.82	B	12.7	0.77	B
SB RT	9.5	0.05	A	8.0	0.06	A	8.1	0.04	A	9.2	0.04	A	7.6	0.06	A	7.5	0.04	A
Overall	13.3	-	B	11.8	-	B	11.1	-	B	13.8	-	B	12.6	-	B	11.4	-	B
3: Honoapiilani Highway & Akahele Street																		
NB LT	42.7	0.77	D	42.6	0.81	D	37.1	0.76	D	45.7	0.77	D	49.4	0.83	D	40.9	0.76	D
NB TH	10.6	0.65	B	13.0	0.76	B	10.0	0.60	A	10.0	0.63	B	13.8	0.77	B	9.8	0.63	A
NB RT	6.5	0.01	A	5.9	0.01	A	6.4	0.01	A	6.0	0.01	A	5.2	0.01	A	5.8	0.01	A
EB LT	44.0	0.72	D	52.9	0.77	D	42.6	0.71	D	49.7	0.74	D	59.0	0.77	E	49.1	0.74	D
EB TH/RT	24.0	0.08	C	32.8	0.04	C	23.8	0.06	C	27.2	0.07	C	38.8	0.05	D	27.5	0.05	C
WB LT	69.5	0.53	E	65.8	0.58	E	51.3	0.55	D	73.5	0.53	E	109.1	0.78	F	56.1	0.56	E
WB TH	25.3	0.03	C	35.5	0.03	D	24.8	0.03	C	28.7	0.03	C	42.2	0.04	D	28.7	0.03	C
WB RT	25.2	0.01	C	35.4	0.01	D	24.7	0.01	C	28.5	0.01	C	42.1	0.01	D	28.6	0.01	C
SB LT	112.0	0.71	F	126.5	0.72	F	110.8	0.70	F	116.5	0.71	F	134.9	0.72	F	116.1	0.71	F
SB TH	15.3	0.84	B	22.9	0.88	C	15.5	0.83	B	15.8	0.86	B	29.0	0.92	C	16.1	0.85	B
SB RT	7.8	0.02	A	10.6	0.05	B	8.3	0.03	A	7.3	0.02	A	9.9	0.05	A	7.8	0.04	A
Overall	15.7	-	B	21.5	-	C	15.8	-	B	15.9	-	B	25.2	-	C	16.1	-	B

Table 4.4: Base Year 2022 with Mitigation and Base Year 2027 Level of Service Summary Cont'd

Intersection	Base Year 2022 with Mitigation									Base Year 2027								
	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	22.4	0.83	C	30.0	0.94	C	21.2	0.87	C	24.4	0.84	C	38.4	0.95	D	23.7	0.88	C
NB TH/RT	4.7	0.33	A	4.4	0.36	A	2.4	0.24	A	4.5	0.33	A	4.3	0.37	A	2.3	0.26	A
EB LT/TH	25.0	0.19	C	41.7	0.38	D	26.8	0.28	C	27.2	0.21	C	48.5	0.42	D	30.0	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	24.4	0.10	C	42.5	0.47	D	25.3	0.05	C	26.6	0.11	C	49.4	0.50	D	28.3	0.05	C
SB LT	50.7	0.74	D	87.3	0.72	F	0.0	0.00	A	53.6	0.74	D	95.5	0.73	F	0.0	0.00	A
SB TH	13.0	0.58	B	27.4	0.70	C	14.7	0.58	B	13.3	0.60	B	30.2	0.74	C	15.3	0.61	B
SB RT	9.2	0.00	A	19.5	0.01	B	11.0	0.03	B	9.1	0.00	A	20.6	0.01	C	10.9	0.03	B
Overall	12.0	-	B	20.9	-	C	12.6	-	B	12.5	-	B	24.2	-	C	13.2	-	B
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive																		
NB LT	31.8	0.79	C	43.8	0.82	D	35.3	0.78	D	34.6	0.80	C	47.4	0.82	D	38.4	0.78	D
NB TH/RT	4.1	0.45	A	7.1	0.60	A	4.9	0.41	A	3.9	0.45	A	7.2	0.61	A	4.8	0.43	A
EB LT/TH	30.4	0.16	C	37.0	0.22	D	30.2	0.25	C	33.3	0.17	C	40.2	0.23	D	33.2	0.27	C
EB RT	30.3	0.01	C	36.2	0.03	D	29.5	0.04	C	33.1	0.01	C	39.3	0.03	D	32.4	0.04	C
WB LT/TH/RT	30.9	0.11	C	38.1	0.08	D	29.5	0.10	C	33.6	0.11	C	41.5	0.09	D	32.6	0.11	C
SB LT	53.5	0.78	D	73.1	0.78	E	59.7	0.75	E	57.5	0.79	E	77.9	0.78	E	63.9	0.76	E
SB TH	7.7	0.61	A	12.5	0.72	B	8.8	0.63	A	7.9	0.64	A	13.8	0.76	B	9.1	0.66	A
SB RT	4.5	0.04	A	6.4	0.04	A	5.1	0.04	A	4.4	0.04	A	6.4	0.04	A	4.9	0.04	A
Overall	8.1	-	A	12.1	-	B	9.3	-	A	8.2	-	A	12.9	-	B	9.5	-	A
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road																		
NB LT	74.0	0.85	E	78.1	0.86	E	39.8	0.78	D	74.2	0.85	E	77.9	0.86	E	41.8	0.78	D
NB TH	6.2	0.48	A	9.8	0.58	A	8.2	0.49	A	6.4	0.50	A	10.3	0.62	B	8.3	0.52	A
NB RT	3.8	0.04	A	5.4	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	31.3	0.23	C	68.7	0.38	E	67.2	0.37	E	33.3	0.24	C
EB RT	63.3	0.01	E	63.7	0.13	E	30.1	0.05	C	63.3	0.01	E	63.7	0.13	E	32.0	0.05	C
WB LT	75.0	0.39	E	78.4	0.54	E	34.6	0.21	C	75.0	0.39	E	78.4	0.54	E	36.9	0.23	D
WB TH/RT	64.1	0.10	E	62.5	0.03	E	29.9	0.03	C	64.1	0.10	E	62.5	0.03	E	31.8	0.03	C
SB LT	82.9	0.69	F	89.0	0.78	F	42.4	0.58	D	82.9	0.69	F	89.0	0.78	F	44.6	0.59	D
SB TH	10.0	0.52	B	18.1	0.73	B	13.6	0.73	B	10.6	0.56	B	20.1	0.79	C	14.4	0.76	B
SB RT	6.0	0.03	A	8.5	0.07	A	7.4	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	14.0	-	B	20.8	-	C	14.1	-	B

Table 4.4: Base Year 2022 with Mitigation and Base Year 2027 Level of Service Summary Cont'd

Intersection	Base Year 2022 with Mitigation									Base Year 2027								
	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	40.7	0.75	D	91.4	0.85	F	49.6	0.71	D	46.2	0.79	D	108.4	0.90	F	66.5	0.83	E
NB TH/RT	16.2	0.68	B	22.0	0.66	C	13.7	0.56	B	15.7	0.66	B	21.7	0.65	C	16.1	0.55	B
EB LT/TH	44.2	0.46	D	86.1	0.60	F	48.6	0.58	D	51.0	0.49	D	111.1	0.79	F	64.5	0.61	E
EB RT	28.3	0.08	C	63.9	0.51	E	36.4	0.34	D	32.1	0.08	C	74.3	0.63	E	44.3	0.44	D
WB LT/TH/RT	44.7	0.18	D	100.0	0.23	F	54.7	0.32	D	51.5	0.19	D	116.3	0.25	F	77.5	0.40	E
SB LT	46.2	0.57	D	112.3	0.72	F	53.9	0.50	D	53.2	0.60	D	139.3	0.76	F	76.4	0.58	E
SB TH	22.1	0.75	C	41.1	0.88	D	20.8	0.76	C	24.0	0.77	C	54.5	0.93	D	31.7	0.81	C
SB RT	9.8	0.08	A	8.2	0.11	A	6.9	0.13	A	10.3	0.10	B	11.3	0.16	B	9.2	0.18	A
Overall	23.7	-	C	44.8	-	D	24.1	-	C	25.5	-	C	56.2	-	E	34.5	-	C
8: Honoapiilani Highway & Leialii Parkway																		
NB LT	75.8	0.45	E	69.1	0.50	E	72.4	0.44	E	75.4	0.45	E	72.5	0.62	E	71.7	0.44	E
NB TH/RT	8.8	0.70	A	2.4	0.75	A	2.9	0.60	A	9.3	0.73	A	2.8	0.82	A	3.5	0.68	A
EB LT/TH/RT	58.6	0.06	E	57.0	0.07	E	50.0	0.03	D	58.6	0.06	E	57.0	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	50.3	0.05	D	58.6	0.01	E	56.7	0.05	E	50.3	0.05	D
SB LT	68.8	0.52	E	66.2	0.78	E	76.2	0.79	E	68.8	0.52	E	66.2	0.78	E	76.2	0.79	E
SB TH/RT	5.2	0.51	A	13.3	0.83	B	10.2	0.70	B	5.6	0.54	A	19.1	0.91	B	12.8	0.78	B
Overall	9.1	-	A	10.8	-	B	11.0	-	B	9.4	-	A	13.9	-	B	12.2	-	B
9: Honoapiilani Highway & Front Street/Flemming Road																		
NB LT	89.8	0.73	F	96.3	0.74	F	87.9	0.84	F	88.0	0.73	F	93.8	0.74	F	85.3	0.84	F
NB TH/RT	7.6	0.67	A	1.9	0.71	A	16.3	0.50	B	8.0	0.70	A	2.5	0.77	A	7.5	0.58	A
EB LT/TH/RT	52.6	0.48	D	59.5	0.72	E	57.7	0.66	E	52.6	0.48	D	59.5	0.72	E	57.7	0.66	E
WB LT/TH/RT	54.3	0.61	D	49.7	0.24	D	52.3	0.32	D	54.3	0.61	D	49.7	0.24	D	52.3	0.32	D
SB LT	88.2	0.81	F	87.4	0.74	F	88.0	0.82	F	87.5	0.81	F	79.4	0.74	E	84.1	0.82	F
SB TH	4.9	0.48	A	11.8	0.79	B	7.7	0.64	A	5.2	0.51	A	13.8	0.87	B	8.8	0.72	A
SB RT	3.2	0.11	A	5.6	0.24	A	4.3	0.17	A	3.2	0.12	A	5.6	0.24	A	4.3	0.18	A
Overall	9.9	-	A	10.4	-	B	14.8	-	B	10.1	-	B	11.2	-	B	11.4	-	B
10: Honoapiilani Highway & Kapunakea Street																		
NB LT	74.7	0.79	E	67.6	0.79	E	71.9	0.79	E	74.0	0.79	E	72.5	0.79	E	71.1	0.78	E
NB TH/RT	1.3	0.66	A	1.3	0.71	A	2.8	0.58	A	1.4	0.69	A	1.2	0.76	A	12.2	0.66	B
EB LT/TH	64.2	0.72	E	62.3	0.75	E	59.7	0.74	E	64.2	0.72	E	70.5	0.80	E	59.7	0.74	E
EB RT	48.3	0.01	D	43.6	0.03	D	42.6	0.04	D	48.3	0.01	D	45.1	0.02	D	42.6	0.04	D
WB LT	55.1	0.51	E	46.9	0.29	D	45.3	0.26	D	55.1	0.51	E	48.5	0.31	D	45.3	0.26	D
WB TH/RT	49.3	0.10	D	44.1	0.08	D	42.9	0.07	D	49.3	0.10	D	45.7	0.09	D	42.9	0.07	D
SB LT	101.8	0.83	F	72.4	0.80	E	85.2	0.84	F	101.0	0.83	F	72.5	0.80	E	82.3	0.84	F
SB TH/RT	10.3	0.56	B	5.5	0.89	A	3.6	0.78	A	10.9	0.59	B	13.4	0.96	B	5.4	0.87	A
Overall	11.9	-	B	9.7	-	A	9.7	-	A	11.9	-	B	14.3	-	B	13.8	-	B

Table 4.4: Base Year 2022 with Mitigation and Base Year 2027 Level of Service Summary Cont'd

Intersection	Base Year 2022 with Mitigation									Base Year 2027								
	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	79.8	0.79	E	69.3	0.78	E	64.0	0.79	E	79.8	0.79	E	69.3	0.78	E	64.0	0.79	E
NB TH	32.3	0.62	C	39.4	0.75	D	31.0	0.55	C	33.6	0.66	C	42.7	0.85	D	33.9	0.68	C
NB RT	23.6	0.08	C	28.6	0.21	C	25.9	0.20	C	23.8	0.08	C	27.6	0.21	C	25.7	0.20	C
EB LT/TH	47.7	0.35	D	63.6	0.79	E	61.5	0.77	E	47.3	0.34	D	71.3	0.84	E	61.6	0.77	E
EB RT	43.9	0.02	D	42.9	0.03	D	44.5	0.04	D	43.5	0.01	D	44.2	0.02	D	44.4	0.04	D
WB LT	38.3	0.29	D	40.7	0.58	D	42.2	0.62	D	38.1	0.29	D	44.9	0.63	D	42.2	0.62	D
WB TH	35.5	0.14	D	33.9	0.20	C	34.6	0.25	C	35.3	0.14	D	35.2	0.21	D	34.6	0.25	C
WB RT	65.7	0.92	E	64.4	0.92	E	43.2	0.68	D	76.2	0.95	E	79.9	0.97	E	43.7	0.70	D
SB LT	51.4	0.91	D	46.4	0.95	D	62.2	0.88	E	51.1	0.91	D	41.6	0.94	D	57.1	0.89	E
SB TH/RT	1.0	0.45	A	1.3	0.70	A	41.1	0.58	D	1.1	0.49	A	0.8	0.79	A	33.3	0.69	C
Overall	32.1	-	C	32.2	-	C	43.9	-	D	33.3	-	C	33.2	-	C	40.4	-	D

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 898 multi-family (MF) residential units, 2 single-family residential lots (for future residential development), an elementary school, a 10-acre park and three (3) retail centers, totaling 62,000 square feet (SF). 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 six (6) phases, but for purposes of this TIAR, will be analyzed as four (4) scenarios.

Although it is not part of this TIAR, the Project envisions future expansion at the north end of the Project site (currently identified as 2 single-family residential lots) with an additional 302 residential units, bringing the total residential unit count to 1,200 residential units. Future traffic analysis and roadway mitigation measures will be assessed at a later date.

Scenario 1 – Develop Phase 1 with a build-out of early 2022 that includes the following:

- 240 MF residential units north of Akahele Street, with direct access provided by two (2) new Project roadways, Road A and Road C, bisecting Akahele Street.

Scenario 2 - Develop Phase 2 and Retail component with a build-out of early 2022 that includes the following:

- 30 MF residential units north of Akahele Street with direct access provided by Road A and a new right-in, right-out (RIRO) access via Honoapiilani Highway.
- 190 MF residential units south of Akahele Street with direct access provided by Road A and Road C.
- Retail Area A consisting of 29,000 square feet (SF) of space located on the northeast corner of the Honoapiilani Highway/Akahele Street intersection.
- Retail Area B consisting of 24,000 SF of space located adjacent to Retail Area A on the southeast corner of the Honoapiilani Highway/Akahele Street intersection.
    - Access to Retail Area A and B will be provided by Road A. Retail Area A will also be accessible by the new RIRO access.
    - Based on the developer forecast absorption for the Retail Area A and B components, approximately 15,000 SF of retail space will be occupied by Year 2022, with subsequent occupancy occurring at a pace of 5,000 SF of retail space every 2 years thereafter. Therefore, full build-out and occupancy of Retail Areas A and B will likely occur well beyond Year 2022, but was assumed to be fully built out by Year 2022 for this TIAR.

Scenario 3 – Develop Phases 3-5 with a build-out of late 2022 that include the following:

- 70 MF residential units (Phase 3) north of Akahele Street, with access provided by Road C.
- 150 MF residential units (Phase 3) south of Akahele Street, with access provided by Road C.

- 218 MF residential units (Phase 4) south of Mahinahina Gulch, with access provided by a new Project roadway, Road J, intersecting Honoapiilani Highway south of Mahinahina Gulch.
- 2 single-family residential lots north of Akahele Street, with access provided by Road A and Road C.
- Retail Area C consisting of 9,000 SF of space located on the northeast corner of the new Honoapiilani Highway/Road J intersection, with access provided by Road J.
- 10-acre park with two (2) practice fields 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 2027 was assumed for the TIAR.

- 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 Napili Islander Route #30 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, 9th 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.

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 and 2027 traffic volumes within the vicinity of the Project to constitute the traffic volumes for Future Year 2022 Scenario 1, 2 and 3 and Future Year 2027 Scenario 4 traffic conditions. Figures 5.1, 5.3, 5.6 and 5.8 illustrate the Project-generated trip distribution for Future Year 2022 Scenario 1, Future Year 2022 Scenario 2, Future Year 2022 Scenario 3 and Future Year 2027 Scenario 4, 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 (221)	Dwelling Units (DU)	[d]	21%	[e]	65%	[f]	54%
Shopping Center (820)	1000 SQ FT	[g]	62%	[h]	48%	[i]	52%
Elementary School (520)	Students	0.45	55%	0.15	49%	0.00	0%
Soccer Complex (480)	Fields	1.12	57%	17.70	67%	30.34	48%

[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)=0.82*LN(X)+0.23

[e] LN(T)=0.88*LN(X)+0.16

[f] LN(T)=0.82*LN(X)+0.41

[g] LN(T)=0.61*LN(X)+2.24

[h] LN(T)=0.67*LN(X)+3.31

[i] LN(T)=0.65*LN(X)+3.78

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 (Early 2022)	Low-Rise Apartment (221)	240 DU	19	70	89	81	44	125	57	49	106
	Subtotal		19	70	89	81	44	125	57	49	106
	Internal Capture (Residential)[1]		(2)	(6)	(8)	(18)	(7)	(25)	0	0	0
	Total NEW External Project Scenario 1 Trips		**17**	**64**	**81**	**63**	**37**	**100**	**57**	**49**	**106**
Scenario 2 (Early 2022)	Low-Rise Apartment (221)	220 DU	17	64	81	74	40	114	52	44	96
	Shopping Center (820)	53,000 SQ FT	62	38	99	179	194	373	285	263	548
	Subtotal		79	102	180	253	234	487	337	307	644
	Internal Capture (Residential)[1]		(2)	(6)	(7)	(15)	(6)	(21)	0	0	0
	Internal Capture (Retail)[1]		(4)	(0)	(4)	(18)	(50)	(68)	0	0	0
	Pass-by (Retail)		0	0	0	(36)	(36)	(72)	(53)	(53)	(106)
	Total NEW External Project Scenario 2 Trips		**73**	**96**	**169**	**184**	**142**	**326**	**284**	**254**	**538**
Scenario 3 (Late 2022)	Single-Family Detached Housing (210)	2 DU	3	8	11	2	1	3	6	5	11
	Low-Rise Apartment (221)	438 DU	34	129	163	148	80	228	104	89	193
	Shopping Center (820)	9000 SQ FT	10	6	16	30	33	63	48	45	93
	Soccer Complex (480)	2 Fields	1	1	2	15	21	36	35	26	61
	Subtotal		48	144	192	195	135	330	193	165	358
	Internal Capture (Residential)[1]		(4)	(12)	(16)	(30)	(12)	(42)	0	0	0
	Internal Capture (Retail)[1]		0	0	0	(3)	(8)	(11)	0	0	0
	Pass-by (Retail)		0	0	0	(6)	(6)	(12)	(9)	(9)	(18)
	Total NEW External Project Scenario 3 Trips		**44**	**132**	**176**	**156**	**109**	**265**	**184**	**156**	**340**
Scenario 4 (2027)	Elementary School (520)	750 Students	186	152	338	55	58	113	0	0	0
	Subtotal		186	152	338	55	58	113	0	0	0
	Internal Capture (School)[1]		(19)	(7)	(26)	(6)	(6)	(12)	0	0	0
	Total NEW External Project Scenario 4 Trips		**167**	**145**	**312**	**49**	**52**	**101**	**0**	**0**	**0**
Total NEW External Project Scenario 1 to 4 Trips			**301**	**437**	**738**	**452**	**340**	**792**	**525**	**459**	**984**

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.

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 81(100)[106] 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. 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.

[3] Honoapiilani Highway/Akahele Street

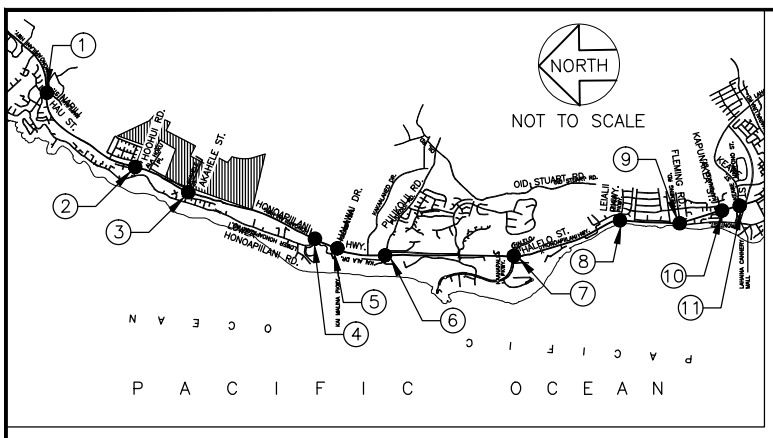
Since this intersection is the exclusive access from Honoapiilani Highway into the Project's Scenario 1 site, turning movements into and out of Akahele Street will increase. As a result, the intersection will worsen from Base Year 2022, but will continue to operate adequately at overall LOS B(C)[B] for 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.

[14-15] Akahele Street intersection with Road A and Road C

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 addition of the Project's bisecting Road A and Road C, forecast through traffic along Akahele Street will continue to operate with low through volumes (under 25 vehicles) at the Road C intersection and slightly higher through volumes, between 30-40 vehicles, at the Road A intersection during all peak hours.

Figures 5.1 illustrate 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. 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.



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.

NAPILIHAU ST.

HONOAPIILANI HWY.

HOOHUI RD.

AKAHELE ST.

KAI MALINA PKWY.

LOWER HONOAPIILANI RD.

HALAWAI DR.

MATCH LINE
FOR CONTINUATION, SEE LEFT

MATCH LINE
FOR CONTINUATION, SEE RIGHT

MATCH LINE
FOR CONTINUATION, SEE FIGURE 5.1B

PULELEHUA

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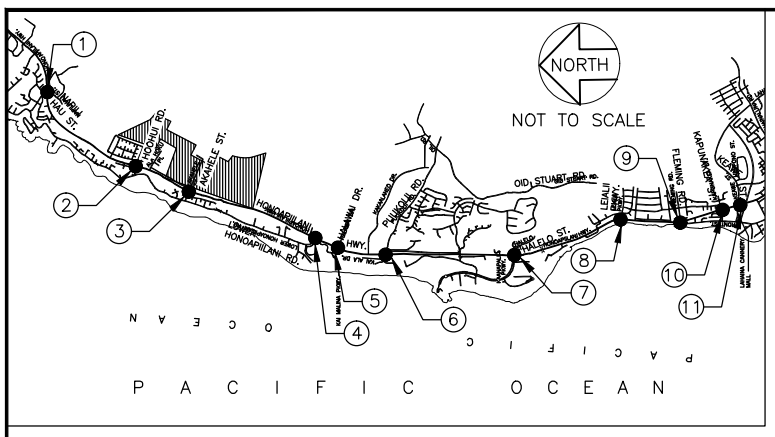
YEAR 2022 SCENARIO 1 PROJECT-GENERATED TRAFFIC

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.

MATCH LINE
FOR CONTINUATION, SEE FIGURE 5.1A

MATCH LINE
FOR CONTINUATION, SEE LEFT

KAI ALA DR.
PUUKOLII RD.
FRONT ST.
FLEMING RD.
KAANAPALI PKWY.
HALELO ST.
KAPUNAKEA ST.
LEIALII PKWY.
LAHAINA CANNERY MALL
KEAWE ST.
HONOAPIILANI HWY.

MATCH LINE
FOR CONTINUATION, SEE RIGHT

PULELEHUA

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YEAR 2022 SCENARIO 1 PROJECT-GENERATED TRAFFIC

FIGURE 5.1B

NORTH
NOT TO SCALE

LEGEND

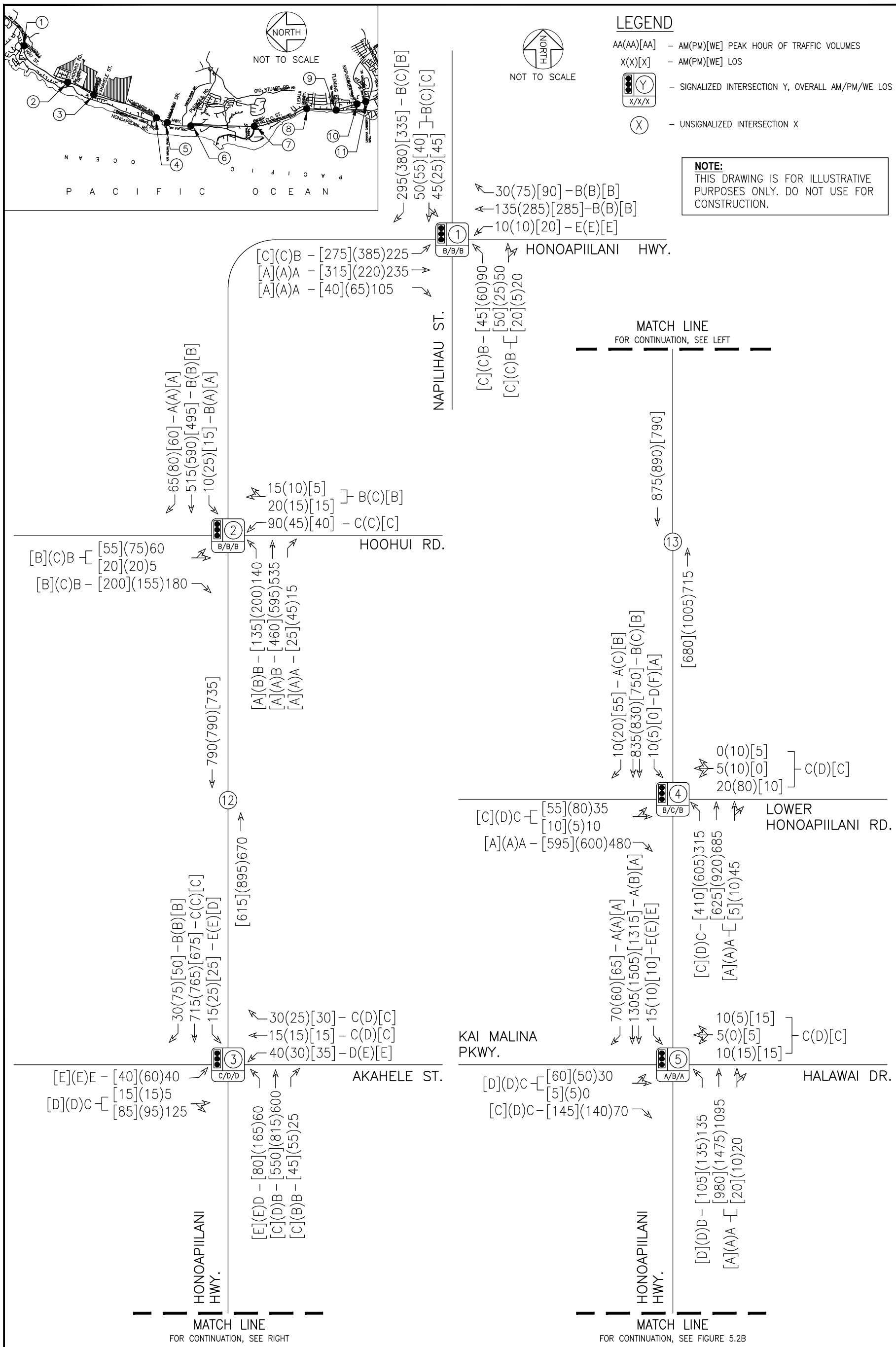
AA(AA)[AA] – AM(PM)[WE] PEAK HOUR OF TRAFFIC VOLUMES

X(X)[X] – AM(PM)[WE] LOS

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

(X) – UNSIGNALIZED INTERSECTION X

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



PULELEHUA

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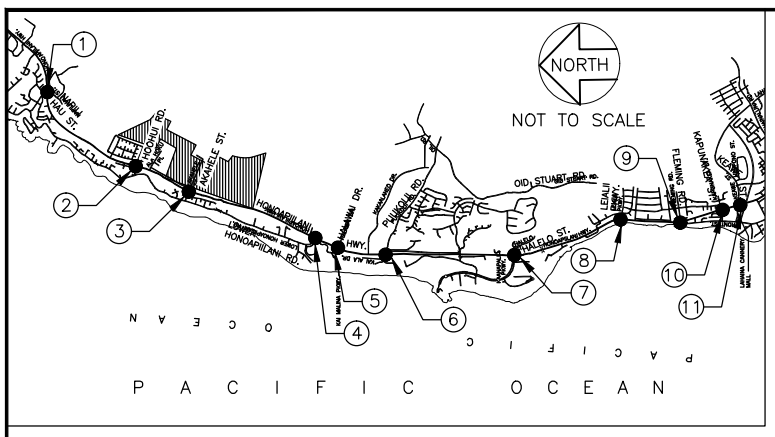
FIGURE 5.2A

FUTURE YEAR 2022 SCENARIO 1 LANE CONFIGURATION, VOLUMES AND LOS



NORTH
NOT TO SCALE

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

(X) – UNSIGNALIZED INTERSECTION X

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

MATCH LINE
FOR CONTINUATION, SEE FIGURE 5.2A

MATCH LINE
FOR CONTINUATION, SEE LEFT

MATCH LINE
FOR CONTINUATION, SEE RIGHT

PULELEHUA

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FIGURE 5.2B

FUTURE YEAR 2022 SCENARIO 1 LANE CONFIGURATION, VOLUMES AND LOS

Table 5.3: Future Year 2022 (Scenario 1)
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)	Cycles per Hour	Average Veh. per Cycle	Minimum Storage Length (1.5 factor)		
						Veh	Ft	
Northbound Left-turn lane	PM	165	100	36	5	7	**175**	Storage accommodated. Max queue could encroach into taper.
	WE	80	100	36	3	4	100	
Southbound Left-turn lane	PM	25	100	36	1	2	60	Storage accommodated
	WE	25	100	36	1	2	**60**	
Eastbound Left-turn lane	PM	60	100	36	2	3	**75**	Storage accommodated
	WE	40	100	36	2	2	60	
Westbound Left-turn lane	PM	30	100	36	1	2	60	Storage accommodated
	WE	35	100	36	1	2	**60**	

Notes:

1. AM peak hour omitted, since PM and WE left-turns were highest volumes.
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. Cycle Length based on existing observation. Majority of cycles < 100 seconds.
5. 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	18.9	0.75	B	19.7	0.82	B	19.5	0.77	B	18.8	0.75	B	19.9	0.83	B	19.6	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	5.9	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	0.26	B	20.4	0.29	C	17.8	0.28	B	15.1	0.26	B	20.8	0.29	C	18.1	0.28	B
EB RT	14.5	0.16	B	19.5	0.13	B	17.2	0.18	B	14.6	0.16	B	19.8	0.13	B	17.5	0.17	B
WB LT	17.4	0.30	B	22.8	0.28	C	19.5	0.18	B	17.5	0.30	B	23.2	0.28	C	19.9	0.19	B
WB TH/RT	14.7	0.22	B	19.4	0.13	B	17.7	0.27	B	14.8	0.22	B	19.7	0.13	B	18.0	0.27	B
SB LT	66.8	0.72	E	73.0	0.73	E	55.6	0.77	E	67.0	0.72	E	73.4	0.73	E	56.1	0.77	E
SB TH	12.9	0.31	B	17.9	0.60	B	15.2	0.57	B	13.0	0.32	B	18.0	0.61	B	15.3	0.57	B
SB RT	11.2	0.02	B	13.1	0.05	B	11.4	0.06	B	11.3	0.02	B	13.2	0.05	B	11.4	0.06	B
Overall	14.2	-	B	16.7	-	B	15.1	-	B	14.3	-	B	16.8	-	B	15.2	-	B
2: Honoapiilani Highway & Hoohui Road																		
NB LT	9.8	0.36	A	9.2	0.47	A	8.4	0.33	A	9.8	0.37	A	9.6	0.49	A	8.4	0.33	A
NB TH	10.8	0.64	B	9.3	0.66	A	8.9	0.57	A	11.0	0.66	B	9.3	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	17.3	0.17	B	19.9	0.31	B	16.3	0.22	B	17.3	0.17	B	20.4	0.32	C	16.5	0.22	B
EB RT	16.3	0.06	B	18.4	0.07	B	15.6	0.10	B	16.3	0.06	B	18.9	0.07	B	15.9	0.10	B
WB LT	19.9	0.28	B	22.0	0.20	C	17.7	0.14	B	20.0	0.28	B	22.6	0.21	C	17.9	0.14	B
WB TH/RT	16.3	0.07	B	18.3	0.07	B	15.5	0.06	B	16.3	0.07	B	18.9	0.07	B	15.7	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	15.1	0.77	B	13.2	0.77	B	12.5	0.73	B	15.2	0.77	B	13.4	0.78	B	12.5	0.74	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	13.3	-	B	11.8	-	B	11.1	-	B	13.4	-	B	12.0	-	B	11.2	-	B
3: Honoapiilani Highway & Akahele Street																		
NB LT	42.7	0.77	D	42.6	0.81	D	37.1	0.76	D	44.7	0.77	D	44.8	0.81	D	39.3	0.76	D
NB TH	10.6	0.65	B	13.0	0.76	B	10.0	0.60	A	12.1	0.66	B	15.4	0.78	B	11.7	0.62	B
NB RT	6.5	0.01	A	5.9	0.01	A	6.4	0.01	A	7.4	0.02	A	7.0	0.04	A	7.6	0.03	A
EB LT	44.0	0.72	D	52.9	0.77	D	42.6	0.71	D	47.7	0.73	D	54.8	0.77	D	46.2	0.73	D
EB TH/RT	24.0	0.08	C	32.8	0.04	C	23.8	0.06	C	25.6	0.06	C	34.6	0.09	C	25.1	0.09	C
WB LT	69.5	0.53	E	65.8	0.58	E	51.3	0.55	D	47.7	0.73	D	63.7	0.74	E	45.7	0.70	D
WB TH	25.3	0.03	C	35.5	0.03	D	24.8	0.03	C	25.7	0.07	C	36.3	0.09	D	25.2	0.07	C
WB RT	25.2	0.01	C	35.4	0.01	D	24.7	0.01	C	25.4	0.01	C	35.8	0.01	D	24.9	0.01	C
SB LT	112.0	0.71	F	126.5	0.72	F	110.8	0.70	F	78.6	0.78	E	80.5	0.82	F	73.9	0.85	E
SB TH	15.3	0.84	B	22.9	0.88	C	15.5	0.83	B	16.8	0.85	B	25.0	0.89	C	17.1	0.84	B
SB RT	7.8	0.02	A	10.6	0.05	B	8.3	0.03	A	8.6	0.02	A	11.2	0.05	B	9.2	0.03	A
Overall	15.7	-	B	21.5	-	C	15.8	-	B	18.2	-	B	24.5	-	C	18.6	-	B
4: Honoapiilani Highway & Lower Honoapiilani Road																		
NB LT	22.4	0.83	C	30.0	0.94	C	21.2	0.87	C	22.7	0.83	C	30.0	0.94	C	21.6	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	4.5	0.37	A	2.5	0.25	A
EB LT/TH	25.0	0.19	C	41.7	0.38	D	26.8	0.28	C	25.3	0.20	C	42.1	0.41	D	27.3	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	24.4	0.10	C	42.5	0.47	D	25.3	0.05	C	24.8	0.11	C	42.6	0.47	D	25.6	0.05	C
SB LT	50.7	0.74	D	87.3	0.72	F	0.0	0.00	A	51.1	0.74	D	87.4	0.72	F	0.0	0.00	A
SB TH	13.0	0.58	B	27.4	0.70	C	14.7	0.58	B	13.1	0.59	B	27.7	0.71	C	15.0	0.59	B
SB RT	9.2	0.00	A	19.5	0.01	B	11.0	0.03	B	9.2	0.01	A	19.5	0.01	B	11.1	0.03	B
Overall	12.0	-	B	20.9	-	C	12.6	-	B	12.1	-	B	20.9	-	C	12.7	-	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
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive																		
NB LT	31.8	0.79	C	43.8	0.82	D	35.3	0.78	D	32.8	0.79	C	44.5	0.82	D	36.0	0.78	D
NB TH/RT	4.1	0.45	A	7.1	0.60	A	4.9	0.41	A	4.0	0.45	A	7.2	0.61	A	5.0	0.42	A
EB LT/TH	30.4	0.16	C	37.0	0.22	D	30.2	0.25	C	31.4	0.17	C	37.6	0.23	D	30.9	0.27	C
EB RT	30.3	0.01	C	36.2	0.03	D	29.5	0.04	C	31.2	0.01	C	36.7	0.03	D	30.1	0.05	C
WB LT/TH/RT	30.9	0.11	C	38.1	0.08	D	29.5	0.10	C	31.8	0.11	C	38.7	0.08	D	30.1	0.11	C
SB LT	53.5	0.78	D	73.1	0.78	E	59.7	0.75	E	54.8	0.78	D	73.9	0.78	E	60.6	0.75	E
SB TH	7.7	0.61	A	12.5	0.72	B	8.8	0.63	A	7.8	0.62	A	12.7	0.73	B	8.9	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	8.1	-	A	12.1	-	B	9.3	-	A	8.1	-	A	12.2	-	B	9.4	-	A
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road																		
NB LT	74.0	0.85	E	78.1	0.86	E	39.8	0.78	D	74.2	0.85	E	78.0	0.86	E	40.2	0.78	D
NB TH	6.2	0.48	A	9.8	0.58	A	8.2	0.49	A	6.4	0.48	A	10.0	0.60	B	8.3	0.50	A
NB RT	3.8	0.04	A	5.4	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	31.3	0.23	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	30.1	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	34.6	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	62.5	0.03	E	29.9	0.03	C	64.1	0.10	E	62.5	0.03	E	30.2	0.03	C
SB LT	82.9	0.69	F	89.0	0.78	F	42.4	0.58	D	84.8	0.76	F	89.0	0.78	F	42.8	0.58	D
SB TH	10.0	0.52	B	18.1	0.73	B	13.6	0.73	B	10.2	0.53	B	18.3	0.74	B	13.7	0.73	B
SB RT	6.0	0.03	A	8.5	0.07	A	7.4	0.05	A	6.0	0.03	A	8.6	0.08	A	7.4	0.05	A
Overall	13.9	-	B	19.9	-	B	13.6	-	B	14.1	-	B	20.0	-	B	13.8	-	B
7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street																		
NB LT	40.7	0.75	D	91.4	0.85	F	49.6	0.71	D	41.7	0.75	D	92.7	0.85	F	50.6	0.71	D
NB TH/RT	16.2	0.68	B	22.0	0.66	C	13.7	0.56	B	16.0	0.68	B	22.4	0.67	C	13.8	0.57	B
EB LT/TH	44.2	0.46	D	86.1	0.60	F	48.6	0.58	D	45.4	0.46	D	87.8	0.61	F	49.6	0.59	D
EB RT	28.3	0.08	C	63.9	0.51	E	36.4	0.34	D	29.1	0.07	C	64.9	0.51	E	37.0	0.34	D
WB LT/TH/RT	44.7	0.18	D	100.0	0.23	F	54.7	0.32	D	45.9	0.18	D	101.4	0.23	F	55.7	0.32	E
SB LT	46.2	0.57	D	112.3	0.72	F	53.9	0.50	D	47.4	0.57	D	114.5	0.72	F	55.0	0.51	D
SB TH	22.1	0.75	C	41.1	0.88	D	20.8	0.76	C	22.2	0.75	C	41.8	0.88	D	21.0	0.76	C
SB RT	9.8	0.08	A	8.2	0.11	A	6.9	0.13	A	9.8	0.09	A	8.2	0.11	A	6.8	0.12	A
Overall	23.7	-	C	44.8	-	D	24.1	-	C	23.8	-	C	45.4	-	D	24.4	-	C
8: Honoapiilani Highway & Leialii Parkway																		
NB LT	75.8	0.45	E	69.1	0.50	E	72.4	0.44	E	75.8	0.45	E	74.2	0.50	E	72.4	0.44	E
NB TH/RT	8.8	0.70	A	2.4	0.75	A	2.9	0.60	A	8.8	0.70	A	2.4	0.75	A	3.0	0.61	A
EB LT/TH/RT	58.6	0.06	E	57.0	0.07	E	50.0	0.03	D	58.6	0.06	E	61.4	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
WB TH/RT	58.6	0.01	E	56.7	0.05	E	50.3	0.05	D	58.6	0.01	E	60.9	0.05	E	50.3	0.05	D
SB LT	68.8	0.52	E	66.2	0.78	E	76.2	0.79	E	68.8	0.52	E	71.5	0.79	E	76.2	0.79	E
SB TH/RT	5.2	0.51	A	13.3	0.83	B	10.2	0.70	B	5.3	0.52	A	13.2	0.83	B	10.3	0.71	B
Overall	9.1	-	A	10.8	-	B	11.0	-	B	9.1	-	A	11.0	-	B	11.1	-	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
9: Honoapiilani Highway & Front Street/Flemming Road																		
NB LT	89.8	0.73	F	96.3	0.74	F	87.9	0.84	F	89.7	0.73	F	102.8	0.75	F	87.3	0.84	F
NB TH/RT	7.6	0.67	A	1.9	0.71	A	16.3	0.50	B	7.7	0.67	A	2.2	0.71	A	6.7	0.51	A
EB LT/TH/RT	52.6	0.48	D	59.5	0.72	E	57.7	0.66	E	52.6	0.48	D	65.1	0.74	E	57.7	0.66	E
WB LT/TH/RT	54.3	0.61	D	49.7	0.24	D	52.3	0.32	D	54.3	0.61	D	53.0	0.24	D	52.3	0.32	D
SB LT	88.2	0.81	F	87.4	0.74	F	88.0	0.82	F	88.0	0.81	F	93.6	0.75	F	87.7	0.82	F
SB TH	4.9	0.48	A	11.8	0.79	B	7.7	0.64	A	5.0	0.49	A	12.5	0.79	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	0.12	A	5.9	0.23	A	4.3	0.18	A
Overall	9.9	-	A	10.4	-	B	14.8	-	B	9.9	-	A	11.1	-	B	11.1	-	B
10: Honoapiilani Highway & Kapunakea Street																		
NB LT	74.7	0.79	E	67.6	0.79	E	71.9	0.79	E	74.6	0.79	E	87.9	0.82	F	71.7	0.79	E
NB TH/RT	1.3	0.66	A	1.3	0.71	A	2.8	0.58	A	1.3	0.66	A	1.3	0.71	A	2.9	0.59	A
EB LT/TH	64.2	0.72	E	62.3	0.75	E	59.7	0.74	E	64.2	0.72	E	68.9	0.77	E	57.5	0.73	E
EB RT	48.3	0.01	D	43.6	0.03	D	42.6	0.04	D	48.3	0.01	D	47.1	0.03	D	42.3	0.04	D
WB LT	55.1	0.51	E	46.9	0.29	D	45.3	0.26	D	55.1	0.51	E	50.6	0.30	D	44.9	0.26	D
WB TH/RT	49.3	0.10	D	44.1	0.08	D	42.9	0.07	D	49.3	0.10	D	47.7	0.08	D	42.7	0.07	D
SB LT	101.8	0.83	F	72.4	0.80	E	85.2	0.84	F	101.7	0.83	F	77.1	0.79	E	85.5	0.84	F
SB TH/RT	10.3	0.56	B	5.5	0.89	A	3.6	0.78	A	10.5	0.56	B	5.1	0.88	A	7.8	0.78	A
Overall	11.9	-	B	9.7	-	A	9.7	-	A	11.9	-	B	10.2	-	B	11.7	-	B
11: Honoapiilani Highway & Keawe Street																		
NB LT	79.8	0.79	E	69.3	0.78	E	64.0	0.79	E	79.8	0.79	E	79.7	0.78	E	64.0	0.79	E
NB TH	32.3	0.62	C	39.4	0.75	D	31.0	0.55	C	32.5	0.62	C	40.5	0.74	D	31.0	0.55	C
NB RT	23.6	0.08	C	28.6	0.21	C	25.9	0.20	C	23.7	0.08	C	29.7	0.22	C	25.9	0.20	C
EB LT/TH	47.7	0.35	D	63.6	0.79	E	61.5	0.77	E	47.7	0.35	D	59.0	0.75	E	61.6	0.77	E
EB RT	43.9	0.02	D	42.9	0.03	D	44.5	0.04	D	43.9	0.02	D	44.4	0.04	D	44.4	0.04	D
WB LT	38.3	0.29	D	40.7	0.58	D	42.2	0.62	D	38.4	0.29	D	46.9	0.62	D	42.2	0.62	D
WB TH	35.5	0.14	D	33.9	0.20	C	34.6	0.25	C	35.6	0.14	D	37.0	0.21	D	34.6	0.25	C
WB RT	65.7	0.92	E	64.4	0.92	E	43.2	0.68	D	65.7	0.92	E	67.7	0.92	E	43.7	0.70	D
SB LT	51.4	0.91	D	46.4	0.95	D	62.2	0.88	E	51.3	0.91	D	48.3	0.94	D	58.0	0.89	E
SB TH/RT	1.0	0.45	A	1.3	0.70	A	41.1	0.58	D	1.0	0.45	A	1.3	0.69	A	30.7	0.59	C
Overall	32.1	-	C	32.2	-	C	43.9	-	D	32.0	-	C	33.2	-	C	39.9	-	D
14: Road A & Akahele Street																		
NB LT/TH/RT										9.4	0.02	A	9.9	0.02	A	9.7	0.02	A
EB LT										7.3	0.01	A	7.4	0.04	A	7.4	0.03	A
WB LT										7.3	0.00	A	7.3	0.00	A	7.3	0.00	A
SB LT/TH/RT										8.9	0.07	A	9.2	0.05	A	9.1	0.05	A
Overall										5.0	-	-	4.8	-	-	4.6	-	-
15: Road C & Akahele Street																		
NB LT/TH/RT										9.1	0.02	A	9.3	0.02	A	9.3	0.02	A
EB LT/TH/RT										7.3	0.01	A	7.3	0.02	A	7.3	0.01	A
WB LT/TH/RT										7.3	0.00	A	7.3	0.00	A	7.3	0.00	A
SB LT/TH/RT										8.8	0.04	A	9.0	0.03	A	8.9	0.03	A
Overall										5.3	-	-	5.2	-	-	4.7	-	-

5.3 Future Year 2022 Scenario 2 Analysis

By completion of Scenario 2 in Future Year 2022, the Project is projected to generate a total of 169(326)[538] 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 proposed RIRO driveway.

By Future Year 2022 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 5-15%, while local traffic at the study intersections (those providing direct access to the Project) along Honoapiilani Highway is estimated to increase overall by approximately 10-40% from Base Year 2022 without the Project scenario, during the AM, PM and WE peak hours of traffic.

5.3.1 Future Year 2022 Scenario 2 Intersection Analysis

All study intersections are forecast to operate similar to Future Year 2022 Scenario 1 with the exception of the Honoapiilani Highway/Akahele Street intersection described further below. The majority of intersection movements forecast to operate at LOS E/F for Future Year 2022 Scenario 1 conditions will continue to operate similarly with Future Year 2022 Scenario 2 of the Project. The majority of high volume through movements only experienced delay increases ranging from 1-5 seconds.

[3] Honoapiilani Highway/Akahele Street

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(D)[C] for the Future Year 2022 Scenario 2. Various left-turn movements will operate at LOS E conditions during all peak hours, due to the long cycle length and increased turning movements 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.

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, 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 275 feet of storage space.

[12] Honoapiilani Highway/Project RIRO

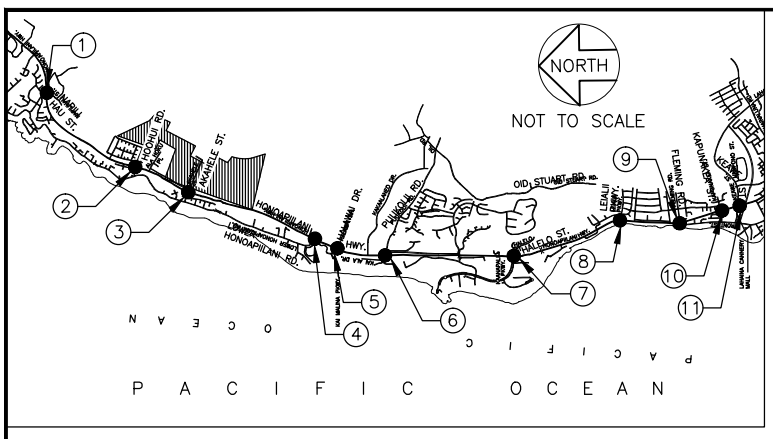
The new RIRO access along Honoapiilani Highway, north of Akahele Street, was analyzed as a stop-controlled intersection with stop control on the westbound right-turn movement out of the Project. The westbound right-turn movement is expected to operate adequately with LOS C or better during all peak hours. 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.

[14-15] Akahele Street intersection with Road A and Road C

With the completion of Scenario 2, volumes along Akahele Street are expected to increase. However, the roadway will continue to operate with low through volumes (under 25 vehicles) at the Road C intersection and slightly higher through volumes, between 35-65 vehicles, at the Road A intersection during all peak hours. The 35-65 vehicles traveling through the Road A intersection will still yield lengthy gaps in throughput traffic along Akahele Street, eliminating occurrences of long queues for opposing left-turn movements turning from Akahele Street. 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' 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 5.3 illustrates the Project-generated trips for Future Year 2022 Scenario 2. Figure 5.4 illustrates the Future Year 2022 Scenario 2 forecast traffic volumes and LOS for the study intersection movements. Figure 5.5 illustrates the Future Year 2022 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 2022 Scenario 2 LOS at the study intersections compared to Base Year 2022 with mitigation and Future Year 2022 Scenario 1 conditions. LOS worksheets are provided in Appendix C.



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.

NAPILIHAU ST.

HONOAPIILANI HWY.

MATCH LINE
FOR CONTINUATION, SEE LEFT

HOOHUI RD.

RIRO ACCESS

AKAHELE ST.

KAI MALINA PKWY.

LOWER HONOAPIILANI RD.

HALAWAI DR.

HONOAPIILANI HWY.

MATCH LINE
FOR CONTINUATION, SEE RIGHT

MATCH LINE
FOR CONTINUATION, SEE FIGURE 5.3B

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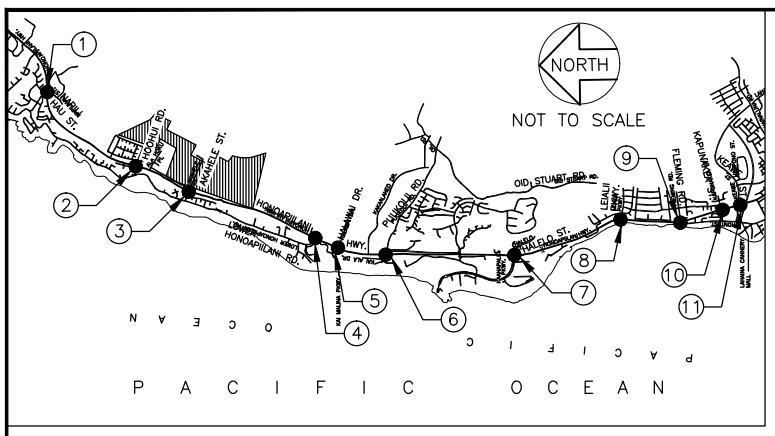
YEAR 2022 SCENARIO 2 PROJECT-GENERATED TRAFFIC

FIGURE 5.3A



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.

MATCH LINE
FOR CONTINUATION, SEE FIGURE 5.3A

MATCH LINE
FOR CONTINUATION, SEE LEFT

KAI ALA DR.

1(4)[5]
39(64)[94]
1(1)[2]

2(3)[4]
0(0)[0]
0(0)[0]

[7](4)2
[0](0)0
[0](0)0

[0](0)0
[121](81)35
[0](0)0

PUUKOLII RD.

FRONT ST.

4(7)[10]
26(41)[59]
0(0)[0]

0(0)[1]
0(0)[0]
0(0)[0]

[9](6)2
[0](0)0
[0](0)0

[0](0)0
[83](58)29
[0](0)0

FLEMING RD.

KAANAPALI PKWY.

3(4)[9]
31(50)[73]
1(2)[2]

0(0)[2]
0(0)[0]
0(0)[0]

[22](14)3
[0](0)0
[0](0)0

[0](0)0
[98](66)32
[0](0)0

HALELO ST.

1(3)[5]
25(37)[54]
0(1)[1]

1(1)[1]
0(0)[0]
0(0)[0]

[9](5)2
[0](0)0
[0](0)0

[0](0)0
[73](52)27
[0](0)0

KAPUNAKEA ST.

0(0)[0]
30(48)[69]
1(2)[3]

1(2)[4]
0(0)[0]
0(0)[0]

[0](0)0
[0](0)0
[0](0)0

[0](0)0
[93](64)31
[0](0)0

LEIALII PKWY.

LAHAINA
CANNERY MALL

0(1)[3]
15(23)[31]
9(12)[19]

12(21)[34]
0(0)[0]
0(0)[0]

[3](2)0
[0](0)0
[0](0)0

[0](0)0
[37](28)14
[0](0)0

KEAWE ST.

HONOAPIILANI HWY.

HONOAPIILANI HWY.

MATCH LINE
FOR CONTINUATION, SEE RIGHT

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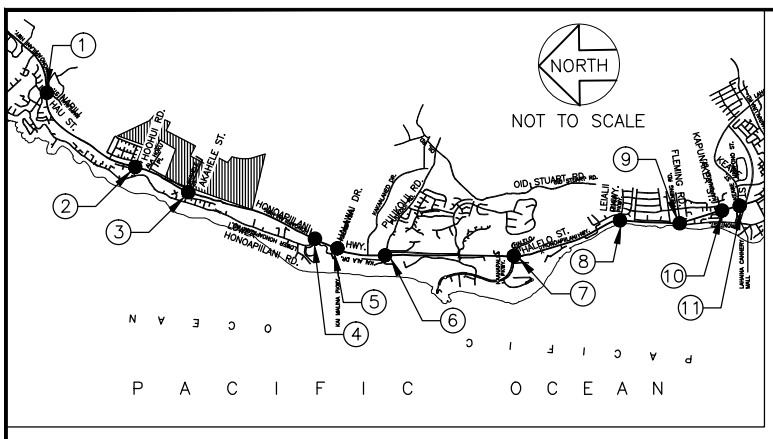
YEAR 2022 SCENARIO 2 PROJECT-GENERATED TRAFFIC

FIGURE
5.3B



NORTH

NOT TO SCALE

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

(X) – UNSIGNALIZED INTERSECTION X

NOTE:
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NAPILIHAU ST.

305(405)[365] – B(C)[B]
50(55)[40] – B(C)[B]
45(25)[45]

[C](C)B – [305](410)240
[A](A)A – [350](230)250
[A](A)A – [40](70)110

HONOAPIILANI HWY.

30(75)[90] – B(B)[B]
140(300)[310] – B(B)[B]
10(10)[20] – E(E)[E]

[C](C)B – [45](60)95
[50](25)50
[B](C)B – [20](5)20

MATCH LINE
FOR CONTINUATION, SEE LEFT

65(80)[60] – A(A)[A]
530(630)[550] – B(B)[B]
10(25)[15] – B(A)[A]

HOOHUI RD.

15(10)[5]
20(15)[15] – B(C)[B]
95(50)[45] – C(C)[B]

[B](C)B – [55](75)60
[20](20)5
[B](C)B – [225](165)185

[A](B)B – [155](215)150
[A](A)B – [525](635)560
[A](A)A – [30](45)15

HALAWAI DR.

920(965)[905]

[830](1105)755

15(20)[60] – A(C)[B]
875(900)[860] – B(C)[B]
10(5)[0] – D(F)[A]

0(10)[5]
5(10)[0]
20(80)[10] – C(D)[C]

AKAHELE ST.

815(845)[820]

30(50)[70] – B(C)[B]

[635](905)680
[95](75)25

30(75)[50] – B(B)[B]
715(750)[655] – B(C)[C]
35(95)[130] – E(E)[D]

40(55)[85] – C(D)[C]
35(50)[65] – C(D)[C]
85(115)[170] – D(E)[D]

[E](E)D – [45](60)45
[D](D)C – [60](45)20
[85](95)125

[D](D)D – [80](165)60
[C](C)B – [605](860)625
[B](B)A – [145](105)45

LOWER HONOAPIILANI RD.

[C](D)C – [65](85)35
[10](5)10

[A](A)A – [595](600)480

70(60)[70] – A(A)[A]
1345(1575)[1415] – A(B)[A]
15(10)[10] – E(E)[E]

[C](C)C – [410](605)315
[765](1005)725
[A](A)A – [5](10)45

KAI MALINA PKWY.

10(5)[15]
5(0)[5]
10(15)[15] – C(D)[C]

[C](D)C – [60](55)35
[5](5)0
[C](D)C – [145](140)70

[D](D)C – [105](135)135
[1110](1560)1135
[A](A)A – [20](10)20

HONOAPIILANI HWY.

MATCH LINE
FOR CONTINUATION, SEE RIGHT

MATCH LINE
FOR CONTINUATION, SEE FIGURE 5.4B

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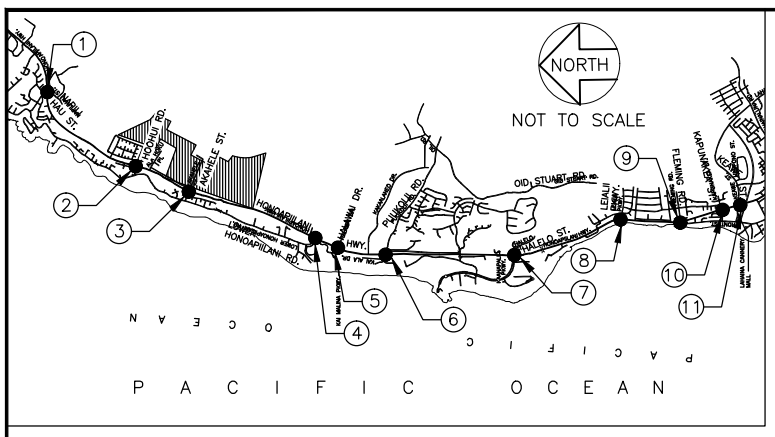
FIGURE 5.4A

FUTURE YEAR 2022 SCENARIO 2 LANE CONFIGURATION, VOLUMES AND LOS



NORTH

NOT TO SCALE

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

(X) – UNSIGNALIZED INTERSECTION X

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

MATCH LINE
FOR CONTINUATION, SEE FIGURE 5.4A

MATCH LINE
FOR CONTINUATION, SEE LEFT

MATCH LINE
FOR CONTINUATION, SEE RIGHT

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FIGURE 5.4B

FUTURE YEAR 2022 SCENARIO 2 LANE CONFIGURATION, VOLUMES AND LOS

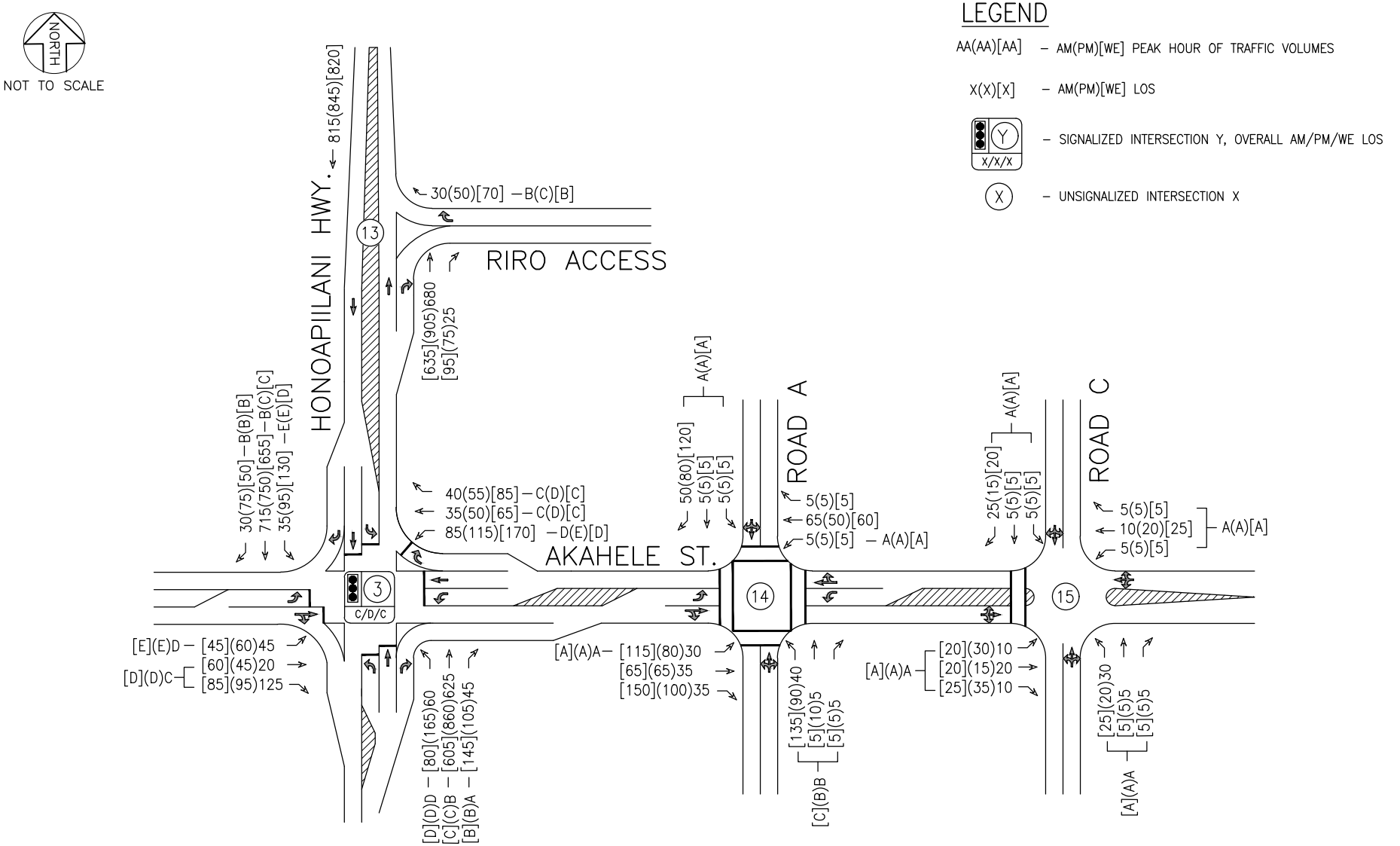

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FIGURE 5.5

FUTURE YEAR 2022 SCENARIO 2
AKAHELE STREET LANE CONFIGURATION, VOLUMES AND LOS

Table 5.5: Future Year 2027 (Full Pulelehua build-out with School)
Left-Turn Storage Lane Length Calculations

Honoapiilani Highway & Akahele Street Intersection										
			AASHTO					SIMULATION		
Movement	Peak Hour	Design Volume per lane (veh)	Cycle Length (sec)	Cycles per Hour	Average Veh. per Cycle	Minimum Storage Length (1.5 factor)		Average Queue	95th Percentile Queue	Recommended storage length [4]
						Veh	Ft	Ft	Ft	
Northbound Left-turn lane	PM	170	150	24	8	11	**275**	145	**276**	275 ft
	WE	85	135	27	4	5	125	100	244	
Southbound Left-turn lane	PM	135	150	24	6	9	225	120	202	250 ft
	WE	145	135	27	6	9	**225**	126	**252**	
Eastbound Left-turn lane [3]	PM	60	150	24	3	4	**100**	59	**127**	Storage accommodated
	WE	45	135	27	2	3	75	43	96	
Westbound Left-turn lane	PM	140	150	24	6	9	225	143	**253**	275 ft
	WE	190	135	27	8	11	**275**	140	223	

Notes:

1. AM peak hour omitted, since PM and WE left-turns were highest volumes.
2. Minimum storage length is 1.5 times the average number of vehicles per cycle; assume 1 vehicle length = 25 ft.
3. Eastbound left-turn storage currently accommodated.
4. Recommended storage length is exclusive of taper length or deceleration length. To be verified upon design.

Table 5.6: Base Year 2022 with Mitigation, Future Year 2022 Scenario 1 and Future Year 2022 Scenario 2 Level of Service Summary

	Base Year 2022 with Mitigation									Future Year 2022 Scenario 1									Future Year 2022 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	18.9	0.75	B	19.7	0.82	B	19.5	0.77	B	18.8	0.75	B	19.9	0.83	B	19.6	0.78	B	18.9	0.75	B	20.6	0.84	C	20.4	0.80	C
NB TH	8.1	0.32	A	6.0	0.23	A	7.6	0.37	A	8.1	0.32	A	5.9	0.23	A	7.5	0.37	A	8.3	0.34	A	5.7	0.24	A	7.3	0.39	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	7.0	0.08	A	5.0	0.05	A	5.5	0.03	A
EB LT/TH	15.0	0.26	B	20.4	0.29	C	17.8	0.28	B	15.1	0.26	B	20.8	0.29	C	18.1	0.28	B	15.3	0.25	B	22.2	0.31	C	19.8	0.31	B
EB RT	14.5	0.16	B	19.5	0.13	B	17.2	0.18	B	14.6	0.16	B	19.8	0.13	B	17.5	0.17	B	14.8	0.16	B	21.1	0.16	C	19.0	0.18	B
WB LT	17.4	0.30	B	22.8	0.28	C	19.5	0.18	B	17.5	0.30	B	23.2	0.28	C	19.9	0.19	B	17.8	0.31	B	24.8	0.30	C	21.8	0.21	C
WB TH/RT	14.7	0.22	B	19.4	0.13	B	17.7	0.27	B	14.8	0.22	B	19.7	0.13	B	18.0	0.27	B	15.0	0.21	B	20.9	0.14	C	19.5	0.29	B
SB LT	66.8	0.72	E	73.0	0.73	E	55.6	0.77	E	67.0	0.72	E	73.4	0.73	E	56.1	0.77	E	67.6	0.72	E	75.2	0.73	E	58.7	0.78	E
SB TH	12.9	0.31	B	17.9	0.60	B	15.2	0.57	B	13.0	0.32	B	18.0	0.61	B	15.3	0.57	B	13.6	0.33	B	18.8	0.63	B	16.1	0.60	B
SB RT	11.2	0.02	B	13.1	0.05	B	11.4	0.06	B	11.3	0.02	B	13.2	0.05	B	11.4	0.06	B	11.8	0.02	B	13.6	0.05	B	11.8	0.06	B
Overall	14.2	-	B	16.7	-	B	15.1	-	B	14.3	-	B	16.8	-	B	15.2	-	B	14.4	-	B	17.4	-	B	15.8	-	B
2: Honoapiilani Highway & Hoohui Road																											
NB LT	9.8	0.36	A	9.2	0.47	A	8.4	0.33	A	9.8	0.37	A	9.6	0.49	A	8.4	0.33	A	10.2	0.40	B	10.8	0.55	B	8.8	0.39	A
NB TH	10.8	0.64	B	9.3	0.66	A	8.9	0.57	A	11.0	0.66	B	9.3	0.66	A	9.0	0.58	A	11.3	0.68	B	9.5	0.68	A	9.1	0.62	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	19.9	0.31	B	16.3	0.22	B	17.3	0.17	B	20.4	0.32	C	16.5	0.22	B	17.8	0.17	B	21.7	0.32	C	18.1	0.23	B
EB RT	16.3	0.06	B	18.4	0.07	B	15.6	0.10	B	16.3	0.06	B	18.9	0.07	B	15.9	0.10	B	16.8	0.07	B	20.1	0.07	C	17.3	0.09	B
WB LT	19.9	0.28	B	22.0	0.20	C	17.7	0.14	B	20.0	0.28	B	22.6	0.21	C	17.9	0.14	B	20.6	0.30	C	24.2	0.23	C	19.7	0.17	B
WB TH/RT	16.3	0.07	B	18.3	0.07	B	15.5	0.06	B	16.3	0.07	B	18.9	0.07	B	15.7	0.06	B	16.8	0.06	B	20.1	0.07	C	17.1	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	B	8.3	0.07	A	8.0	0.04	A
SB TH	15.1	0.77	B	13.2	0.77	B	12.5	0.73	B	15.2	0.77	B	13.4	0.78	B	12.5	0.74	B	15.6	0.78	B	14.1	0.80	B	13.0	0.76	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	9.7	0.05	A	8.0	0.07	A	7.9	0.04	A
Overall	13.3	-	B	11.8	-	B	11.1	-	B	13.4	-	B	12.0	-	B	11.2	-	B	13.7	-	B	12.6	-	B	11.5	-	B
3: Honoapiilani Highway & Akahele Street																											
NB LT	42.7	0.77	D	42.6	0.81	D	37.1	0.76	D	44.7	0.77	D	44.8	0.81	D	39.3	0.76	D	48.5	0.77	D	54.2	0.84	D	48.5	0.76	D
NB TH	10.6	0.65	B	13.0	0.76	B	10.0	0.60	A	12.1	0.66	B	15.4	0.78	B	11.7	0.62	B	15.5	0.72	B	34.8	0.93	C	25.6	0.86	C
NB RT	6.5	0.01	A	5.9	0.01	A	6.4	0.01	A	7.4	0.02	A	7.0	0.04	A	7.6	0.03	A	9.3	0.03	A	11.8	0.08	B	15.7	0.15	B
EB LT	44.0	0.72	D	52.9	0.77	D	42.6	0.71	D	47.7	0.73	D	54.8	0.77	D	46.2	0.73	D	54.8	0.79	D	63.4	0.77	E	58.5	0.78	E
EB TH/RT	24.0	0.08	C	32.8	0.04	C	23.8	0.06	C	25.6	0.06	C	34.6	0.09	C	25.1	0.09	C	28.8	0.12	C	46.9	0.52	D	37.1	0.57	D
WB LT	69.5	0.53	E	65.8	0.58	E	51.3	0.55	D	47.7	0.73	D	63.7	0.74	E	45.7	0.70	D	43.7	0.76	D	56.8	0.80	E	42.7	0.82	D
WB TH	25.3	0.03	C	35.5	0.03	D	24.8	0.03	C	25.7	0.07	C	36.3	0.09	D	25.2	0.07	C	26.7	0.12	C	39.9	0.19	D	27.1	0.18	C
WB RT	25.2	0.01	C	35.4	0.01	D	24.7	0.01	C	25.4	0.01	C	35.8	0.01	D	24.9	0.01	C	26.1	0.02	C	38.5	0.02	D	26.1	0.04	C
SB LT	112.0	0.71	F	126.5	0.72	F	110.8	0.70	F	78.6	0.78	E	80.5	0.82	F	73.9	0.85	E	62.2	0.80	E	58.1	0.78	E	44.2	0.79	D
SB TH	15.3	0.84	B	22.9	0.88	C	15.5	0.83	B	16.8	0.85	B	25.0	0.89	C	17.1	0.84	B	19.8	0.86	B	31.6	0.89	C	23.4	0.86	C
SB RT	7.8	0.02	A	10.6	0.05	B	8.3	0.03	A	8.6	0.02	A	11.2	0.05	B	9.2	0.03	A	10.1	0.02	B	14.0	0.05	B	13.0	0.03	B
Overall	15.7	-	B	21.5	-	C	15.8	-	B	18.2	-	B	24.5	-	C	18.6	-	B	22.3	-	C	37.6	-	D	29.3	-	C
4: Honoapiilani Highway & Lower Honoapiilani Road																											
NB LT	22.4	0.83	C	30.0	0.94	C	21.2	0.87	C	22.7	0.83	C	30.0	0.94	C	21.6	0.87	C	23.7	0.84	C	34.3	0.94	C	25.0	0.88	C
NB TH/RT	4.7	0.33	A	4.4	0.36	A	2.4	0.24	A	4.7	0.34	A	4.5	0.37	A	2.5	0.25	A	4.7	0.35	A	4.5	0.40	A	2.7	0.30	A
EB LT/TH	25.0	0.19	C	41.7	0.38	D	26.8	0.28	C	25.3	0.20	C	42.1	0.41	D	27.3	0.31	C	26.4	0.20	C	46.1	0.45	D	31.2	0.36	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	24.4	0.10	C	42.5	0.47	D	25.3	0.05	C	24.8	0.11	C	42.6	0.47	D	25.6	0.05	C	25.8	0.11	C	46.3	0.48	D	28.9	0.05	C
SB LT	50.7	0.74	D	87.3	0.72	F	0.0	0.00	A	51.1	0.74	D	87.4	0.72	F	0.0	0.00	A	52.5	0.74	D	91.8	0.73	F	0.0	0.00	A
SB TH	13.0	0.58	B	27.4	0.70	C	14.7	0.58	B	13.1	0.59	B	27.7	0.71	C	15.0	0.59	B	13.3	0.60	B	29.3	0.74	C	16.3	0.63	B
SB RT	9.2	0.00	A	19.5	0.01	B	11.0	0.03	B	9.2	0.01	A	19.5	0.01	B	11.1	0.03	B	9.2	0.01	A	20.0	0.01	C	11.6	0.04	B
Overall	12.0	-	B	20.9	-	C	12.6	-	B	12.1	-	B	20.9	-	C	12.7	-	B	12.3	-	B	22.4	-	C	13.6	-	B
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive																											
NB LT	31.8	0.79	C	43.8	0.82	D	35.3	0.78	D	32.8	0.79	C	44.5	0.82	D	36.0	0.78	D	34.1	0.79	C	46.7	0.82	D	39.0	0.78	D
NB TH/RT	4.1	0.45	A	7.1	0.60	A	4.9	0.41	A	4.0	0.45	A	7.2	0.61	A	5.0	0.42	A	4.1	0.47	A	7.8	0.64	A	5.1	0.47	A
EB LT/TH	30.4	0.16	C	37.0	0.22	D	30.2	0.25	C	31.4	0.17	C	37.6	0.23	D	30.9	0.27	C	32.7	0.19	C	39.5	0.25	D	33.8	0.28	C
EB RT	30.3	0.01	C	36.2	0.03	D	29.5	0.04	C	31.2	0.01	C	36.7	0.03	D	30.1	0.05	C	32.4	0.01	C	38.5	0.03	D	32.9	0.04	C
WB LT/TH/RT	30.9	0.11	C	38.1	0.08	D	29.5	0.10	C	31.8	0.11	C	38.7	0.08	D	30.1	0.11	C	32.8	0.11	C	40.8	0.09	D	33.1	0.11	C
SB LT	53.5	0.78	D	73.1	0.78	E	59.7	0.75	E	54.8	0.78	D	73.9	0.78	E	60.6	0.75	E	56.7	0.79	E	77.0	0.78	E	64.7	0.76	E
SB TH	7.7	0.61	A	12.5	0.72	B	8.8	0.63	A	7.8	0.62	A	12.7	0.73	B	8.9	0.64	A	8.0	0.63	A	13.6	0.75	B	9.2	0.67	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	4.5	0.05	A	6.5	0.04	A	5.0	0.04	A
Overall	8.1	-	A	12.1	-	B	9.3	-	A	8.1	-	A	12.2	-	B	9.4	-	A	8.3	-	A	12.9	-	B	9.6	-	A

Table 5.6: Base Year 2022 with Mitigation, Future Year 2022 Scenario 1 and Future Year 2022 Scenario 2 Level of Service Summary Cont'd

	Base Year 2022 with Mitigation									Future Year 2022 Scenario 1									Future Year 2022 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
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road																											
NB LT	74.0	0.85	E	78.1	0.86	E	39.8	0.78	D	74.2	0.85	E	78.0	0.86	E	40.2	0.78	D	74.1	0.85	E	77.8	0.86	E	41.9	0.78	D
NB TH	6.2	0.48	A	9.8	0.58	A	8.2	0.49	A	6.4	0.48	A	10.0	0.60	B	8.3	0.50	A	6.5	0.50	A	10.8	0.63	B	8.7	0.56	A
NB RT	3.8	0.04	A	5.4	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	31.3	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	33.8	0.27	C
EB RT	63.3	0.01	E	63.7	0.13	E	30.1	0.05	C	63.3	0.01	E	63.7	0.13	E	30.3	0.05	C	63.3	0.01	E	63.7	0.18	E	32.1	0.05	C
WB LT	75.0	0.39	E	78.4	0.54	E	34.6	0.21	C	75.0	0.39	E	78.4	0.54	E	35.3	0.22	D	75.0	0.39	E	78.7	0.54	E	37.7	0.24	D
WB TH/RT	64.1	0.10	E	62.5	0.03	E	29.9	0.03	C	64.1	0.10	E	62.5	0.03	E	30.2	0.03	C	64.1	0.10	E	62.1	0.03	E	31.9	0.03	C
SB LT	82.9	0.69	F	89.0	0.78	F	42.4	0.58	D	84.8	0.76	F	89.0	0.78	F	42.8	0.58	D	84.8	0.76	F	89.0	0.78	F	44.8	0.62	D
SB TH	10.0	0.52	B	18.1	0.73	B	13.6	0.73	B	10.2	0.53	B	18.3	0.74	B	13.7	0.73	B	10.4	0.55	B	19.8	0.77	B	14.5	0.76	B
SB RT	6.0	0.03	A	8.5	0.07	A	7.4	0.05	A	6.0	0.03	A	8.6	0.08	A	7.4	0.05	A	6.0	0.03	A	8.8	0.08	A	7.3	0.05	A
Overall	13.9	-	B	19.9	-	B	13.6	-	B	14.1	-	B	20.0	-	B	13.8	-	B	14.2	-	B	20.9	-	C	14.4	-	B
7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street																											
NB LT	40.7	0.75	D	91.4	0.85	F	49.6	0.71	D	41.7	0.75	D	92.7	0.85	F	50.6	0.71	D	43.1	0.76	D	97.0	0.86	F	56.6	0.73	E
NB TH/RT	16.2	0.68	B	22.0	0.66	C	13.7	0.56	B	16.0	0.68	B	22.4	0.67	C	13.8	0.57	B	16.3	0.69	B	24.1	0.70	C	14.9	0.60	B
EB LT/TH	44.2	0.46	D	86.1	0.60	F	48.6	0.58	D	45.4	0.46	D	87.8	0.61	F	49.6	0.59	D	46.9	0.47	D	93.2	0.65	F	55.2	0.64	E
EB RT	28.3	0.08	C	63.9	0.51	E	36.4	0.34	D	29.1	0.07	C	64.9	0.51	E	37.0	0.34	D	30.2	0.07	C	68.4	0.52	E	41.1	0.35	D
WB LT/TH/RT	44.7	0.18	D	100.0	0.23	F	54.7	0.32	D	45.9	0.18	D	101.4	0.23	F	55.7	0.32	E	47.4	0.18	D	106.1	0.24	F	62.2	0.34	E
SB LT	46.2	0.57	D	112.3	0.72	F	53.9	0.50	D	47.4	0.57	D	114.5	0.72	F	55.0	0.51	D	48.9	0.59	D	124.2	0.75	F	61.3	0.55	E
SB TH	22.1	0.75	C	41.1	0.88	D	20.8	0.76	C	22.2	0.75	C	41.8	0.88	D	21.0	0.76	C	22.5	0.76	C	44.6	0.90	D	22.4	0.78	C
SB RT	9.8	0.08	A	8.2	0.11	A	6.9	0.13	A	9.8	0.09	A	8.2	0.11	A	6.8	0.12	A	9.7	0.09	A	8.2	0.11	A	6.7	0.13	A
Overall	23.7	-	C	44.8	-	D	24.1	-	C	23.8	-	C	45.4	-	D	24.4	-	C	24.3	-	C	48.0	-	D	26.4	-	C
8: Honoapiilani Highway & Leialii Parkway																											
NB LT	75.8	0.45	E	69.1	0.50	E	72.4	0.44	E	75.8	0.45	E	74.2	0.50	E	72.4	0.44	E	75.6	0.45	E	73.9	0.50	E	72.0	0.44	E
NB TH/RT	8.8	0.70	A	2.4	0.75	A	2.9	0.60	A	8.8	0.70	A	2.4	0.75	A	3.0	0.61	A	9.0	0.71	A	2.6	0.78	A	3.2	0.64	A
EB LT/TH/RT	58.6	0.06	E	57.0	0.07	E	50.0	0.03	D	58.6	0.06	E	61.4	0.07	E	50.0	0.03	D	58.6	0.06	E	61.4	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	50.3	0.05	D	58.6	0.01	E	60.9	0.05	E	50.3	0.05	D	58.6	0.01	E	60.9	0.05	E	50.3	0.05	D
SB LT	68.8	0.52	E	66.2	0.78	E	76.2	0.79	E	68.8	0.52	E	71.5	0.79	E	76.2	0.79	E	68.8	0.52	E	74.5	0.80	E	76.2	0.79	E
SB TH/RT	5.2	0.51	A	13.3	0.83	B	10.2	0.70	B	5.3	0.52	A	13.2	0.83	B	10.3	0.71	B	5.4	0.53	A	14.1	0.85	B	11.1	0.73	B
Overall	9.1	-	A	10.8	-	B	11.0	-	B	9.1	-	A	11.0	-	B	11.1	-	B	9.3	-	A	11.6	-	B	11.3	-	B
9: Honoapiilani Highway & Front Street/Flemming Road																											
NB LT	89.8	0.73	F	96.3	0.74	F	87.9	0.84	F	89.7	0.73	F	102.8	0.75	F	87.3	0.84	F	89.0	0.73	F	100.4	0.75	F	86.2	0.84	F
NB TH/RT	7.6	0.67	A	1.9	0.71	A	16.3	0.50	B	7.7	0.67	A	2.2	0.71	A	6.7	0.51	A	7.8	0.68	A	2.4	0.74	A	7.5	0.55	A
EB LT/TH/RT	52.6	0.48	D	59.5	0.72	E	57.7	0.66	E	52.6	0.48	D	65.1	0.74	E	57.7	0.66	E	52.6	0.48	D	65.2	0.75	E	57.5	0.68	E
WB LT/TH/RT	54.3	0.61	D	49.7	0.24	D	52.3	0.32	D	54.3	0.61	D	53.0	0.24	D	52.3	0.32	D	54.3	0.61	D	52.5	0.23	D	51.3	0.30	D
SB LT	88.2	0.81	F	87.4	0.74	F	88.0	0.82	F	88.0	0.81	F	93.6	0.75	F	87.7	0.82	F	87.8	0.81	F	92.2	0.75	F	86.6	0.82	F
SB TH	4.9	0.48	A	11.8	0.79	B	7.7	0.64	A	5.0	0.49	A	12.5	0.79	B	7.8	0.64	A	5.0	0.50	A	13.2	0.81	B	8.6	0.68	A
SB RT	3.2	0.11	A	5.6	0.24	A	4.3	0.17	A	3.2	0.12	A	5.9	0.23	A	4.3	0.18	A	3.2	0.12	A	6.1	0.24	A	4.7	0.19	A
Overall	9.9	-	A	10.4	-	B	14.8	-	B	9.9	-	A	11.1	-	B	11.1	-	B	10.0	-	A	11.5	-	B	11.7	-	B
10: Honoapiilani Highway & Kapunakea Street																											
NB LT	74.7	0.79	E	67.6	0.79	E	71.9	0.79	E	74.6	0.79	E	87.9	0.82	F	71.7	0.79	E	74.1	0.79	E	83.9	0.82	F	70.6	0.79	E
NB TH/RT	1.3	0.66	A	1.3	0.71	A	2.8	0.58	A	1.3	0.66	A	1.3	0.71	A	2.9	0.59	A	1.3	0.68	A	1.2	0.74	A	3.3	0.63	A
EB LT/TH	64.2	0.72	E	62.3	0.75	E	59.7	0.74	E	64.2	0.72	E	68.9	0.77	E	57.5	0.73	E	64.5	0.72	E	69.3	0.77	E	57.8	0.74	E
EB RT	48.3	0.01	D	43.6	0.03	D	42.6	0.04	D	48.3	0.01	D	47.1	0.03	D	42.3	0.04	D	47.9	0.01	D	46.8	0.03	D	41.6	0.04	D
WB LT	55.1	0.51	E	46.9	0.29	D	45.3	0.26	D	55.1	0.51	E	50.6	0.30	D	44.9	0.26	D	54.6	0.50	D	50.2	0.29	D	44.1	0.25	D
WB TH/RT	49.3	0.10	D	44.1	0.08	D	42.9	0.07	D	49.3	0.10	D	47.7	0.08	D	42.7	0.07	D	48.9	0.10	D	47.3	0.08	D	42.0	0.07	D
SB LT	101.8	0.83	F	72.4	0.80	E	85.2	0.84	F	101.7	0.83	F	77.1	0.79	E	85.5	0.84	F	101.4	0.83	F	74.3	0.79	E	84.5	0.84	F
SB TH/RT	10.3	0.56	B	5.5	0.89	A	3.6	0.78	A	10.5	0.56	B	5.1	0.88	A	7.8	0.78	A	10.9	0.58	B	5.9	0.90	A	9.1	0.82	A
Overall	11.9	-	B	9.7	-	A	9.7	-	A	11.9	-	B	10.2	-	B	11.7	-	B	12.0	-	B	10.5	-	B	12.4	-	B

Table 5.6: Base Year 2022 with Mitigation, Future Year 2022 Scenario 1 and Future Year 2022 Scenario 2 Level of Service Summary Cont'd

	Base Year 2022 with Mitigation									Future Year 2022 Scenario 1									Future Year 2022 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
11: Honoapiilani Highway & Keawe Street																											
NB LT	79.8	0.79	E	69.3	0.78	E	64.0	0.79	E	79.8	0.79	E	79.7	0.78	E	64.0	0.79	E	79.8	0.79	E	79.7	0.78	E	64.0	0.79	E
NB TH	32.3	0.62	C	39.4	0.75	D	31.0	0.55	C	32.5	0.62	C	40.5	0.74	D	31.0	0.55	C	34.6	0.65	C	45.2	0.80	D	32.5	0.59	C
NB RT	23.6	0.08	C	28.6	0.21	C	25.9	0.20	C	23.7	0.08	C	29.7	0.22	C	25.9	0.20	C	24.9	0.08	C	31.8	0.23	C	26.5	0.20	C
EB LT/TH	47.7	0.35	D	63.6	0.79	E	61.5	0.77	E	47.7	0.35	D	59.0	0.75	E	61.6	0.77	E	46.2	0.33	D	57.2	0.73	E	62.0	0.78	E
EB RT	43.9	0.02	D	42.9	0.03	D	44.5	0.04	D	43.9	0.02	D	44.4	0.04	D	44.4	0.04	D	42.5	0.01	D	42.5	0.03	D	44.3	0.04	D
WB LT	38.3	0.29	D	40.7	0.58	D	42.2	0.62	D	38.4	0.29	D	46.9	0.62	D	42.2	0.62	D	37.1	0.28	D	43.8	0.59	D	42.3	0.63	D
WB TH	35.5	0.14	D	33.9	0.20	C	34.6	0.25	C	35.6	0.14	D	37.0	0.21	D	34.6	0.25	C	34.4	0.14	C	35.2	0.20	D	34.5	0.25	C
WB RT	65.7	0.92	E	64.4	0.92	E	43.2	0.68	D	65.7	0.92	E	67.7	0.92	E	43.7	0.70	D	66.5	0.93	E	69.0	0.93	E	48.1	0.78	D
SB LT	51.4	0.91	D	46.4	0.95	D	62.2	0.88	E	51.3	0.91	D	48.3	0.94	D	58.0	0.89	E	51.2	0.92	D	47.4	0.95	D	57.7	0.89	E
SB TH/RT	1.0	0.45	A	1.3	0.70	A	41.1	0.58	D	1.0	0.45	A	1.3	0.69	A	30.7	0.59	C	1.1	0.47	A	1.4	0.73	A	31.3	0.61	C
Overall	32.1	-	C	32.2	-	C	43.9	-	D	32.0	-	C	33.2	-	C	39.9	-	D	32.8	-	C	34.3	-	C	40.8	-	D
12: RIRO Access & Honoapiilani Highway																											
WB RT																			14.4	0.08	B	19.6	0.18	C	14.8	0.17	B
Overall																			0.3	-	-	0.5	-	-	0.6	-	-
14: Road A & Akahele Street																											
NB LT/TH/RT										9.4	0.02	A	9.9	0.02	A	9.7	0.02	A	10.7	0.08	B	14.5	0.23	B	21.8	0.43	C
EB LT										7.3	0.01	A	7.4	0.04	A	7.4	0.03	A	7.4	0.02	A	7.5	0.06	A	7.6	0.08	A
WB LT										7.3	0.00	A	7.3	0.00	A	7.3	0.00	A	7.4	0.00	A	7.6	0.00	A	7.7	0.00	A
SB LT/TH/RT										8.9	0.07	A	9.2	0.05	A	9.1	0.05	A	9.2	0.07	A	9.6	0.12	A	9.7	0.16	A
Overall										5.0	-	-	4.8	-	-	4.6	-	-	4.7	-	-	6.1	-	-	7.9	-	-
15: Road C & Akahele Street																											
NB LT/TH/RT										9.1	0.02	A	9.3	0.02	A	9.3	0.02	A	9.3	0.05	A	9.6	0.04	A	9.6	0.05	A
EB LT/TH/RT										7.3	0.01	A	7.3	0.02	A	7.3	0.01	A	7.3	0.01	A	7.3	0.02	A	7.3	0.01	A
WB LT/TH/RT										7.3	0.00	A	7.3	0.00	A	7.3	0.00	A	7.3	0.00	A	7.3	0.00	A	7.3	0.00	A
SB LT/TH/RT										8.8	0.04	A	9.0	0.03	A	8.9	0.03	A	8.8	0.04	A	9.1	0.03	A	9.0	0.04	A
Overall										5.3	-	-	5.2	-	-	4.7	-	-	5.8	-	-	4.7	-	-	4.8	-	-

5.4 Future Year 2022 Scenario 3 Analysis

By completion of Scenario 3 in Future Year 2022, the Project is projected to generate an additional 176(265)[340] 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 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 2022 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 10-55% from Base Year 2022 without the Project scenario, during the AM, PM and WE peak hours of traffic.

5.4.1 Future Year 2022 Scenario 3 Intersection Analysis

With the additional trips generated by Scenario 3, all study intersections are forecast to operate similar to Future Year 2022 with Scenario 2, with no major changes to LOS or capacity with the exception of the Honoapiilani Highway/Akahele Street intersection described further below. All intersection movements forecast to operate at LOS E/F for Future Year 2022 Scenario 2 conditions will continue to operate at LOS E/F conditions during Future Year 2022 Scenario 3. The majority of high volume through movements only experienced delay increases ranging from 1-5 seconds.

[3] Honoapiilani Highway/Akahele Street

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 2022 Scenario 3. The majority of left-turn movements will operate at LOS E conditions during all peak hours, due to the long cycle length and increased turning movements at the intersection. However, all movements will continue to operate under capacity. All left-turn storage lane lengths recommended in Table 5.5 accounts for traffic generated for the Future Year 2022 Scenario 3.

[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 is also recommended 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:

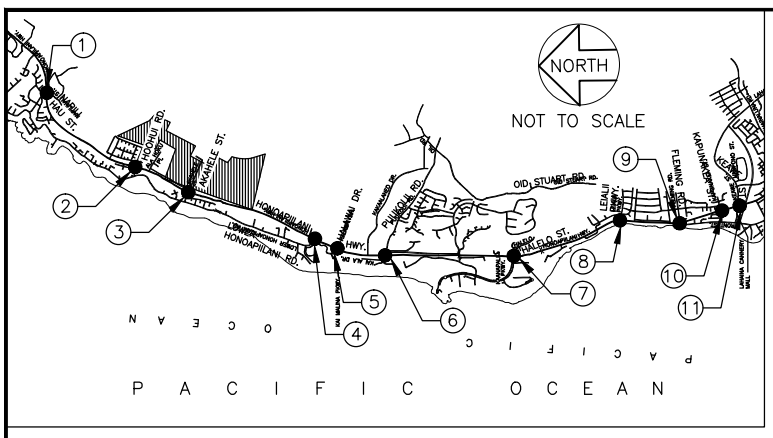
- Northbound Approach → Provide one (1) through lane and a new right-turn deceleration lane with at least 100 feet of storage space. Additional taper length and/or deceleration length to be provided based upon design. AASHTO Green Book recommends 425 feet to accommodate full deceleration length with 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.
    - Construct a median refuge lane 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 during both the PM and WE 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. Also, a median refuge lane is proposed to provide two-stage movement for left-turn vehicles to cross one direction at a time.

[14-15] Akahele Street intersection with Road A and Road C

With the proposed left-turn storage lanes at the Road A intersection, both intersections are expected to continue operating adequately at LOS D or better. As in Future Year 2022 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 5.6 illustrates the Project-generated trips for Future Year 2022 Scenario 3. Figure 5.7 illustrates the Future Year 2022 Scenario 3 forecast traffic volumes and LOS for the study intersection movements. Figure 5.8 illustrates the Future Year 2022 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 5.7 summarizes the Future Year 2022 Scenario 3 LOS at the study intersections compared to Base Year 2022 with mitigation and Future Year 2022 Scenario 2. LOS worksheets are provided in Appendix C.



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:
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NAPILIHAU ST.

HONOAPIILANI HWY.

5(17)[20]
0(0)[0]
0(0)[0]
0(0)[0]
3(15)[16]
0(0)[0]
[17](9)15
[19](6)15
[0](0)6
[0](2)0
[0](0)0
[0](0)0

MATCH LINE
FOR CONTINUATION, SEE LEFT

HOOHUI RD.

0(0)[0]
9(32)[37]
0(0)[0]
0(0)[0]
0(0)[0]
2(2)[4]
[0](0)0
[0](0)0
[16](10)3
[12](8)9
[36](17)36
[2](2)1

ROAD J

32(2)[20]
10(35)[47]
24(31)[43]
46(51)[72]
[26](22)10
[88](67)19

RIRO ACCESS

14(43)[56]
0(-5)[0]
[50](30)47
[0](-2)0

LOWER HONOAPIILANI RD.

1(1)[7]
76(52)[85]
0(0)[0]
0(0)[0]
0(0)[0]
0(0)[0]
[10](8)2
[0](0)0
[0](0)0
[0](0)0
[104](80)27
[0](0)0

AKAHELE ST.

0(0)[0]
8(29)[39]
6(14)[17]
25(7)[18]
14(2)[10]
32(4)[23]
[0](0)0
[9](6)3
[5](4)2
[5](4)2
[32](21)22
[32](28)10

KAI MALINA PKWY.

2(1)[4]
73(51)[81]
0(0)[0]
0(0)[0]
0(0)[0]
0(0)[0]
[4](1)0
[0](0)0
[0](0)0
[0](0)0
[100](78)27
[0](0)0

HONOAPIILANI HWY.

MATCH LINE
FOR CONTINUATION, SEE RIGHT

HONOAPIILANI HWY.

MATCH LINE
FOR CONTINUATION, SEE FIGURE 5.6B

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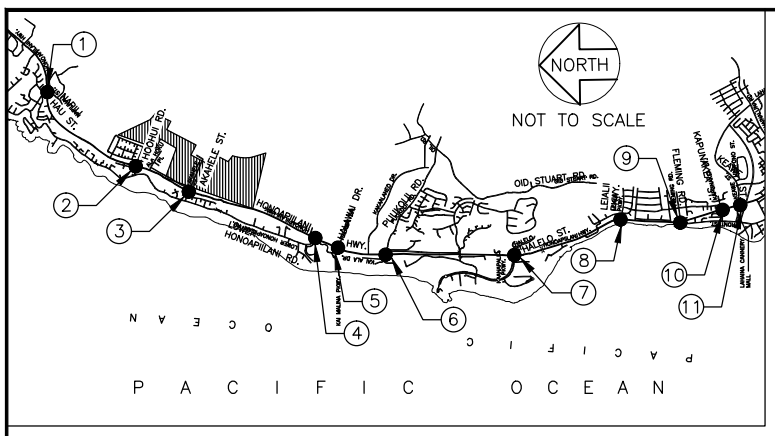
YEAR 2022 SCENARIO 3 PROJECT-GENERATED TRAFFIC

FIGURE 5.6A



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.

MATCH LINE
FOR CONTINUATION, SEE FIGURE 5.6A

MATCH LINE
FOR CONTINUATION, SEE LEFT

KAI ALA DR.

PUUKOLII RD.

FRONT ST.

FLEMING RD.

KAANAPALI PKWY.

HALELO ST.

KAPUNAKEA ST.

LEIALII PKWY.

LAHAINA CANNERY MALL

KEAWE ST.

HONOAPIILANI HWY.

MATCH LINE
FOR CONTINUATION, SEE RIGHT

PULELEHUA

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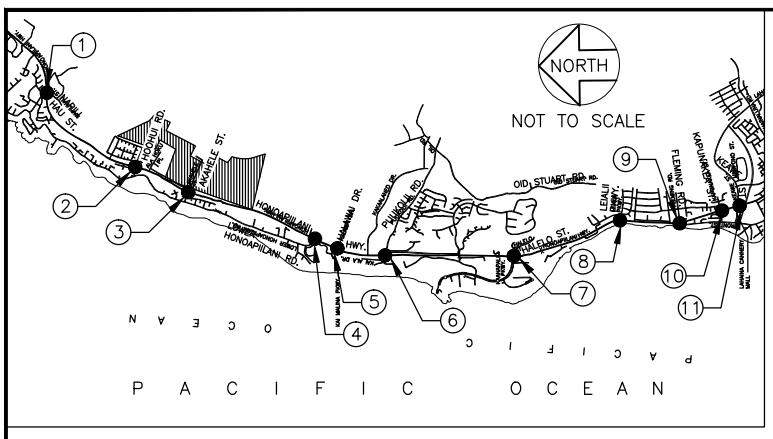
YEAR 2022 SCENARIO 3 PROJECT-GENERATED TRAFFIC

FIGURE 5.6B



NORTH

NOT TO SCALE

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

(X) – UNSIGNALIZED INTERSECTION X

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

NAPILIHAU ST.

310(420)[385] – B(C)[B]
50(55)[40] ┘
45(25)[45] – B(C)[C]

[C](C)B – [325](420)255
[A](A)A – [365](240)265
[A](A)A – [40](70)115

[C](C)B – [45](65)95
[50](25)50
[20](5)20

HONOAPIILANI HWY.

30(75)[90] – B(B)[B]
140(315)[325] – B(B)[B]
10(10)[20] – E(E)[E]

1 B/B/B

MATCH LINE
FOR CONTINUATION, SEE LEFT

HOOHUI RD.

65(80)[60] – A(A)[A]
540(665)[590] – B(B)[B]
10(25)[15] – B(A)[A]

15(10)[5]
20(15)[15] ┘ B(C)[B]
95(50)[50] – C(C)[C]

[B](C)B – [55](75)60
[20](20)5
[B](C)B – [240](175)190

[A](B)B – [170](220)155
[A](A)B – [560](655)595
[A](A)A – [30](50)20

2 B/B/B

HALAWAI DR.

950(965)[925] – A(B)[B]
10(35)[50] – C(C)[C]
25(35)[45] – C(C)[C]
50(55)[75] – D(E)[E]

[855](1125)765
[90](70)20

13

ROAD J

15(20)[70] – A(C)[B]
955(955)[945] – B(C)[B]
10(5)[0] – E(F)[A]

0(10)[5]
5(10)[0] ┘ C(D)[C]
20(80)[10]

4 B/C/B

LOWER HONOAPIILANI RD.

[C](D)C – [75](95)40
[10](5)10
[A](A)A – [595](600)480

[C](D)C – [410](605)315
[865](1085)750
[A](A)A – [5](10)45

830(890)[880]

30(75)[50] – B(B)[B]
720(780)[690] – C(C)[C]
40(110)[145] – E(E)[D]

30(45)[70] – C(C)[C]

[685](935)725
[95](75)25

12

RIRO ACCESS

70(60)[70] – A(A)[A]
1420(1625)[1495] – A(B)[A]
15(10)[10] – E(E)[E]

10(5)[15]
5(0)[5] ┘ C(D)[D]
10(15)[15]

65(65)[100] – C(D)[C]
50(50)[75] – C(D)[C]
115(120)[190] – D(E)[D]

[E](E)E – [45](60)45
[D](D)C – [70](50)20
[90](100)125

[D](E)D – [85](170)60
[C](D)B – [635](885)645
[B](B)B – [175](135)55

3 C/D/C

AKAHELE ST.

[65](55)35
[5](5)0
[D](D)C – [C](D)C – [145](140)70

[D](D)D – [105](135)135
[1210](1640)1160
[A](A)A – [20](10)20

5 A/B/B

KAI MALINA PKWY.

HALAWAI DR.

HONOAPIILANI HWY.

MATCH LINE
FOR CONTINUATION, SEE RIGHT

MATCH LINE
FOR CONTINUATION, SEE FIGURE 5.7B

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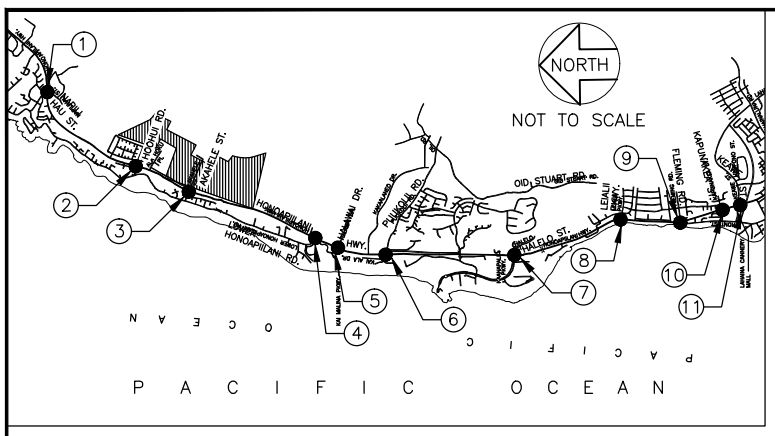
FUTURE YEAR 2022 SCENARIO 3 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 5.7A



NORTH

NOT TO SCALE

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

X – UNSIGNALIZED INTERSECTION X

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

MATCH LINE
FOR CONTINUATION, SEE FIGURE 5.7A

MATCH LINE
FOR CONTINUATION, SEE LEFT

KAI ALA DR. / PUUKOLII RD.

6 B/C/B

45(105)[85] – A(A)[A]
1360(1770)[1560] – B(C)[B]
30(35)[35] – F(F)[D]

50(50)[40]
15(5)[5] – E(E)[C]
40(70)[45] – E(E)[D]

[D](E)E – [75](85)55
[5](5)5
[C](E)E – [180](175)35

105(145)[170] – A(A)[A]
1295(1795)[1525] – C(D)[C]
85(80)[60] – D(F)[E]

[D](E)E – [110](125)110
[A](B)A – [1265](1615)1295
[A](A)A – [50](60)60

KAANAPALI PKWY. / HALELO ST.

7 C/D/C

10(5)[20]
10(0)[5]
10(15)[15] – D(F)[E]

[E](F)D – [280](320)140
[5](5)10
[D](E)C – [445](615)220

5(5)[10]
1490(2350)[1945] – A(B)[B]
30(90)[95] – E(E)[E]

[E](F)D – [290](385)425
[1340](1625)1370
[B](C)B – [15](10)15

45(65)[70]
0(5)[5] – E(E)[D]
60(90)[135] – E(E)[E]

LEIALII PKWY.

8 A/B/B

[D](E)E – [5](10)5
[0](0)5
[5](5)5

[E](E)E – [5](10)5
[1510](1955)1805
[A](A)A – [90](90)90

HONOAPIILANI HWY.

FRONT ST. / FLEMING RD.

9 B/B/B

200(340)[280] – A(A)[A]
1320(1990)[1710] – A(B)[A]
10(5)[10] – F(F)[F]

15(10)[15]
15(5)[5]
105(60)[65] – D(D)[D]

[E](E)D – [150](190)90
[5](15)5
[15](10)5

75(160)[140]
1355(1920)[1710] – B(A)[B]
10(30)[15] – F(E)[F]

[F](F)F – [15](5)5
[1435](1865)1785
[A](A)A – [15](20)20

KAPUNAKEA ST.

10 B/B/B

35(20)[20]
25(25)[20] – D(D)[D]
145(95)[90] – D(D)[D]

[E](E)E – [205](190)150
[20](35)30
[D](D)D – [50](45)20

20(65)[105]
915(1270)[1010] – A(A)[C]
545(655)[610] – D(D)[E]

[E](F)E – [60](55)25
[1450](1655)1600
[A](A)A – [60](105)75

LAHAINA CANNERY MALL

11 C/D/D

735(740)[715] – E(E)[D]
75(110)[130] – C(C)[C]
95(125)[145] – D(D)[D]

[E](D)D – [65](65)15
[150](185)110
[D](D)D – [90](60)35

[E](E)E – [80](55)25
[C](D)D – [785](1005)895
[C](C)C – [195](195)120

KEAWE ST.

HONOAPIILANI HWY.

MATCH LINE
FOR CONTINUATION, SEE RIGHT

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FIGURE 5.7B

FUTURE YEAR 2022 SCENARIO 3 LANE CONFIGURATION, VOLUMES AND LOS

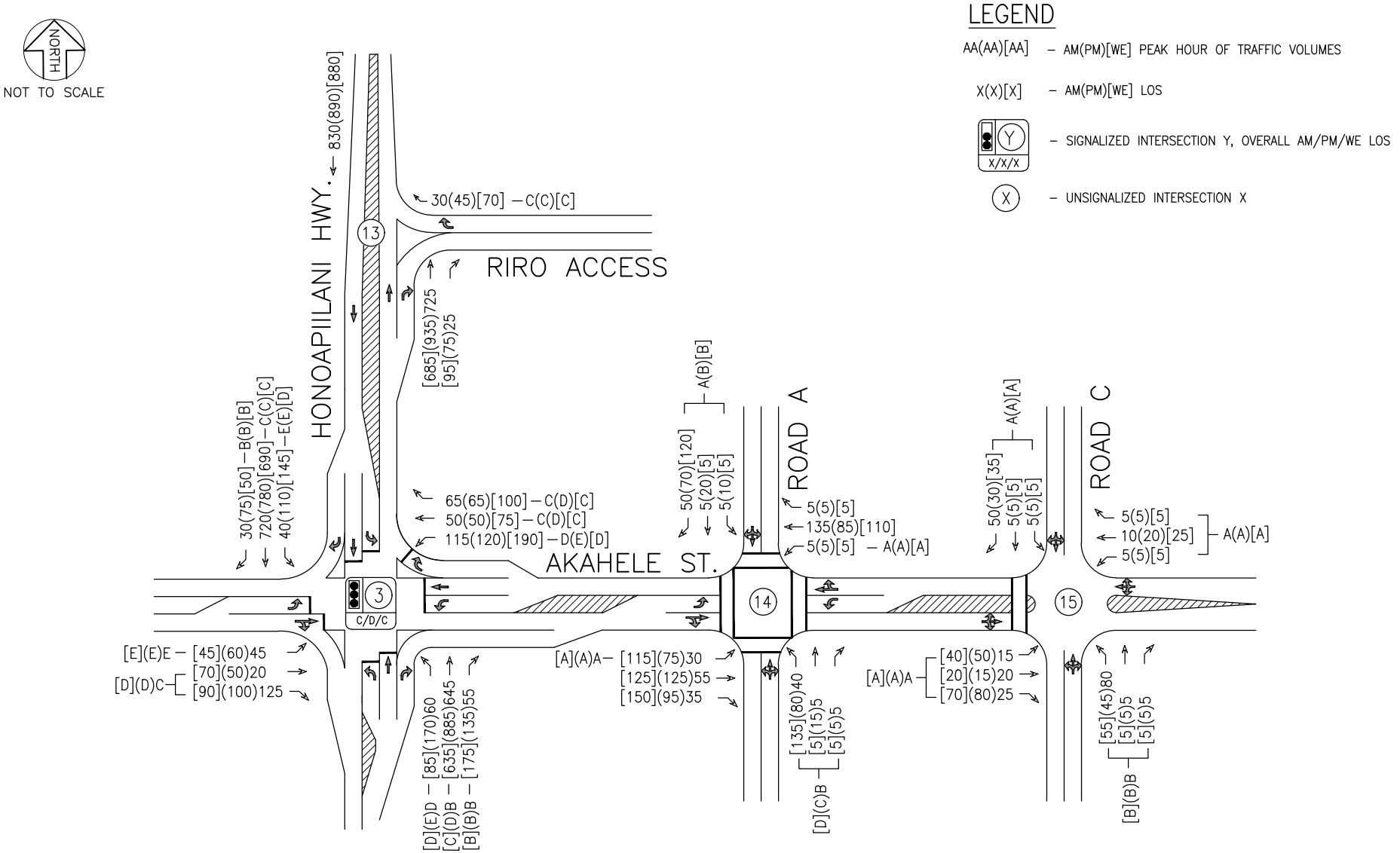

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FIGURE 5.8

FUTURE YEAR 2022 SCENARIO 3
AKAHELE STREET LANE CONFIGURATION, VOLUMES AND LOS

Table 5.7: Base Year 2022 with Mitigation, Future Year 2022 Scenario 2 and Future Year 2022 Scenario 3 Level of Service Summary

	Base Year 2022 with Mitigation									Future Year 2022 Scenario 2									Future Year 2022 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
1: Honoapiilani Highway & Napilihau Street																											
NB LT	18.9	0.75	B	19.7	0.82	B	19.5	0.77	B	18.9	0.75	B	20.6	0.84	C	20.4	0.80	C	18.9	0.76	B	21.5	0.85	C	21.1	0.81	C
NB TH	8.1	0.32	A	6.0	0.23	A	7.6	0.37	A	8.3	0.34	A	5.7	0.24	A	7.3	0.39	A	8.3	0.35	A	5.7	0.24	A	7.2	0.40	A
NB RT	6.9	0.08	A	5.2	0.05	A	5.9	0.03	A	7.0	0.08	A	5.0	0.05	A	5.5	0.03	A	7.0	0.09	A	4.9	0.05	A	5.3	0.03	A
EB LT/TH	15.0	0.26	B	20.4	0.29	C	17.8	0.28	B	15.3	0.25	B	22.2	0.31	C	19.8	0.31	B	15.5	0.25	B	22.9	0.30	C	20.8	0.32	C
EB RT	14.5	0.16	B	19.5	0.13	B	17.2	0.18	B	14.8	0.16	B	21.1	0.16	C	19.0	0.18	B	15.0	0.17	B	22.0	0.16	C	19.9	0.18	B
WB LT	17.4	0.30	B	22.8	0.28	C	19.5	0.18	B	17.8	0.31	B	24.8	0.30	C	21.8	0.21	C	18.1	0.32	B	25.9	0.33	C	22.9	0.22	C
WB TH/RT	14.7	0.22	B	19.4	0.13	B	17.7	0.27	B	15.0	0.21	B	20.9	0.14	C	19.5	0.29	B	15.2	0.21	B	21.8	0.13	C	20.5	0.29	C
SB LT	66.8	0.72	E	73.0	0.73	E	55.6	0.77	E	67.6	0.72	E	75.2	0.73	E	58.7	0.78	E	68.1	0.72	E	76.9	0.73	E	60.5	0.78	E
SB TH	12.9	0.31	B	17.9	0.60	B	15.2	0.57	B	13.6	0.33	B	18.8	0.63	B	16.1	0.60	B	14.0	0.34	B	19.5	0.64	B	16.8	0.61	B
SB RT	11.2	0.02	B	13.1	0.05	B	11.4	0.06	B	11.8	0.02	B	13.6	0.05	B	11.8	0.06	B	12.1	0.02	B	14.0	0.05	B	12.1	0.06	B
Overall	14.2	-	B	16.7	-	B	15.1	-	B	14.4	-	B	17.4	-	B	15.8	-	B	14.5	-	B	18.0	-	B	16.3	-	B
2: Honoapiilani Highway & Hoohui Road																											
NB LT	9.8	0.36	A	9.2	0.47	A	8.4	0.33	A	10.2	0.40	B	10.8	0.55	B	8.8	0.39	A	10.4	0.42	B	11.7	0.58	B	9.5	0.44	A
NB TH	10.8	0.64	B	9.3	0.66	A	8.9	0.57	A	11.3	0.68	B	9.5	0.68	A	9.1	0.62	A	11.7	0.72	B	9.5	0.68	A	9.1	0.63	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	19.9	0.31	B	16.3	0.22	B	17.8	0.17	B	21.7	0.32	C	18.1	0.23	B	18.1	0.17	B	22.8	0.33	C	19.3	0.24	B
EB RT	16.3	0.06	B	18.4	0.07	B	15.6	0.10	B	16.8	0.07	B	20.1	0.07	C	17.3	0.09	B	17.1	0.07	B	21.1	0.07	C	18.4	0.09	B
WB LT	19.9	0.28	B	22.0	0.20	C	17.7	0.14	B	20.6	0.30	C	24.2	0.23	C	19.7	0.17	B	21.0	0.30	C	25.4	0.24	C	21.2	0.20	C
WB TH/RT	16.3	0.07	B	18.3	0.07	B	15.5	0.06	B	16.8	0.06	B	20.1	0.07	C	17.1	0.06	B	17.0	0.07	B	21.0	0.07	C	18.3	0.06	B
SB LT	9.7	0.03	A	8.1	0.07	A	8.0	0.04	A	10.0	0.03	B	8.3	0.07	A	8.0	0.04	A	10.2	0.03	B	8.3	0.07	A	8.1	0.04	A
SB TH	15.1	0.77	B	13.2	0.77	B	12.5	0.73	B	15.6	0.78	B	14.1	0.80	B	13.0	0.76	B	15.7	0.79	B	14.4	0.82	B	13.5	0.79	B
SB RT	9.5	0.05	A	8.0	0.06	A	8.1	0.04	A	9.7	0.05	A	8.0	0.07	A	7.9	0.04	A	9.7	0.05	A	7.9	0.06	A	7.9	0.04	A
Overall	13.3	-	B	11.8	-	B	11.1	-	B	13.7	-	B	12.6	-	B	11.5	-	B	13.9	-	B	12.9	-	B	11.9	-	B
3: Honoapiilani Highway & Akahele Street																											
NB LT	42.7	0.77	D	42.6	0.81	D	37.1	0.76	D	48.5	0.77	D	54.2	0.84	D	48.5	0.76	D	50.8	0.76	D	57.4	0.85	E	52.1	0.77	D
NB TH	10.6	0.65	B	13.0	0.76	B	10.0	0.60	A	15.5	0.72	B	34.8	0.93	C	25.6	0.86	C	17.4	0.75	B	40.5	0.95	D	28.3	0.88	C
NB RT	6.5	0.01	A	5.9	0.01	A	6.4	0.01	A	9.3	0.03	A	11.8	0.08	B	15.7	0.15	B	10.2	0.04	B	12.6	0.12	B	16.8	0.19	B
EB LT	44.0	0.72	D	52.9	0.77	D	42.6	0.71	D	54.8	0.79	D	63.4	0.77	E	58.5	0.78	E	56.9	0.78	E	66.7	0.77	E	62.2	0.78	E
EB TH/RT	24.0	0.08	C	32.8	0.04	C	23.8	0.06	C	28.8	0.12	C	46.9	0.52	D	37.1	0.57	D	31.0	0.12	C	52.1	0.63	D	44.9	0.73	D
WB LT	69.5	0.53	E	65.8	0.58	E	51.3	0.55	D	43.7	0.76	D	56.8	0.80	E	42.7	0.82	D	43.3	0.78	D	60.0	0.81	E	48.4	0.84	D
WB TH	25.3	0.03	C	35.5	0.03	D	24.8	0.03	C	26.7	0.12	C	39.9	0.19	D	27.1	0.18	C	27.6	0.16	C	42.7	0.20	D	30.0	0.21	C
WB RT	25.2	0.01	C	35.4	0.01	D	24.7	0.01	C	26.1	0.02	C	38.5	0.02	D	26.1	0.04	C	26.7	0.03	C	41.3	0.03	D	28.9	0.05	C
SB LT	112.0	0.71	F	126.5	0.72	F	110.8	0.70	F	62.2	0.80	E	58.1	0.78	E	44.2	0.79	D	60.2	0.79	E	60.3	0.80	E	47.8	0.81	D
SB TH	15.3	0.84	B	22.9	0.88	C	15.5	0.83	B	19.8	0.86	B	31.6	0.89	C	23.4	0.86	C	21.7	0.87	C	34.9	0.90	C	26.2	0.86	C
SB RT	7.8	0.02	A	10.6	0.05	B	8.3	0.03	A	10.1	0.02	B	14.0	0.05	B	13.0	0.03	B	10.9	0.02	B	14.1	0.05	B	13.4	0.03	B
Overall	15.7	-	B	21.5	-	C	15.8	-	B	22.3	-	C	37.6	-	D	29.3	-	C	24.4	-	C	41.5	-	D	32.7	-	C
4: Honoapiilani Highway & Lower Honoapiilani Road																											
NB LT	22.4	0.83	C	30.0	0.94	C	21.2	0.87	C	23.7	0.84	C	34.3	0.94	C	25.0	0.88	C	25.7	0.85	C	39.2	0.95	D	28.3	0.89	C
NB TH/RT	4.7	0.33	A	4.4	0.36	A	2.4	0.24	A	4.7	0.35	A	4.5	0.40	A	2.7	0.30	A	4.5	0.35	A	4.7	0.43	A	2.9	0.34	A
EB LT/TH	25.0	0.19	C	41.7	0.38	D	26.8	0.28	C	26.4	0.20	C	46.1	0.45	D	31.2	0.36	C	28.7	0.23	C	50.0	0.51	D	34.6	0.41	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	24.4	0.10	C	42.5	0.47	D	25.3	0.05	C	25.8	0.11	C	46.3	0.48	D	28.9	0.05	C	27.9	0.11	C	49.4	0.48	D	31.7	0.05	C
SB LT	50.7	0.74	D	87.3	0.72	F	0.0	0.00	A	52.5	0.74	D	91.8	0.73	F	0.0	0.00	A	55.4	0.74	E	96.2	0.73	F	0.0	0.00	A
SB TH	13.0	0.58	B	27.4	0.70	C	14.7	0.58	B	13.3	0.60	B	29.3	0.74	C	16.3	0.63	B	13.7	0.63	B	31.6	0.77	C	17.8	0.66	B
SB RT	9.2	0.00	A	19.5	0.01	B	11.0	0.03	B	9.2	0.01	A	20.0	0.01	C	11.6	0.04	B	9.1	0.01	A	20.8	0.01	C	12.3	0.06	B
Overall	12.0	-	B	20.9	-	C	12.6	-	B	12.3	-	B	22.4	-	C	13.6	-	B	12.8	-	B	24.2	-	C	14.7	-	B

Table 5.7: Base Year 2022 with Mitigation, Future Year 2022 Scenario 2 and Future Year 2022 Scenario 3 Level of Service Summary Cont'd

	Base Year 2022 with Mitigation									Future Year 2022 Scenario 2									Future Year 2022 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	31.8	0.79	C	43.8	0.82	D	35.3	0.78	D	34.1	0.79	C	46.7	0.82	D	39.0	0.78	D	36.2	0.80	D	48.0	0.83	D	41.7	0.79	D
NB TH/RT	4.1	0.45	A	7.1	0.60	A	4.9	0.41	A	4.1	0.47	A	7.8	0.64	A	5.1	0.47	A	4.0	0.47	A	8.3	0.67	A	5.4	0.50	A
EB LT/TH	30.4	0.16	C	37.0	0.22	D	30.2	0.25	C	32.7	0.19	C	39.5	0.25	D	33.8	0.28	C	34.9	0.20	C	40.7	0.25	D	36.2	0.31	D
EB RT	30.3	0.01	C	36.2	0.03	D	29.5	0.04	C	32.4	0.01	C	38.5	0.03	D	32.9	0.04	C	34.5	0.01	C	39.6	0.03	D	35.0	0.04	C
WB LT/TH/RT	30.9	0.11	C	38.1	0.08	D	29.5	0.10	C	32.8	0.11	C	40.8	0.09	D	33.1	0.11	C	34.9	0.11	C	42.1	0.09	D	35.5	0.12	D
SB LT	53.5	0.78	D	73.1	0.78	E	59.7	0.75	E	56.7	0.79	E	77.0	0.78	E	64.7	0.76	E	59.9	0.80	E	78.8	0.79	E	68.3	0.77	E
SB TH	7.7	0.61	A	12.5	0.72	B	8.8	0.63	A	8.0	0.63	A	13.6	0.75	B	9.2	0.67	A	8.2	0.65	A	14.2	0.77	B	9.8	0.69	A
SB RT	4.5	0.04	A	6.4	0.04	A	5.1	0.04	A	4.5	0.05	A	6.5	0.04	A	5.0	0.04	A	4.4	0.05	A	6.5	0.04	A	5.0	0.05	A
Overall	8.1	-	A	12.1	-	B	9.3	-	A	8.3	-	A	12.9	-	B	9.6	-	A	8.4	-	A	13.4	-	B	10.1	-	B
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road																											
NB LT	74.0	0.85	E	78.1	0.86	E	39.8	0.78	D	74.1	0.85	E	77.8	0.86	E	41.9	0.78	D	74.1	0.85	E	77.7	0.86	E	43.2	0.79	D
NB TH	6.2	0.48	A	9.8	0.58	A	8.2	0.49	A	6.5	0.50	A	10.8	0.63	B	8.7	0.56	A	6.6	0.51	A	11.6	0.67	B	9.0	0.59	A
NB RT	3.8	0.04	A	5.4	0.04	A	5.5	0.03	A	3.8	0.04	A	5.5	0.04	A	5.4	0.03	A	3.8	0.04	A	5.6	0.04	A	5.3	0.03	A
EB LT/TH	68.7	0.38	E	67.2	0.37	E	31.3	0.23	C	68.7	0.38	E	67.1	0.39	E	33.8	0.27	C	68.7	0.38	E	67.0	0.40	E	35.4	0.30	D
EB RT	63.3	0.01	E	63.7	0.13	E	30.1	0.05	C	63.3	0.01	E	63.7	0.18	E	32.1	0.05	C	63.3	0.01	E	63.6	0.20	E	33.3	0.05	C
WB LT	75.0	0.39	E	78.4	0.54	E	34.6	0.21	C	75.0	0.39	E	78.7	0.54	E	37.7	0.24	D	75.0	0.39	E	79.2	0.55	E	39.6	0.25	D
WB TH/RT	64.1	0.10	E	62.5	0.03	E	29.9	0.03	C	64.1	0.10	E	62.1	0.03	E	31.9	0.03	C	64.1	0.10	E	61.6	0.03	E	33.1	0.03	C
SB LT	82.9	0.69	F	89.0	0.78	F	42.4	0.58	D	84.8	0.76	F	89.0	0.78	F	44.8	0.62	D	84.8	0.76	F	89.0	0.78	F	46.2	0.63	D
SB TH	10.0	0.52	B	18.1	0.73	B	13.6	0.73	B	10.4	0.55	B	19.8	0.77	B	14.5	0.76	B	10.9	0.57	B	21.1	0.80	C	15.4	0.79	B
SB RT	6.0	0.03	A	8.5	0.07	A	7.4	0.05	A	6.0	0.03	A	8.8	0.08	A	7.3	0.05	A	6.0	0.03	A	9.0	0.08	A	7.2	0.06	A
Overall	13.9	-	B	19.9	-	B	13.6	-	B	14.2	-	B	20.9	-	C	14.4	-	B	14.3	-	B	21.7	-	C	14.9	-	B
7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street																											
NB LT	40.7	0.75	D	91.4	0.85	F	49.6	0.71	D	43.1	0.76	D	97.0	0.86	F	56.6	0.73	E	46.2	0.77	D	99.6	0.86	F	61.3	0.75	E
NB TH/RT	16.2	0.68	B	22.0	0.66	C	13.7	0.56	B	16.3	0.69	B	24.1	0.70	C	14.9	0.60	B	16.2	0.68	B	24.9	0.72	C	15.6	0.63	B
EB LT/TH	44.2	0.46	D	86.1	0.60	F	48.6	0.58	D	46.9	0.47	D	93.2	0.65	F	55.2	0.64	E	50.2	0.49	D	97.1	0.68	F	59.6	0.67	E
EB RT	28.3	0.08	C	63.9	0.51	E	36.4	0.34	D	30.2	0.07	C	68.4	0.52	E	41.1	0.35	D	32.4	0.08	C	70.6	0.52	E	44.4	0.35	D
WB LT/TH/RT	44.7	0.18	D	100.0	0.23	F	54.7	0.32	D	47.4	0.18	D	106.1	0.24	F	62.2	0.34	E	50.7	0.18	D	108.9	0.24	F	67.5	0.36	E
SB LT	46.2	0.57	D	112.3	0.72	F	53.9	0.50	D	48.9	0.59	D	124.2	0.75	F	61.3	0.55	E	52.3	0.61	D	130.2	0.76	F	66.4	0.57	E
SB TH	22.1	0.75	C	41.1	0.88	D	20.8	0.76	C	22.5	0.76	C	44.6	0.90	D	22.4	0.78	C	23.1	0.77	C	46.7	0.91	D	23.5	0.79	C
SB RT	9.8	0.08	A	8.2	0.11	A	6.9	0.13	A	9.7	0.09	A	8.2	0.11	A	6.7	0.13	A	9.7	0.09	A	8.3	0.12	A	6.6	0.14	A
Overall	23.7	-	C	44.8	-	D	24.1	-	C	24.3	-	C	48.0	-	D	26.4	-	C	25.0	-	C	49.6	-	D	27.8	-	C
8: Honoapiilani Highway & Leialii Parkway																											
NB LT	75.8	0.45	E	69.1	0.50	E	72.4	0.44	E	75.6	0.45	E	73.9	0.50	E	72.0	0.44	E	75.5	0.45	E	73.7	0.50	E	71.8	0.44	E
NB TH/RT	8.8	0.70	A	2.4	0.75	A	2.9	0.60	A	9.0	0.71	A	2.6	0.78	A	3.2	0.64	A	9.1	0.72	A	2.7	0.80	A	3.6	0.68	A
EB LT/TH/RT	58.6	0.06	E	57.0	0.07	E	50.0	0.03	D	58.6	0.06	E	61.4	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	50.3	0.05	D	58.6	0.01	E	60.9	0.05	E	50.3	0.05	D	58.6	0.01	E	61.0	0.05	E	50.3	0.05	D
SB LT	68.8	0.52	E	66.2	0.78	E	76.2	0.79	E	68.8	0.52	E	74.5	0.80	E	76.2	0.79	E	68.8	0.52	E	74.5	0.80	E	78.6	0.80	E
SB TH/RT	5.2	0.51	A	13.3	0.83	B	10.2	0.70	B	5.4	0.53	A	14.1	0.85	B	11.1	0.73	B	5.7	0.55	A	15.1	0.86	B	11.7	0.75	B
Overall	9.1	-	A	10.8	-	B	11.0	-	B	9.3	-	A	11.6	-	B	11.3	-	B	9.4	-	A	12.1	-	B	11.8	-	B
9: Honoapiilani Highway & Front Street/Flemming Road																											
NB LT	89.8	0.73	F	96.3	0.74	F	87.9	0.84	F	89.0	0.73	F	100.4	0.75	F	86.2	0.84	F	88.7	0.73	F	98.9	0.75	F	85.4	0.84	F
NB TH/RT	7.6	0.67	A	1.9	0.71	A	16.3	0.50	B	7.8	0.68	A	2.4	0.74	A	7.5	0.55	A	7.9	0.69	A	2.7	0.76	A	8.0	0.57	A
EB LT/TH/RT	52.6	0.48	D	59.5	0.72	E	57.7	0.66	E	52.6	0.48	D	65.2	0.75	E	57.5	0.68	E	52.6	0.48	D	65.4	0.75	E	57.6	0.68	E
WB LT/TH/RT	54.3	0.61	D	49.7	0.24	D	52.3	0.32	D	54.3	0.61	D	52.5	0.23	D	51.3	0.30	D	54.3	0.61	D	52.0	0.23	D	50.8	0.30	D
SB LT	88.2	0.81	F	87.4	0.74	F	88.0	0.82	F	87.8	0.81	F	92.2	0.75	F	86.6	0.82	F	87.4	0.81	F	90.8	0.75	F	85.6	0.82	F
SB TH	4.9	0.48	A	11.8	0.79	B	7.7	0.64	A	5.0	0.50	A	13.2	0.81	B	8.6	0.68	A	5.2	0.52	A	13.9	0.83	B	9.1	0.70	A
SB RT	3.2	0.11	A	5.6	0.24	A	4.3	0.17	A	3.2	0.12	A	6.1	0.24	A	4.7	0.19	A	3.2	0.13	A	6.3	0.25	A	4.8	0.19	A
Overall	9.9	-	A	10.4	-	B	14.8	-	B	10.0	-	A	11.5	-	B	11.7	-	B	10.0	-	B	11.9	-	B	12.1	-	B

Table 5.7: Base Year 2022 with Mitigation, Future Year 2022 Scenario 2 and Future Year 2022 Scenario 3 Level of Service Summary Cont'd

	Base Year 2022 with Mitigation									Future Year 2022 Scenario 2									Future Year 2022 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
10: Honoapiilani Highway & Kapunakea Street																											
NB LT	74.7	0.79	E	67.6	0.79	E	71.9	0.79	E	74.1	0.79	E	83.9	0.82	F	70.6	0.79	E	73.7	0.79	E	80.3	0.82	F	69.7	0.79	E
NB TH/RT	1.3	0.66	A	1.3	0.71	A	2.8	0.58	A	1.3	0.68	A	1.2	0.74	A	3.3	0.63	A	1.3	0.68	A	1.1	0.76	A	3.6	0.66	A
EB LT/TH	64.2	0.72	E	62.3	0.75	E	59.7	0.74	E	64.5	0.72	E	69.3	0.77	E	57.8	0.74	E	64.5	0.72	E	71.2	0.79	E	58.0	0.75	E
EB RT	48.3	0.01	D	43.6	0.03	D	42.6	0.04	D	47.9	0.01	D	46.8	0.03	D	41.6	0.04	D	47.9	0.01	D	46.7	0.03	D	41.2	0.04	D
WB LT	55.1	0.51	E	46.9	0.29	D	45.3	0.26	D	54.6	0.50	D	50.2	0.29	D	44.1	0.25	D	54.6	0.50	D	50.1	0.29	D	43.7	0.25	D
WB TH/RT	49.3	0.10	D	44.1	0.08	D	42.9	0.07	D	48.9	0.10	D	47.3	0.08	D	42.0	0.07	D	48.9	0.10	D	47.3	0.08	D	41.6	0.07	D
SB LT	101.8	0.83	F	72.4	0.80	E	85.2	0.84	F	101.4	0.83	F	74.3	0.79	E	84.5	0.84	F	101.0	0.83	F	74.0	0.79	E	83.8	0.84	F
SB TH/RT	10.3	0.56	B	5.5	0.89	A	3.6	0.78	A	10.9	0.58	B	5.9	0.90	A	9.1	0.82	A	11.2	0.60	B	6.5	0.92	A	10.2	0.85	B
Overall	11.9	-	B	9.7	-	A	9.7	-	A	12.0	-	B	10.5	-	B	12.4	-	B	12.1	-	B	10.9	-	B	13.0	-	B
11: Honoapiilani Highway & Keawe Street																											
NB LT	79.8	0.79	E	69.3	0.78	E	64.0	0.79	E	79.8	0.79	E	79.7	0.78	E	64.0	0.79	E	79.8	0.79	E	79.7	0.78	E	64.0	0.79	E
NB TH	32.3	0.62	C	39.4	0.75	D	31.0	0.55	C	34.6	0.65	C	45.2	0.80	D	32.5	0.59	C	36.2	0.68	D	49.5	0.86	D	34.4	0.63	C
NB RT	23.6	0.08	C	28.6	0.21	C	25.9	0.20	C	24.9	0.08	C	31.8	0.23	C	26.5	0.20	C	25.8	0.08	C	33.2	0.23	C	27.6	0.21	C
EB LT/TH	47.7	0.35	D	63.6	0.79	E	61.5	0.77	E	46.2	0.33	D	57.2	0.73	E	62.0	0.78	E	45.4	0.32	D	54.9	0.70	D	62.8	0.78	E
EB RT	43.9	0.02	D	42.9	0.03	D	44.5	0.04	D	42.5	0.01	D	42.5	0.03	D	44.3	0.04	D	41.9	0.01	D	41.3	0.03	D	43.5	0.04	D
WB LT	38.3	0.29	D	40.7	0.58	D	42.2	0.62	D	37.1	0.28	D	43.8	0.59	D	42.3	0.63	D	36.5	0.27	D	41.4	0.55	D	41.9	0.63	D
WB TH	35.5	0.14	D	33.9	0.20	C	34.6	0.25	C	34.4	0.14	C	35.2	0.20	D	34.5	0.25	C	33.8	0.14	C	34.1	0.19	C	33.8	0.24	C
WB RT	65.7	0.92	E	64.4	0.92	E	43.2	0.68	D	66.5	0.93	E	69.0	0.93	E	48.1	0.78	D	66.9	0.93	E	70.2	0.94	E	51.1	0.82	D
SB LT	51.4	0.91	D	46.4	0.95	D	62.2	0.88	E	51.2	0.92	D	47.4	0.95	D	57.7	0.89	E	51.0	0.92	D	46.5	0.95	D	57.4	0.89	E
SB TH/RT	1.0	0.45	A	1.3	0.70	A	41.1	0.58	D	1.1	0.47	A	1.4	0.73	A	31.3	0.61	C	1.2	0.49	A	1.3	0.75	A	32.2	0.63	C
Overall	32.1	-	C	32.2	-	C	43.9	-	D	32.8	-	C	34.3	-	C	40.8	-	D	33.1	-	C	35.3	-	D	41.8	-	D
12: RIRO Access & Honoapiilani Highway																											
WB RT										14.4	0.08	B	19.6	0.18	C	14.8	0.17	B	15.0	0.08	C	20.0	0.17	C	15.6	0.18	C
Overall										0.3	-	-	0.5	-	-	0.6	-	-	0.3	-	-	0.5	-	-	0.6	-	-
13: Honoapiilani Highway & Road J																											
WB LT																			29.4	0.27	D	49.7	0.43	E	47.8	0.50	E
WB RT																			15.5	0.07	C	24.9	0.17	C	18.1	0.15	C
SB LT																			9.7	0.01	A	12.3	0.07	B	10.8	0.08	B
Overall																			1.1	-	-	1.8	-	-	2.4	-	-
14: Road A & Akahele Street																											
NB LT/TH/RT										10.7	0.08	B	14.5	0.23	B	21.8	0.43	C	11.7	0.09	B	16.4	0.26	C	29.1	0.52	D
EB LT										7.4	0.02	A	7.5	0.06	A	7.6	0.08	A	7.6	0.02	A	7.5	0.05	A	7.7	0.09	A
WB LT										7.4	0.00	A	7.6	0.00	A	7.7	0.00	A	7.4	0.00	A	7.7	0.00	A	7.9	0.00	A
SB LT/TH/RT										9.2	0.07	A	9.6	0.12	A	9.7	0.16	A	9.7	0.08	A	10.9	0.15	B	10.3	0.17	B
Overall										4.7	-	-	6.1	-	-	7.9	-	-	3.8	-	-	5.6	-	-	8.3	-	-
15: Road C & Akahele Street																											
NB LT/TH/RT										9.3	0.05	A	9.6	0.04	A	9.6	0.05	A	10.1	0.12	B	10.6	0.09	B	10.6	0.10	B
EB LT/TH/RT										7.3	0.01	A	7.3	0.02	A	7.3	0.01	A	7.3	0.01	A	7.3	0.03	A	7.3	0.03	A
WB LT/TH/RT										7.3	0.00	A	7.3	0.00	A	7.3	0.00	A	7.3	0.00	A	7.4	0.00	A	7.4	0.00	A
SB LT/TH/RT										8.8	0.04	A	9.1	0.03	A	9.0	0.04	A	8.8	0.06	A	9.1	0.05	A	9.0	0.05	A
Overall										5.8	-	-	4.7	-	-	4.8	-	-	6.9	-	-	5.0	-	-	5.2	-	-
16: Road G & Road J																											
NB LT/TH/RT																			8.1	0.01	A	10.2	0.05	B	10.9	0.07	B
EB LT/TH/RT																			7.4	0.01	A	7.4	0.02	A	7.4	0.04	A
WB LT/TH/RT																			7.3	0.00	A	7.4	0.00	A	7.4	0.00	A
SB LT/TH/RT																			9.2	0.03	A	9.8	0.08	A	9.2	0.07	A
Overall																			2.9	-	-	4.6	-	-	4.6	-	-
17: Road F & Road J																											
NB LT/RT																			9.0	0.05	A	9.2	0.04	A	9.0	0.04	A
WB LT/TH																			7.3	0.00	A	7.4	0.00	A	7.4	0.00	A
Overall																			4.0	-	-	2.1	-	-	2.6	-	-

5.5 Future Year 2027 Scenario 4 Analysis

As discussed earlier, a future elementary school will 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 2027 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 2027, the Project is projected to generate an additional 312(101)[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.

5.5.1 Future Year 2027 Scenario 4 Intersection Analysis

With the additional trips generated by Scenario 4 and background traffic growth, several study intersections are forecast to operate with increased delay from Base Year 2027 without the Project and Future Year 2022 with Scenarios 1, 2 and 3. All intersection movements forecast to operate at LOS E/F for Future Year 2022 Scenario 3 conditions will continue to operate at LOS E/F conditions during Future Year 2027 Scenario 4.

[3] Honoapiilani Highway/Akahele Street

With the increase in turning movements at Akahele Street due to traffic generated by Scenario 4, several minor street and left-turn movements will worsen to LOS E/F during the peak hours of traffic. However, the major through movements will operate at LOS D or better. All left-turn storage lane lengths recommended in Table 5.5 accounts for traffic generated for the Future Year 2027 Scenario 4.

[7] Honoapiilani Highway/Kaanapali Parkway

As discussed in Section 4.5.1, this intersection will worsen from overall LOS C(D)[C] during Base Year 2022 to LOS C(E)[C] during Base Year 2027 even without the Project. Therefore, during Future Year 2027 with Project, overall LOS will generally be maintained at LOS C(E)[D]. However, the major through movements will continue operating at LOS D or better during all peak hours. Based on Scenario 4 trip distribution, the Project is anticipated to reduce some of the through traffic along Honoapiilani Highway due to the Elementary School reroutes.

[10] Honoapiilani Highway/Kapunakea Street

During the PM peak hour of traffic, the southbound shared through/right-turn movement is expected to operate at over-capacity conditions. The eastbound approach could be restriped to provide an exclusive left-turn lane and a shared through/right-turn lane, consistent with the striping on the westbound approach. With the restriping, all movements will operate under-

capacity with the major through movements operating at LOS B or better during all peak hours of traffic. Numerous left-turn movements will continue operating at LOS E/F due to the long coordinated cycle length.

[11] Honoapiilani Highway/Keawe Street

During the PM peak hour of traffic, the westbound right-turn movement is expected to operate at LOS F and over-capacity conditions because the intersection serves as a critical junction between Honoapiilani Highway and Lahaina Bypass Road. Plans for Lahaina Bypass Road Phase 1C will extend the roadway further north to the Kaanapali area and provide a new connection between the bypass road and Honoapiilani Highway, which will help alleviate the high volume turning movements at the Honoapiilani Highway/Keawe Street intersection. Because there is currently no set completion date for Phase 1C, the bypass extension is not included as a mitigative measure. However, the extension is expected to improve operations at the Honoapiilani Highway/Keawe Street intersection when completed.

[14-15] Akahele Street intersection with Road A and Road C

Upon full build-out of the Project, both intersections are expected to continue operating adequately at LOS D or better with available gaps in through traffic expected along Akahele Street to help prevent long queues for opposing left-turn movements. Similar to Scenarios 2 and 3, 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 5.9 illustrates the Project-generated trips for Future Year 2027 Scenario 4. Figure 5.10 illustrates the Future Year 2027 Scenario 4 forecast traffic volumes and LOS for the study intersection movements. Figure 5.11 illustrates the Future Year 2027 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 5.8 summarizes the Future Year 2027 Scenario 4 LOS at the study intersections compared to Base Year 2027 and Future Year 2022 Scenario 3. LOS worksheets are provided in Appendix C. Full Future Year 2022 and 2027 roadway improvements for Scenarios 1-4 are listed in Appendix D.

NORTH
NOT TO SCALE

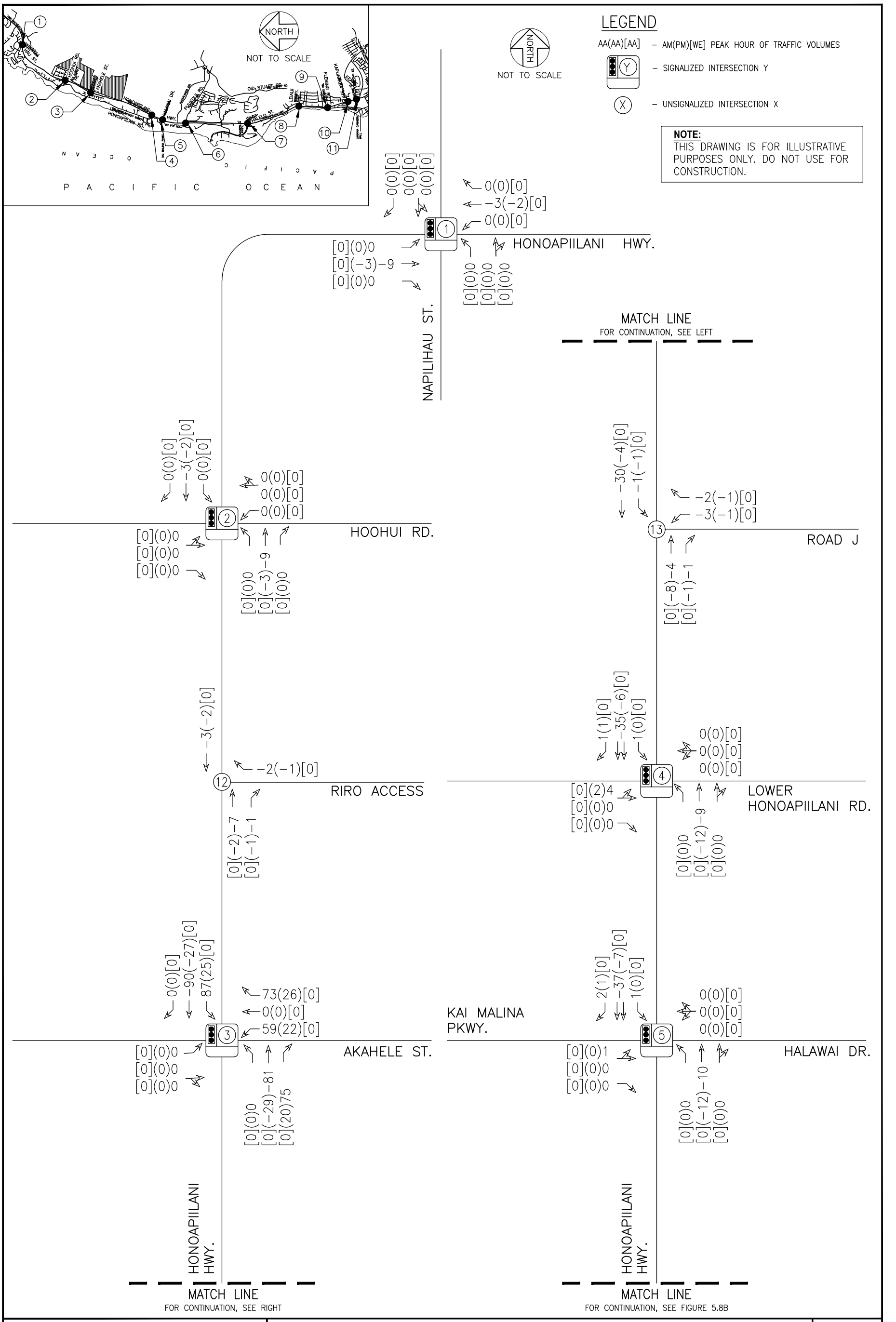
LEGEND

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

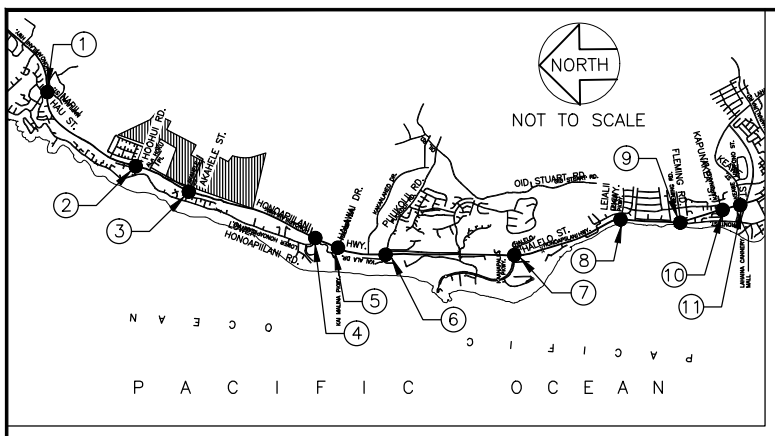
(Y) – SIGNALIZED INTERSECTION Y

(X) – UNSIGNALIZED INTERSECTION X

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



PULELEHUA	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE
	YEAR 2027 SCENARIO 4 PROJECT-GENERATED TRAFFIC	5.9A



NOT TO SCALE

LEGEND

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

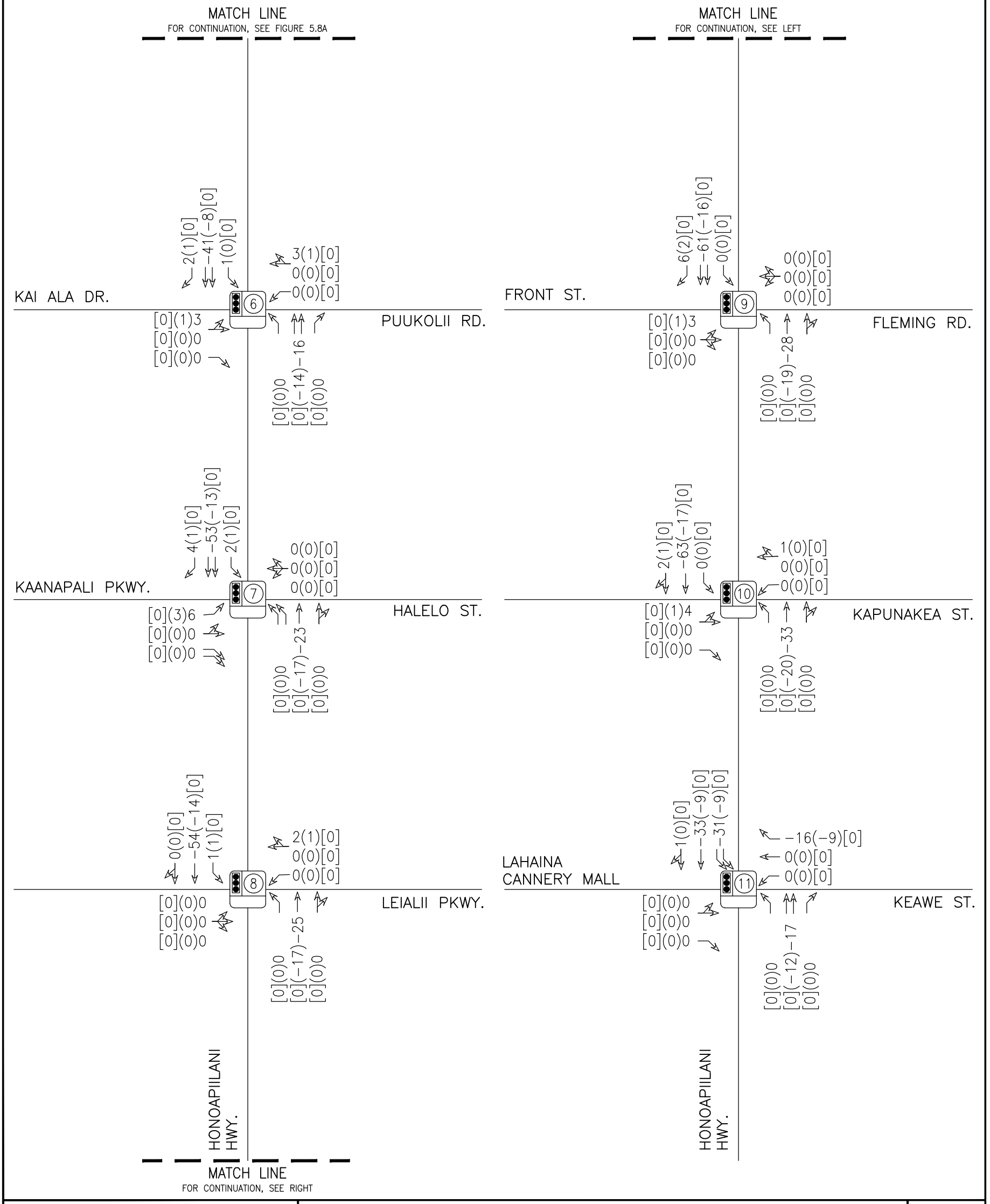
(Y) – SIGNALIZED INTERSECTION Y

(X) – UNSIGNALIZED INTERSECTION X

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

MATCH LINE
FOR CONTINUATION, SEE FIGURE 5.8A

MATCH LINE
FOR CONTINUATION, SEE LEFT



MATCH LINE
FOR CONTINUATION, SEE RIGHT

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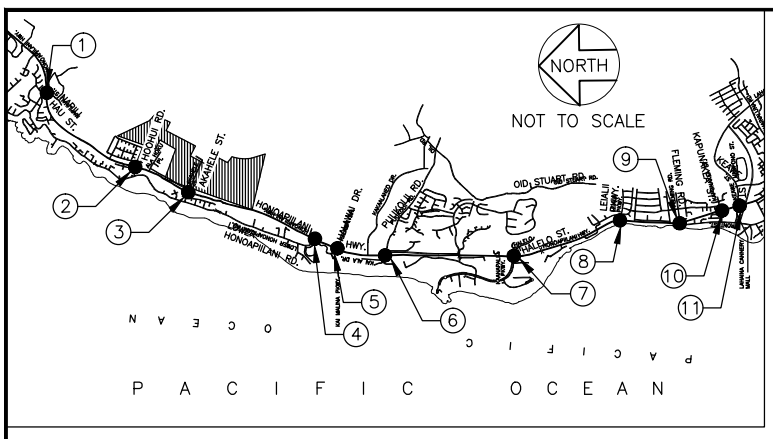
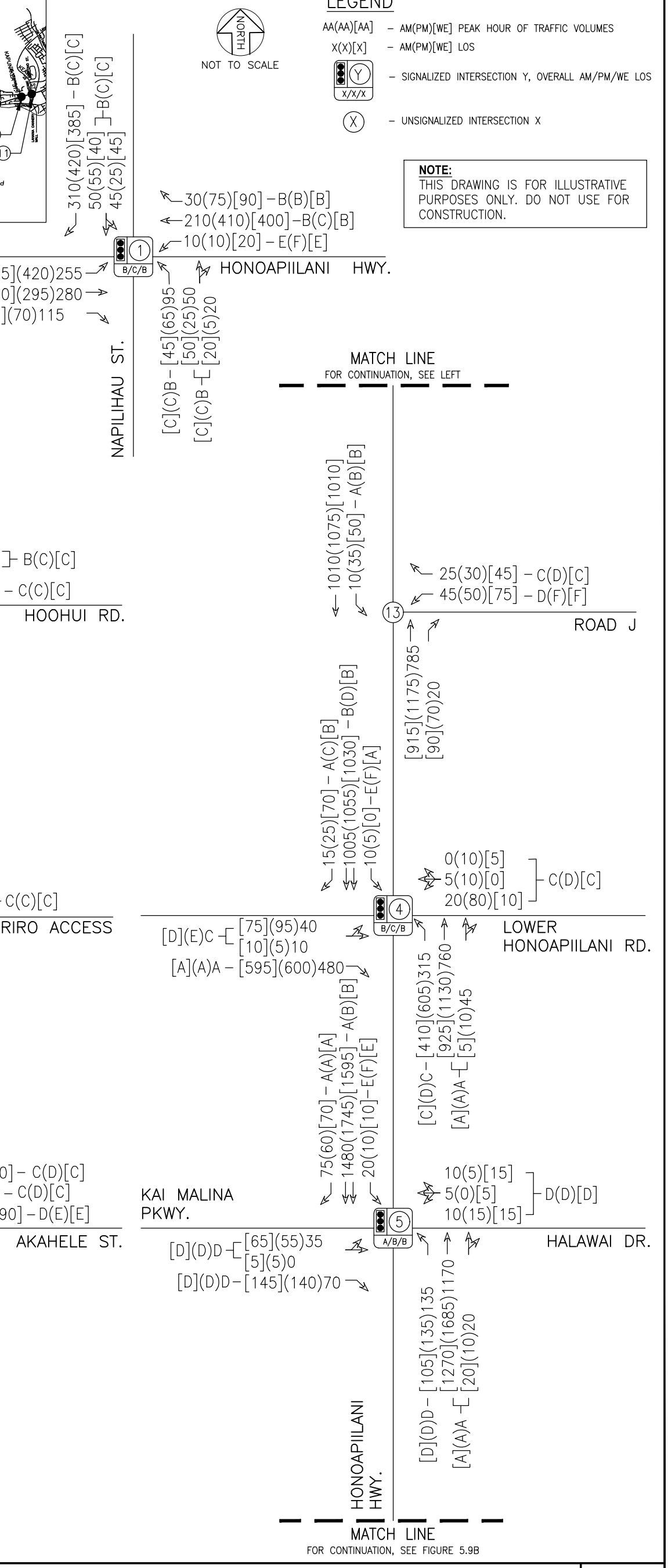
FIGURE 5.9B

YEAR 2027 SCENARIO 4 PROJECT-GENERATED TRAFFIC





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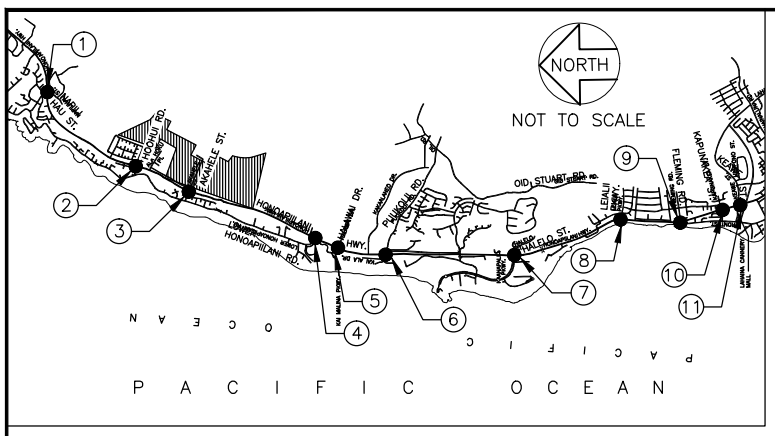
FUTURE YEAR 2027 SCENARIO 4 LANE CONFIGURATION, VOLUMES AND LOS

FIGURE 5.10A



NORTH

NOT TO SCALE

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

X – UNSIGNALIZED INTERSECTION X

NOTE:
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FIGURE 5.10B

FUTURE YEAR 2027 SCENARIO 4 LANE CONFIGURATION, VOLUMES AND LOS

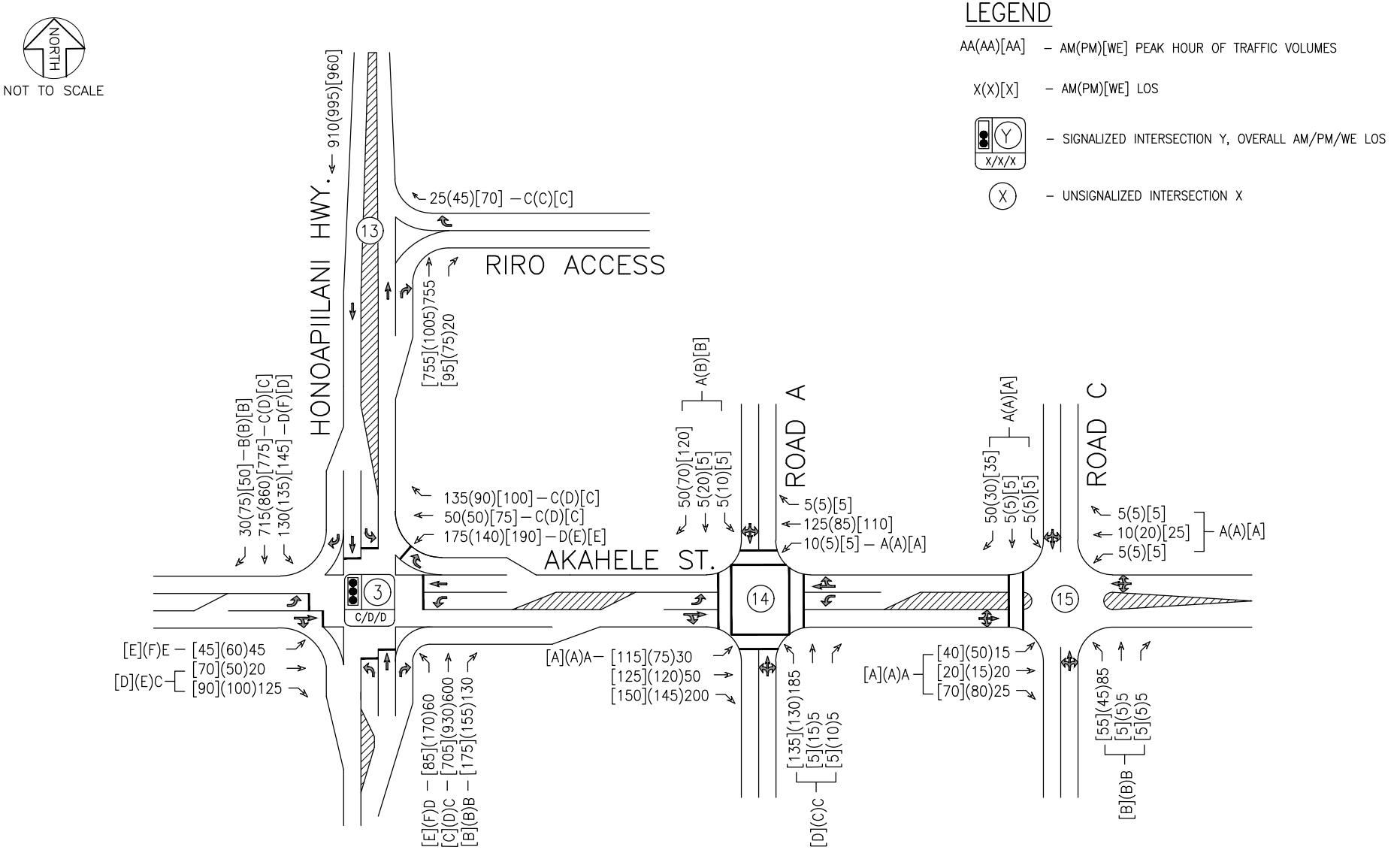

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FIGURE 5.11

FUTURE YEAR 2027 SCENARIO 4
AKAHELE STREET LANE CONFIGURATION, VOLUMES AND LOS

Table 5.8: Base Year 2027, Future Year 2022 Scenario 3 and Future Year 2027 Scenario 4 Level of Service Summary

	Base Year 2027									Future Year 2022 Scenario 3									Future Year 2027 Scenario 4								
	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	18.9	0.75	B	23.2	0.84	C	22.0	0.79	C	18.9	0.76	B	21.5	0.85	C	21.1	0.81	C	18.8	0.76	B	27.8	0.87	C	24.1	0.83	C
NB TH	8.3	0.35	A	5.7	0.27	A	7.4	0.42	A	8.3	0.35	A	5.7	0.24	A	7.2	0.40	A	8.5	0.37	A	5.6	0.27	A	7.2	0.43	A
NB RT	6.9	0.08	A	4.7	0.05	A	5.4	0.03	A	7.0	0.09	A	4.9	0.05	A	5.3	0.03	A	7.0	0.09	A	4.6	0.05	A	5.1	0.03	A
EB LT/TH	15.0	0.26	B	24.2	0.32	C	20.7	0.32	C	15.5	0.25	B	22.9	0.30	C	20.8	0.32	C	15.5	0.26	B	27.2	0.32	C	23.6	0.33	C
EB RT	14.5	0.15	B	22.8	0.12	C	19.7	0.16	B	15.0	0.17	B	22.0	0.16	C	19.9	0.18	B	15.0	0.15	B	25.9	0.15	C	22.4	0.17	C
WB LT	17.4	0.30	B	27.2	0.32	C	22.7	0.21	C	18.1	0.32	B	25.9	0.33	C	22.9	0.22	C	18.1	0.32	B	30.8	0.36	C	25.9	0.23	C
WB TH/RT	14.7	0.22	B	22.9	0.14	C	20.3	0.29	C	15.2	0.21	B	21.8	0.13	C	20.5	0.29	C	15.2	0.21	B	25.8	0.13	C	23.1	0.30	C
SB LT	66.8	0.72	E	78.4	0.74	E	60.2	0.78	E	68.1	0.72	E	76.9	0.73	E	60.5	0.78	E	68.1	0.72	E	84.4	0.74	F	66.3	0.80	E
SB TH	14.2	0.47	B	18.7	0.66	B	15.5	0.62	B	14.0	0.34	B	19.5	0.64	B	16.8	0.61	B	15.5	0.51	B	21.3	0.70	C	17.7	0.66	B
SB RT	11.2	0.02	B	12.8	0.05	B	10.9	0.06	B	12.1	0.02	B	14.0	0.05	B	12.1	0.06	B	12.1	0.02	B	14.2	0.05	B	12.0	0.06	B
Overall	14.3	-	B	18.1	-	B	15.7	-	B	14.5	-	B	18.0	-	B	16.3	-	B	14.7	-	B	20.7	-	C	17.3	-	B
2: Honoapiilani Highway & Hoohui Road																											
NB LT	10.7	0.39	B	11.1	0.53	B	8.8	0.36	A	10.4	0.42	B	11.7	0.58	B	9.5	0.44	A	11.6	0.45	B	14.6	0.65	B	10.7	0.48	B
NB TH	10.7	0.64	B	9.4	0.68	A	8.9	0.61	A	11.7	0.72	B	9.5	0.68	A	9.1	0.63	A	11.5	0.70	B	9.8	0.70	A	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	19.1	0.18	B	22.7	0.33	C	18.3	0.24	B	18.1	0.17	B	22.8	0.33	C	19.3	0.24	B	20.1	0.18	C	26.3	0.35	C	21.3	0.25	C
EB RT	18.0	0.06	B	20.9	0.06	C	17.4	0.08	B	17.1	0.07	B	21.1	0.07	C	18.4	0.09	B	18.9	0.06	B	24.2	0.06	C	20.3	0.09	C
WB LT	22.0	0.30	C	25.1	0.22	C	19.9	0.15	B	21.0	0.30	C	25.4	0.24	C	21.2	0.20	C	23.2	0.32	C	29.3	0.26	C	23.4	0.21	C
WB TH/RT	18.0	0.07	B	20.9	0.07	C	17.4	0.07	B	17.0	0.07	B	21.0	0.07	C	18.3	0.06	B	18.9	0.07	B	24.2	0.07	C	20.2	0.07	C
SB LT	9.5	0.03	A	8.1	0.07	A	7.7	0.04	A	10.2	0.03	B	8.3	0.07	A	8.1	0.04	A	10.1	0.03	B	8.4	0.08	A	8.1	0.04	A
SB TH	15.7	0.81	B	13.9	0.82	B	12.7	0.77	B	15.7	0.79	B	14.4	0.82	B	13.5	0.79	B	16.3	0.82	B	16.1	0.85	B	14.0	0.82	B
SB RT	9.2	0.04	A	7.6	0.06	A	7.5	0.04	A	9.7	0.05	A	7.9	0.06	A	7.9	0.04	A	9.3	0.05	A	7.5	0.06	A	7.6	0.04	A
Overall	13.8	-	B	12.6	-	B	11.4	-	B	13.9	-	B	12.9	-	B	11.9	-	B	14.5	-	B	14.2	-	B	12.5	-	B
3: Honoapiilani Highway & Akahele Street																											
NB LT	45.7	0.77	D	49.4	0.83	D	40.9	0.76	D	50.8	0.76	D	57.4	0.85	E	52.1	0.77	D	54.3	0.76	D	90.3	0.89	F	58.1	0.77	E
NB TH	10.0	0.63	B	13.8	0.77	B	9.8	0.63	A	17.4	0.75	B	40.5	0.95	D	28.3	0.88	C	25.1	0.83	C	45.4	0.95	D	33.6	0.90	C
NB RT	6.0	0.01	A	5.2	0.01	A	5.8	0.01	A	10.2	0.04	B	12.6	0.12	B	16.8	0.19	B	15.7	0.13	B	14.5	0.15	B	16.9	0.19	B
EB LT	49.7	0.74	D	59.0	0.77	E	49.1	0.74	D	56.9	0.78	E	66.7	0.77	E	62.2	0.78	E	60.0	0.78	E	80.9	0.77	F	67.5	0.77	E
EB TH/RT	27.2	0.07	C	38.8	0.05	D	27.5	0.05	C	31.0	0.12	C	52.1	0.63	D	44.9	0.73	D	34.5	0.12	C	71.5	0.74	E	51.9	0.77	D
WB LT	73.5	0.53	E	109.1	0.78	F	56.1	0.56	E	43.3	0.78	D	60.0	0.81	E	48.4	0.84	D	44.4	0.83	D	73.6	0.85	E	58.5	0.86	E
WB TH	28.7	0.03	C	42.2	0.04	D	28.7	0.03	C	27.6	0.16	C	42.7	0.20	D	30.0	0.21	C	27.8	0.13	C	53.5	0.20	D	34.6	0.21	C
WB RT	28.5	0.01	C	42.1	0.01	D	28.6	0.01	C	26.7	0.03	C	41.3	0.03	D	28.9	0.05	C	27.3	0.06	C	52.0	0.04	D	33.2	0.05	C
SB LT	116.5	0.71	F	134.9	0.72	F	116.1	0.71	F	60.2	0.79	E	60.3	0.80	E	47.8	0.81	D	46.0	0.79	D	96.7	0.87	F	54.0	0.82	D
SB TH	15.8	0.86	B	29.0	0.92	C	16.1	0.85	B	21.7	0.87	C	34.9	0.90	C	26.2	0.86	C	25.3	0.88	C	41.4	0.92	D	32.7	0.91	C
SB RT	7.3	0.02	A	9.9	0.05	A	7.8	0.04	A	10.9	0.02	B	14.1	0.05	B	13.4	0.03	B	12.3	0.02	B	15.0	0.05	B	13.3	0.03	B
Overall	15.9	-	B	25.2	-	C	16.1	-	B	24.4	-	C	41.5	-	D	32.7	-	C	29.8	-	C	51.3	-	D	38.2	-	D
4: Honoapiilani Highway & Lower Honoapiilani Road																											
NB LT	24.4	0.84	C	38.4	0.95	D	23.7	0.88	C	25.7	0.85	C	39.2	0.95	D	28.3	0.89	C	26.9	0.85	C	46.1	0.95	D	30.9	0.90	C
NB TH/RT	4.5	0.33	A	4.3	0.37	A	2.3	0.26	A	4.5	0.35	A	4.7	0.43	A	2.9	0.34	A	4.4	0.35	A	4.7	0.44	A	2.9	0.35	A
EB LT/TH	27.2	0.21	C	48.5	0.42	D	30.0	0.31	C	28.7	0.23	C	50.0	0.51	D	34.6	0.41	C	30.1	0.24	C	55.4	0.53	E	37.7	0.42	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	26.6	0.11	C	49.4	0.50	D	28.3	0.05	C	27.9	0.11	C	49.4	0.48	D	31.7	0.05	C	29.3	0.12	C	54.6	0.50	D	34.5	0.05	C
SB LT	53.6	0.74	D	95.5	0.73	F	0.0	0.00	A	55.4	0.74	E	96.2	0.73	F	0.0	0.00	A	57.2	0.75	E	102.9	0.73	F	0.0	0.00	A
SB TH	13.3	0.60	B	30.2	0.74	C	15.3	0.61	B	13.7	0.63	B	31.6	0.77	C	17.8	0.66	B	13.9	0.64	B	35.7	0.81	D	18.8	0.69	B
SB RT	9.1	0.00	A	20.6	0.01	C	10.9	0.03	B	9.1	0.01	A	20.8	0.01	C	12.3	0.06	B	9.1	0.01	A	21.8	0.01	C	12.5	0.06	B
Overall	12.5	-	B	24.2	-	C	13.2	-	B	12.8	-	B	24.2	-	C	14.7	-	B	13.0	-	B	27.4	-	C	15.5	-	B
5: Honoapiilani Highway & Kai Malina Parkway/Halawai Drive																											
NB LT	34.6	0.80	C	47.4	0.82	D	38.4	0.78	D	36.2	0.80	D	48.0	0.83	D	41.7	0.79	D	37.9	0.80	D	50.7	0.83	D	44.5	0.79	D
NB TH/RT	3.9	0.45	A	7.2	0.61	A	4.8	0.43	A	4.0	0.47	A	8.3	0.67	A	5.4	0.50	A	4.0	0.47	A	8.5	0.68	A	5.4	0.52	A
EB LT/TH	33.3	0.17	C	40.2	0.23	D	33.2	0.27	C	34.9	0.20	C	40.7	0.25	D	36.2	0.31	D	36.7	0.21	D	43.2	0.26	D	38.9	0.32	D
EB RT	33.1	0.01	C	39.3	0.03	D	32.4	0.04	C	34.5	0.01	C	39.6	0.03	D	35.0	0.04	C	36.3	0.01	D	41.9	0.03	D	37.5	0.04	D
WB LT/TH/RT	33.6	0.11	C	41.5	0.09	D	32.6	0.11	C	34.9	0.11	C	42.1	0.09	D	35.5	0.12	D	36.7	0.12	D	44.6	0.09	D	38.3	0.13	D
SB LT	57.5	0.79	E	77.9	0.78	E	63.9	0.76	E	59.9	0.80	E	78.8	0.79	E	68.3	0.77	E	62.9	0.85	E	82.4	0.79	F	72.2	0.77	E
SB TH	7.9	0.64	A	13.8	0.76	B	9.1	0.66	A	8.2	0.65	A	14.2	0.77	B	9.8	0.69	A	8.4	0.67	A	16.0	0.82	B	10.6	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	0.05	A	4.4	0.05	A	6.5	0.04	A	5.0	0.05	A
Overall	8.2	-	A	12.9	-	B	9.5	-	A	8.4	-	A	13.4	-	B	10.1	-	B	8.7	-	A	14.5	-	B	10.6	-	B

Table 5.8: Base Year 2027, Future Year 2022 Scenario 3 and Future Year 2027 Scenario 4 Level of Service Summary Cont'd

	Base Year 2027									Future Year 2022 Scenario 3									Future Year 2027 Scenario 4								
	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
6: Honoapiilani Highway & Kai Ala Drive/Puukolii Road																											
NB LT	74.2	0.85	E	77.9	0.86	E	41.8	0.78	D	74.1	0.85	E	77.7	0.86	E	43.2	0.79	D	74.2	0.85	E	77.5	0.86	E	44.4	0.79	D
NB TH	6.4	0.50	A	10.3	0.62	B	8.3	0.52	A	6.6	0.51	A	11.6	0.67	B	9.0	0.59	A	6.9	0.52	A	12.2	0.70	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	5.6	0.04	A	5.3	0.03	A	4.0	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	33.3	0.24	C	68.7	0.38	E	67.0	0.40	E	35.4	0.30	D	68.5	0.40	E	67.0	0.40	E	36.8	0.31	D
EB RT	63.3	0.01	E	63.7	0.13	E	32.0	0.05	C	63.3	0.01	E	63.6	0.20	E	33.3	0.05	C	62.8	0.01	E	63.6	0.20	E	34.5	0.05	C
WB LT	75.0	0.39	E	78.4	0.54	E	36.9	0.23	D	75.0	0.39	E	79.2	0.55	E	39.6	0.25	D	75.0	0.39	E	79.2	0.55	E	41.1	0.26	D
WB TH/RT	64.1	0.10	E	62.5	0.03	E	31.8	0.03	C	64.1	0.10	E	61.6	0.03	E	33.1	0.03	C	63.6	0.09	E	61.6	0.03	E	34.4	0.03	C
SB LT	82.9	0.69	F	89.0	0.78	F	44.6	0.59	D	84.8	0.76	F	89.0	0.78	F	46.2	0.63	D	84.8	0.76	F	89.0	0.78	F	47.7	0.63	D
SB TH	10.6	0.56	B	20.1	0.79	C	14.4	0.76	B	10.9	0.57	B	21.1	0.80	C	15.4	0.79	B	11.6	0.60	B	23.8	0.85	C	16.8	0.83	B
SB RT	6.0	0.03	A	8.5	0.07	A	7.2	0.05	A	6.0	0.03	A	9.0	0.08	A	7.2	0.06	A	6.1	0.03	A	9.0	0.09	A	7.1	0.06	A
Overall	14.0	-	B	20.8	-	C	14.1	-	B	14.3	-	B	21.7	-	C	14.9	-	B	14.6	-	B	23.1	-	C	15.7	-	B
7: Honoapiilani Highway & Kaanapali Parkway/Halelo Street																											
NB LT	46.2	0.79	D	108.4	0.90	F	66.5	0.83	E	46.2	0.77	D	99.6	0.86	F	61.3	0.75	E	50.2	0.80	D	129.3	0.92	F	78.6	0.85	E
NB TH/RT	15.7	0.66	B	21.7	0.65	C	16.1	0.55	B	16.2	0.68	B	24.9	0.72	C	15.6	0.63	B	16.2	0.67	B	22.7	0.69	C	17.6	0.61	B
EB LT/TH	51.0	0.49	D	111.1	0.79	F	64.5	0.61	E	50.2	0.49	D	97.1	0.68	F	59.6	0.67	E	55.0	0.54	E	134.9	0.90	F	80.1	0.74	F
EB RT	32.1	0.08	C	74.3	0.63	E	44.3	0.44	D	32.4	0.08	C	70.6	0.52	E	44.4	0.35	D	34.6	0.08	C	86.3	0.70	F	53.1	0.45	D
WB LT/TH/RT	51.5	0.19	D	116.3	0.25	F	77.5	0.40	E	50.7	0.18	D	108.9	0.24	F	67.5	0.36	E	55.8	0.19	E	132.7	0.40	F	91.9	0.44	F
SB LT	53.2	0.60	D	139.3	0.76	F	76.4	0.58	E	52.3	0.61	D	130.2	0.76	F	66.4	0.57	E	57.6	0.63	E	129.4	0.77	F	90.2	0.64	F
SB TH	24.0	0.77	C	54.5	0.93	D	31.7	0.81	C	23.1	0.77	C	46.7	0.91	D	23.5	0.79	C	25.0	0.78	C	54.4	0.93	D	35.9	0.84	D
SB RT	10.3	0.10	B	11.3	0.16	B	9.2	0.18	A	9.7	0.09	A	8.3	0.12	A	6.6	0.14	A	10.3	0.10	B	10.3	0.16	B	9.4	0.20	A
Overall	25.5	-	C	56.2	-	E	34.5	-	C	25.0	-	C	49.6	-	D	27.8	-	C	26.9	-	C	61.1	-	E	39.5	-	D
8: Honoapiilani Highway & Leialii Parkway																											
NB LT	75.4	0.45	E	72.5	0.62	E	71.7	0.44	E	75.5	0.45	E	73.7	0.50	E	71.8	0.44	E	75.2	0.45	E	73.0	0.50	E	70.9	0.44	E
NB TH/RT	9.3	0.73	A	2.8	0.82	A	3.5	0.68	A	9.1	0.72	A	2.7	0.80	A	3.6	0.68	A	9.5	0.74	A	3.3	0.86	A	4.2	0.75	A
EB LT/TH/RT	58.6	0.06	E	57.0	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	50.3	0.05	D	58.6	0.01	E	61.0	0.05	E	50.3	0.05	D	58.6	0.01	E	61.0	0.05	E	50.3	0.05	D
SB LT	68.8	0.52	E	66.2	0.78	E	76.2	0.79	E	68.8	0.52	E	74.5	0.80	E	78.6	0.80	E	69.9	0.60	E	74.5	0.80	E	78.6	0.80	E
SB TH/RT	5.6	0.54	A	19.1	0.91	B	12.8	0.78	B	5.7	0.55	A	15.1	0.86	B	11.7	0.75	B	5.8	0.56	A	22.7	0.93	C	14.8	0.82	B
Overall	9.4	-	A	13.9	-	B	12.2	-	B	9.4	-	A	12.1	-	B	11.8	-	B	9.7	-	A	16.0	-	B	13.3	-	B
9: Honoapiilani Highway & Front Street/Flemming Road																											
NB LT	88.0	0.73	F	93.8	0.74	F	85.3	0.84	F	88.7	0.73	F	98.9	0.75	F	85.4	0.84	F	89.1	0.73	F	95.6	0.75	F	82.8	0.84	F
NB TH/RT	8.0	0.70	A	2.5	0.77	A	7.5	0.58	A	7.9	0.69	A	2.7	0.76	A	8.0	0.57	A	8.3	0.71	A	3.4	0.83	A	8.9	0.64	A
EB LT/TH/RT	52.6	0.48	D	59.5	0.72	E	57.7	0.66	E	52.6	0.48	D	65.4	0.75	E	57.6	0.68	E	53.1	0.50	D	65.6	0.76	E	57.6	0.68	E
WB LT/TH/RT	54.3	0.61	D	49.7	0.24	D	52.3	0.32	D	54.3	0.61	D	52.0	0.23	D	50.8	0.30	D	54.4	0.61	D	51.6	0.22	D	50.8	0.30	D
SB LT	87.5	0.81	F	79.4	0.74	E	84.1	0.82	F	87.4	0.81	F	90.8	0.75	F	85.6	0.82	F	87.1	0.81	F	82.7	0.75	F	81.8	0.82	F
SB TH	5.2	0.51	A	13.8	0.87	B	8.8	0.72	A	5.2	0.52	A	13.9	0.83	B	9.1	0.70	A	5.2	0.52	A	16.7	0.91	B	10.3	0.77	B
SB RT	3.2	0.12	A	5.6	0.24	A	4.3	0.18	A	3.2	0.13	A	6.3	0.25	A	4.8	0.19	A	3.2	0.13	A	6.4	0.25	A	4.8	0.20	A
Overall	10.1	-	B	11.2	-	B	11.4	-	B	10.0	-	B	11.9	-	B	12.1	-	B	10.2	-	B	13.3	-	B	12.7	-	B
10: Honoapiilani Highway & Kapunakea Street**																											
NB LT	74.0	0.79	E	72.5	0.79	E	71.1	0.78	E	73.7	0.79	E	80.3	0.82	F	69.7	0.79	E	73.9	0.79	E	74.8	0.82	E	68.5	0.78	E
NB TH/RT	1.4	0.69	A	1.2	0.76	A	12.2	0.66	B	1.3	0.68	A	1.1	0.76	A	3.6	0.66	A	1.4	0.69	A	0.7	0.80	A	13.1	0.72	B
EB LT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61.5	0.66	E	71.3	0.76	E	57.0	0.72	E
EB LT/TH	64.2	0.72	E	70.5	0.80	E	59.7	0.74	E	64.5	0.72	E	71.2	0.79	E	58.0	0.75	E	-	-	-	-	-	-	-	-	-
EB TH/RT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49.9	0.12	D	50.6	0.16	D	42.9	0.08	D
EB RT	48.3	0.01	D	45.1	0.02	D	42.6	0.04	D	47.9	0.01	D	46.7	0.03	D	41.2	0.04	D	-	-	-	-	-	-	-	-	-
WB LT	55.1	0.51	E	48.5	0.31	D	45.3	0.26	D	54.6	0.50	D	50.1	0.29	D	43.7	0.25	D	60.5	0.63	E	57.3	0.41	E	47.4	0.32	D
WB TH/RT	49.3	0.10	D	45.7	0.09	D	42.9	0.07	D	48.9	0.10	D	47.3	0.08	D	41.6	0.07	D	49.8	0.10	D	49.8	0.09	D	42.7	0.07	D
SB LT	101.0	0.83	F	72.5	0.80	E	82.3	0.84	F	101.0	0.83	F	74.0	0.79	E	83.8	0.84	F	100.7	0.83	F	72.2	0.79	E	80.8	0.84	F
SB TH/RT	10.9	0.59	B	13.4	0.96	B	5.4	0.87	A	11.2	0.60	B	6.5	0.92	A	10.2	0.85	B	10.8	0.60	B	8.9	0.97	A	11.9	0.91	B
Overall	11.9	-	B	14.3	-	B	13.8	-	B	12.1	-	B	10.9	-	B	13.0	-	B	11.8	-	B	12.0	-	B	17.3	-	B

Table 5.8: Base Year 2027, Future Year 2022 Scenario 3 and Future Year 2027 Scenario 4 Level of Service Summary Cont'd

	Base Year 2027									Future Year 2022 Scenario 3									Future Year 2027 Scenario 4								
	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
11: Honoapiilani Highway & Keawe Street																											
NB LT	79.8	0.79	E	69.3	0.78	E	64.0	0.79	E	79.8	0.79	E	79.7	0.78	E	64.0	0.79	E	79.8	0.79	E	74.4	0.78	E	64.0	0.79	E
NB TH	33.6	0.66	C	42.7	0.85	D	33.9	0.68	C	36.2	0.68	D	49.5	0.86	D	34.4	0.63	C	34.2	0.67	C	51.7	0.91	D	38.1	0.76	D
NB RT	23.8	0.08	C	27.6	0.21	C	25.7	0.20	C	25.8	0.08	C	33.2	0.23	C	27.6	0.21	C	24.0	0.08	C	30.7	0.23	C	27.4	0.21	C
EB LT/TH	47.3	0.34	D	71.3	0.84	E	61.6	0.77	E	45.4	0.32	D	54.9	0.70	D	62.8	0.78	E	47.0	0.34	D	57.8	0.69	E	62.8	0.78	E
EB RT	43.5	0.01	D	44.2	0.02	D	44.4	0.04	D	41.9	0.01	D	41.3	0.03	D	43.5	0.04	D	43.2	0.01	D	44.6	0.02	D	43.4	0.04	D
WB LT	38.1	0.29	D	44.9	0.63	D	42.2	0.62	D	36.5	0.27	D	41.4	0.55	D	41.9	0.63	D	37.8	0.29	D	38.0	0.38	D	41.9	0.63	D
WB TH	35.3	0.14	D	35.2	0.21	D	34.6	0.25	C	33.8	0.14	C	34.1	0.19	C	33.8	0.24	C	35.0	0.14	D	35.6	0.20	D	33.7	0.24	C
WB RT	76.2	0.95	E	79.9	0.97	E	43.7	0.70	D	66.9	0.93	E	70.2	0.94	E	51.1	0.82	D	66.0	0.92	E	105.9	1.06	F*	52.0	0.83	D
SB LT	51.1	0.91	D	41.6	0.94	D	57.1	0.89	E	51.0	0.92	D	46.5	0.95	D	57.4	0.89	E	51.4	0.91	D	51.2	0.98	D	52.1	0.90	D
SB TH/RT	1.1	0.49	A	0.8	0.79	A	33.3	0.69	C	1.2	0.49	A	1.3	0.75	A	32.2	0.63	C	1.3	0.50	A	1.2	0.83	A	24.0	0.72	C
Overall	33.3	-	C	33.2	-	C	40.4	-	D	33.1	-	C	35.3	-	D	41.8	-	D	31.9	-	C	39.7	-	D	38.6	-	D
12: RIRO Access & Honoapiilani Highway																											
WB RT										15.0	0.08	C	20.0	0.17	C	15.6	0.18	C	15.4	0.07	C	21.9	0.19	C	17.1	0.20	C
Overall										0.3	-	-	0.5	-	-	0.6	-	-	0.2	-	-	0.5	-	-	0.6	-	-
13: Honoapiilani Highway & Road J																											
WB LT										29.4	0.27	D	49.7	0.43	E	47.8	0.50	E	30.8	0.26	D	56.3	0.45	F	59.2	0.57	F
WB RT										15.5	0.07	C	24.9	0.17	C	18.1	0.15	C	15.8	0.08	C	26.1	0.16	D	19.5	0.17	C
SB LT										9.7	0.01	A	12.3	0.07	B	10.8	0.08	B	9.7	0.01	A	12.6	0.08	B	11.2	0.09	B
Overall										1.1	-	-	1.8	-	-	2.4	-	-	1.0	-	-	1.7	-	-	2.7	-	-
14: Road A & Akahele Street																											
NB LT/TH/RT										11.7	0.09	B	16.4	0.26	C	29.1	0.52	D	17.4	0.42	C	19.8	0.41	C	29.1	0.52	D
EB LT										7.6	0.02	A	7.5	0.05	A	7.7	0.09	A	7.6	0.02	A	7.5	0.05	A	7.7	0.09	A
WB LT										7.4	0.00	A	7.7	0.00	A	7.9	0.00	A	7.8	0.01	A	7.8	0.00	A	7.9	0.00	A
SB LT/TH/RT										9.7	0.08	A	10.9	0.15	B	10.3	0.17	B	9.9	0.08	A	11.1	0.16	B	10.3	0.17	B
Overall										3.8	-	-	5.6	-	-	8.3	-	-	6.4	-	-	6.9	-	-	8.3	-	-
15: Road C & Akahele Street																											
NB LT/TH/RT										10.1	0.12	B	10.6	0.09	B	10.6	0.10	B	10.1	0.13	B	10.6	0.1	B	10.6	0.10	B
EB LT/TH/RT										7.3	0.01	A	7.3	0.03	A	7.3	0.03	A	7.3	0.01	A	7.3	0.03	A	7.3	0.03	A
WB LT/TH/RT										7.3	0.00	A	7.4	0.00	A	7.4	0.00	A	7.3	0.00	A	7.4	0.00	A	7.4	0.00	A
SB LT/TH/RT										8.8	0.06	A	9.1	0.05	A	9.0	0.05	A	8.8	0.06	A	9.1	0.05	A	9.0	0.05	A
Overall										6.9	-	-	5.0	-	-	5.2	-	-	6.9	-	-	5.0	-	-	5.2	-	-
16: Road G & Road J																											
NB LT/TH/RT										8.1	0.01	A	10.2	0.05	B	10.9	0.07	B	8.1	0.01	A	10.2	0.05	B	10.9	0.07	B
EB LT/TH/RT										7.4	0.01	A	7.4	0.02	A	7.4	0.04	A	7.4	0.01	A	7.4	0.02	A	7.4	0.04	A
WB LT/TH/RT										7.3	0.00	A	7.4	0.00	A	7.4	0.00	A	7.3	0.00	A	7.4	0.00	A	7.4	0.00	A
SB LT/TH/RT										9.2	0.03	A	9.8	0.08	A	9.2	0.07	A	9.2	0.03	A	9.7	0.08	A	9.2	0.07	A
Overall										2.9	-	-	4.6	-	-	4.6	-	-	3.0	-	-	4.7	-	-	4.6	-	-
17: Road F & Road J																											
NB LT/RT										9.0	0.05	A	9.2	0.04	A	9.0	0.04	A	9.0	0.05	A	9.2	0.04	A	9.0	0.04	A
WB LT/TH										7.3	0.00	A	7.4	0.00	A	7.4	0.00	A	7.3	0.00	A	7.4	0.00	A	7.4	0.00	A
Overall										4.0	-	-	2.1	-	-	2.6	-	-	4.2	-	-	2.1	-	-	2.6	-	-

* Denotes overcapacity condition, v/c ≥ 1.

** For Future Year 2027 Scenario 4, the analysis for Honoapiilani Highway/Kapunakea Street includes restriping the eastbound approach to provide an exclusive left-turn lane and a shared through/right-turn lane.

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 898 multi-family (MF) residential units, 2 single-family residential lots (for future residential development), an elementary school, a 10-acre park and three (3) retail centers, totaling 62,000 square feet (SF). 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 six (6) phases, but for purposes of this TIAR, will be analyzed as four (4) scenarios.

The Project's 2 single-family residential lots at the north end of the site may be redeveloped in the future to provide additional residential units. However, this is not being considered at this time.

Scenario 1 – Develop Phase 1 with a build-out of early 2022 that includes the following:

- 240 MF residential units north of Akahele Street, with direct access provided by two (2) new Project roadways, Road A and Road C, bisecting Akahele Street.

Scenario 2 - Develop Phase 2 and Retail component with a build-out of early 2022 that includes the following:

- 30 MF residential units north of Akahele Street with direct access provided by Road A and a new right-in, right-out (RIRO) access via Honoapiilani Highway.
- 190 MF residential units south of Akahele Street with direct access provided by Road A and Road C.
- Retail Area A consisting of 29,000 square feet (SF) of space located on the northeast corner of the Honoapiilani Highway/Akahele Street intersection.
- Retail Area B consisting of 24,000 SF of space located adjacent to Retail Area A on the southeast corner of the Honoapiilani Highway/Akahele Street intersection.
    - Access to Retail Area A and B will be provided by Road A. Retail Area A will also be accessible by the new RIRO access.
    - Based on the developer forecast absorption for the Retail Area A and B components, approximately 15,000 SF of retail space will be occupied by Year 2022, with subsequent occupancy occurring at a pace of 5,000 SF of retail space every 2 years thereafter. Therefore, full build-out and occupancy of Retail Areas A and B will likely occur well beyond Year 2022, but was assumed to be fully built out by Year 2022 for this TIAR.

Scenario 3 – Develop Phases 3-5 with a build-out of late 2022 that include the following:

- 70 MF residential units (Phase 3) north of Akahele Street, with access provided by Road C.
- 150 MF residential units (Phase 3) south of Akahele Street, with access provided by Road C.

- 218 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.
- 2 single-family residential lots north of Akahele Street, with access provided by Road A and Road C.
- Retail Area C consisting of 9,000 SF of space located on the northeast corner of the new Honoapiilani Highway/Road J intersection, with access provided by Road J.
- 10-acre park with two (2) practice fields 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 2027 was assumed for the TIAR.

- 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.

6.2 Base Year 2022

It is anticipated that by Year 2022, traffic will have increased over existing conditions due to various anticipated new developments in the Lahaina region shown in Figure 4.1 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 Year 2022, it is assumed that various planned roadway improvements will be implemented even without the Project and include the Lahaina Bypass Road Phase 1B-2, an additional southbound left-turn lane for the Honoapiilani Highway/Keawe Street/Lahaina Cannery Mall intersection, resulting in dual southbound left-turn lanes 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 over-capacity 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

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.

6.4 Base Year 2027

It is anticipated that by Year 2027, traffic will have increased over Base Year 2022 due to various new developments in the region shown in Figure 4.1 and a 0.5% ambient growth rate, adjusted and applied from HDOT's MRTDM. By Base Year 2027 without the Project, traffic at the study intersections along Honoapiilani Highway is estimated to generally increase by an additional 5-10% for most parts along the corridor during the AM, PM and WE peak hours of traffic over Base Year 2022 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. The majority of intersection movements operating at LOS E/F conditions during Base Year 2022 will continue to operate similarly in Base Year 2027.

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.

6.5 Future Year 2022 Scenario 1

By completion of Scenario 1 in Future Year 2022, the Project is projected to generate a total of 81(100)[106] 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.

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.

6.6 Future Year 2022 Scenario 2

By completion of Scenario 2 in Future Year 2022, the Project is projected to generate a total of 169(326)[538] 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 proposed RIRO driveway.

By Future Year 2022 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 5-15%, while local traffic at the study intersections (those providing direct access to the Project) along Honoapiilani Highway is estimated to increase overall by approximately 10-40% 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 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(D)[C] for the Future Year 2022 Scenario 2. Various left-turn movements will operate at LOS E conditions during all peak hours, due to the long cycle length and increased turning movements at the intersection. 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 5.5.

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.

With the addition of the Project's bisecting Road A and Road C, forecast traffic indicates that throughput traffic along Akahele Street will continue to operate with low through volumes (under 25 vehicles) at the Road C intersection and slightly higher through volumes, between 35-65

vehicles, at the Road A intersection during all peak hours. The 35-65 vehicles traveling through the Road A intersection will still yield lengthy gaps in throughput traffic along Akahele Street, eliminating long queues for left-turn movements turning off from Akahele Street onto Road A. However, exclusive left-turn storage lanes should be considered to remove left-turns from the through lanes and increase left-turning vehicle sight distance with the proposed median on Akahele Street.

6.7 Future Year 2022 Scenario 3

By completion of Scenario 3 in Future Year 2022, the Project is projected to generate an additional 176(265)[340] 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 the Honoapiilani Highway/Road J intersection.

By Future Year 2022 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 10-55% 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 Future Year 2022 Scenario 2, with no major changes to LOS or capacity with the exception of the Honoapiilani Highway/Akahele Street intersection. 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 2022 Scenario 3. The majority of left-turn movements will operate at LOS E conditions during all peak hours, however, all movements will continue to operate under capacity. All left-turn storage lane lengths recommended in for Future Year 2022 Scenario 2 account for traffic generated for the Future Year 2022 Scenario 3. Although conditions at the Honoapiilani Highway/Akahele Street intersection are expected to worsen, 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 is also recommended, to facilitate westbound vehicles making the left-turn movement from the Full Access 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, various storage lengths are recommended at the intersection.

With the proposed configuration, the westbound left-turn out of the Project is expected to operate at LOS F during the PM peak hour of traffic and LOS E during the WE peak hour of traffic. However, gaps in through traffic along Honoapiilani Highway and the median refuge lane will help facilitate westbound left-turn movements.

6.8 Future Year 2027 Scenario 4

As discussed earlier, a future elementary school will 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 2027 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 2027, the Project is projected to generate an additional 312(101)[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 Base Year 2027 without the Project and Future Year 2022 with Scenarios 1, 2 and 3. All intersection movements forecast to operate at LOS E/F for Future Year 2022 Scenario 3 conditions will continue to operate at LOS E/F conditions during Future Year 2027 Scenario 4.

However, the majority of movements expected to experience an increase in delay are minor or left-turn movements that will operate at LOS E/F due to long through movement green times and cycle lengths. The southbound shared through/right-turn at Honoapiilani Highway/Kapunakea Street and the westbound right-turn at Honoapiilani Highway/Keawe Street are expected to operate at over-capacity conditions by Future Year 2027 Scenario 4.

The Lahaina Bypass Road Phase 1C is expected to alleviate some through traffic in the Lahaina area and reduce turning movement volumes at Honoapiilani Highway/Keawe Street by providing an additional connection between the bypass road and the highway. Because there is currently no set completion date for Phase 1C, the bypass extension is not included as a mitigative measure. However, the extension is expected to improve operations at both the Honoapiilani Highway/Kapunakea Street and Honoapiilani Highway/Keawe Street intersections when completed. Additional mitigation is proposed for Honoapiilani Highway/Kapunakea Street.

7. RECOMMENDATIONS

Full Base Year and Future Year 2022 and 2027 roadway improvements are listed in Appendix D and discussed in more detail below.

7.1 Planned Roadway Improvements

The following roadway improvements planned to be constructed by other entities by Year 2022.

Lahaina Bypass Road Phase 1B-2

- Phase 1B-2 will extend LBR from Hokiokio Place to its southern terminus with Honoapiilani Highway and is expected to be completed in January 2018.

Honoapiilani Highway/Keawe Street/Lahaina Cannery Mall

- An additional southbound left-turn lane is planned for the Honoapiilani Highway/Keawe Street/Lahaina Cannery Mall intersection, resulting in dual southbound left-turn lanes.
- 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.

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 Future Year 2022 Scenario 2 Mitigation

The following mitigations are proposed for Future Year 2022 Scenario 2.

[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 275 feet of storage space.

[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 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.

[14-15] Akahele Street intersection with Road A and Road C

- Consider providing exclusive left-turn storage lanes on Akahele Street at its intersections with Road A & Road C to remove left-turns from the through lanes along Akahele Street. with a minimum 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

7.4 Future Year 2027 Scenario 3 Mitigation

[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.
  - Construct a median refuge lane 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.

7.5 Future Year 2027 Scenario 4 Mitigation

[10] Honoapiilani Highway/Kapunakea Street

- Restripe the eastbound approach to provide an exclusive left-turn lane and a shared through/right-turn lane.

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, 9th Edition, 2012.
4. Transportation Research Board, Highway Capacity Manual, 2010.

A P P E N D I C E S

APPENDIX A

TRAFFIC COUNT DATA

AUSTIN TSUTSUMI & ASSOCIATES

501 Sumner Street, Suite 521
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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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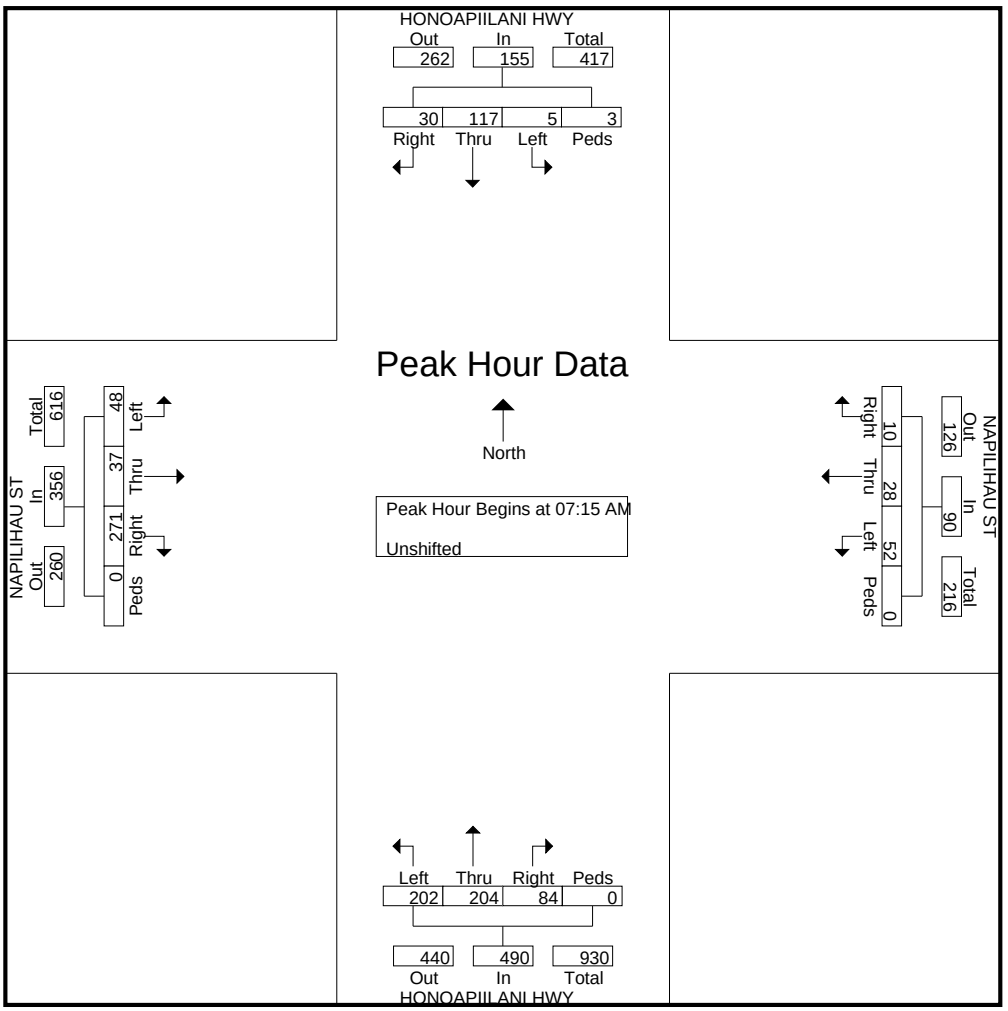
File Name : AM_Honoapiilani Hwy - Napilihau St
Site Code : 00000000
Start Date : 12/1/2016
Page No : 2

	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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File Name : AM_Honoapiilani Hwy - Hoohui Rd
Site Code : 00000000
Start Date : 12/1/2016
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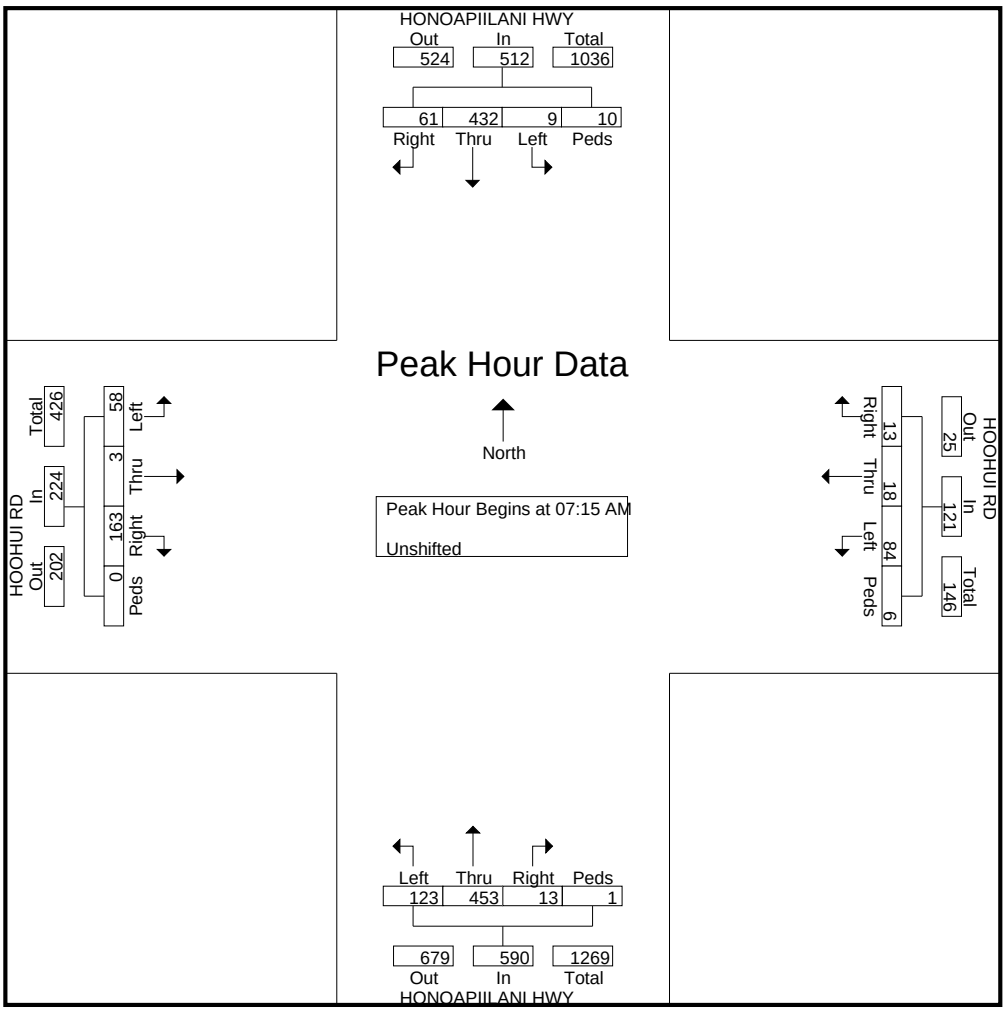
	HONOAPIILANI HWY Southbound					HOOHUI RD Westbound					HONOAPIILANI HWY Northbound					HOOHUI RD Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**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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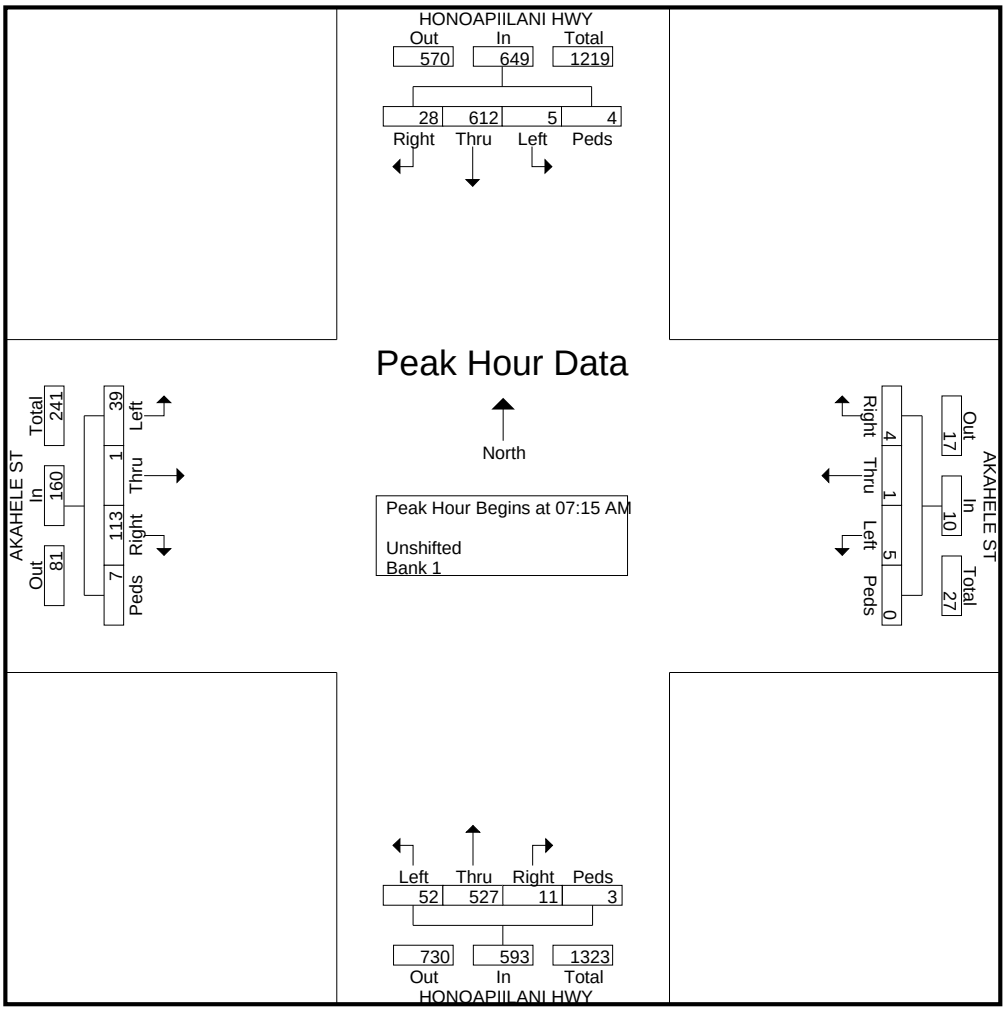
Site Code : 00000000
Start Date : 12/7/2016
Page No : 2

	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 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

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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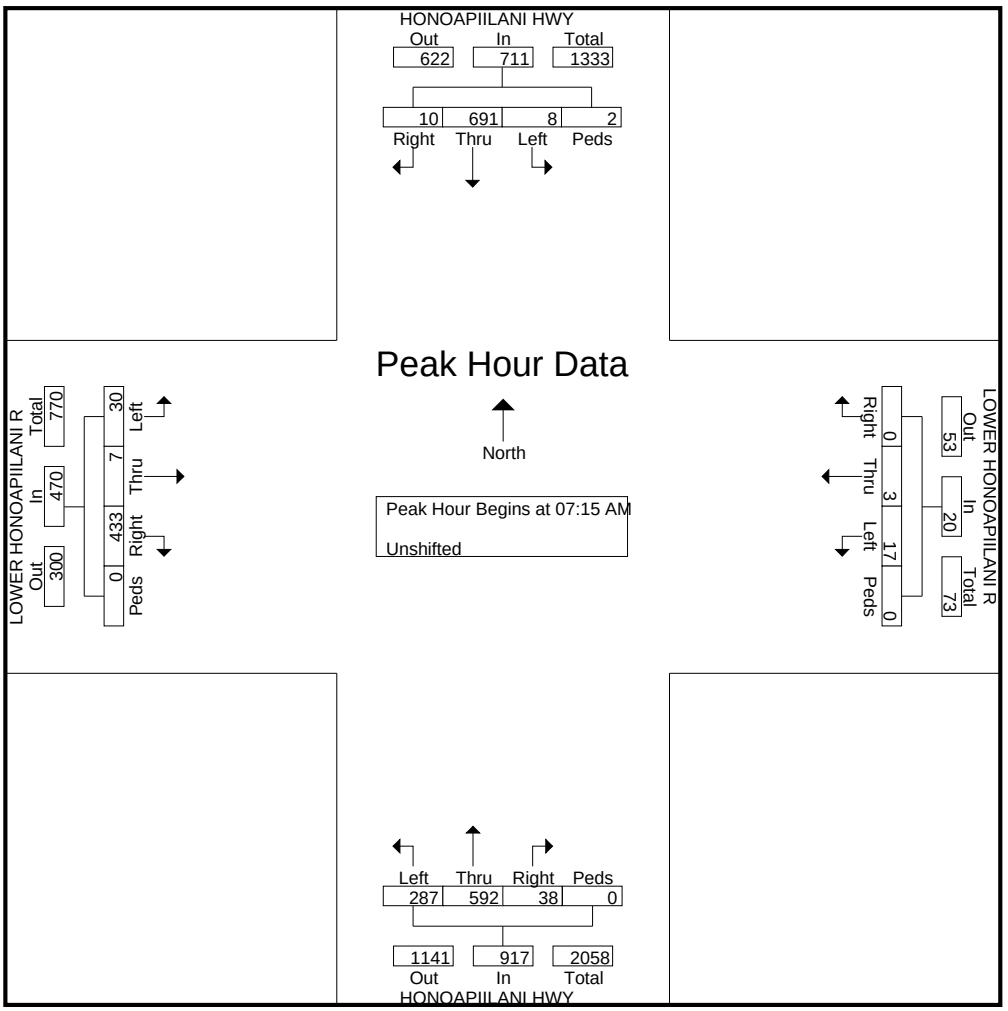
File Name : AM_Honoapiilani Hwy - Lower Honoapiilani Rd
Site Code : 00000000
Start Date : 12/7/2016
Page No : 2

	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
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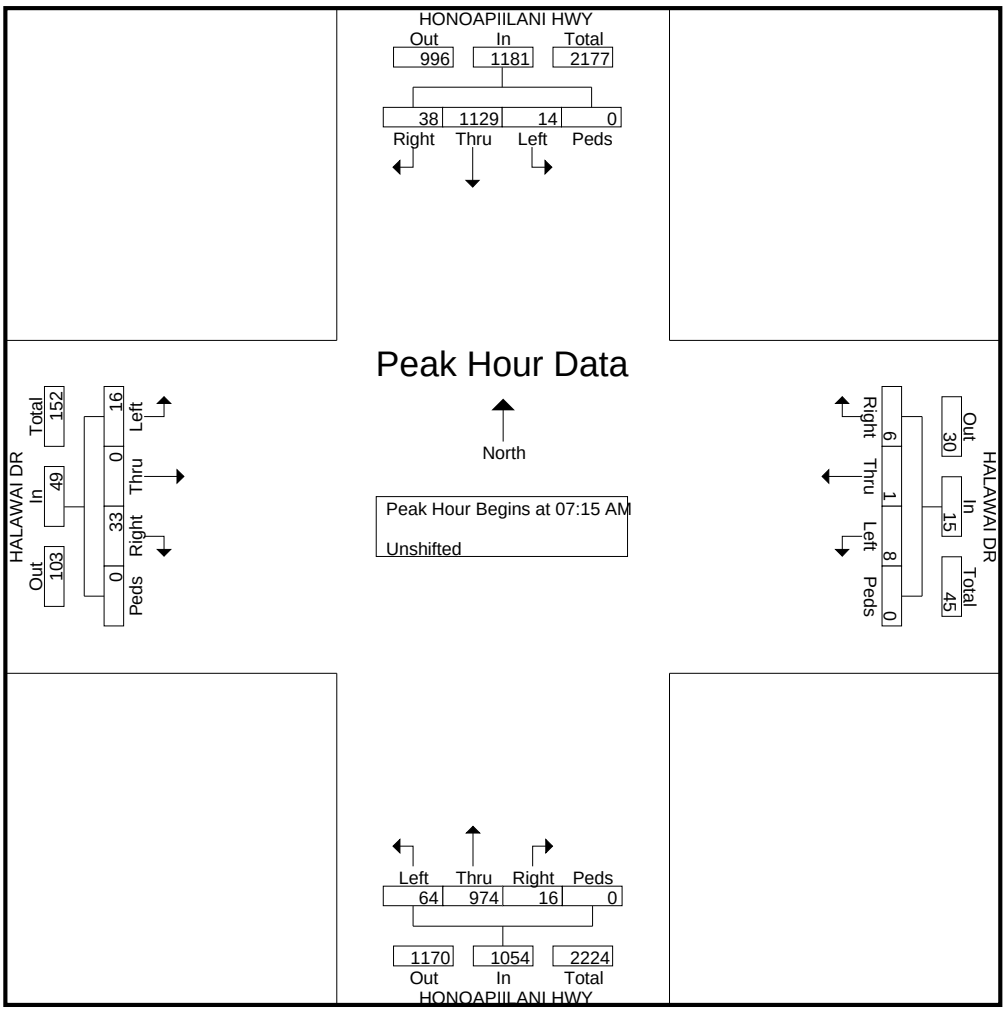
	HONOAPIILANI HWY Southbound					HALAWAI DR Westbound					HONOAPIILANI HWY Northbound					HALAWAI DR Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**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
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**
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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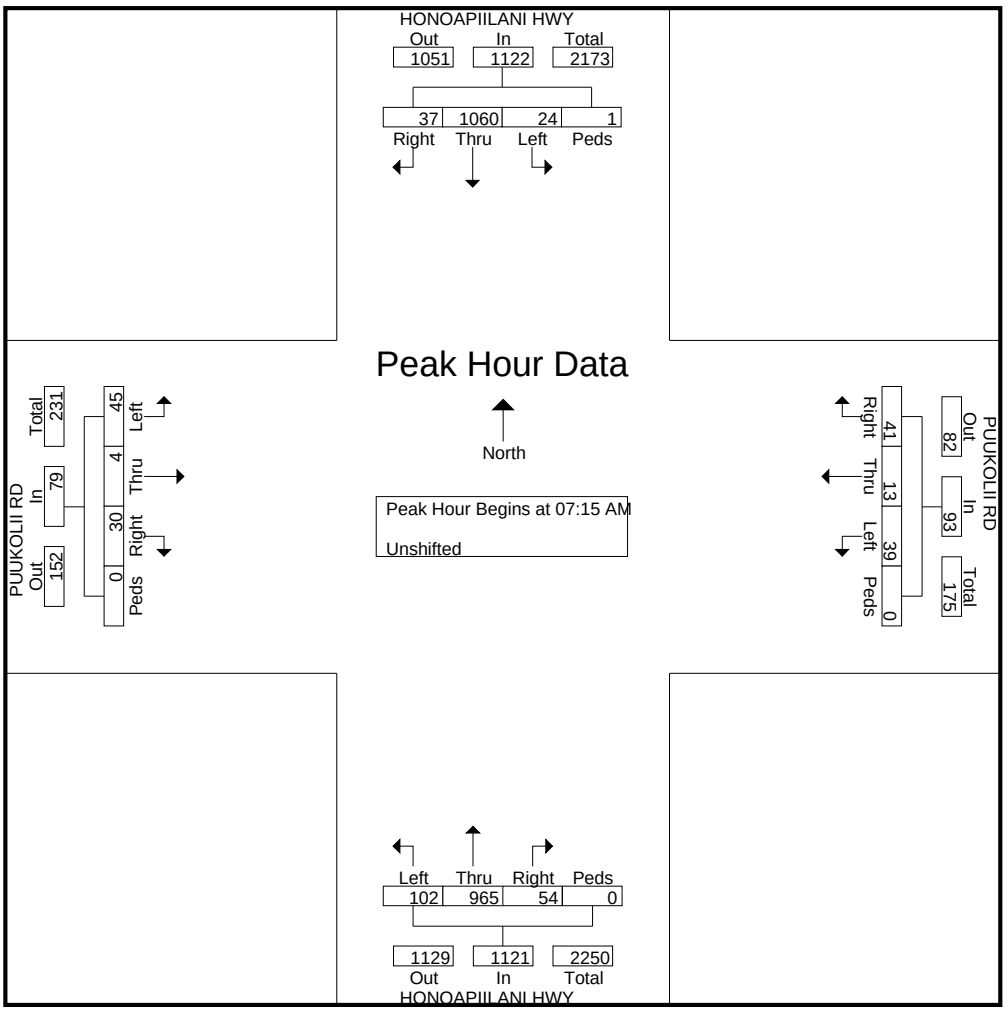
File Name : AM_Honoapiilani Hwy - Puukolii Rd
Site Code : 00000000
Start Date : 12/7/2016
Page No : 2

	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
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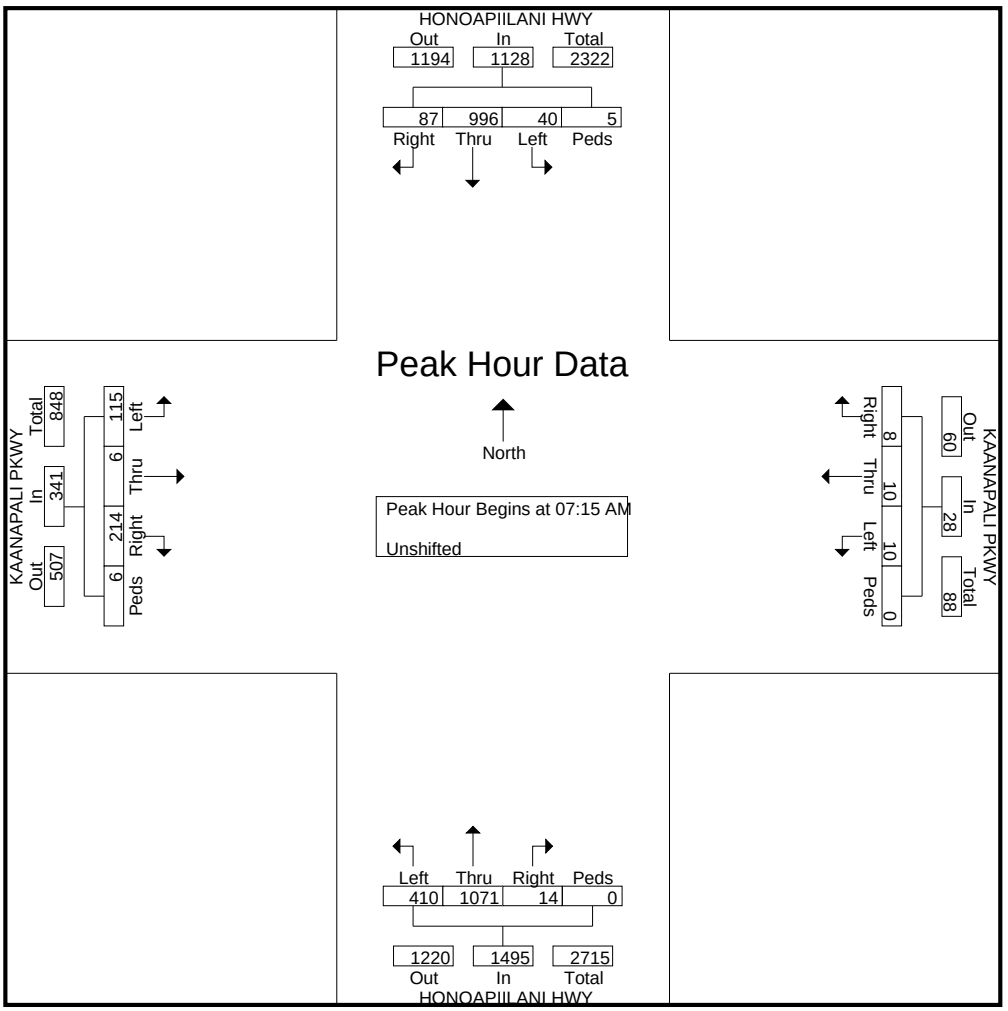
	HONOAPIILANI HWY Southbound					KAANAPALI PKWY Westbound					HONOAPIILANI HWY Northbound					KAANAPALI PKWY Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**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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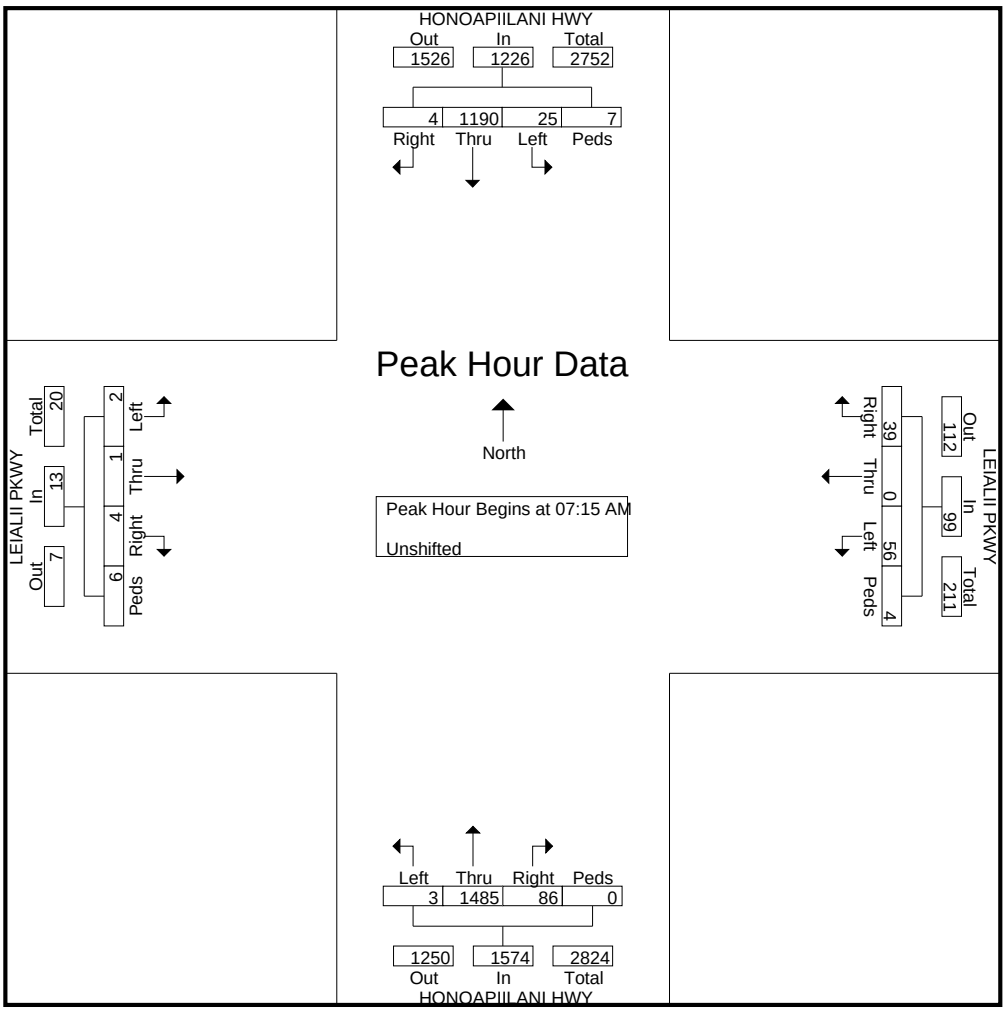
File Name : AM_Honoapiilani Hwy - Leialii Pkwy
Site Code : 00000000
Start Date : 12/7/2016
Page No : 2

	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
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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
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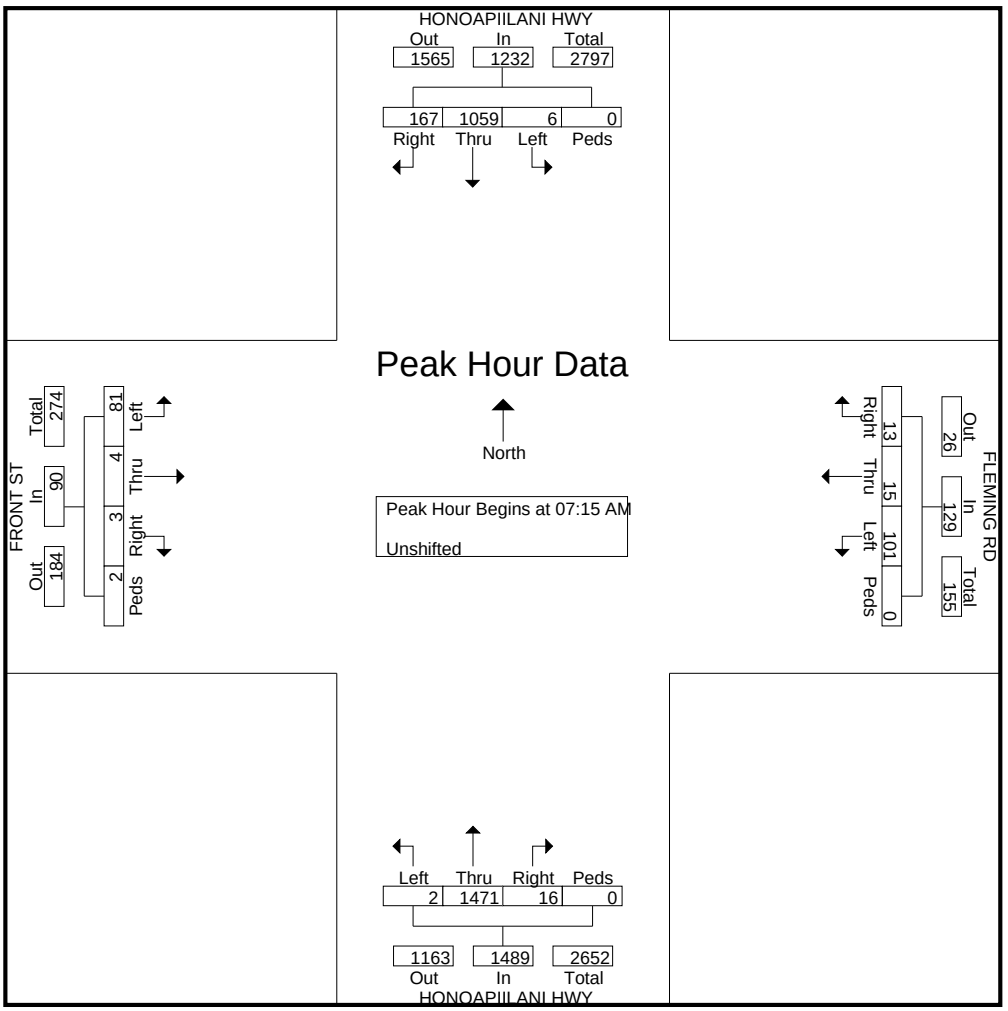
	HONOAPIILANI HWY Southbound					FLEMING RD Westbound					HONOAPIILANI HWY Northbound					FRONT ST Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**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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Site Code : 00000000
Start Date : 12/7/2016
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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
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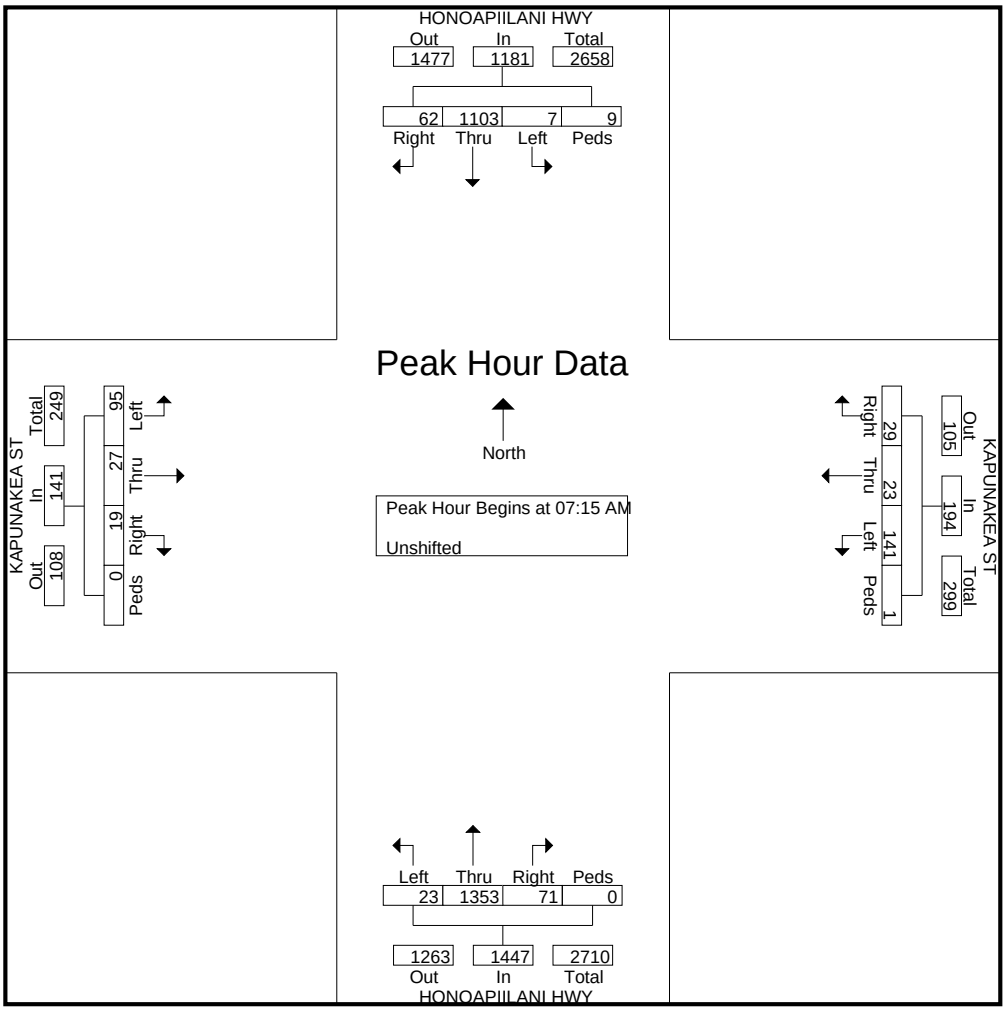
	KAPUNAKEA ST Eastbound					KAPUNAKEA ST Westbound					HONOAPIILANI HWY Northbound					HONOAPIILANI HWY Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM 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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Site Code : 00000000
Start Date : 12/7/2016
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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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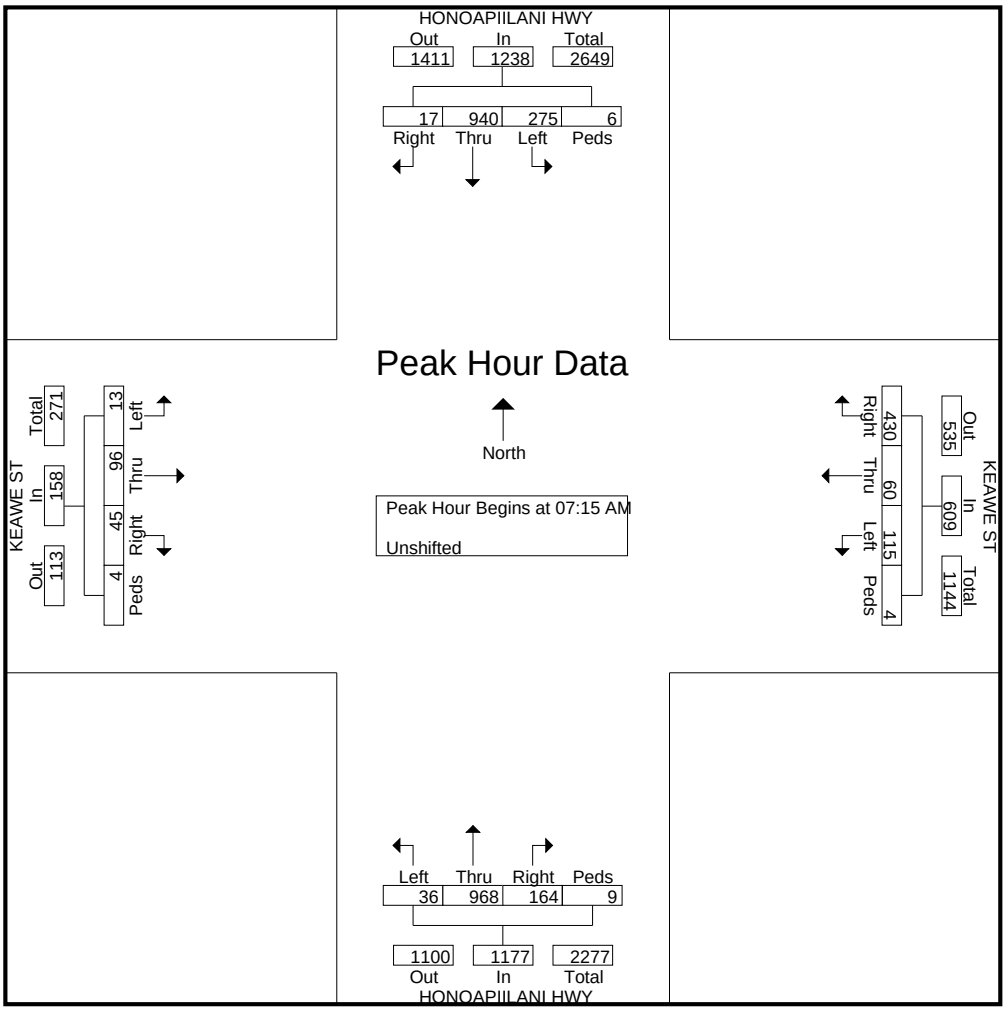
File Name : AM_Honoapiilani Hwy-Keawe St
Site Code : 00000000
Start Date : 12/7/2016
Page No : 2

	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
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**
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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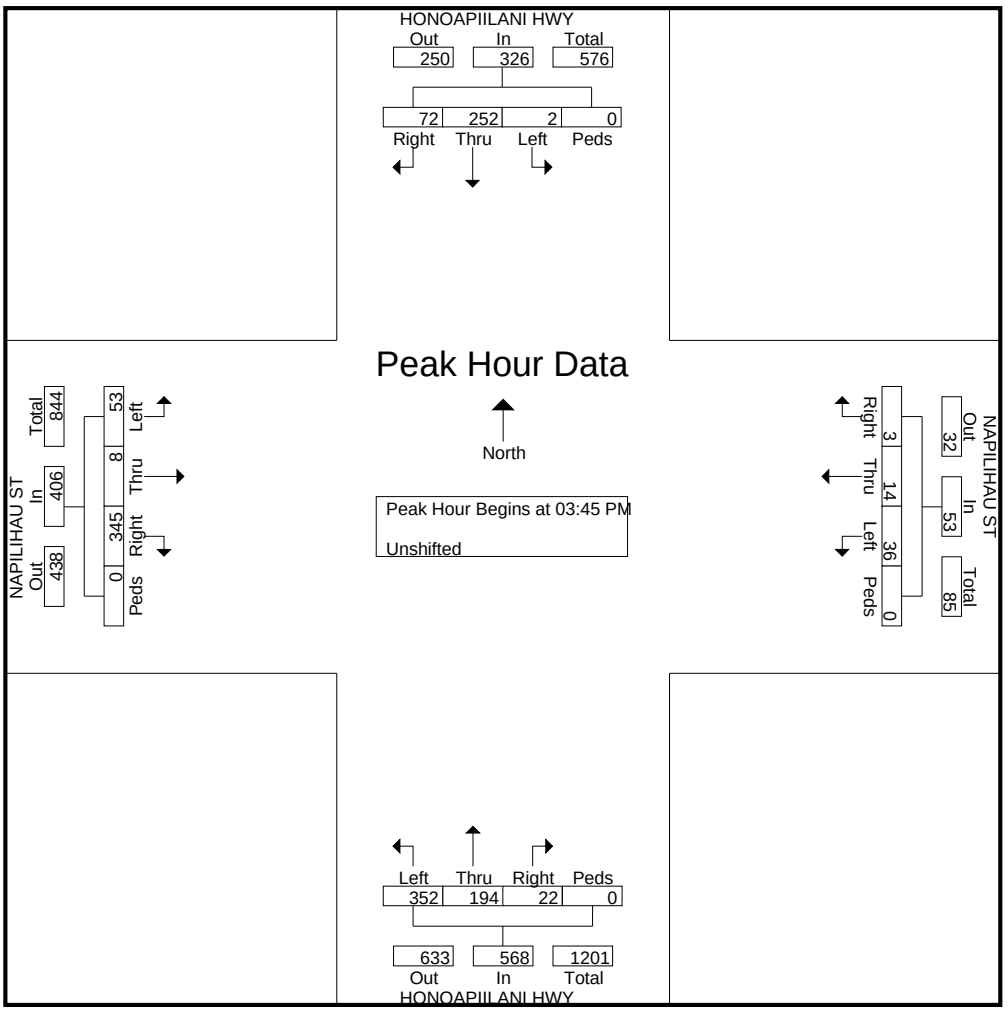
File Name : PM_Honoapiilani Hwy - Napilihau St
Site Code : 00000000
Start Date : 11/30/2016
Page No : 2

	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 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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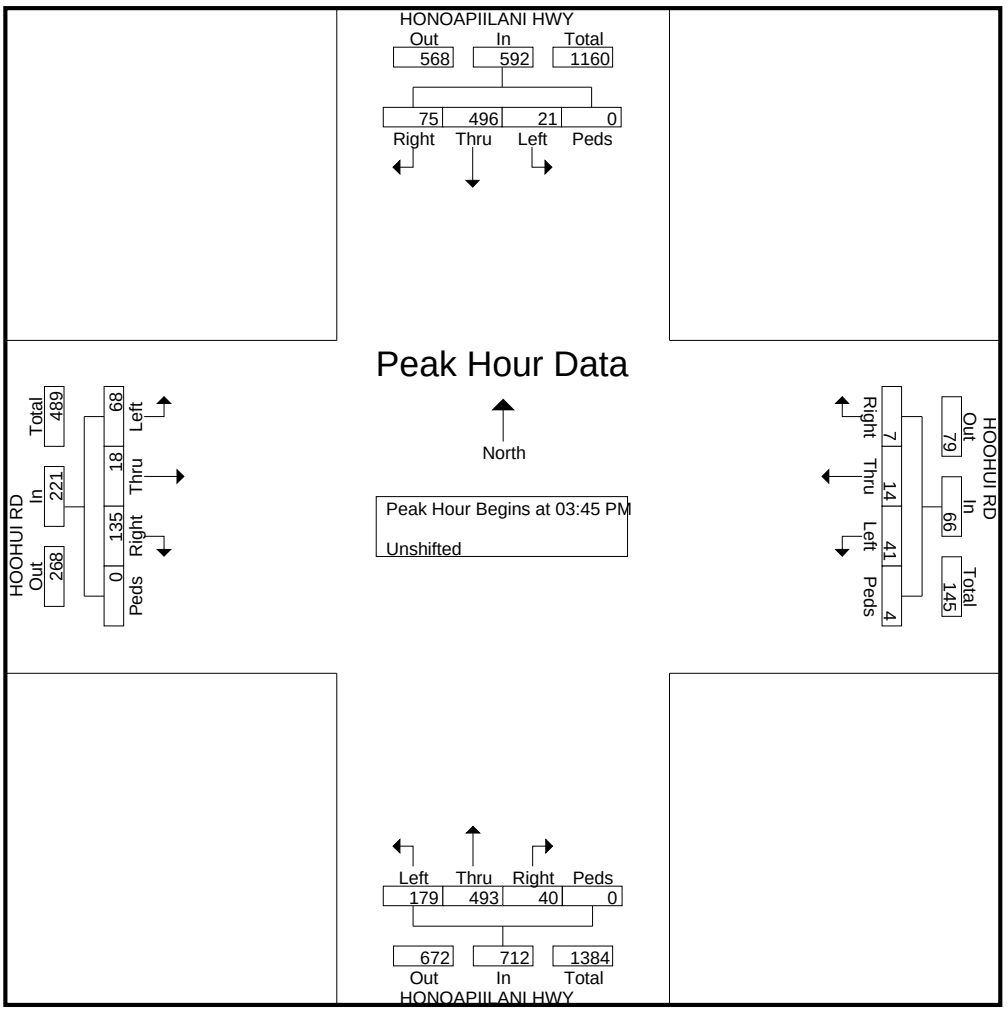
File Name : PM_Honoapiilani Hwy - Hoohui Rd
Site Code : 00000000
Start Date : 11/30/2016

	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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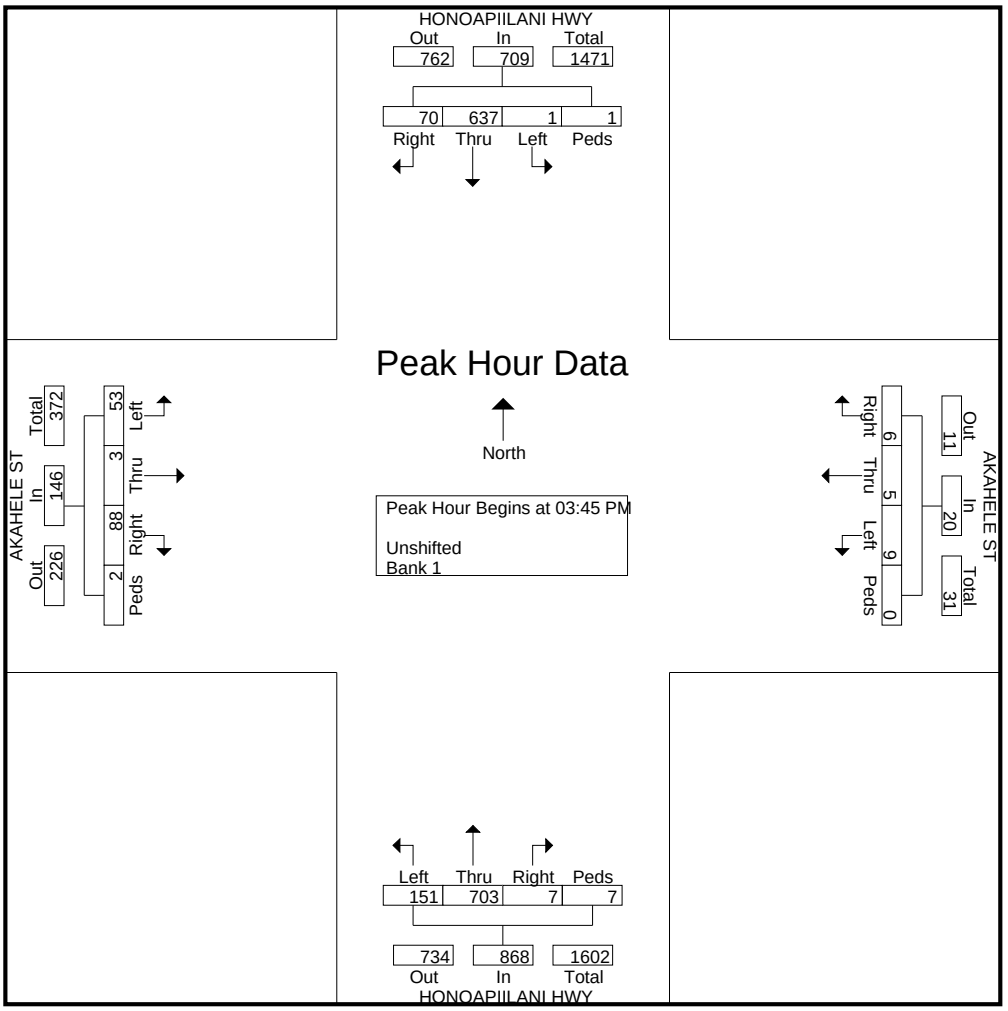
File Name : PM_Honoapiilani Hwy - Akahele St
Site Code : 00000000
Start Date : 12/6/2016
Page No : 2

	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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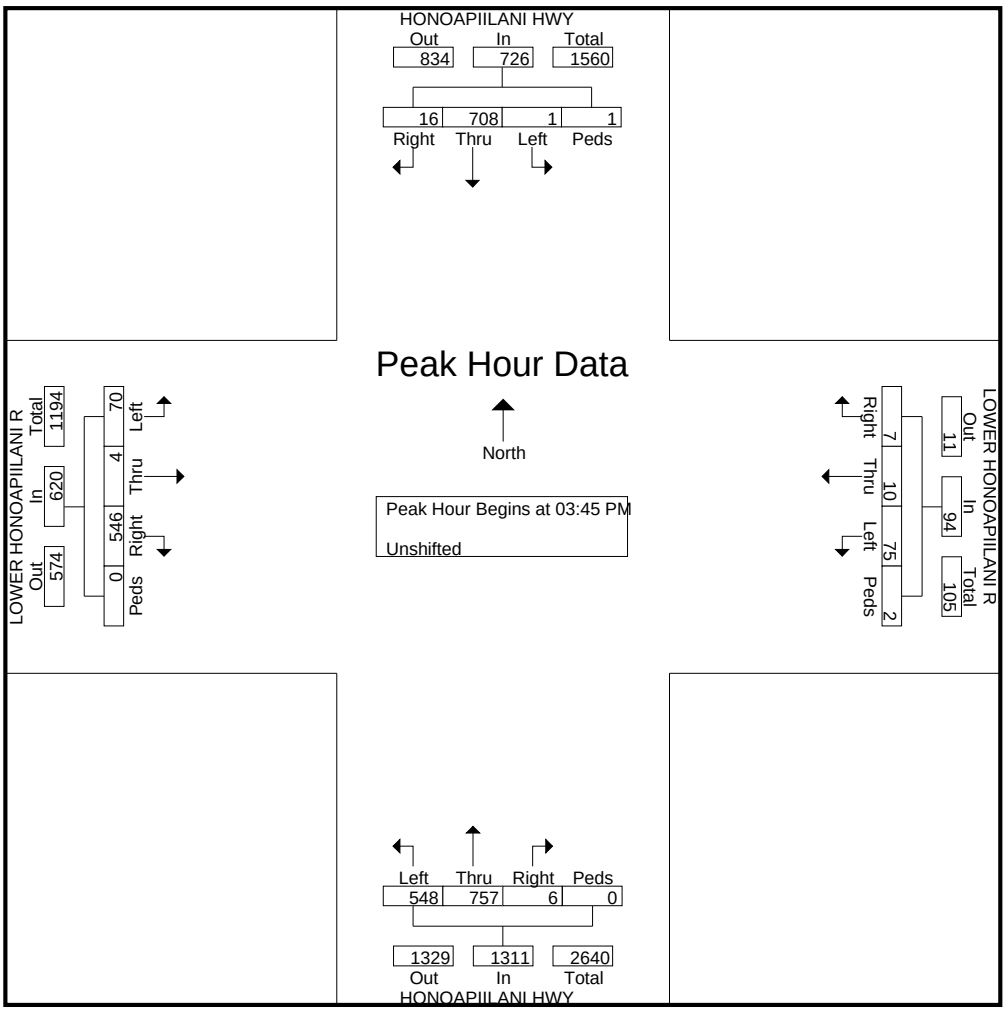
File Name : PM_Honoapiilani Hwy - Lower Honoapiilani Rd
Site Code : 00000000
Start Date : 12/6/2016
Page No : 2

	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
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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
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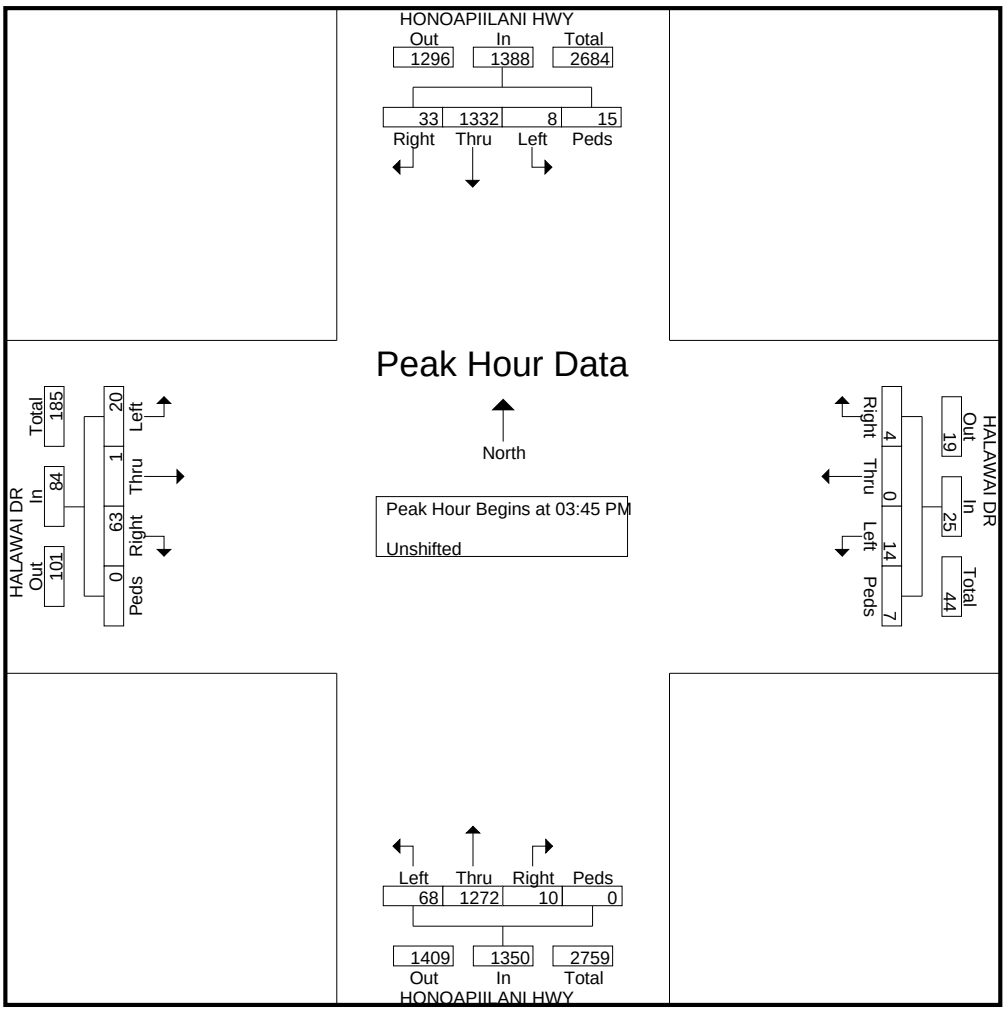
	HONOAPIILANI HWY Southbound					HALAWAI DR Westbound					HONOAPIILANI HWY Northbound					HALAWAI DR Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**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
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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**
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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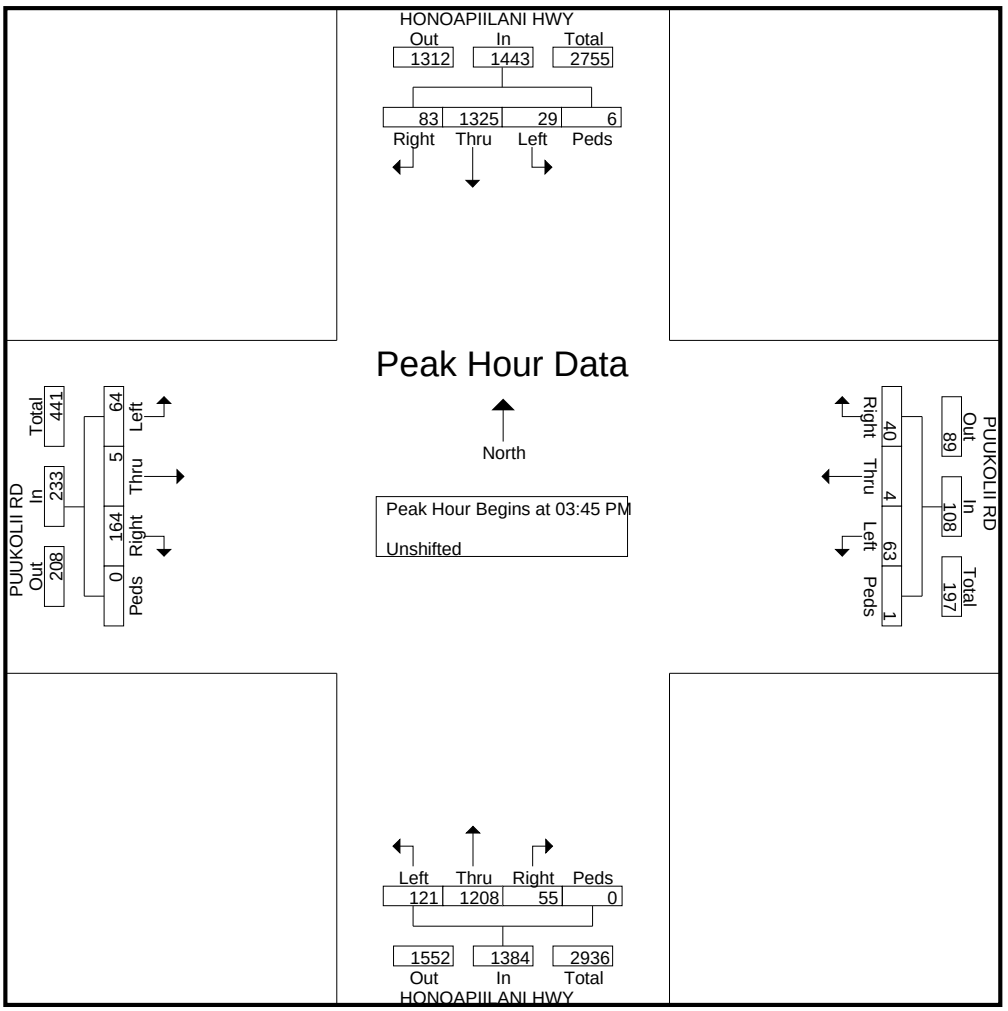
	HONOAPIILANI HWY Southbound					PUUKOLII RD Westbound					HONOAPIILANI HWY Northbound					PUUKOLII RD Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**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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	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
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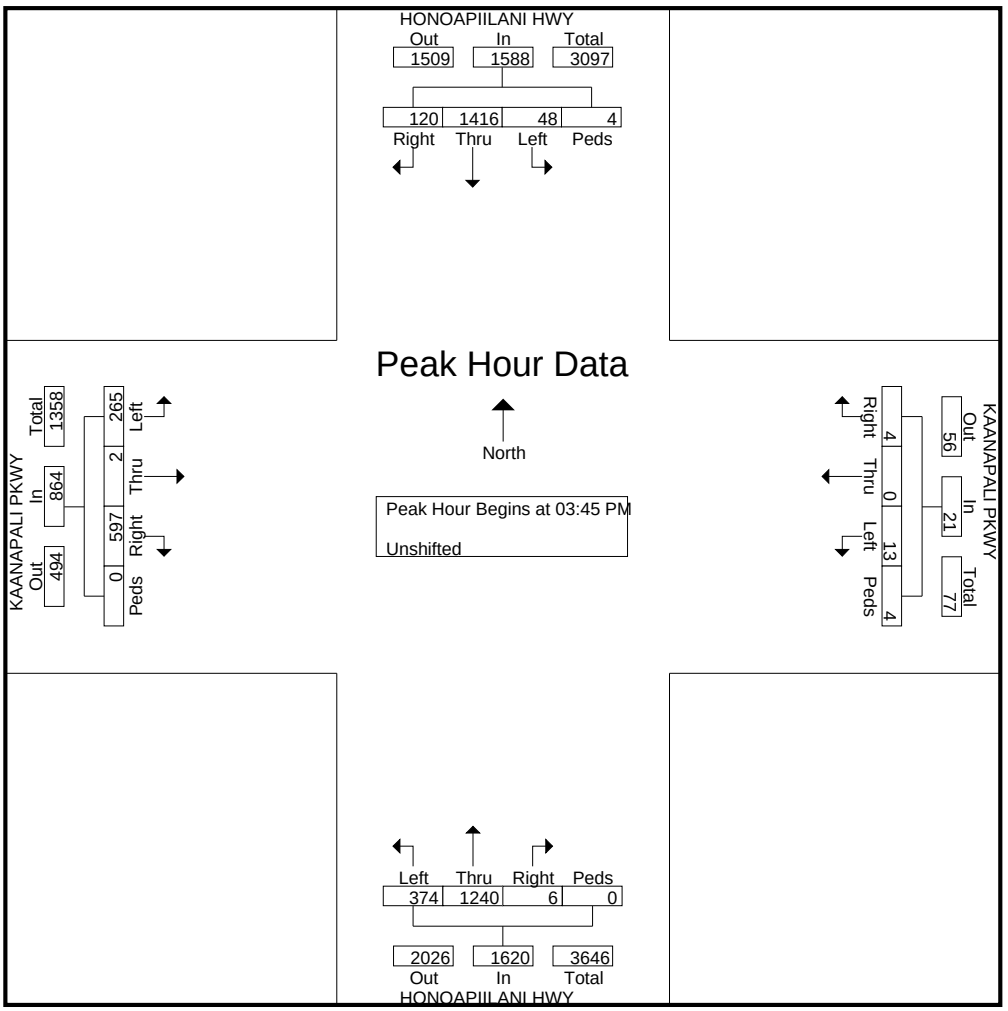
	HONOAPIILANI HWY Southbound					KAANAPALI PKWY Westbound					HONOAPIILANI HWY Northbound					KAANAPALI PKWY Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**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
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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**
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
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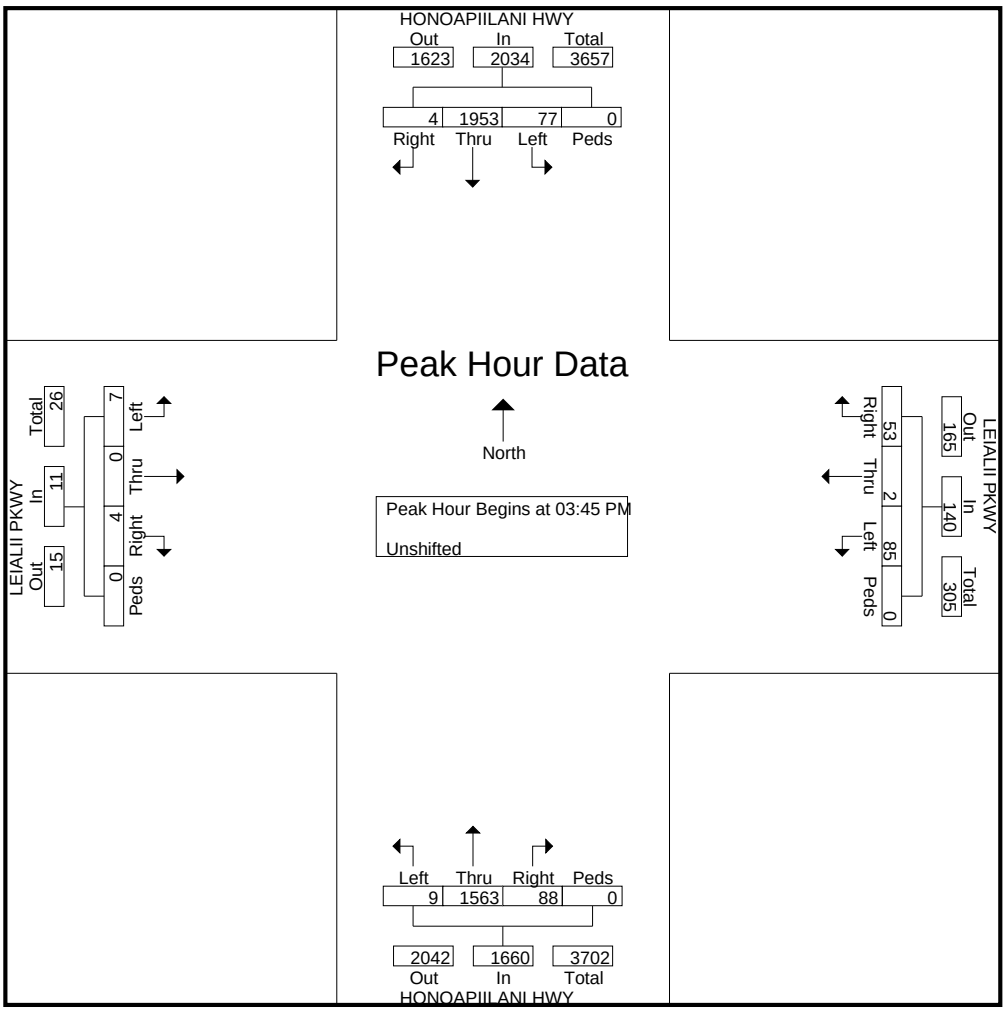
	HONOAPIILANI HWY Southbound					LEIALII PKWY Westbound					HONOAPIILANI HWY Northbound					LEIALII PKWY Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**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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Site Code : 00000000
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	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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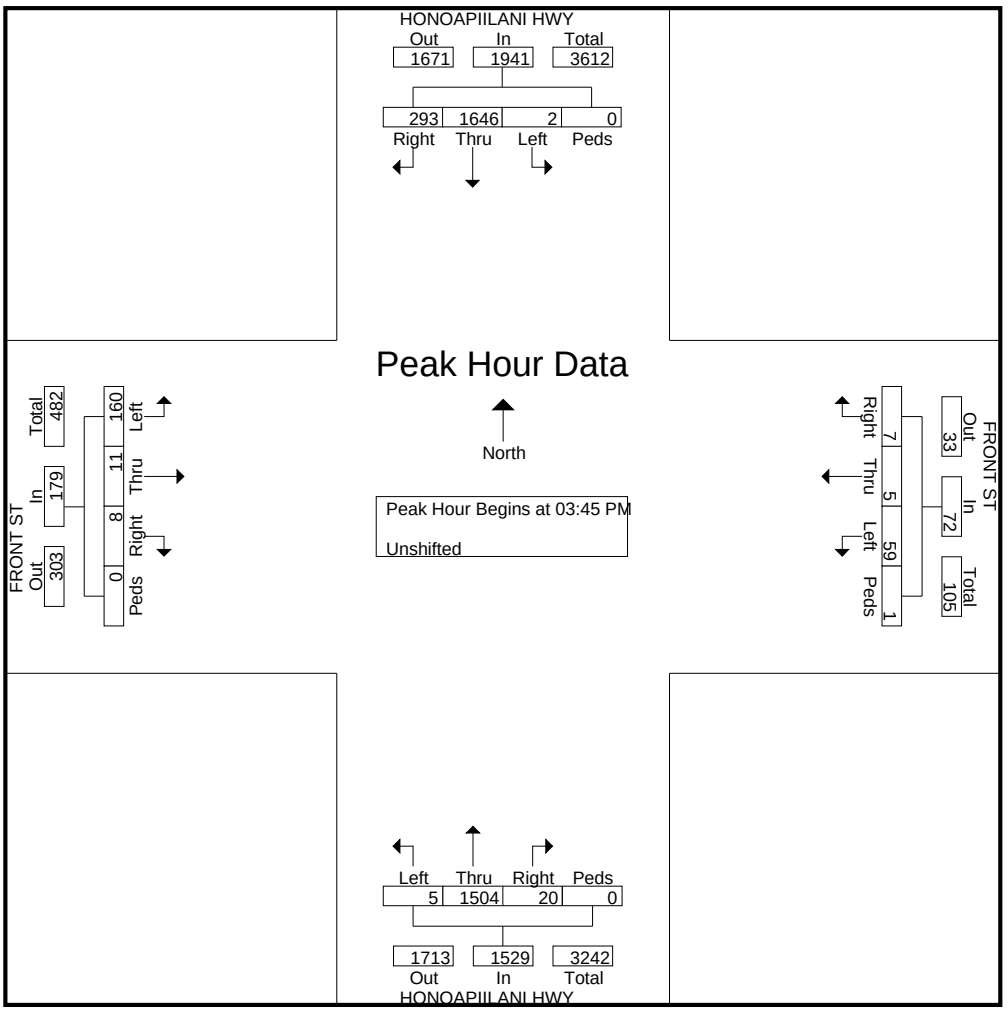
	HONOAPIILANI HWY Southbound					FRONT ST Westbound					HONOAPIILANI HWY Northbound					FRONT ST Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**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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Phone: (808) 533-3646 Fax: (808) 526-1267

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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Site Code : 00000000
Start Date : 12/6/2016
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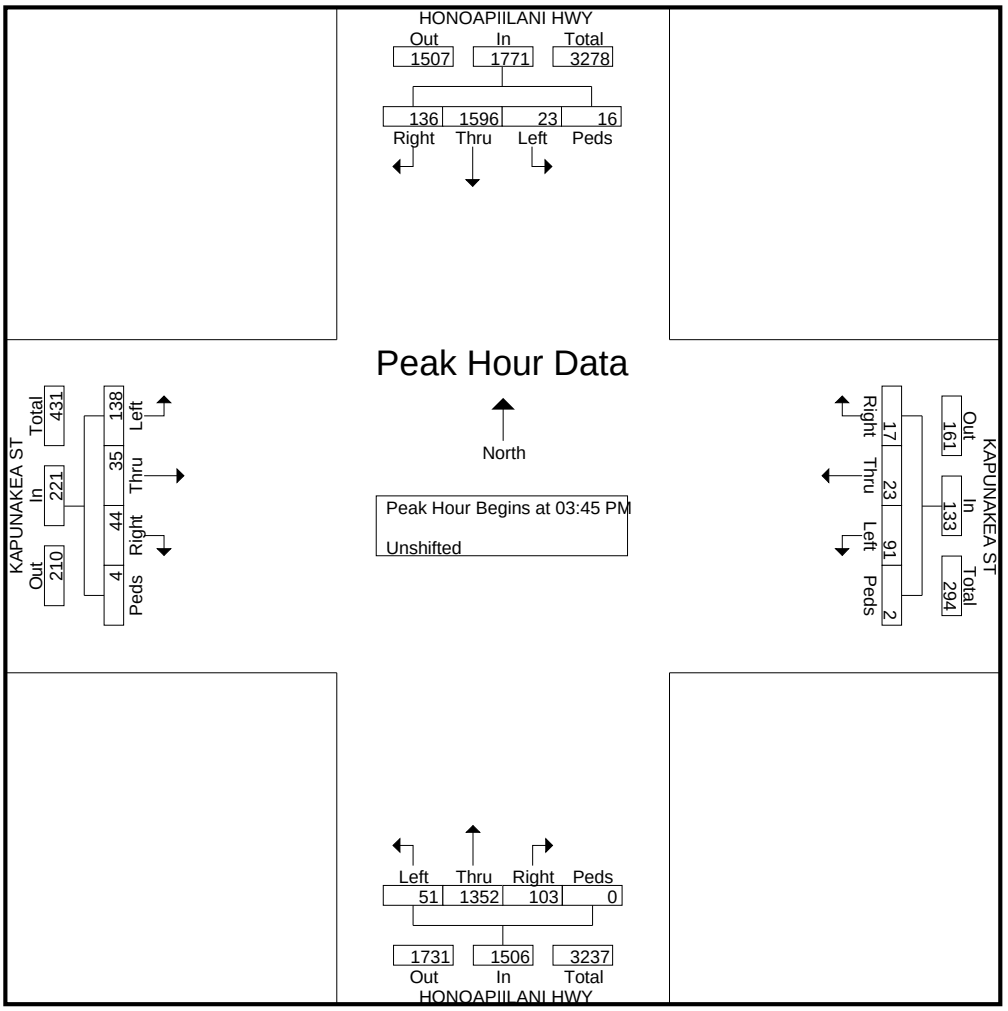
	KAPUNAKEA ST Eastbound					KAPUNAKEA ST Westbound					HONOAPIILANI HWY Northbound					HONOAPIILANI HWY Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM 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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Phone: (808) 533-3646 Fax: (808) 526-1267

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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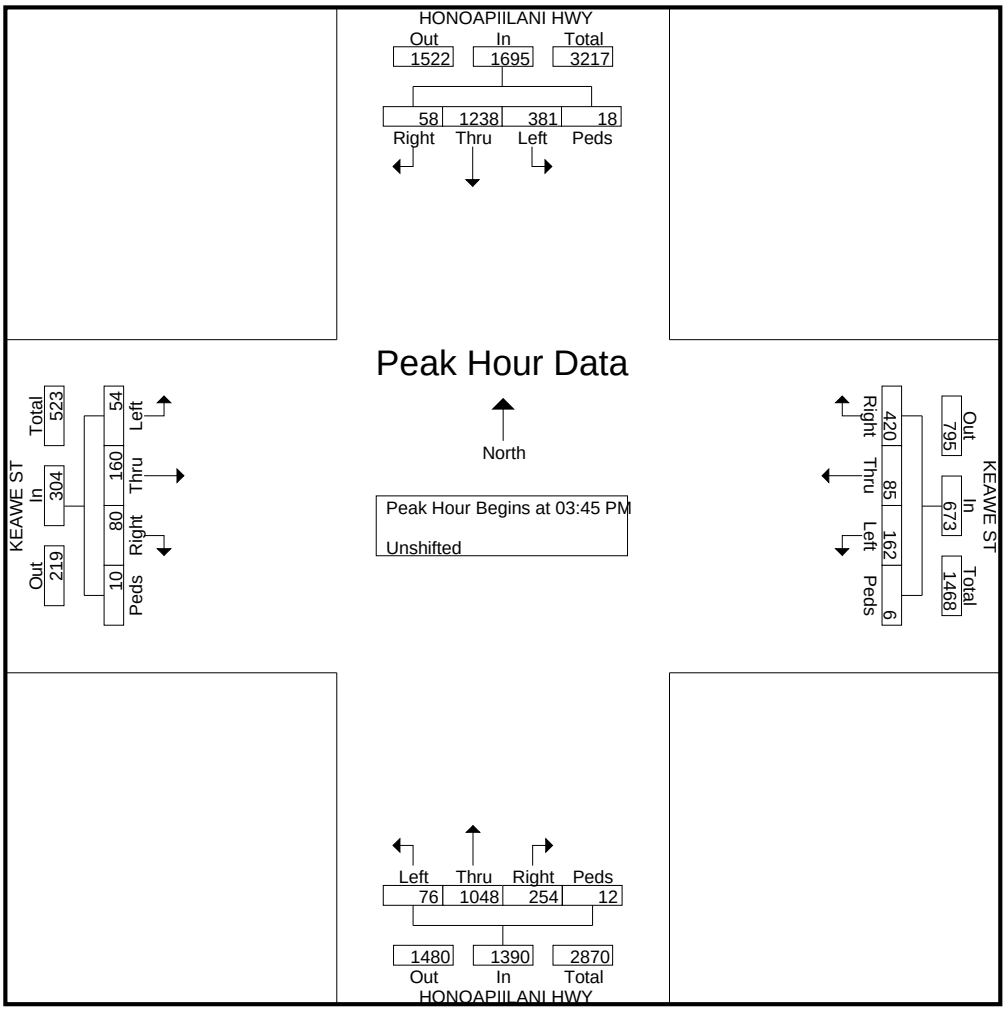
File Name : PM_Honoapiilani Hwy-Keawe St
Site Code : 00000000
Start Date : 12/6/2016
Page No : 2

	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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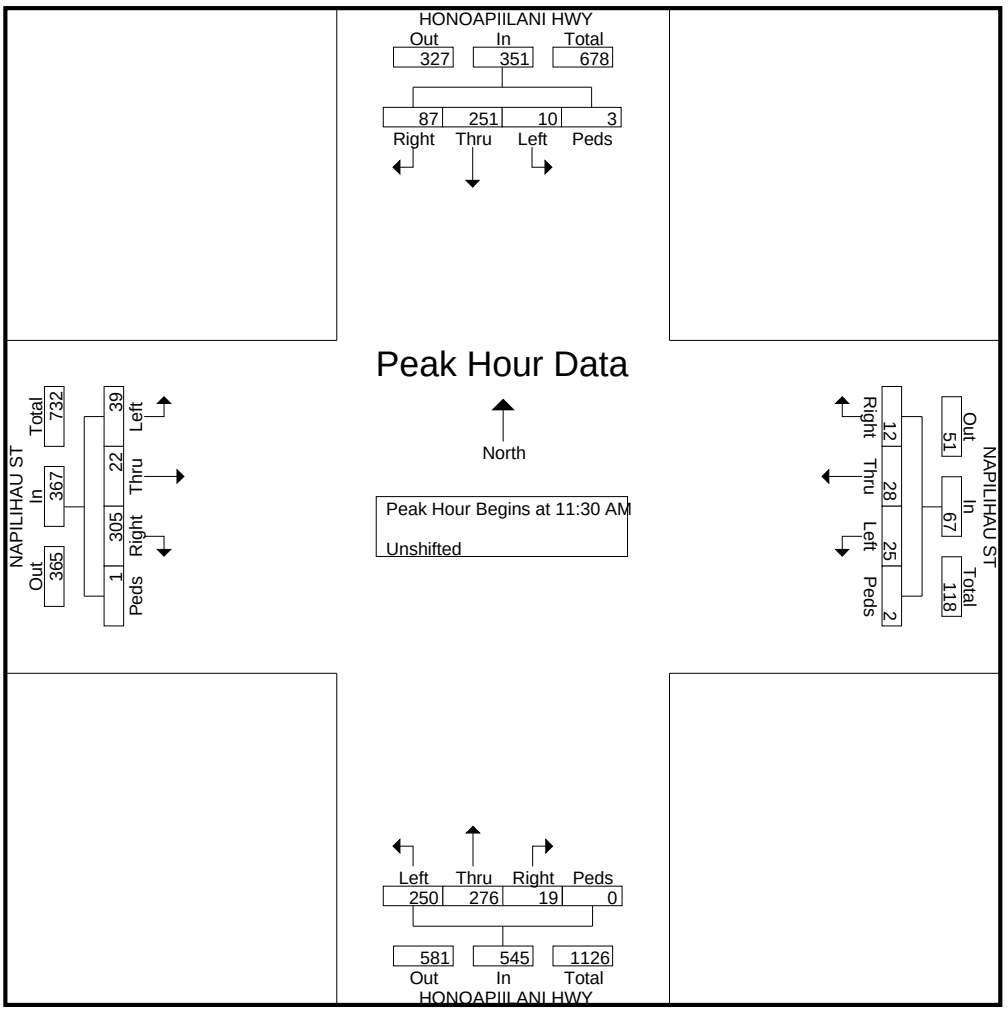
File Name : WE_Honoapiilani Hwy - Napilihau St
Site Code : 00000000
Start Date : 1/21/2017
Page No : 2

	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 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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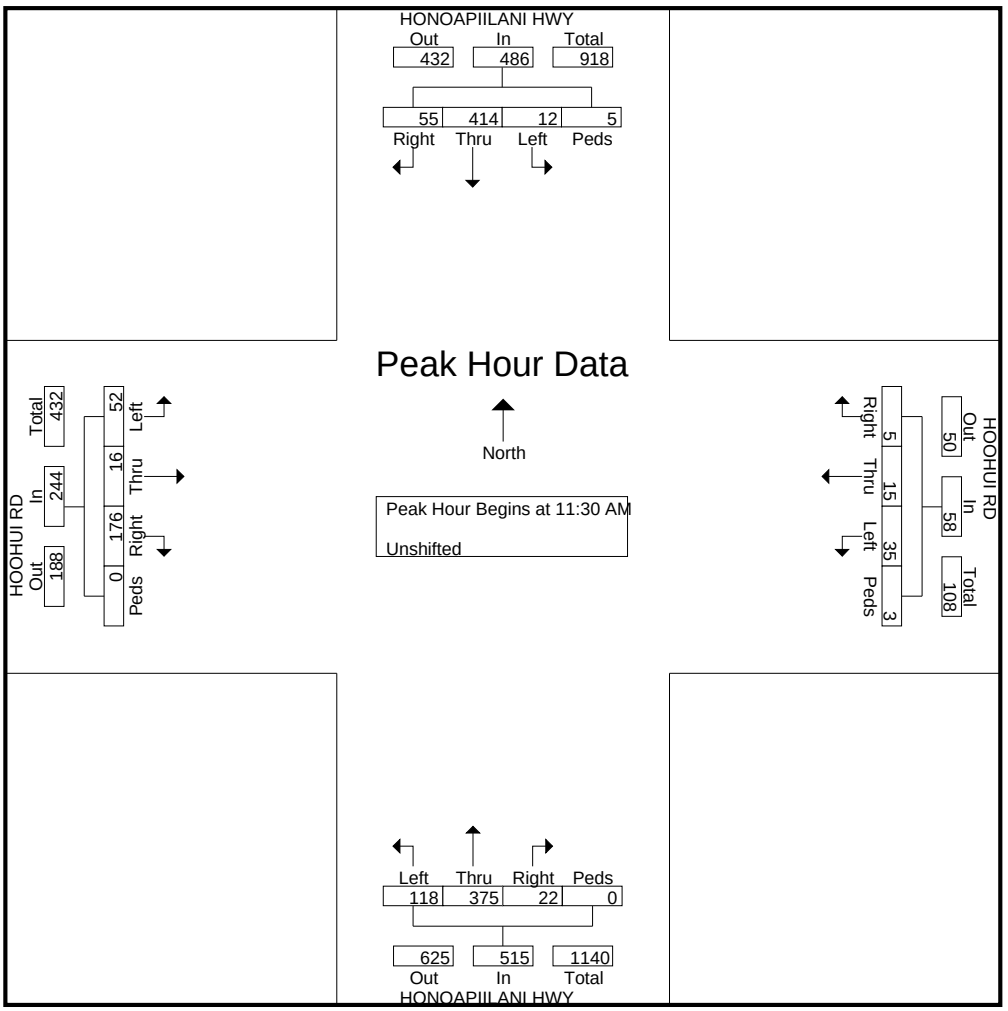
File Name : WE_Honoapiilani Hwy - Hoohui Rd
Site Code : 00000000
Start Date : 12/10/2016
Page No : 2

	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 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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Honolulu, HI 96817-5031
Phone: (808) 533-3646 Fax: (808) 526-1267

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
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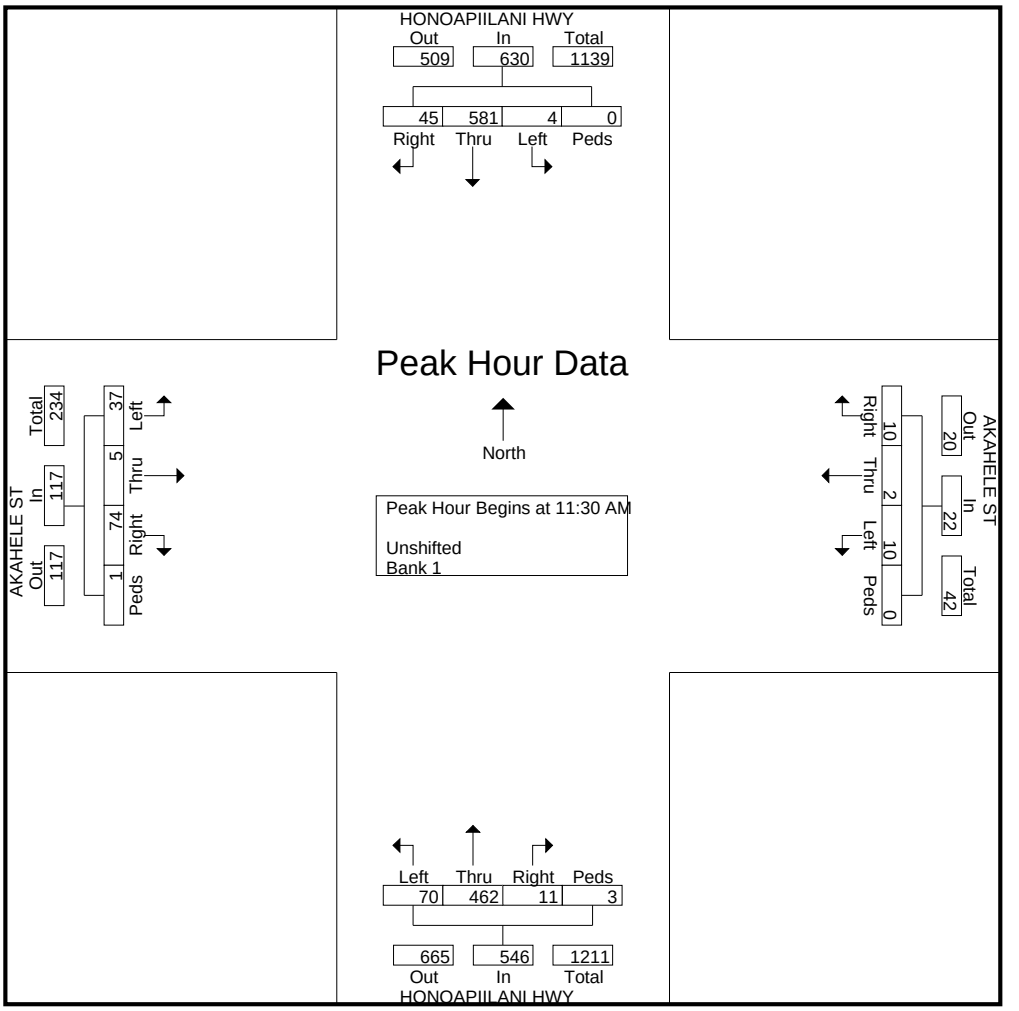
	HONOAPIILANI HWY Southbound					AKAHELE ST Westbound					HONOAPIILANI HWY Northbound					AKAHELE ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:30 AM to 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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501 Sumner Street, Suite 521
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Phone: (808) 533-3646 Fax: (808) 526-1267

File Name : WE_Honoapiilani Hwy - Lower Honoapiilani Rd
Site Code : 00000000
Start Date : 12/10/2016

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
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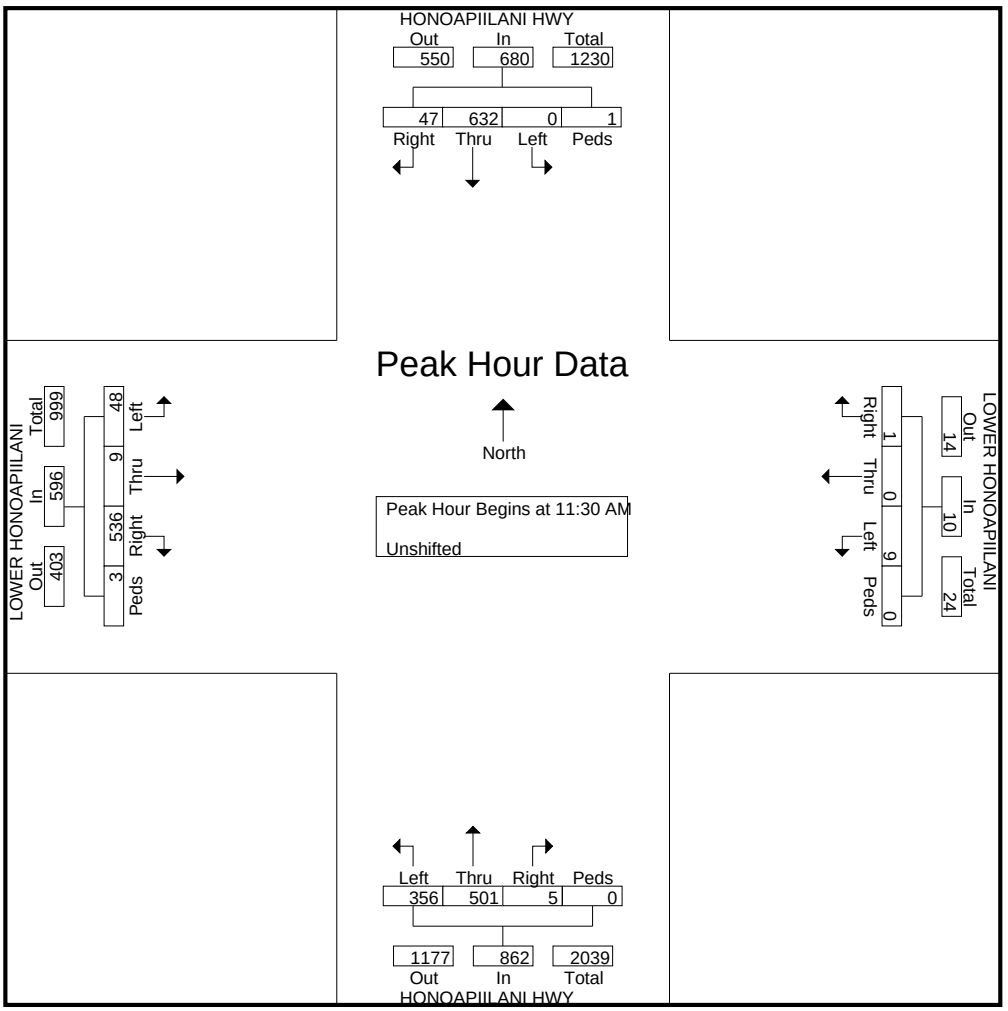
	HONOAPIILANI HWY Southbound					LOWER HONOAPIILANI Westbound					HONOAPIILANI HWY Northbound					LOWER HONOAPIILANI Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**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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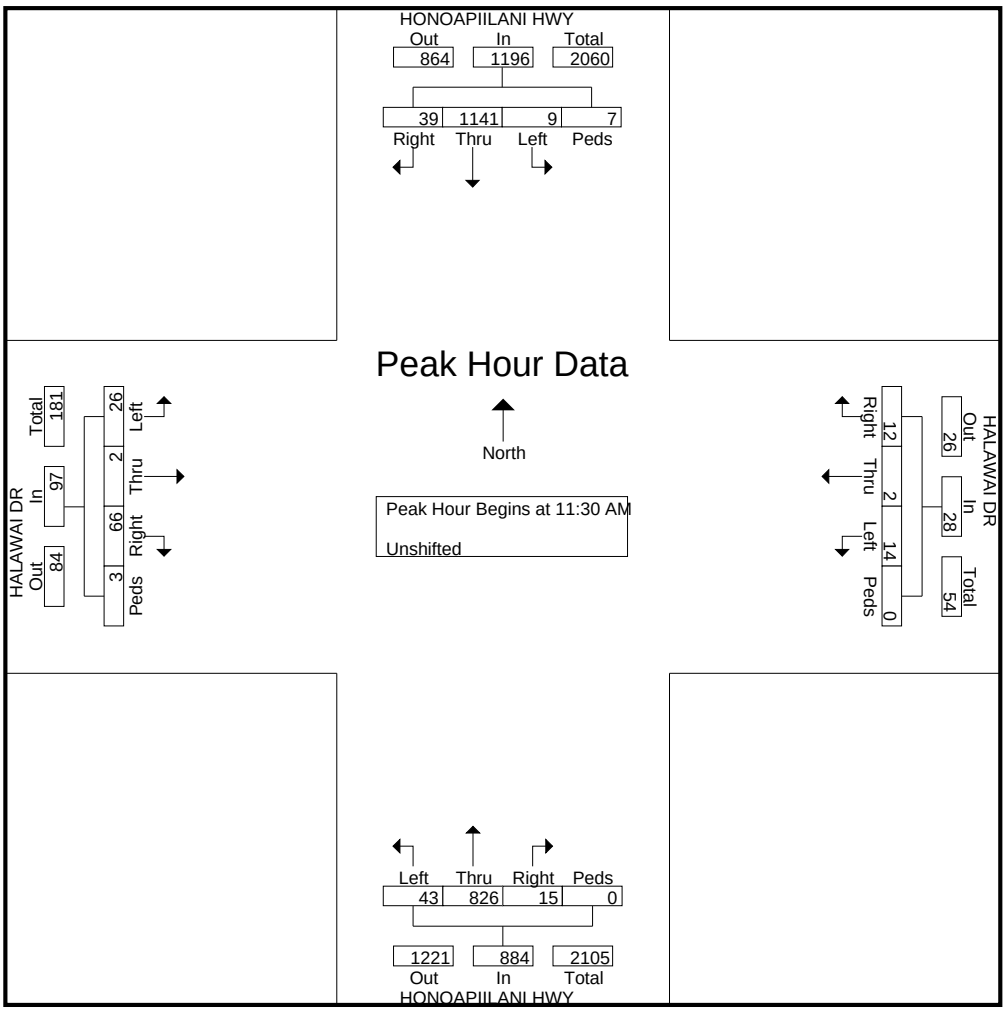
File Name : WE_Honoapiilani Hwy - Halawai Dr
Site Code : 00000000
Start Date : 12/10/2016
Page No : 2

	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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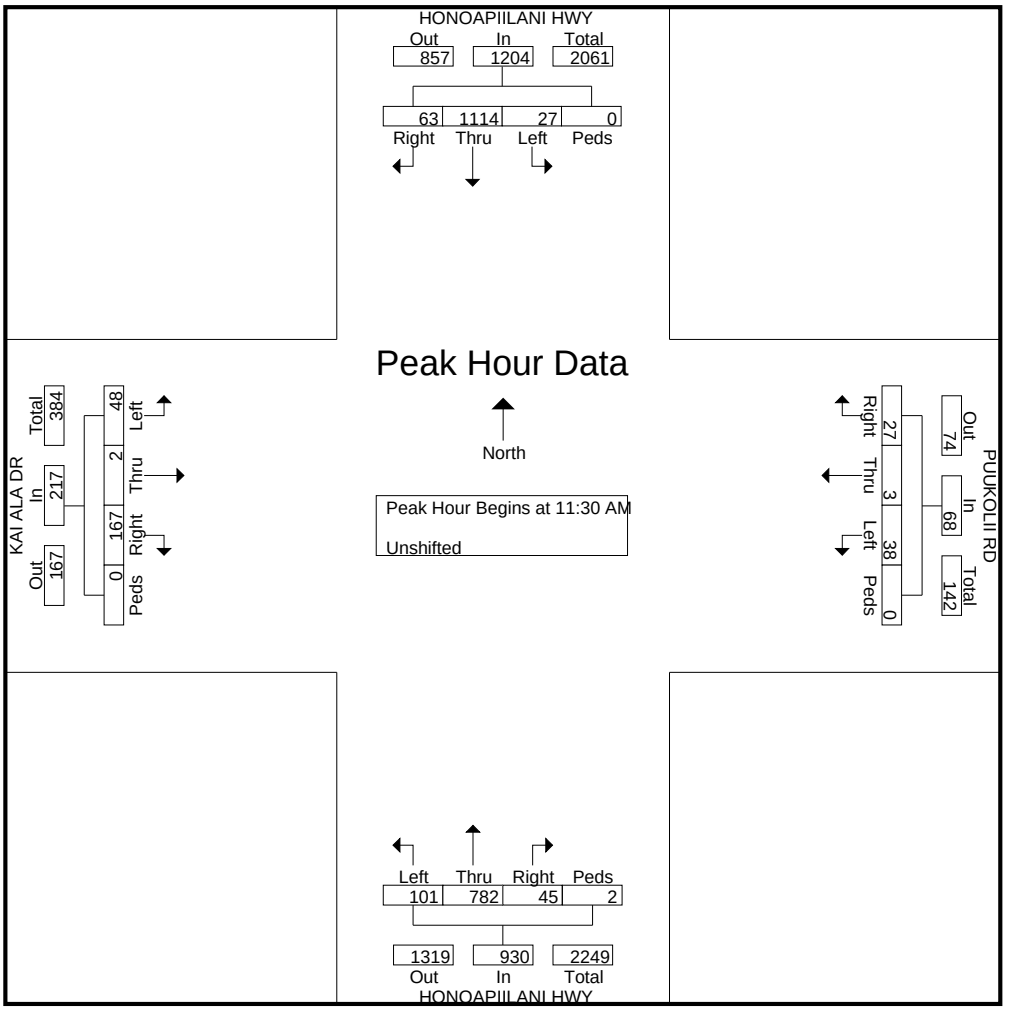
File Name : WE_Honoapiilani Hwy-Puukolii Rd
Site Code : 00000000
Start Date : 12/10/2016
Page No : 2

	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



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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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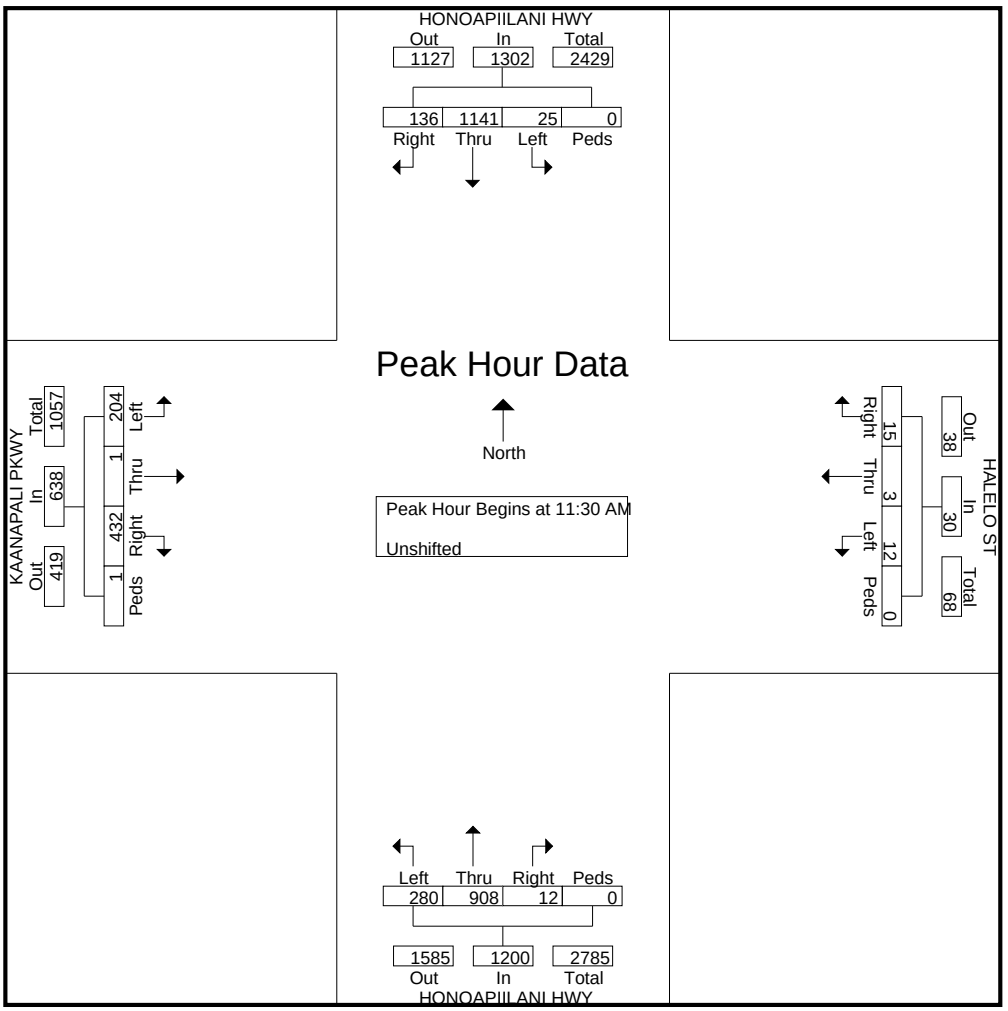
File Name : WE_Honopiilani Hwy - Kaanapali Pkwy_Halelo St
Site Code : 00000000
Start Date : 1/21/2017
Page No : 2

	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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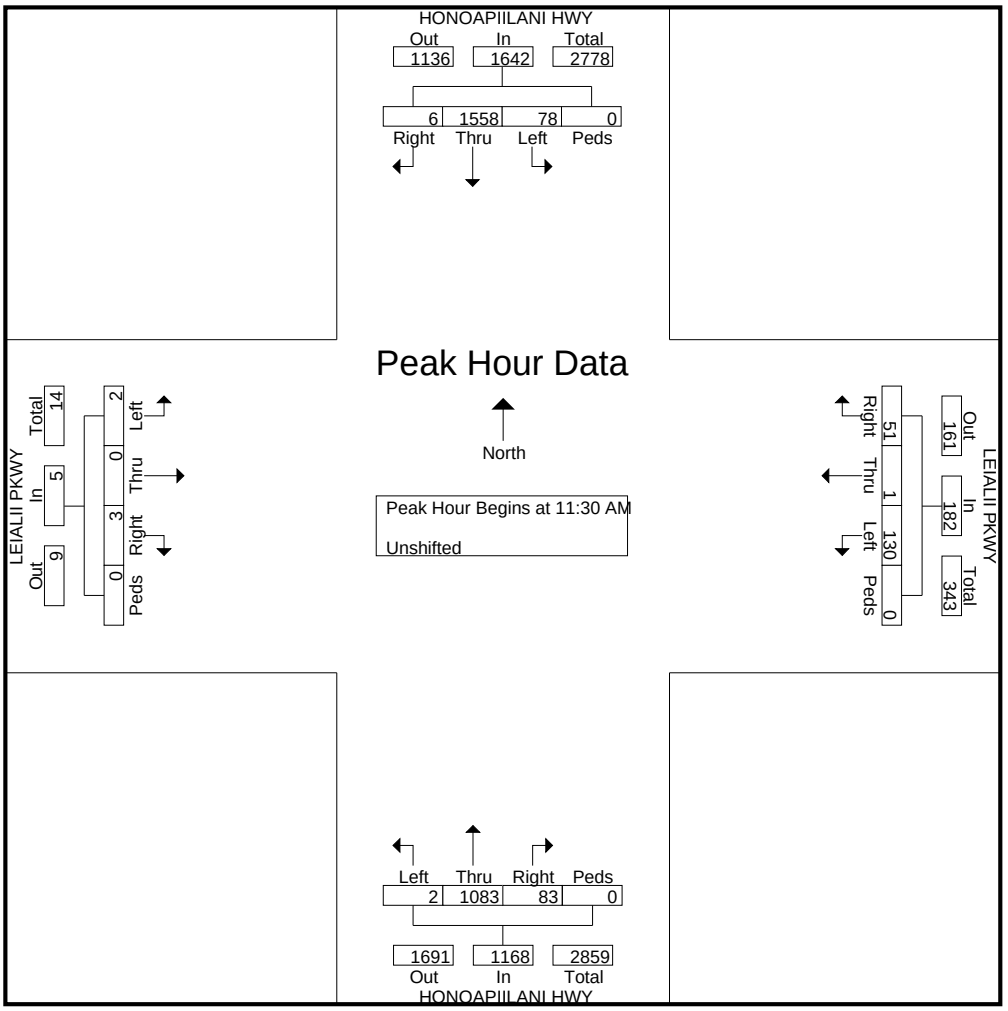
File Name : WE_Honoapiilani Hwy-Leialii Pkwy
Site Code : 00000000
Start Date : 12/10/2016
Page No : 2

	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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Site Code : 00000000
Start Date : 12/10/2016
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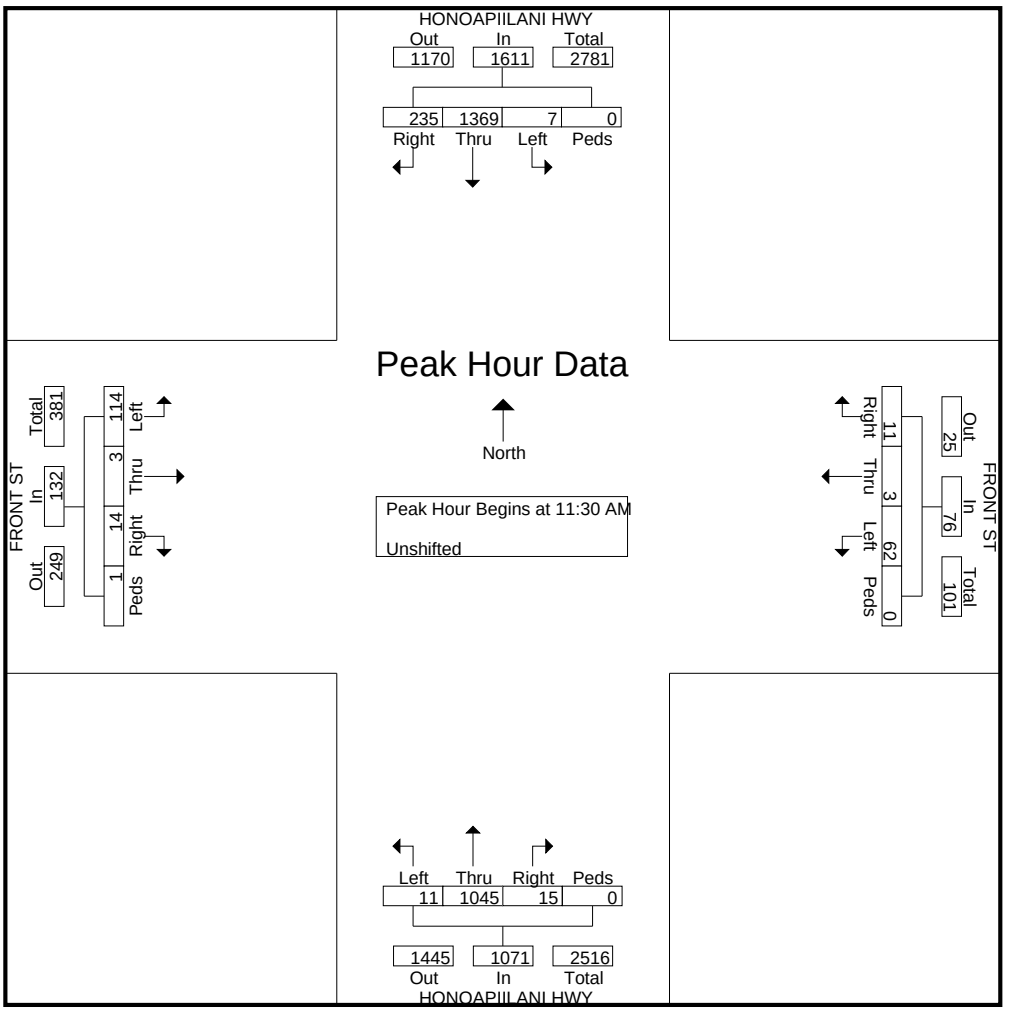
	HONOAPIILANI HWY Southbound					FRONT ST Westbound					HONOAPIILANI HWY Northbound					FRONT ST Eastbound					
Start Time	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**Peds**	**App. Total**	**Left**	**Thru**	**Right**	**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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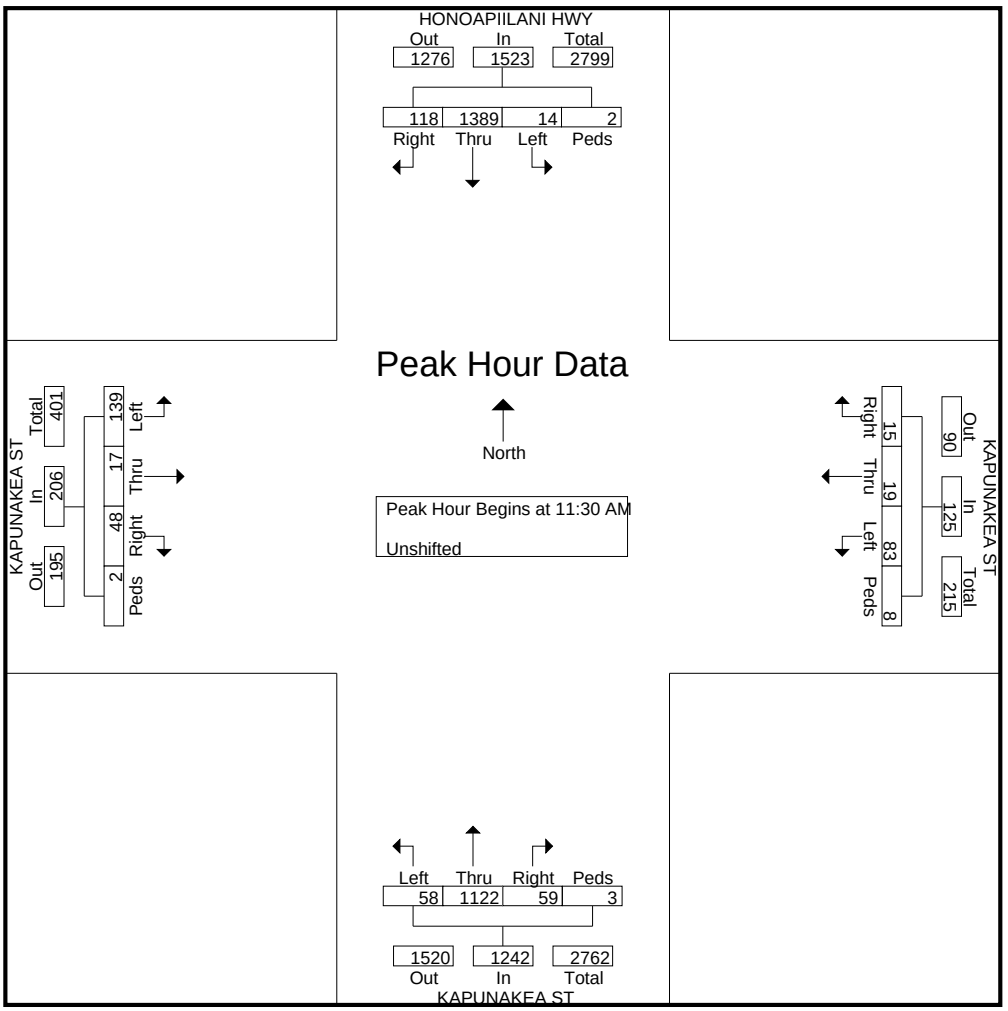
File Name : WE_Honoapiilani Hwy - Kapunakea St
Site Code : 00000000
Start Date : 1/21/2017
Page No : 2

	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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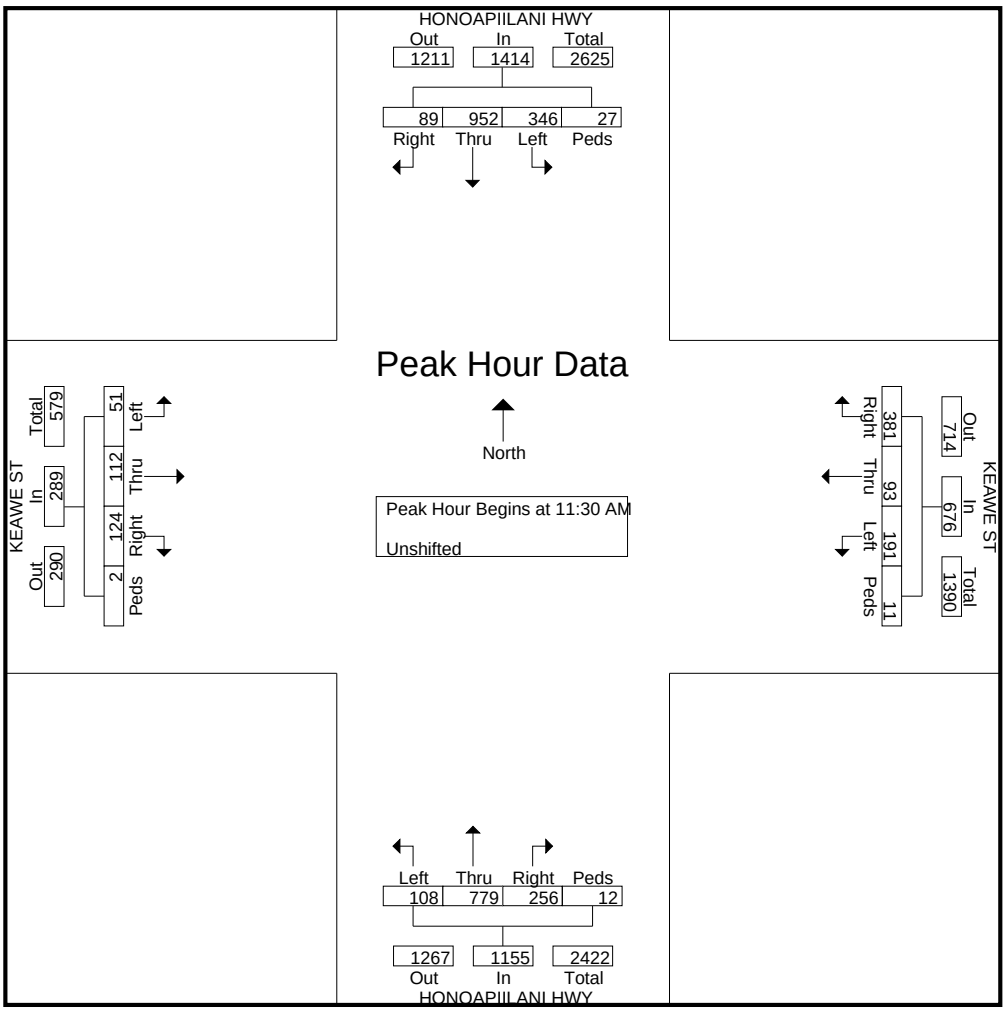
File Name : WE_Honoapiilani Hwy - Keawe St
Site Code : 00000000
Start Date : 1/21/2017
Page No : 2

	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 2010)

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 2010)

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	52	40	37	57	30	8	220	222	77	5	127	8
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	135	225	239	86	16	298	567	197	7	493	419
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	747	941	1568	604	600	111	1774	1323	459	1774	1863	1583
Grp Volume(v), veh/h	92	0	37	95	0	0	220	0	299	5	127	8
Grp Sat Flow(s),veh/h/ln	1688	0	1568	1314	0	0	1774	0	1782	1774	1863	1583
Q Serve(g_s), s	0.0	0.0	0.8	1.1	0.0	0.0	4.4	0.0	4.4	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	4.4	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	392	0	225	341	0	0	298	0	764	7	493	419
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	1147	0	996	1062	0	0	1409	0	3726	704	3156	2683
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	11.0	10.3
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.4	0.0	0.0	3.6	0.0	0.7	78.2	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	0.9	0.0	0.4	1.0	0.0	0.0	2.4	0.0	2.2	0.2	1.1	0.1
LnGrp Delay(d),s/veh	14.9	0.0	14.5	15.5	0.0	0.0	18.5	0.0	8.1	97.0	11.5	10.3
LnGrp LOS	B		B	B			B		A	F	B	B
Approach Vol, veh/h		129			95			519			140	
Approach Delay, s/veh		14.8			15.5			12.5			14.5	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
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	6.4		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 2010 Ctrl Delay	13.5
HCM 2010 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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	63	3	22	91	20	2	134	492	0	10	470	25
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	403	16	304	363	327	33	444	809	687	384	648	546
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	1240	79	1543	1351	1662	166	1774	1863	1583	1774	1863	1570
Grp Volume(v), veh/h	66	0	22	91	0	22	134	492	0	10	470	25
Grp Sat Flow(s),veh/h/ln	1320	0	1543	1351	0	1828	1774	1863	1583	1774	1863	1570
Q Serve(g_s), s	1.7	0.0	0.5	2.7	0.0	0.4	2.0	9.0	0.0	0.2	9.8	0.5
Cycle Q Clear(g_c), s	2.1	0.0	0.5	4.9	0.0	0.4	2.0	9.0	0.0	0.2	9.8	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	419	0	304	363	0	360	444	809	687	384	648	546
V/C Ratio(X)	0.16	0.00	0.07	0.25	0.00	0.06	0.30	0.61	0.00	0.03	0.73	0.05
Avail Cap(c_a), veh/h	921	0	871	859	0	1031	877	2144	1822	971	2144	1806
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	15.3	0.0	14.5	17.2	0.0	14.5	8.5	9.6	0.0	9.6	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	0.7	0.0	0.2	1.0	0.0	0.2	1.0	4.7	0.0	0.1	5.2	0.2
LnGrp Delay(d),s/veh	15.4	0.0	14.6	17.6	0.0	14.5	8.8	10.4	0.0	9.6	14.2	9.6
LnGrp LOS	B		B	B		B	A	B		A	B	A
Approach Vol, veh/h		88			113			626			505	
Approach Delay, s/veh		15.2			17.0			10.1			13.9	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.3	25.2		13.7	9.2	21.4		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	11.0		4.1	4.0	11.8		6.9
Green Ext Time (p_c), s	0.0	3.4		0.4	0.2	3.3		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	12.4
HCM 2010 LOS	B

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	42	1	13	5	1	1	57	573	7	5	665	14
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	175	147	72	899	764	7	831	701
Arrive On Green	0.03	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	1774	113	1472	1774	1863	1567	1774	1863	1583	1774	1863	1571
Grp Volume(v), veh/h	42	0	14	5	1	1	57	573	7	5	665	14
Grp Sat Flow(s),veh/h/ln	1774	0	1585	1774	1863	1567	1774	1863	1583	1774	1863	1571
Q Serve(g_s), s	1.2	0.0	0.4	0.1	0.0	0.0	1.7	12.0	0.1	0.1	16.0	0.3
Cycle Q Clear(g_c), s	1.2	0.0	0.4	0.1	0.0	0.0	1.7	12.0	0.1	0.1	16.0	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	196	10	175	147	72	899	764	7	831	701
V/C Ratio(X)	0.68	0.00	0.07	0.53	0.01	0.01	0.79	0.64	0.01	0.70	0.80	0.02
Avail Cap(c_a), veh/h	682	0	639	682	751	632	852	2326	1977	852	2326	1961
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	20.2	25.8	21.4	21.4	24.8	10.1	7.0	25.9	12.4	8.1
Incr Delay (d2), s/veh	12.1	0.0	0.2	38.4	0.0	0.0	17.4	0.8	0.0	80.2	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	0.8	0.0	0.2	0.2	0.0	0.0	1.2	6.2	0.1	0.2	8.6	0.1
LnGrp Delay(d),s/veh	36.9	0.0	20.3	64.3	21.4	21.4	42.1	10.8	7.0	106.1	14.3	8.1
LnGrp LOS	D		C	E	C	C	D	B	A	F	B	A
Approach Vol, veh/h		56			7			637			684	
Approach Delay, s/veh		32.8			52.0			13.6			14.8	
Approach LOS		C			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	30.1	5.3	11.4	7.1	28.2	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	14.0	2.1	2.4	3.7	18.0	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 2010 Ctrl Delay	15.2
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	33	8	0	18	3	0	312	643	40	9	751	3
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	23	112	224	24	0	389	2069	129	13	1413	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	1183	326	1583	1200	338	0	1774	3385	210	1774	3539	1583
Grp Volume(v), veh/h	41	0	0	21	0	0	312	336	347	9	751	3
Grp Sat Flow(s),veh/h/ln	1508	0	1583	1538	0	0	1774	1770	1826	1774	1770	1583
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	273	0	112	279	0	0	389	1082	1116	13	1413	632
V/C Ratio(X)	0.15	0.00	0.00	0.08	0.00	0.00	0.80	0.31	0.31	0.72	0.53	0.00
Avail Cap(c_a), veh/h	778	0	656	926	0	0	2426	2713	2799	2426	5427	2428
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	21.0	0.0	0.0	20.7	0.0	0.0	17.9	4.5	4.5	23.9	11.1	8.7
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.1	0.0	0.0	1.5	0.3	0.3	24.6	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	0.5	0.0	0.0	0.3	0.0	0.0	4.1	2.2	2.2	0.2	3.9	0.0
LnGrp Delay(d),s/veh	21.2	0.0	0.0	20.8	0.0	0.0	19.3	4.8	4.8	48.5	11.7	8.7
LnGrp LOS	C			C			B	A	A	D	B	A
Approach Vol, veh/h		41			21			995			763	
Approach Delay, s/veh		21.2			20.8			9.4			12.1	
Approach LOS		C			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.6	25.3		8.4	4.3	35.5		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 2010 Ctrl Delay		10.9
HCM 2010 LOS		B

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	17	0	1	9	1	2	70	1059	16	15	1227	26
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	2420	37	20	2264	1013
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	1524	0	1583	913	101	203	1774	3569	54	1774	3539	1583
Grp Volume(v), veh/h	17	0	1	12	0	0	70	525	550	15	1227	26
Grp Sat Flow(s),veh/h/ln	1524	0	1583	1217	0	0	1774	1770	1853	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	2.0	6.9	6.9	0.4	9.7	0.3
Cycle Q Clear(g_c), s	0.5	0.0	0.0	0.9	0.0	0.0	2.0	6.9	6.9	0.4	9.7	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	224	0	54	190	0	0	88	1200	1257	20	2264	1013
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	816	0	720	807	0	0	736	3007	3149	386	5314	2378
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	23.4	0.0	23.6	23.9	0.0	0.0	23.8	3.7	3.7	25.0	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	18.6	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	0.2	0.0	0.0	1.1	3.4	3.5	0.3	4.7	0.1
LnGrp Delay(d),s/veh	23.4	0.0	23.7	23.9	0.0	0.0	29.7	4.3	4.2	43.5	5.5	3.4
LnGrp LOS	C		C	C			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	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.5	37.4		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	11.7		2.9	2.4	8.9		2.5
Green Ext Time (p_c), s	0.0	20.7		0.0	0.0	15.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	6.1
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	49	4	1	42	14	2	111	1049	46	26	1152	29
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	139	110	140	20	132	2809	1257	39	2622	1173
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	1188	119	1578	1402	1594	228	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	53	0	1	42	0	16	111	1049	46	26	1152	29
Grp Sat Flow(s),veh/h/ln	1307	0	1578	1402	0	1822	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.3	0.0	0.1	4.6	0.0	1.3	9.6	13.5	1.0	2.3	19.4	0.7
Cycle Q Clear(g_c), s	6.6	0.0	0.1	11.1	0.0	1.3	9.6	13.5	1.0	2.3	19.4	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	159	0	139	110	0	160	132	2809	1257	39	2622	1173
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	254	0	244	204	0	282	183	2809	1257	183	2622	1173
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	67.9	0.0	64.5	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	13.7	0.3	0.0	7.4	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	2.2	0.0	0.0	1.8	0.0	0.6	5.2	6.7	0.4	1.2	9.6	0.3
LnGrp Delay(d),s/veh	69.2	0.0	64.5	75.0	0.0	65.3	84.5	5.0	3.4	82.7	8.2	5.3
LnGrp LOS	E		E	E		E	F	A	A	F	A	A
Approach Vol, veh/h		54			58			1206			1207	
Approach Delay, s/veh		69.1			72.3			12.3			9.8	
Approach LOS		E			E			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	15.5	120.9		18.6	7.4	129.0		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	11.6	21.4		13.1	4.3	15.5		8.6
Green Ext Time (p_c), s	0.1	19.3		0.1	0.0	16.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	13.7
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	125	7	84	11	11	4	446	1164	15	43	1083	49
Adj No. of Lanes	0	1	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	12	827	67	67	24	618	1885	24	137	1501	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	1684	94	2728	749	749	272	3442	3578	46	1774	3539	1577
Grp Volume(v), veh/h	132	0	84	26	0	0	446	576	603	43	1083	49
Grp Sat Flow(s),veh/h/ln	1779	0	1364	1771	0	0	1721	1770	1855	1774	1770	1577
Q Serve(g_s), s	6.3	0.0	2.0	1.2	0.0	0.0	11.1	20.8	20.8	2.1	23.1	1.7
Cycle Q Clear(g_c), s	6.3	0.0	2.0	1.2	0.0	0.0	11.1	20.8	20.8	2.1	23.1	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	232	0	827	159	0	0	618	932	977	137	1501	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	1095	0	2150	681	0	0	1627	4066	4261	410	7276	3241
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	37.1	0.0	23.0	38.5	0.0	0.0	35.2	15.1	15.1	39.7	21.7	15.6
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.5	0.0	0.0	0.6	1.0	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	3.2	0.0	0.8	0.6	0.0	0.0	5.3	10.3	10.8	1.0	11.5	0.7
LnGrp Delay(d),s/veh	37.9	0.0	23.1	38.9	0.0	0.0	35.8	16.1	16.0	40.2	22.7	15.6
LnGrp LOS	D		C	D			D	B	B	D	C	B
Approach Vol, veh/h		216			26			1625			1175	
Approach Delay, s/veh		32.2			38.9			21.5			23.0	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.3	42.6		12.2	11.0	51.9		15.9
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	13.1	25.1		3.2	4.1	22.8		8.3
Green Ext Time (p_c), s	1.2	11.5		0.1	0.0	11.0		0.6

Intersection Summary		
HCM 2010 Ctrl Delay		23.0
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	2	1	1	61	0	1	3	1614	91	27	1293	4
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	94	46	34	172	0	134	7	2697	151	63	2980	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	635	533	389	1376	0	1542	1774	3407	191	1774	3619	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	1557	0	0	1376	0	1542	1774	1770	1828	1774	1770	1861
Q Serve(g_s), s	0.0	0.0	0.0	5.6	0.0	0.1	0.2	26.0	26.6	2.1	13.7	13.7
Cycle Q Clear(g_c), s	0.3	0.0	0.0	5.9	0.0	0.1	0.2	26.0	26.6	2.1	13.7	13.7
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	1401	1448	63	1457	1532
V/C Ratio(X)	0.02	0.00	0.00	0.36	0.00	0.01	0.43	0.60	0.60	0.43	0.43	0.43
Avail Cap(c_a), veh/h	302	0	0	288	0	264	101	1401	1448	101	1457	1532
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	11.5	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	2.3	0.0	0.0	0.1	13.1	13.7	1.1	7.1	7.4
LnGrp Delay(d),s/veh	58.7	0.0	0.0	62.2	0.0	58.9	81.1	7.2	7.3	67.8	4.3	4.3
LnGrp LOS	E			E		E	F	A	A	E	A	A
Approach Vol, veh/h		4			62			1708			1324	
Approach Delay, s/veh		58.7			62.2			7.4			5.6	
Approach LOS		E			E			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.6	119.3		16.2	9.0	114.8		16.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	95.0		23.0	8.0	95.0		23.0
Max Q Clear Time (g_c+I1), s	2.2	15.7		7.9	4.1	28.6		2.3
Green Ext Time (p_c), s	0.0	21.4		0.1	0.0	35.5		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	7.8
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	88	4	2	110	16	11	2	1599	17	7	1151	130
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	194	20	14	3	2825	30	9	2800	1251
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	1388	82	32	1308	190	131	1774	3588	38	1774	3539	1581
Grp Volume(v), veh/h	94	0	0	137	0	0	2	788	828	7	1151	130
Grp Sat Flow(s),veh/h/ln	1503	0	0	1629	0	0	1774	1770	1856	1774	1770	1581
Q Serve(g_s), s	0.0	0.0	0.0	2.5	0.0	0.0	0.1	20.5	20.5	0.5	12.1	2.2
Cycle Q Clear(g_c), s	7.0	0.0	0.0	9.5	0.0	0.0	0.1	20.5	20.5	0.5	12.1	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	219	0	0	229	0	0	3	1394	1462	9	2800	1251
V/C Ratio(X)	0.43	0.00	0.00	0.60	0.00	0.00	0.70	0.57	0.57	0.76	0.41	0.10
Avail Cap(c_a), veh/h	430	0	0	449	0	0	118	1394	1462	118	2800	1251
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	2.9
Incr Delay (d2), s/veh	1.3	0.0	0.0	2.5	0.0	0.0	62.7	1.3	1.2	33.9	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	3.1	0.0	0.0	4.6	0.0	0.0	0.1	10.4	10.9	0.3	5.9	1.0
LnGrp Delay(d),s/veh	52.2	0.0	0.0	54.4	0.0	0.0	122.6	6.2	6.1	93.5	4.3	3.0
LnGrp LOS	D			D			F	A	A	F	A	A
Approach Vol, veh/h		94			137			1618			1288	
Approach Delay, s/veh		52.2			54.4			6.3			4.6	
Approach LOS		D			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.2	98.9		16.9	4.6	98.5		16.9
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	14.1		11.5	2.5	22.5		9.0
Green Ext Time (p_c), s	0.0	26.7		0.4	0.0	33.0		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	9.1
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	103	29	3	153	25	4	25	1471	75	8	1199	65
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	42	227	259	229	37	31	2612	133	10	2562	139
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.14	0.04	1.00	1.00	0.01	0.75	0.74
Sat Flow, veh/h	1016	286	1554	1359	1563	250	1774	3427	174	1774	3415	185
Grp Volume(v), veh/h	132	0	3	153	0	29	25	757	789	8	621	643
Grp Sat Flow(s),veh/h/ln	1302	0	1554	1359	0	1813	1774	1770	1832	1774	1770	1830
Q Serve(g_s), s	12.3	0.0	0.2	0.0	0.0	1.9	2.0	0.0	0.0	0.6	18.9	19.0
Cycle Q Clear(g_c), s	14.2	0.0	0.2	14.2	0.0	1.9	2.0	0.0	0.0	0.6	18.9	19.0
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	236	0	227	259	0	265	31	1349	1396	10	1328	1373
V/C Ratio(X)	0.56	0.00	0.01	0.59	0.00	0.11	0.80	0.56	0.56	0.79	0.47	0.47
Avail Cap(c_a), veh/h	314	0	311	332	0	363	139	1349	1396	139	1328	1373
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	0.73	0.73	0.73	0.91	0.91	0.91
Uniform Delay (d), s/veh	58.0	0.0	51.1	57.1	0.0	51.9	67.3	0.0	0.0	69.5	6.7	6.8
Incr Delay (d2), s/veh	2.1	0.0	0.0	2.2	0.0	0.2	12.0	1.2	1.2	35.0	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	5.0	0.0	0.1	5.8	0.0	1.0	1.1	0.5	0.5	0.4	9.5	9.9
LnGrp Delay(d),s/veh	60.1	0.0	51.1	59.2	0.0	52.1	79.2	1.2	1.2	104.5	7.8	7.8
LnGrp LOS	E		D	E		D	E	A	A	F	A	A
Approach Vol, veh/h		135			182			1571			1272	
Approach Delay, s/veh		59.9			58.1			2.5			8.4	
Approach LOS		E			E			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.5	109.0		24.5	4.8	110.7		24.5
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	21.0		16.2	2.6	2.0		16.2
Green Ext Time (p_c), s	0.0	19.9		0.5	0.0	32.0		0.3

Intersection Summary		
HCM 2010 Ctrl Delay		10.5
HCM 2010 LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	95	45	115	60	430	36	968	164	275	940	17
Future Volume (veh/h)	13	95	45	115	60	430	36	968	164	275	940	17
Number	7	4	14	3	8	18	1	6	16	5	2	12
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		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	14	103	2	125	65	124	39	1052	114	299	1022	17
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	42	180	167	251	402	337	50	1835	818	320	2388	40
Arrive On Green	0.11	0.11	0.11	0.08	0.22	0.22	0.03	0.52	0.52	0.36	1.00	1.00
Sat Flow, veh/h	126	1662	1544	1774	1863	1564	1774	3539	1577	1774	3562	59
Grp Volume(v), veh/h	117	0	2	125	65	124	39	1052	114	299	508	531
Grp Sat Flow(s),veh/h/ln	1788	0	1544	1774	1863	1564	1774	1770	1577	1774	1770	1852
Q Serve(g_s), s	2.5	0.0	0.2	8.5	4.0	9.5	3.1	28.5	5.3	22.8	0.0	0.0
Cycle Q Clear(g_c), s	8.5	0.0	0.2	8.5	4.0	9.5	3.1	28.5	5.3	22.8	0.0	0.0
Prop In Lane	0.12		1.00	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	223	0	167	251	402	337	50	1835	818	320	1186	1242
V/C Ratio(X)	0.53	0.00	0.01	0.50	0.16	0.37	0.78	0.57	0.14	0.94	0.43	0.43
Avail Cap(c_a), veh/h	320	0	254	251	506	424	177	1835	818	431	1186	1242
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	1.00	0.79	0.79	0.79	0.83	0.83	0.83
Uniform Delay (d), s/veh	59.4	0.0	55.7	48.5	44.6	46.8	67.6	23.1	17.5	44.0	0.0	0.0
Incr Delay (d2), s/veh	1.9	0.0	0.0	1.5	0.2	0.7	7.3	1.0	0.3	18.2	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	4.4	0.0	0.1	4.2	2.1	4.2	1.6	14.1	2.3	12.7	0.3	0.3
LnGrp Delay(d),s/veh	61.3	0.0	55.7	50.0	44.8	47.5	74.9	24.1	17.8	62.1	0.9	0.9
LnGrp LOS	E		E	D	D	D	E	C	B	E	A	A
Approach Vol, veh/h		119			314			1205			1338	
Approach Delay, s/veh		61.2			47.9			25.2			14.6	
Approach LOS		E			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	8.0	97.9	15.0	19.2	29.2	76.6		34.2
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	5.1	2.0	10.5	10.5	24.8	30.5		11.5
Green Ext Time (p_c), s	0.0	14.0	0.0	0.3	0.5	12.4		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	24.3
HCM 2010 LOS	C

Notes

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	58	9	23	39	15	1	383	211	21	2	274	19
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	295	35	178	221	64	3	477	874	87	4	479	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	1275	313	1583	731	567	24	1774	1667	166	1774	1863	1583
Grp Volume(v), veh/h	67	0	23	55	0	0	383	0	232	2	274	19
Grp Sat Flow(s),veh/h/ln	1588	0	1583	1322	0	0	1774	0	1833	1774	1863	1583
Q Serve(g_s), s	0.0	0.0	0.6	0.6	0.0	0.0	8.9	0.0	3.1	0.0	5.7	0.4
Cycle Q Clear(g_c), s	1.5	0.0	0.6	2.1	0.0	0.0	8.9	0.0	3.1	0.0	5.7	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	331	0	178	288	0	0	477	0	961	4	479	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	949	0	858	924	0	0	1202	0	3271	601	2692	2288
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	18.1	0.0	17.7	18.2	0.0	0.0	15.1	0.0	5.7	22.1	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	73.1	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	0.8	0.0	0.3	0.7	0.0	0.0	4.8	0.0	1.6	0.1	3.2	0.2
LnGrp Delay(d),s/veh	18.4	0.0	18.0	18.5	0.0	0.0	18.3	0.0	6.0	95.1	16.6	12.5
LnGrp LOS	B		B	B			B		A	F	B	B
Approach Vol, veh/h		90			55			615			295	
Approach Delay, s/veh		18.3			18.5			13.7			16.9	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.1	29.2		10.0	16.9	17.4		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	5.1		3.5	10.9	7.7		4.1
Green Ext Time (p_c), s	0.0	3.0		0.3	1.1	3.7		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	15.2
HCM 2010 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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	74	20	12	45	15	0	195	536	0	23	539	32
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	50	193	258	227	0	480	900	765	437	738	624
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.00	0.10	0.48	0.00	0.02	0.40	0.40
Sat Flow, veh/h	1087	409	1583	1372	1863	0	1774	1863	1583	1774	1863	1575
Grp Volume(v), veh/h	94	0	12	45	15	0	195	536	0	23	539	32
Grp Sat Flow(s),veh/h/ln	1496	0	1583	1372	1863	0	1774	1863	1583	1774	1863	1575
Q Serve(g_s), s	2.1	0.0	0.3	1.3	0.3	0.0	2.5	8.8	0.0	0.3	10.4	0.5
Cycle Q Clear(g_c), s	2.4	0.0	0.3	3.8	0.3	0.0	2.5	8.8	0.0	0.3	10.4	0.5
Prop In Lane	0.79		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	334	0	193	258	227	0	480	900	765	437	738	624
V/C Ratio(X)	0.28	0.00	0.06	0.17	0.07	0.00	0.41	0.60	0.00	0.05	0.73	0.05
Avail Cap(c_a), veh/h	1025	0	936	902	1101	0	925	2246	1909	1036	2246	1899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.4	0.0	16.4	19.2	16.4	0.0	7.5	7.9	0.0	7.7	10.9	7.9
Incr Delay (d2), s/veh	0.5	0.0	0.1	0.3	0.1	0.0	0.6	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	1.1	0.0	0.1	0.5	0.2	0.0	1.3	4.6	0.0	0.2	5.5	0.2
LnGrp Delay(d),s/veh	17.8	0.0	16.6	19.5	16.6	0.0	8.0	8.6	0.0	7.8	12.3	7.9
LnGrp LOS	B		B	B	B		A	A		A	B	A
Approach Vol, veh/h		106			60			731			594	
Approach Delay, s/veh		17.7			18.8			8.4			11.9	
Approach LOS		B			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.7	26.4		10.1	9.4	22.7		10.1
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	2.3	10.8		4.4	4.5	12.4		5.8
Green Ext Time (p_c), s	0.0	3.8		0.5	0.4	3.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	10.9
HCM 2010 LOS	B

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	58	3	7	10	5	0	164	764	5	1	728	35
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	63	147	18	180	153	210	1075	914	3	856	726
Arrive On Green	0.04	0.13	0.13	0.01	0.10	0.00	0.12	0.58	0.58	0.00	0.46	0.46
Sat Flow, veh/h	1774	488	1139	1774	1863	1583	1774	1863	1583	1774	1863	1580
Grp Volume(v), veh/h	58	0	10	10	5	0	164	764	5	1	728	35
Grp Sat Flow(s),veh/h/ln	1774	0	1628	1774	1863	1583	1774	1863	1583	1774	1863	1580
Q Serve(g_s), s	2.3	0.0	0.4	0.4	0.2	0.0	6.3	20.8	0.1	0.0	24.5	0.9
Cycle Q Clear(g_c), s	2.3	0.0	0.4	0.4	0.2	0.0	6.3	20.8	0.1	0.0	24.5	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	210	18	180	153	210	1075	914	3	856	726
V/C Ratio(X)	0.78	0.00	0.05	0.56	0.03	0.00	0.78	0.71	0.01	0.40	0.85	0.05
Avail Cap(c_a), veh/h	502	0	484	502	554	471	628	1714	1457	628	1714	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	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.5	0.0	27.0	34.8	28.9	0.0	30.2	10.7	6.3	35.3	16.9	10.6
Incr Delay (d2), s/veh	15.7	0.0	0.1	24.5	0.1	0.0	6.2	0.9	0.0	79.3	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	1.4	0.0	0.2	0.3	0.1	0.0	3.5	10.7	0.0	0.1	13.1	0.4
LnGrp Delay(d),s/veh	49.2	0.0	27.1	59.3	29.0	0.0	36.4	11.6	6.3	114.5	19.4	10.6
LnGrp LOS	D		C	E	C		D	B	A	F	B	B
Approach Vol, veh/h		68			15			933			764	
Approach Delay, s/veh		45.9			49.2			15.9			19.1	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.1	45.8	5.7	14.1	13.4	37.5	8.0	11.8
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	2.0	22.8	2.4	2.4	8.3	26.5	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 2010 Ctrl Delay	18.7
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	76	4	0	82	11	6	596	823	7	1	770	4
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	7	141	206	16	9	652	2543	22	2	1206	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	1524	80	1583	1317	177	96	1774	3596	31	1774	3539	1583
Grp Volume(v), veh/h	80	0	0	99	0	0	596	405	425	1	770	4
Grp Sat Flow(s),veh/h/ln	1604	0	1583	1590	0	0	1774	1770	1857	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	1.0	0.0	0.0	23.7	6.4	6.4	0.0	13.6	0.1
Cycle Q Clear(g_c), s	3.1	0.0	0.0	4.1	0.0	0.0	23.7	6.4	6.4	0.0	13.6	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	260	0	141	252	0	0	652	1252	1314	2	1206	540
V/C Ratio(X)	0.31	0.00	0.00	0.39	0.00	0.00	0.91	0.32	0.32	0.42	0.64	0.01
Avail Cap(c_a), veh/h	514	0	428	614	0	0	1703	1651	1733	1703	3302	1477
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	31.7	0.0	0.0	32.1	0.0	0.0	22.3	4.1	4.1	36.9	20.5	16.1
Incr Delay (d2), s/veh	0.7	0.0	0.0	1.0	0.0	0.0	2.2	0.3	0.3	37.7	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	0.0	2.0	0.0	0.0	11.8	3.1	3.3	0.0	6.8	0.1
LnGrp Delay(d),s/veh	32.3	0.0	0.0	33.1	0.0	0.0	24.5	4.4	4.4	74.6	21.8	16.1
LnGrp LOS	C			C			C	A	A	E	C	B
Approach Vol, veh/h		80			99			1426			775	
Approach Delay, s/veh		32.3			33.1			12.8			21.8	
Approach LOS		C			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	31.2	31.2		11.6	4.1	58.3		11.6
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	25.7	15.6		6.1	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 2010 Ctrl Delay	17.2	
HCM 2010 LOS	B	

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	22	1	2	15	0	1	74	1383	11	9	1448	23
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	247	9	166	225	3	9	95	2475	20	12	2268	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	1355	81	1518	1160	26	79	1774	3599	29	1774	3539	1583
Grp Volume(v), veh/h	23	0	2	16	0	0	74	680	714	9	1448	23
Grp Sat Flow(s),veh/h/ln	1435	0	1518	1265	0	0	1774	1770	1858	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.1	0.6	0.0	0.0	2.9	13.9	13.9	0.4	17.8	0.4
Cycle Q Clear(g_c), s	0.8	0.0	0.1	1.4	0.0	0.0	2.9	13.9	13.9	0.4	17.8	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	276	0	166	254	0	0	95	1217	1277	12	2268	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	569	0	489	545	0	0	522	2131	2236	273	3766	1685
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	28.3	0.0	28.4	28.7	0.0	0.0	33.4	5.7	5.7	35.4	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	27.1	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	0.4	0.0	0.0	0.3	0.0	0.0	1.6	6.9	7.2	0.3	8.6	0.2
LnGrp Delay(d),s/veh	28.3	0.0	28.4	28.7	0.0	0.0	38.4	6.5	6.5	62.5	8.4	4.7
LnGrp LOS	C		C	C			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	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.8	50.8		12.8	4.5	54.1		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	19.8		3.4	2.4	15.9		2.8
Green Ext Time (p_c), s	0.0	26.0		0.0	0.0	24.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.7
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	70	5	3	68	4	1	132	1313	45	32	1448	65
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	13	186	139	171	43	153	2712	1212	41	2490	1114
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	1290	105	1559	1385	1434	359	1774	3539	1582	1774	3539	1583
Grp Volume(v), veh/h	75	0	3	68	0	5	132	1313	45	32	1448	65
Grp Sat Flow(s),veh/h/ln	1395	0	1559	1385	0	1793	1774	1770	1582	1774	1770	1583
Q Serve(g_s), s	7.9	0.0	0.3	7.9	0.0	0.4	12.1	22.7	1.1	3.0	33.9	2.1
Cycle Q Clear(g_c), s	8.3	0.0	0.3	16.3	0.0	0.4	12.1	22.7	1.1	3.0	33.9	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	217	0	186	139	0	214	153	2712	1212	41	2490	1114
V/C Ratio(X)	0.35	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	254	0	227	175	0	261	226	2712	1212	108	2490	1114
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	64.1	74.4	7.2	4.6	80.1	12.3	7.6
Incr Delay (d2), s/veh	0.9	0.0	0.0	2.6	0.0	0.0	11.5	0.5	0.0	10.8	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	3.2	0.0	0.1	3.1	0.0	0.2	6.4	11.1	0.5	1.6	16.8	1.0
LnGrp Delay(d),s/veh	68.2	0.0	64.1	77.8	0.0	64.2	86.0	7.6	4.7	90.9	13.3	7.7
LnGrp LOS	E		E	E		E	F	A	A	F	B	A
Approach Vol, veh/h		78			73			1490			1545	
Approach Delay, s/veh		68.1			76.9			14.5			14.6	
Approach LOS		E			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.2	122.1		24.7	7.8	132.4		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	35.9		18.3	5.0	24.7		10.3
Green Ext Time (p_c), s	0.1	29.2		0.1	0.0	25.6		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	17.3
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	288	2	453	14	0	1	407	1348	7	52	1539	94
Adj No. of Lanes	0	1	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	349	2	929	78	0	6	493	2216	12	91	1847	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	1762	12	2758	1638	0	117	3442	3610	19	1774	3539	1583
Grp Volume(v), veh/h	290	0	453	15	0	0	407	661	694	52	1539	94
Grp Sat Flow(s),veh/h/ln	1775	0	1379	1755	0	0	1721	1770	1859	1774	1770	1583
Q Serve(g_s), s	27.9	0.0	23.3	1.5	0.0	0.0	20.5	41.0	41.1	5.1	65.6	5.4
Cycle Q Clear(g_c), s	27.9	0.0	23.3	1.5	0.0	0.0	20.5	41.0	41.1	5.1	65.6	5.4
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	351	0	929	83	0	0	493	1086	1141	91	1847	826
V/C Ratio(X)	0.83	0.00	0.49	0.18	0.00	0.00	0.83	0.61	0.61	0.57	0.83	0.11
Avail Cap(c_a), veh/h	557	0	1250	344	0	0	830	2074	2179	209	3711	1660
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	68.6	0.0	47.1	81.7	0.0	0.0	74.2	21.2	21.2	82.7	36.1	21.7
Incr Delay (d2), s/veh	2.8	0.0	0.1	0.4	0.0	0.0	1.4	0.8	0.8	2.1	1.5	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	14.0	0.0	8.9	0.7	0.0	0.0	9.9	20.2	21.3	2.6	32.4	2.4
LnGrp Delay(d),s/veh	71.4	0.0	47.3	82.1	0.0	0.0	75.6	22.0	22.0	84.8	37.5	21.8
LnGrp LOS	E		D	F			E	C	C	F	D	C
Approach Vol, veh/h		743			15			1762			1685	
Approach Delay, s/veh		56.7			82.1			34.4			38.1	
Approach LOS		E			F			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	29.5	97.1		12.4	13.2	113.4		39.3
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	22.5	67.6		3.5	7.1	43.1		29.9
Green Ext Time (p_c), s	1.0	23.5		0.0	0.0	14.4		2.3

Intersection Summary	
HCM 2010 Ctrl Delay	40.0
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	8	0	1	92	2	3	10	1699	94	84	2123	4
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	154	3	13	175	57	85	21	2608	143	110	2954	6
Arrive On Green	0.08	0.00	0.08	0.08	0.08	0.08	0.01	0.76	0.76	0.06	0.81	0.81
Sat Flow, veh/h	1224	36	157	1410	674	1011	1774	3412	188	1774	3624	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	1417	0	0	1410	0	1684	1774	1770	1830	1774	1770	1862
Q Serve(g_s), s	0.5	0.0	0.0	7.6	0.0	0.4	0.8	31.2	32.0	6.3	35.3	35.4
Cycle Q Clear(g_c), s	0.8	0.0	0.0	8.4	0.0	0.4	0.8	31.2	32.0	6.3	35.3	35.4
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	1353	1399	110	1442	1517
V/C Ratio(X)	0.05	0.00	0.00	0.53	0.00	0.04	0.49	0.65	0.66	0.76	0.72	0.72
Avail Cap(c_a), veh/h	303	0	0	306	0	299	145	1353	1399	250	1442	1517
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	5.6	5.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	2.4	0.0	0.1	4.8	1.8	1.8	4.1	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	0.3	0.0	0.0	3.5	0.0	0.2	0.4	15.5	16.5	3.2	17.9	18.8
LnGrp Delay(d),s/veh	57.1	0.0	0.0	62.8	0.0	57.1	71.1	9.2	9.3	66.4	8.7	8.5
LnGrp LOS	E			E		E	E	A	A	E	A	A
Approach Vol, veh/h		9			97			1803			2211	
Approach Delay, s/veh		57.1			62.5			9.6			10.8	
Approach LOS		E			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.6	114.0		15.4	12.4	107.2		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	37.4		10.4	8.3	34.0		2.8
Green Ext Time (p_c), s	0.0	40.6		0.2	0.1	30.6		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	11.6
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	174	12	7	64	5	5	5	1635	21	2	1789	242
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	14	8	260	20	17	7	2719	35	3	2681	1200
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	1355	93	54	1408	137	112	1774	3578	46	1774	3539	1583
Grp Volume(v), veh/h	193	0	0	74	0	0	5	808	848	2	1789	242
Grp Sat Flow(s),veh/h/ln	1503	0	0	1656	0	0	1774	1770	1855	1774	1770	1583
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	33.4	5.9
Cycle Q Clear(g_c), s	16.7	0.0	0.0	5.2	0.0	0.0	0.4	0.0	0.0	0.2	33.4	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	1345	1409	3	2681	1200
V/C Ratio(X)	0.70	0.00	0.00	0.25	0.00	0.00	0.74	0.60	0.60	0.70	0.67	0.20
Avail Cap(c_a), veh/h	379	0	0	401	0	0	105	1345	1409	105	2681	1200
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	51.0	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	34.7	1.5	1.4	51.9	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	7.3	0.0	0.0	2.5	0.0	0.0	0.3	0.5	0.5	0.1	16.5	2.6
LnGrp Delay(d),s/veh	59.0	0.0	0.0	51.5	0.0	0.0	101.6	1.5	1.4	119.3	8.8	4.9
LnGrp LOS	E			D			F	A	A	F	A	A
Approach Vol, veh/h		193			74			1661			2033	
Approach Delay, s/veh		59.0			51.5			1.7			8.5	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	106.3		24.2	4.2	106.6		24.2
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	35.4		7.2	2.2	2.0		18.7
Green Ext Time (p_c), s	0.0	41.3		0.2	0.0	50.7		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	8.9
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	150	38	5	99	25	2	55	1470	109	25	1735	144
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	223	44	256	294	283	23	70	2430	179	31	2335	191
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.16	0.08	1.00	1.00	0.02	0.71	0.70
Sat Flow, veh/h	1049	266	1538	1343	1698	136	1774	3342	247	1774	3312	272
Grp Volume(v), veh/h	188	0	5	99	0	27	55	775	804	25	917	962
Grp Sat Flow(s),veh/h/ln	1315	0	1538	1343	0	1834	1774	1770	1819	1774	1770	1814
Q Serve(g_s), s	17.4	0.0	0.4	0.0	0.0	1.7	4.1	0.0	0.0	1.9	42.8	45.0
Cycle Q Clear(g_c), s	19.1	0.0	0.4	8.2	0.0	1.7	4.1	0.0	0.0	1.9	42.8	45.0
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	267	0	256	294	0	305	70	1287	1322	31	1248	1279
V/C Ratio(X)	0.70	0.00	0.02	0.34	0.00	0.09	0.78	0.60	0.61	0.80	0.74	0.75
Avail Cap(c_a), veh/h	336	0	330	359	0	394	105	1287	1322	105	1248	1279
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	0.55	0.55	0.55	0.67	0.67	0.67
Uniform Delay (d), s/veh	55.7	0.0	47.0	50.3	0.0	47.6	61.6	0.0	0.0	66.1	12.2	12.6
Incr Delay (d2), s/veh	4.8	0.0	0.0	0.7	0.0	0.1	5.9	1.2	1.2	11.2	2.6	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	7.2	0.0	0.2	3.4	0.0	0.9	2.1	0.4	0.4	1.0	21.6	23.2
LnGrp Delay(d),s/veh	60.5	0.0	47.1	51.0	0.0	47.7	67.5	1.2	1.2	77.3	14.8	15.4
LnGrp LOS	E		D	D		D	E	A	A	E	B	B
Approach Vol, veh/h		193			126			1634			1904	
Approach Delay, s/veh		60.1			50.3			3.4			15.9	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.3	99.2		26.5	6.4	102.1		26.5
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	85.0		28.0	8.0	85.0		28.0
Max Q Clear Time (g_c+I1), s	6.1	47.0		10.2	3.9	2.0		21.1
Green Ext Time (p_c), s	0.0	28.7		0.4	0.0	33.3		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	14.0
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	160	80	162	85	420	76	1048	254	381	1238	58
Future Volume (veh/h)	54	160	80	162	85	420	76	1048	254	381	1238	58
Number	7	4	14	3	8	18	1	6	16	5	2	12
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	1.00		0.98	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	59	174	9	176	92	153	83	1139	197	414	1346	61
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	211	256	244	532	444	105	1401	622	407	1953	88
Arrive On Green	0.17	0.17	0.17	0.09	0.29	0.29	0.06	0.40	0.40	0.46	1.00	1.00
Sat Flow, veh/h	357	1261	1532	1774	1863	1553	1774	3539	1571	1774	3447	156
Grp Volume(v), veh/h	233	0	9	176	92	153	83	1139	197	414	690	717
Grp Sat Flow(s),veh/h/ln	1618	0	1532	1774	1863	1553	1774	1770	1571	1774	1770	1834
Q Serve(g_s), s	16.3	0.0	0.7	10.8	5.0	10.5	6.2	38.7	11.7	31.0	0.0	0.0
Cycle Q Clear(g_c), s	18.8	0.0	0.7	10.8	5.0	10.5	6.2	38.7	11.7	31.0	0.0	0.0
Prop In Lane	0.25		1.00	1.00		1.00	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	304	0	256	244	532	444	105	1401	622	407	1002	1039
V/C Ratio(X)	0.77	0.00	0.04	0.72	0.17	0.34	0.79	0.81	0.32	1.02	0.69	0.69
Avail Cap(c_a), veh/h	332	0	284	244	566	472	276	1401	622	407	1002	1039
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	1.00	0.88	0.88	0.88	0.56	0.56	0.56
Uniform Delay (d), s/veh	54.5	0.0	47.1	41.7	36.2	38.2	62.7	36.3	28.2	36.5	0.0	0.0
Incr Delay (d2), s/veh	9.5	0.0	0.1	10.0	0.2	0.5	4.5	4.7	1.2	37.6	2.2	2.1
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	0.3	6.0	2.6	4.6	3.2	19.7	5.3	19.3	0.6	0.6
LnGrp Delay(d),s/veh	64.0	0.0	47.2	51.7	36.4	38.7	67.2	41.0	29.3	74.1	2.2	2.1
LnGrp LOS	E		D	D	D	D	E	D	C	F	A	A
Approach Vol, veh/h		242			421			1419			1821	
Approach Delay, s/veh		63.4			43.6			40.9			18.5	
Approach LOS		E			D			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	12.0	80.5	16.0	26.6	35.0	57.4		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	21.0	60.0	11.0	24.0	31.0	50.0		40.0
Max Q Clear Time (g_c+I1), s	8.2	2.0	12.8	20.8	33.0	40.7		12.5
Green Ext Time (p_c), s	0.1	23.4	0.0	0.3	0.0	6.9		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	32.1
HCM 2010 LOS	C

Notes

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	42	24	30	27	30	6	272	300	19	11	273	29
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	243	101	194	189	123	19	360	812	51	15	511	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	777	812	1567	493	988	156	1774	1733	110	1774	1863	1580
Grp Volume(v), veh/h	66	0	30	63	0	0	272	0	319	11	273	29
Grp Sat Flow(s),veh/h/ln	1589	0	1567	1637	0	0	1774	0	1843	1774	1863	1580
Q Serve(g_s), s	0.1	0.0	0.7	0.0	0.0	0.0	5.8	0.0	4.5	0.2	5.0	0.5
Cycle Q Clear(g_c), s	1.3	0.0	0.7	1.3	0.0	0.0	5.8	0.0	4.5	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	344	0	194	331	0	0	360	0	864	15	511	434
V/C Ratio(X)	0.19	0.00	0.15	0.19	0.00	0.00	0.76	0.00	0.37	0.72	0.53	0.07
Avail Cap(c_a), veh/h	1056	0	937	1073	0	0	1326	0	3627	663	2970	2520
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	16.0	0.0	15.7	15.9	0.0	0.0	15.1	0.0	6.9	19.9	12.4	10.8
Incr Delay (d2), s/veh	0.3	0.0	0.4	0.3	0.0	0.0	3.3	0.0	0.6	47.3	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	0.7	0.0	0.3	0.7	0.0	0.0	3.1	0.0	2.4	0.3	2.8	0.3
LnGrp Delay(d),s/veh	16.2	0.0	16.1	16.2	0.0	0.0	18.3	0.0	7.4	67.1	14.2	10.9
LnGrp LOS	B		B	B			B		A	E	B	B
Approach Vol, veh/h		96			63			591			313	
Approach Delay, s/veh		16.2			16.2			12.4			15.8	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
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	6.5		3.3	7.8	7.0		3.3
Green Ext Time (p_c), s	0.0	4.3		0.4	0.8	3.8		0.3

Intersection Summary		
HCM 2010 Ctrl Delay		14.0
HCM 2010 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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	57	17	21	38	16	1	128	408	0	13	450	22
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	75	239	340	265	17	456	777	660	453	654	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	1010	489	1558	1346	1733	108	1774	1863	1583	1774	1863	1577
Grp Volume(v), veh/h	74	0	21	38	0	17	128	408	0	13	450	22
Grp Sat Flow(s),veh/h/ln	1498	0	1558	1346	0	1842	1774	1863	1583	1774	1863	1577
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	7.9	0.4
Cycle Q Clear(g_c), s	1.6	0.0	0.4	2.5	0.0	0.3	1.7	6.2	0.0	0.2	7.9	0.4
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	397	0	239	340	0	282	456	777	660	453	654	553
V/C Ratio(X)	0.19	0.00	0.09	0.11	0.00	0.06	0.28	0.53	0.00	0.03	0.69	0.04
Avail Cap(c_a), veh/h	1129	0	1022	1017	0	1208	1019	2492	2118	1133	2492	2109
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	13.9	15.5	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	0.6	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	0.7	0.0	0.2	0.4	0.0	0.2	0.8	3.3	0.0	0.1	4.2	0.2
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		B	B		B	A	A		A	B	A
Approach Vol, veh/h		95			55			536			485	
Approach Delay, s/veh		14.4			15.1			8.6			11.6	
Approach LOS		B			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	21.9		10.8	7.9	19.4		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		3.6	3.7	9.9		4.5
Green Ext Time (p_c), s	0.0	2.7		0.4	0.2	3.1		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	10.6
HCM 2010 LOS	B

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	40	5	5	11	2	1	76	502	7	4	632	23
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	93	93	20	162	138	99	897	762	6	799	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	1774	852	852	1774	1863	1583	1774	1863	1583	1774	1863	1581
Grp Volume(v), veh/h	40	0	10	11	2	1	76	502	7	4	632	23
Grp Sat Flow(s),veh/h/ln	1774	0	1705	1774	1863	1583	1774	1863	1583	1774	1863	1581
Q Serve(g_s), s	1.1	0.0	0.3	0.3	0.0	0.0	2.1	9.7	0.1	0.1	14.9	0.4
Cycle Q Clear(g_c), s	1.1	0.0	0.3	0.3	0.0	0.0	2.1	9.7	0.1	0.1	14.9	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	60	0	187	20	162	138	99	897	762	6	799	678
V/C Ratio(X)	0.66	0.00	0.05	0.55	0.01	0.01	0.77	0.56	0.01	0.70	0.79	0.03
Avail Cap(c_a), veh/h	700	0	706	700	772	656	875	2388	2030	875	2388	2028
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	24.2	0.0	20.2	24.9	21.2	21.1	23.6	9.3	6.8	25.2	12.5	8.4
Incr Delay (d2), s/veh	11.8	0.0	0.1	21.2	0.0	0.0	11.8	0.6	0.0	92.3	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	0.3	0.0	0.0	1.4	5.0	0.1	0.2	7.9	0.2
LnGrp Delay(d),s/veh	36.0	0.0	20.3	46.2	21.2	21.2	35.4	9.9	6.9	117.6	14.3	8.4
LnGrp LOS	D		C	D	C	C	D	A	A	F	B	A
Approach Vol, veh/h		50			14			585			659	
Approach Delay, s/veh		32.9			40.8			13.2			14.7	
Approach LOS		C			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	29.4	5.6	10.6	7.8	26.7	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	11.7	2.3	2.3	4.1	16.9	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 2010 Ctrl Delay	15.0
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	52	10	0	10	0	1	387	545	5	0	687	15
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	215	15	102	228	5	9	467	2557	23	4	1298	578
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	1245	239	1583	1363	80	144	1774	3594	33	1774	3539	1577
Grp Volume(v), veh/h	62	0	0	11	0	0	387	268	282	0	687	15
Grp Sat Flow(s),veh/h/ln	1485	0	1583	1587	0	0	1774	1770	1857	1774	1770	1577
Q Serve(g_s), s	1.7	0.0	0.0	0.0	0.0	0.0	10.1	2.5	2.5	0.0	7.5	0.3
Cycle Q Clear(g_c), s	1.9	0.0	0.0	0.3	0.0	0.0	10.1	2.5	2.5	0.0	7.5	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	261	0	102	274	0	0	467	1259	1321	4	1298	578
V/C Ratio(X)	0.24	0.00	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	764	0	646	904	0	0	2569	2490	2613	2569	4980	2219
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	21.2	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	0.8	0.0	0.0	0.1	0.0	0.0	5.1	1.3	1.3	0.0	3.8	0.1
LnGrp Delay(d),s/veh	22.4	0.0	0.0	21.2	0.0	0.0	18.5	2.6	2.6	0.0	12.9	10.0
LnGrp LOS	C			C			B	A	A		B	A
Approach Vol, veh/h		62			11			937			702	
Approach Delay, s/veh		22.4			21.2			9.2			12.9	
Approach LOS		C			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.9	24.0		8.2	0.0	40.9		8.2
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	12.1	9.5		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 2010 Ctrl Delay		11.2
HCM 2010 LOS		B

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	28	2	1	15	2	1	47	898	15	10	1240	26
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	240	12	131	207	22	6	57	2315	39	14	2213	988
Arrive On Green	0.10	0.08	0.08	0.10	0.08	0.08	0.03	0.65	0.65	0.01	0.63	0.63
Sat Flow, veh/h	1325	142	1547	1013	259	75	1774	3562	60	1774	3539	1580
Grp Volume(v), veh/h	30	0	1	18	0	0	47	446	467	10	1240	26
Grp Sat Flow(s),veh/h/ln	1468	0	1547	1347	0	0	1774	1770	1852	1774	1770	1580
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	11.0	0.3
Cycle Q Clear(g_c), s	0.8	0.0	0.0	1.0	0.0	0.0	1.4	6.4	6.4	0.3	11.0	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	279	0	131	260	0	0	57	1150	1204	14	2213	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	756	0	656	746	0	0	686	2804	2934	359	4955	2211
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	22.8	22.7	0.0	0.0	26.1	4.5	4.5	26.9	5.9	3.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	10.2	0.5	0.4	23.6	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	0.4	0.0	0.0	0.2	0.0	0.0	0.9	3.2	3.4	0.2	5.3	0.2
LnGrp Delay(d),s/veh	22.8	0.0	22.8	22.7	0.0	0.0	36.3	4.9	4.9	50.5	6.3	3.9
LnGrp LOS	C		C	C			D	A	A	D	A	A
Approach Vol, veh/h		31			18			960			1276	
Approach Delay, s/veh		22.8			22.7			6.4			6.6	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.8	38.9		9.6	4.4	40.3		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	13.0		3.0	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 2010 Ctrl Delay	6.9
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	52	2	17	41	3	3	110	850	28	29	1211	34
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	10	260	287	141	141	144	2064	923	55	1887	844
Arrive On Green	0.18	0.16	0.16	0.16	0.16	0.16	0.08	0.58	0.58	0.03	0.53	0.53
Sat Flow, veh/h	1338	63	1578	1383	854	854	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	54	0	17	41	0	6	110	850	28	29	1211	34
Grp Sat Flow(s),veh/h/ln	1401	0	1578	1383	0	1709	1774	1770	1583	1774	1770	1583
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	16.5	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	16.5	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	356	0	260	287	0	282	144	2064	923	55	1887	844
V/C Ratio(X)	0.15	0.00	0.07	0.14	0.00	0.02	0.77	0.41	0.03	0.53	0.64	0.04
Avail Cap(c_a), veh/h	622	0	557	548	0	604	548	3595	1608	313	3126	1399
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	24.3	0.0	23.9	26.4	0.0	23.8	30.6	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	2.9	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	0.3	0.7	0.0	0.1	2.1	4.4	0.2	0.6	8.1	0.3
LnGrp Delay(d),s/veh	24.5	0.0	24.0	26.7	0.0	23.8	33.8	8.0	6.0	35.3	12.0	7.6
LnGrp LOS	C		C	C		C	C	A	A	D	B	A
Approach Vol, veh/h		71			47			988			1274	
Approach Delay, s/veh		24.4			26.3			10.9			12.4	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.5	42.2		16.2	6.1	45.6		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	18.5		6.1	3.1	10.9		4.3
Green Ext Time (p_c), s	0.2	17.7		0.1	0.0	11.5		0.2

Intersection Summary		
HCM 2010 Ctrl Delay		12.4
HCM 2010 LOS		B

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	222	1	255	13	3	4	304	987	13	27	1240	107
Adj No. of Lanes	0	1	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	321	1	846	58	13	18	454	1926	25	124	1685	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	1766	8	2787	1134	262	349	3442	3577	47	1774	3539	1582
Grp Volume(v), veh/h	223	0	255	20	0	0	304	488	512	27	1240	107
Grp Sat Flow(s),veh/h/ln	1774	0	1393	1744	0	0	1721	1770	1854	1774	1770	1582
Q Serve(g_s), s	11.8	0.0	7.0	1.1	0.0	0.0	8.5	17.7	17.7	1.4	28.4	3.8
Cycle Q Clear(g_c), s	11.8	0.0	7.0	1.1	0.0	0.0	8.5	17.7	17.7	1.4	28.4	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	322	0	846	89	0	0	454	953	999	124	1685	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	0.74	0.14
Avail Cap(c_a), veh/h	989	0	1893	608	0	0	1473	3681	3857	371	6587	2945
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	38.5	0.0	26.8	46.0	0.0	0.0	41.5	14.8	14.8	44.2	21.2	14.8
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	5.9	0.0	2.7	0.5	0.0	0.0	4.1	8.7	9.1	0.7	14.0	1.7
LnGrp Delay(d),s/veh	39.5	0.0	26.9	46.5	0.0	0.0	42.2	15.4	15.4	44.5	22.1	14.9
LnGrp LOS	D		C	D			D	B	B	D	C	B
Approach Vol, veh/h		478			20			1304			1374	
Approach Delay, s/veh		32.8			46.5			21.6			22.0	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	17.3	51.8		9.1	11.0	58.1		22.2
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	10.5	30.4		3.1	3.4	19.7		13.8
Green Ext Time (p_c), s	0.8	15.5		0.0	0.0	8.3		1.4

Intersection Summary		
HCM 2010 Ctrl Delay		23.6
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	2	0	1	141	1	4	2	1177	86	85	1693	7
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	157	9	60	228	40	159	5	2418	177	111	2831	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	912	74	493	1410	326	1306	1774	3345	244	1774	3615	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	1479	0	0	1410	0	1632	1774	1770	1820	1774	1770	1860
Q Serve(g_s), s	0.0	0.0	0.0	12.4	0.0	0.4	0.1	3.3	3.4	6.1	24.8	24.9
Cycle Q Clear(g_c), s	0.2	0.0	0.0	12.6	0.0	0.4	0.1	3.3	3.4	6.1	24.8	24.9
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	1279	1316	111	1386	1457
V/C Ratio(X)	0.01	0.00	0.00	0.62	0.00	0.03	0.42	0.49	0.49	0.76	0.60	0.60
Avail Cap(c_a), veh/h	318	0	0	316	0	301	150	1279	1316	150	1386	1457
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	55.6	0.0	50.6	64.7	0.8	0.8	60.0	5.8	5.8
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.7	0.0	0.1	18.7	1.2	1.2	9.7	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	5.1	0.0	0.2	0.1	1.7	1.8	3.3	12.7	13.3
LnGrp Delay(d),s/veh	50.4	0.0	0.0	58.4	0.0	50.7	83.4	2.0	2.0	69.6	7.7	7.6
LnGrp LOS	D			E		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			10.6	
Approach LOS		D			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.3	105.8		19.9	12.2	98.0		19.9
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	82.0		23.0	11.0	82.0		23.0
Max Q Clear Time (g_c+I1), s	2.1	26.9		14.6	8.1	5.4		2.2
Green Ext Time (p_c), s	0.0	31.9		0.3	0.0	20.4		0.0

Intersection Summary		
HCM 2010 Ctrl Delay	9.4	
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	124	3	12	67	3	7	12	1136	15	8	1488	182
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	207	11	17	14	2824	37	10	2786	1246
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	1366	33	132	1385	96	148	1774	3577	47	1774	3539	1582
Grp Volume(v), veh/h	139	0	0	77	0	0	12	562	589	8	1488	182
Grp Sat Flow(s),veh/h/ln	1531	0	0	1629	0	0	1774	1770	1854	1774	1770	1582
Q Serve(g_s), s	5.8	0.0	0.0	0.0	0.0	0.0	0.9	24.7	24.7	0.6	20.1	3.6
Cycle Q Clear(g_c), s	11.3	0.0	0.0	5.5	0.0	0.0	0.9	24.7	24.7	0.6	20.1	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	224	0	0	235	0	0	14	1397	1464	10	2786	1246
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	349	0	0	360	0	0	109	1397	1464	109	2786	1246
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	12.3	12.3	64.5	5.1	3.3
Incr Delay (d2), s/veh	2.8	0.0	0.0	0.8	0.0	0.0	30.7	0.7	0.7	28.6	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	5.0	0.0	0.0	2.6	0.0	0.0	0.6	12.3	12.9	0.4	9.9	1.6
LnGrp Delay(d),s/veh	58.8	0.0	0.0	54.5	0.0	0.0	95.2	13.0	13.0	93.2	5.6	3.5
LnGrp LOS	E			D			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	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.1	106.3		18.6	4.8	106.6		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	22.1		7.5	2.6	26.7		13.3
Green Ext Time (p_c), s	0.0	40.8		0.2	0.0	22.8		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	12.5
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.99	1.00		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	151	18	6	90	21	2	63	1220	62	15	1510	124
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	232	21	241	302	256	24	80	2552	130	18	2352	192
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.09	1.00	1.00	0.01	0.94	0.93
Sat Flow, veh/h	1175	140	1574	1384	1674	159	1774	3427	174	1774	3314	270
Grp Volume(v), veh/h	169	0	6	90	0	23	63	630	652	15	802	832
Grp Sat Flow(s),veh/h/ln	1315	0	1574	1384	0	1833	1774	1770	1831	1774	1770	1815
Q Serve(g_s), s	15.1	0.0	0.4	0.0	0.0	1.4	4.5	0.0	0.0	1.1	8.3	8.8
Cycle Q Clear(g_c), s	16.5	0.0	0.4	6.3	0.0	1.4	4.5	0.0	0.0	1.1	8.3	8.8
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	254	0	241	302	0	280	80	1318	1364	18	1256	1288
V/C Ratio(X)	0.67	0.00	0.02	0.30	0.00	0.08	0.79	0.48	0.48	0.85	0.64	0.65
Avail Cap(c_a), veh/h	331	0	327	378	0	381	109	1318	1364	109	1256	1288
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	0.75	0.75	0.75	0.81	0.81	0.81
Uniform Delay (d), s/veh	54.3	0.0	46.8	49.3	0.0	47.3	58.5	0.0	0.0	64.0	1.3	1.3
Incr Delay (d2), s/veh	3.2	0.0	0.0	0.5	0.0	0.1	12.4	0.9	0.9	26.6	2.0	2.0
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	0.2	2.9	0.0	0.7	2.5	0.3	0.3	0.7	4.2	4.7
LnGrp Delay(d),s/veh	57.6	0.0	46.9	49.9	0.0	47.4	70.9	0.9	0.9	90.6	3.3	3.4
LnGrp LOS	E		D	D		D	E	A	A	F	A	A
Approach Vol, veh/h		175			113			1345			1649	
Approach Delay, s/veh		57.2			49.4			4.2			4.1	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.9	96.3		23.9	5.3	100.8		23.9
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	10.8		8.3	3.1	2.0		18.5
Green Ext Time (p_c), s	0.0	33.8		0.3	0.0	21.1		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	8.6
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	112	124	191	93	381	108	779	256	346	952	89
Future Volume (veh/h)	51	112	124	191	93	381	108	779	256	346	952	89
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.95	0.98		0.97	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	55	122	20	208	101	96	117	847	182	376	1035	93
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	103	187	240	315	555	459	143	1343	592	408	1738	156
Arrive On Green	0.16	0.16	0.16	0.11	0.30	0.30	0.08	0.38	0.38	0.08	0.17	0.17
Sat Flow, veh/h	421	1173	1503	1774	1863	1540	1774	3539	1560	1774	3285	295
Grp Volume(v), veh/h	177	0	20	208	101	96	117	847	182	376	557	571
Grp Sat Flow(s),veh/h/ln	1593	0	1503	1774	1863	1540	1774	1770	1560	1774	1770	1810
Q Serve(g_s), s	10.8	0.0	1.5	12.4	5.2	6.1	8.4	25.4	10.7	27.4	37.7	37.8
Cycle Q Clear(g_c), s	13.4	0.0	1.5	12.4	5.2	6.1	8.4	25.4	10.7	27.4	37.7	37.8
Prop In Lane	0.31		1.00	1.00		1.00	1.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	291	0	240	315	555	459	143	1343	592	408	936	958
V/C Ratio(X)	0.61	0.00	0.08	0.66	0.18	0.21	0.82	0.63	0.31	0.92	0.60	0.60
Avail Cap(c_a), veh/h	353	0	301	315	630	521	328	1343	592	491	936	958
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	1.00	0.79	0.79	0.79	0.71	0.71	0.71
Uniform Delay (d), s/veh	51.3	0.0	46.5	39.0	33.8	34.1	58.9	32.9	28.3	58.9	40.8	40.9
Incr Delay (d2), s/veh	2.1	0.0	0.1	5.1	0.2	0.2	3.5	1.8	1.1	14.7	2.0	1.9
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	6.2	0.0	0.6	6.5	2.7	2.6	4.3	12.7	4.8	15.1	19.0	19.5
LnGrp Delay(d),s/veh	53.4	0.0	46.7	44.0	34.0	34.4	62.4	34.7	29.4	73.6	42.8	42.8
LnGrp LOS	D		D	D	C	C	E	C	C	E	D	D
Approach Vol, veh/h		197			405			1146			1504	
Approach Delay, s/veh		52.7			39.2			36.7			50.5	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	14.4	72.8	18.0	24.8	33.9	53.3		42.8
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	10.4	39.8	14.4	15.4	29.4	27.4		8.1
Green Ext Time (p_c), s	0.2	6.0	0.0	0.5	0.5	5.8		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	44.4
HCM 2010 LOS	D

Notes

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	54	49	42	98	54	11	239	250	51	11	147	8
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	320	789	671	15	469	399
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	612	999	1569	1291	1500	306	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	103	0	42	98	0	65	239	250	51	11	147	8
Grp Sat Flow(s),veh/h/ln	1612	0	1569	1291	0	1806	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	0.5	0.0	0.9	2.9	0.0	1.2	5.1	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	5.1	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	320	789	671	15	469	399
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	1078	0	948	896	0	1091	1341	3706	3151	670	3003	2552
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	12.1	11.2
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.5	0.0	0.4	3.5	0.5	0.1	47.2	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	1.0	0.0	0.4	1.1	0.0	0.6	2.8	1.9	0.3	0.3	1.4	0.1
LnGrp Delay(d),s/veh	15.0	0.0	14.5	17.4	0.0	14.7	18.9	8.1	6.9	66.8	12.9	11.2
LnGrp LOS	B		B	B		B	B	A	A	E	B	B
Approach Vol, veh/h		145			163			540			166	
Approach Delay, s/veh		14.9			16.3			12.8			16.4	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.3	22.8		11.5	12.2	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	7.1	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 2010 Ctrl Delay	14.2
HCM 2010 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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	5	20	98	22	2	147	560	0	11	560	28
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	309	347	336	31	409	878	746	365	725	612
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	1209	122	1544	1351	1679	153	1774	1863	1583	1774	1863	1571
Grp Volume(v), veh/h	70	0	20	98	0	24	147	560	0	11	560	28
Grp Sat Flow(s),veh/h/ln	1331	0	1544	1351	0	1831	1774	1863	1583	1774	1863	1571
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	13.1	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	13.1	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	405	0	309	347	0	366	409	878	746	365	725	612
V/C Ratio(X)	0.17	0.00	0.06	0.28	0.00	0.07	0.36	0.64	0.00	0.03	0.77	0.05
Avail Cap(c_a), veh/h	819	0	773	754	0	917	782	1903	1618	883	1903	1605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	10.0	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	0.8	0.0	0.2	1.3	0.0	0.3	1.1	5.9	0.0	0.1	7.0	0.2
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		B	B		B	A	B		A	B	A
Approach Vol, veh/h		90			122			707			599	
Approach Delay, s/veh		17.1			19.2			10.6			14.7	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	29.5		15.0	9.5	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	13.3		4.5	4.2	15.1		7.8
Green Ext Time (p_c), s	0.0	4.0		0.4	0.3	4.1		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	13.3
HCM 2010 LOS	B

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	5	11	5	5	1	65	652	9	5	777	17
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	175	147	84	1010	858	7	929	784
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	1774	515	1132	1774	1863	1564	1774	1863	1583	1774	1863	1572
Grp Volume(v), veh/h	43	0	16	5	5	1	65	652	9	5	777	17
Grp Sat Flow(s),veh/h/ln	1774	0	1646	1774	1863	1564	1774	1863	1583	1774	1863	1572
Q Serve(g_s), s	1.5	0.0	0.5	0.2	0.1	0.0	2.2	15.1	0.2	0.2	22.0	0.3
Cycle Q Clear(g_c), s	1.5	0.0	0.5	0.2	0.1	0.0	2.2	15.1	0.2	0.2	22.0	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	202	9	175	147	84	1010	858	7	929	784
V/C Ratio(X)	0.72	0.00	0.08	0.53	0.03	0.01	0.77	0.65	0.01	0.71	0.84	0.02
Avail Cap(c_a), veh/h	578	0	563	578	637	535	723	1973	1677	723	1973	1665
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	29.4	0.0	23.9	30.4	25.3	25.2	28.9	9.9	6.5	30.5	13.2	7.8
Incr Delay (d2), s/veh	14.6	0.0	0.2	39.1	0.1	0.0	13.8	0.7	0.0	81.5	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	1.0	0.0	0.2	0.2	0.1	0.0	1.4	7.8	0.1	0.2	11.8	0.1
LnGrp Delay(d),s/veh	44.0	0.0	24.0	69.5	25.3	25.2	42.7	10.6	6.5	112.0	15.3	7.8
LnGrp LOS	D		C	E	C	C	D	B	A	F	B	A
Approach Vol, veh/h		59			11			726			799	
Approach Delay, s/veh		38.6			45.4			13.4			15.8	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	38.3	5.3	12.5	7.9	35.6	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	17.1	2.2	2.5	4.2	24.0	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 2010 Ctrl Delay	15.7
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	38	11	0	22	5	0	342	734	48	11	875	3
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	31	117	200	31	0	411	2202	144	15	1521	680
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	1112	417	1583	1143	422	0	1774	3373	220	1774	3539	1583
Grp Volume(v), veh/h	49	0	0	27	0	0	342	385	397	11	875	3
Grp Sat Flow(s),veh/h/ln	1530	0	1583	1565	0	0	1774	1770	1824	1774	1770	1583
Q Serve(g_s), s	0.8	0.0	0.0	0.0	0.0	0.0	10.4	5.5	5.5	0.3	10.6	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	0.3	10.6	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	253	0	117	258	0	0	411	1155	1190	15	1521	680
V/C Ratio(X)	0.19	0.00	0.00	0.10	0.00	0.00	0.83	0.33	0.33	0.74	0.58	0.00
Avail Cap(c_a), veh/h	667	0	560	796	0	0	2070	2315	2386	2070	4631	2072
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	24.6	0.0	0.0	24.2	0.0	0.0	20.7	4.4	4.4	28.0	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	22.7	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	0.4	0.0	0.0	5.2	2.7	2.8	0.3	5.3	0.0
LnGrp Delay(d),s/veh	25.0	0.0	0.0	24.4	0.0	0.0	22.4	4.7	4.7	50.7	13.0	9.2
LnGrp LOS	C			C			C	A	A	D	B	A
Approach Vol, veh/h		49			27			1124			889	
Approach Delay, s/veh		25.0			24.4			10.1			13.4	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	17.1	30.3		9.2	4.5	42.9		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	12.6		2.8	2.3	7.5		3.6
Green Ext Time (p_c), s	0.8	11.7		0.0	0.0	9.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.0
HCM 2010 LOS	B

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	33	0	1	11	5	1	147	1179	21	16	1386	38
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	121	19	3	186	2603	46	20	2259	1011
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	1553	0	1583	701	414	70	1774	3558	63	1774	3539	1583
Grp Volume(v), veh/h	33	0	1	17	0	0	147	586	614	16	1386	38
Grp Sat Flow(s),veh/h/ln	1553	0	1583	1185	0	0	1774	1770	1852	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	5.4	8.8	8.8	0.6	15.5	0.6
Cycle Q Clear(g_c), s	1.2	0.0	0.0	1.6	0.0	0.0	5.4	8.8	8.8	0.6	15.5	0.6
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	1295	1355	20	2259	1011
V/C Ratio(X)	0.16	0.00	0.01	0.11	0.00	0.00	0.79	0.45	0.45	0.78	0.61	0.04
Avail Cap(c_a), veh/h	625	0	548	621	0	0	561	2292	2398	294	4050	1812
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	4.4
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	0.6	0.0	0.0	0.3	0.0	0.0	2.8	4.4	4.6	0.4	7.5	0.3
LnGrp Delay(d),s/veh	30.4	0.0	30.3	30.9	0.0	0.0	31.8	4.1	4.1	53.5	7.7	4.5
LnGrp LOS	C		C	C			C	A	A	D	A	A
Approach Vol, veh/h		34			17			1347			1440	
Approach Delay, s/veh		30.4			30.9			7.1			8.1	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.0	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	7.4	17.5		3.6	2.6	10.8		3.2
Green Ext Time (p_c), s	0.1	24.9		0.0	0.0	18.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.1
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	5	1	43	16	1	120	1332	50	27	1332	35
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	153	111	168	10	142	2776	1242	39	2571	1150
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	1193	120	1578	1401	1735	108	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	65	0	1	43	0	17	120	1332	50	27	1332	35
Grp Sat Flow(s),veh/h/ln	1313	0	1578	1401	0	1843	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	6.6	0.0	0.1	4.7	0.0	1.3	10.3	20.2	1.1	2.3	25.6	1.0
Cycle Q Clear(g_c), s	7.9	0.0	0.1	12.5	0.0	1.3	10.3	20.2	1.1	2.3	25.6	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	153	111	0	178	142	2776	1242	39	2571	1150
V/C Ratio(X)	0.38	0.00	0.01	0.39	0.00	0.10	0.85	0.48	0.04	0.69	0.52	0.03
Avail Cap(c_a), veh/h	254	0	244	192	0	285	240	2776	1242	240	2571	1150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	63.8	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	3.7	0.4	0.0	7.6	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	2.7	0.0	0.0	1.9	0.0	0.7	5.2	10.0	0.5	1.2	12.7	0.4
LnGrp Delay(d),s/veh	68.7	0.0	63.3	75.0	0.0	64.1	74.0	6.2	3.8	82.9	10.0	6.0
LnGrp LOS	E		E	E		E	E	A	A	F	B	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	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.6		20.0	7.4	127.6		20.0
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	27.6		14.5	4.3	22.2		9.9
Green Ext Time (p_c), s	0.1	24.4		0.1	0.0	25.2		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	13.9
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	147	11	67	11	11	3	462	1424	16	87	1288	76
Adj No. of Lanes	0	1	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	825	60	60	16	601	2033	23	147	1683	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	1656	124	2731	783	783	214	3442	3585	40	1774	3539	1577
Grp Volume(v), veh/h	158	0	67	25	0	0	462	703	737	87	1288	76
Grp Sat Flow(s),veh/h/ln	1780	0	1365	1780	0	0	1721	1770	1856	1774	1770	1577
Q Serve(g_s), s	9.6	0.0	2.0	1.5	0.0	0.0	14.6	32.4	32.5	5.4	34.2	2.3
Cycle Q Clear(g_c), s	9.6	0.0	2.0	1.5	0.0	0.0	14.6	32.4	32.5	5.4	34.2	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	136	0	0	601	1004	1053	147	1683	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	0.77	0.08
Avail Cap(c_a), veh/h	532	0	1278	485	0	0	1753	3015	3162	234	4694	2289
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	47.0	0.0	28.7	49.4	0.0	0.0	44.8	17.7	17.7	50.3	24.6	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	1.1	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	4.8	0.0	0.8	0.8	0.0	0.0	7.0	16.2	17.0	2.7	16.9	1.3
LnGrp Delay(d),s/veh	48.2	0.0	28.7	50.1	0.0	0.0	45.6	19.0	18.9	51.8	25.7	9.6
LnGrp LOS	D		C	D			D	B	B	D	C	A
Approach Vol, veh/h		225			25			1902			1451	
Approach Delay, s/veh		42.4			50.1			25.4			26.4	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	23.9	58.1		12.7	13.4	68.6		19.1
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	16.6	36.2		3.5	7.4	34.5		11.6
Green Ext Time (p_c), s	1.3	16.0		0.0	0.1	16.4		0.5

Intersection Summary		
HCM 2010 Ctrl Delay		27.0
HCM 2010 LOS		C

Notes

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	1897	96	33	1505	5
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	176	0	138	11	2706	136	63	2961	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	584	895	148	1372	0	1543	1774	3429	172	1774	3618	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	1627	0	0	1372	0	1543	1774	1770	1832	1774	1770	1861
Q Serve(g_s), s	0.0	0.0	0.0	5.4	0.0	0.1	0.4	35.9	37.3	2.6	18.1	18.1
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	35.9	37.3	2.6	18.1	18.1
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	176	0	138	11	1396	1446	63	1448	1523
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.45	0.70	0.71	0.52	0.51	0.51
Avail Cap(c_a), veh/h	312	0	0	289	0	265	101	1396	1446	101	1448	1523
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	7.1	66.3	3.9	4.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	6.5	1.9	1.9	2.5	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	2.5	0.0	0.0	0.2	18.0	19.2	1.3	9.1	9.5
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	75.8	8.8	9.0	68.8	5.2	5.2
LnGrp LOS	E			E		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			6.6	
Approach LOS		E			E			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	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	20.1		8.1	4.6	39.3		2.8
Green Ext Time (p_c), s	0.0	29.0		0.1	0.0	41.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.1
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	98	5	3	114	16	12	5	1875	21	11	1337	141
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	198	20	15	7	2805	31	14	2782	1243
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	1387	71	42	1312	184	138	1774	3585	40	1774	3539	1581
Grp Volume(v), veh/h	106	0	0	142	0	0	5	924	972	11	1337	141
Grp Sat Flow(s),veh/h/ln	1500	0	0	1634	0	0	1774	1770	1856	1774	1770	1581
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.3	28.5	28.8	0.7	15.6	2.5
Cycle Q Clear(g_c), s	7.9	0.0	0.0	9.8	0.0	0.0	0.3	28.5	28.8	0.7	15.6	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	1384	1452	14	2782	1243
V/C Ratio(X)	0.48	0.00	0.00	0.61	0.00	0.00	0.73	0.67	0.67	0.81	0.48	0.11
Avail Cap(c_a), veh/h	430	0	0	450	0	0	118	1384	1452	118	2782	1243
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.64	0.64	0.64	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	6.0	59.5	4.4	3.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.5	0.0	0.0	30.1	1.7	1.6	28.7	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	3.5	0.0	0.0	4.7	0.0	0.0	0.2	14.2	15.0	0.5	7.6	1.2
LnGrp Delay(d),s/veh	52.6	0.0	0.0	54.3	0.0	0.0	89.8	7.6	7.6	88.2	4.9	3.2
LnGrp LOS	D			D			F	A	A	F	A	A
Approach Vol, veh/h		106			142			1901			1489	
Approach Delay, s/veh		52.6			54.3			7.8			5.4	
Approach LOS		D			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.3		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	17.6		11.8	2.7	30.8		9.9
Green Ext Time (p_c), s	0.0	31.2		0.5	0.0	32.5		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	9.9
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	158	33	2	158	27	5	27	1685	80	11	1380	73
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	38	265	307	259	48	34	2536	120	13	2480	131
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	1070	224	1558	1358	1525	282	1774	3441	163	1774	3420	181
Grp Volume(v), veh/h	191	0	2	158	0	32	27	862	903	11	713	740
Grp Sat Flow(s),veh/h/ln	1294	0	1558	1358	0	1807	1774	1770	1834	1774	1770	1831
Q Serve(g_s), s	18.4	0.0	0.1	0.0	0.0	2.1	2.1	0.0	0.0	0.9	25.9	26.2
Cycle Q Clear(g_c), s	20.5	0.0	0.1	13.4	0.0	2.1	2.1	0.0	0.0	0.9	25.9	26.2
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	267	0	265	307	0	307	34	1304	1352	13	1283	1328
V/C Ratio(X)	0.72	0.00	0.01	0.51	0.00	0.10	0.79	0.66	0.67	0.83	0.56	0.56
Avail Cap(c_a), veh/h	310	0	312	348	0	361	139	1304	1352	139	1283	1328
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	0.50	0.50	0.50	0.86	0.86	0.86
Uniform Delay (d), s/veh	57.8	0.0	48.3	53.8	0.0	49.2	67.0	0.0	0.0	69.4	8.8	8.9
Incr Delay (d2), s/veh	6.5	0.0	0.0	1.3	0.0	0.1	7.6	1.3	1.3	32.4	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	7.7	0.0	0.1	5.8	0.0	1.1	1.1	0.5	0.5	0.5	13.0	13.7
LnGrp Delay(d),s/veh	64.2	0.0	48.3	55.1	0.0	49.3	74.7	1.3	1.3	101.8	10.3	10.4
LnGrp LOS	E		D	E		D	E	A	A	F	B	B
Approach Vol, veh/h		193			190			1792			1464	
Approach Delay, s/veh		64.1			54.2			2.4			11.0	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	105.5		27.8	5.0	107.2		27.8
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	88.0		27.0	11.0	88.0		27.0
Max Q Clear Time (g_c+I1), s	4.1	28.2		15.4	2.9	2.0		22.5
Green Ext Time (p_c), s	0.0	25.1		0.5	0.0	43.0		0.3

Intersection Summary		
HCM 2010 Ctrl Delay		11.9
HCM 2010 LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	110	35	95	75	715	25	865	120	515	860	20
Future Volume (veh/h)	15	110	35	95	75	715	25	865	120	515	860	20
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	16	120	5	103	82	439	27	940	53	560	935	21
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	52	341	328	353	567	478	34	1527	680	614	2090	47
Arrive On Green	0.21	0.21	0.21	0.07	0.30	0.30	0.02	0.43	0.43	0.36	1.00	1.00
Sat Flow, veh/h	110	1627	1563	1774	1863	1569	1774	3539	1576	3442	3539	79
Grp Volume(v), veh/h	136	0	5	103	82	439	27	940	53	560	468	488
Grp Sat Flow(s),veh/h/ln	1737	0	1563	1774	1863	1569	1774	1770	1576	1721	1770	1849
Q Serve(g_s), s	0.0	0.0	0.4	6.1	4.5	37.8	2.1	28.8	2.8	21.7	0.0	0.0
Cycle Q Clear(g_c), s	8.7	0.0	0.4	6.1	4.5	37.8	2.1	28.8	2.8	21.7	0.0	0.0
Prop In Lane	0.12		1.00	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	393	0	328	353	567	478	34	1527	680	614	1045	1092
V/C Ratio(X)	0.35	0.00	0.02	0.29	0.14	0.92	0.79	0.62	0.08	0.91	0.45	0.45
Avail Cap(c_a), veh/h	393	0	328	528	665	560	177	1527	680	836	1045	1092
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	1.00	0.79	0.79	0.79	0.74	0.74	0.74
Uniform Delay (d), s/veh	47.1	0.0	43.8	37.9	35.4	47.0	68.4	30.8	23.4	44.0	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.5	0.1	18.7	11.4	1.5	0.2	7.4	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	4.6	0.0	0.2	3.0	2.3	18.9	1.2	14.4	1.2	10.9	0.3	0.3
LnGrp Delay(d),s/veh	47.7	0.0	43.9	38.3	35.5	65.7	79.8	32.3	23.6	51.4	1.0	1.0
LnGrp LOS	D		D	D	D	E	E	C	C	D	A	A
Approach Vol, veh/h		141			624			1020			1516	
Approach Delay, s/veh		47.5			57.2			33.1			19.6	
Approach LOS		D			E			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	86.7	13.2	33.4	29.0	64.4		46.6
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	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	8.1	10.7	23.7	30.8		39.8
Green Ext Time (p_c), s	0.0	12.0	0.3	0.4	1.2	6.8		1.8

Intersection Summary	
HCM 2010 Ctrl Delay	32.1
HCM 2010 LOS	C

Notes

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	27	24	65	27	1	413	234	45	11	304	20
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	72	184	236	207	8	501	1013	861	15	503	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	912	622	1583	1348	1785	66	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	87	0	24	65	0	28	413	234	45	11	304	20
Grp Sat Flow(s),veh/h/ln	1534	0	1583	1348	0	1851	1774	1863	1583	1774	1863	1583
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	6.9	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	6.9	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	304	0	184	236	0	215	501	1013	861	15	503	428
V/C Ratio(X)	0.29	0.00	0.13	0.28	0.00	0.13	0.82	0.23	0.05	0.73	0.60	0.05
Avail Cap(c_a), veh/h	874	0	787	749	0	920	1102	3046	2590	551	2468	2098
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	19.9	0.0	19.2	22.2	0.0	19.2	16.2	5.7	5.2	23.9	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	49.1	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	0.3	0.9	0.0	0.4	5.5	1.7	0.3	0.3	3.8	0.2
LnGrp Delay(d),s/veh	20.4	0.0	19.5	22.8	0.0	19.4	19.7	6.0	5.2	73.0	17.9	13.1
LnGrp LOS	C		B	C		B	B	A	A	E	B	B
Approach Vol, veh/h		111			93			692			335	
Approach Delay, s/veh		20.2			21.8			14.1			19.4	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	32.3		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	5.2		4.5	12.5	8.9		6.8
Green Ext Time (p_c), s	0.0	3.4		0.5	1.2	4.2		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	16.7
HCM 2010 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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	22	14	49	16	1	212	636	0	27	620	44
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	55	207	243	227	14	447	960	816	392	802	679
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	1075	422	1583	1367	1735	108	1774	1863	1583	1774	1863	1576
Grp Volume(v), veh/h	104	0	14	49	0	17	212	636	0	27	620	44
Grp Sat Flow(s),veh/h/ln	1497	0	1583	1367	0	1844	1774	1863	1583	1774	1863	1576
Q Serve(g_s), s	2.6	0.0	0.4	1.7	0.0	0.4	2.9	12.0	0.0	0.4	13.6	0.8
Cycle Q Clear(g_c), s	3.0	0.0	0.4	4.7	0.0	0.4	2.9	12.0	0.0	0.4	13.6	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	330	0	207	243	0	241	447	960	816	392	802	679
V/C Ratio(X)	0.31	0.00	0.07	0.20	0.00	0.07	0.47	0.66	0.00	0.07	0.77	0.06
Avail Cap(c_a), veh/h	907	0	828	779	0	964	820	1988	1689	916	1988	1682
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	21.6	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	1.3	0.0	0.2	0.7	0.0	0.2	1.5	6.2	0.0	0.2	7.3	0.3
LnGrp Delay(d),s/veh	19.9	0.0	18.4	22.0	0.0	18.3	9.2	9.3	0.0	8.1	13.2	8.0
LnGrp LOS	B		B	C		B	A	A		A	B	A
Approach Vol, veh/h		118			66			848			691	
Approach Delay, s/veh		19.7			21.0			9.3			12.7	
Approach LOS		B			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.9	30.6		11.2	10.0	26.6		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	14.0		5.0	4.9	15.6		6.7
Green Ext Time (p_c), s	0.0	4.7		0.5	0.4	4.7		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	11.8
HCM 2010 LOS	B

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	5	4	11	5	1	179	886	8	5	832	44
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	91	19	154	127	221	1168	993	7	943	800
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	1774	946	757	1774	1863	1537	1774	1863	1583	1774	1863	1580
Grp Volume(v), veh/h	65	0	9	11	5	1	179	886	8	5	832	44
Grp Sat Flow(s),veh/h/ln	1774	0	1702	1774	1863	1537	1774	1863	1583	1774	1863	1580
Q Serve(g_s), s	3.0	0.0	0.4	0.5	0.2	0.1	8.2	28.4	0.2	0.2	33.5	1.2
Cycle Q Clear(g_c), s	3.0	0.0	0.4	0.5	0.2	0.1	8.2	28.4	0.2	0.2	33.5	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	1168	993	7	943	800
V/C Ratio(X)	0.77	0.00	0.04	0.58	0.03	0.01	0.81	0.76	0.01	0.72	0.88	0.05
Avail Cap(c_a), veh/h	423	0	426	423	466	384	528	1442	1226	528	1442	1223
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	39.5	0.0	32.7	41.3	35.4	35.3	35.8	11.1	5.9	41.8	18.5	10.5
Incr Delay (d2), s/veh	13.4	0.0	0.1	24.4	0.1	0.0	6.9	1.9	0.0	84.7	4.4	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	1.8	0.0	0.2	0.4	0.1	0.0	4.5	14.9	0.1	0.3	18.3	0.5
LnGrp Delay(d),s/veh	52.9	0.0	32.8	65.8	35.5	35.4	42.6	13.0	5.9	126.5	22.9	10.6
LnGrp LOS	D		C	E	D	D	D	B	A	F	C	B
Approach Vol, veh/h		74			17			1073			881	
Approach Delay, s/veh		50.4			55.1			17.9			22.9	
Approach LOS		D			E			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	57.7	5.9	15.1	15.5	47.5	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	30.4	2.5	2.4	10.2	35.5	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 2010 Ctrl Delay	21.5
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	82	5	0	87	11	9	658	957	11	5	880	6
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	139	186	15	12	702	2681	31	7	1260	564
Arrive On Green	0.10	0.09	0.00	0.10	0.09	0.09	0.40	0.75	0.75	0.00	0.36	0.36
Sat Flow, veh/h	1461	89	1583	1320	167	137	1774	3584	41	1774	3539	1583
Grp Volume(v), veh/h	87	0	0	107	0	0	658	473	495	5	880	6
Grp Sat Flow(s),veh/h/ln	1550	0	1583	1623	0	0	1774	1770	1855	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	33.4	8.6	8.6	0.3	20.0	0.2
Cycle Q Clear(g_c), s	4.7	0.0	0.0	5.5	0.0	0.0	33.4	8.6	8.6	0.3	20.0	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	228	0	139	230	0	0	702	1324	1388	7	1260	564
V/C Ratio(X)	0.38	0.00	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	404	0	338	490	0	0	1345	1324	1388	1345	2607	1166
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	40.7	0.0	0.0	41.0	0.0	0.0	27.2	4.1	4.1	46.6	25.8	19.5
Incr Delay (d2), s/veh	1.1	0.0	0.0	1.5	0.0	0.0	2.8	0.3	0.3	40.7	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	2.2	0.0	0.0	2.7	0.0	0.0	16.8	4.2	4.4	0.2	10.0	0.1
LnGrp Delay(d),s/veh	41.7	0.0	0.0	42.5	0.0	0.0	30.0	4.4	4.4	87.3	27.4	19.5
LnGrp LOS	D			D			C	A	A	F	C	B
Approach Vol, veh/h		87			107			1626			891	
Approach Delay, s/veh		41.7			42.5			14.8			27.6	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	41.1	39.4		13.2	4.4	76.1		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	35.4	22.0		7.5	2.3	10.6		6.7
Green Ext Time (p_c), s	1.7	11.4		0.3	0.0	12.2		0.2

Intersection Summary		
HCM 2010 Ctrl Delay		20.9
HCM 2010 LOS		C

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	54	5	6	16	0	1	147	1560	11	11	1614	38
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	18	174	187	2	7	180	2613	18	14	2236	1000
Arrive On Green	0.13	0.11	0.11	0.13	0.00	0.11	0.10	0.73	0.73	0.01	0.63	0.63
Sat Flow, veh/h	1353	155	1521	968	19	62	1774	3602	25	1774	3539	1583
Grp Volume(v), veh/h	59	0	6	17	0	0	147	766	805	11	1614	38
Grp Sat Flow(s),veh/h/ln	1509	0	1521	1049	0	0	1774	1770	1858	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.3	0.9	0.0	0.0	7.5	19.3	19.3	0.6	28.4	0.8
Cycle Q Clear(g_c), s	2.8	0.0	0.3	3.7	0.0	0.0	7.5	19.3	19.3	0.6	28.4	0.8
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	264	0	174	207	0	0	180	1283	1348	14	2236	1000
V/C Ratio(X)	0.22	0.00	0.03	0.08	0.00	0.00	0.82	0.60	0.60	0.78	0.72	0.04
Avail Cap(c_a), veh/h	454	0	381	393	0	0	406	1657	1740	212	2929	1310
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	36.8	0.0	36.2	38.0	0.0	0.0	40.4	6.1	6.1	45.5	11.4	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	27.6	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	1.4	0.0	0.1	0.4	0.0	0.0	3.8	9.5	10.0	0.4	14.0	0.4
LnGrp Delay(d),s/veh	37.0	0.0	36.2	38.1	0.0	0.0	43.8	7.1	7.0	73.1	12.5	6.4
LnGrp LOS	D		D	D			D	A	A	E	B	A
Approach Vol, veh/h		65			17			1718			1663	
Approach Delay, s/veh		36.9			38.1			10.2			12.8	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.3	63.0		15.5	4.7	71.6		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	9.5	30.4		5.7	2.6	21.3		4.8
Green Ext Time (p_c), s	0.1	27.7		0.0	0.0	29.8		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.1
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	5	27	76	5	1	136	1549	49	38	1788	81
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	212	12	205	142	197	39	157	2656	1187	49	2440	1091
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	1298	89	1562	1358	1504	301	1774	3539	1582	1774	3539	1583
Grp Volume(v), veh/h	87	0	27	76	0	6	136	1549	49	38	1788	81
Grp Sat Flow(s),veh/h/ln	1387	0	1562	1358	0	1805	1774	1770	1582	1774	1770	1583
Q Serve(g_s), s	9.2	0.0	2.5	9.1	0.0	0.5	12.5	32.1	1.3	3.5	52.3	2.8
Cycle Q Clear(g_c), s	9.7	0.0	2.5	18.8	0.0	0.5	12.5	32.1	1.3	3.5	52.3	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	205	142	0	237	157	2656	1187	49	2440	1091
V/C Ratio(X)	0.37	0.00	0.13	0.54	0.00	0.03	0.86	0.58	0.04	0.78	0.73	0.07
Avail Cap(c_a), veh/h	253	0	227	161	0	263	280	2656	1187	108	2440	1091
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	66.2	0.0	63.4	75.2	0.0	62.5	74.2	9.1	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	3.9	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	3.7	0.0	1.1	3.5	0.0	0.2	6.3	15.7	0.6	1.8	26.0	1.3
LnGrp Delay(d),s/veh	67.2	0.0	63.7	78.4	0.0	62.5	78.1	9.8	5.4	89.0	18.1	8.5
LnGrp LOS	E		E	E		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			19.1	
Approach LOS		E			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.6	119.7		26.6	8.6	129.8		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	14.5	54.3		20.8	5.5	34.1		11.7
Green Ext Time (p_c), s	0.2	32.1		0.1	0.0	34.5		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	19.9
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	315	5	469	16	0	1	418	1598	11	82	1837	109
Adj No. of Lanes	0	1	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	4	812	69	0	4	489	2398	16	113	2078	930
Arrive On Green	0.16	0.16	0.15	0.04	0.00	0.03	0.14	0.67	0.66	0.06	0.59	0.59
Sat Flow, veh/h	1748	28	2750	1653	0	103	3442	3603	25	1774	3539	1583
Grp Volume(v), veh/h	320	0	469	17	0	0	418	784	825	82	1837	109
Grp Sat Flow(s),veh/h/ln	1775	0	1375	1756	0	0	1721	1770	1858	1774	1770	1583
Q Serve(g_s), s	34.0	0.0	31.7	2.0	0.0	0.0	25.9	58.1	58.3	9.9	97.3	6.7
Cycle Q Clear(g_c), s	34.0	0.0	31.7	2.0	0.0	0.0	25.9	58.1	58.3	9.9	97.3	6.7
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	276	0	812	73	0	0	489	1178	1237	113	2078	930
V/C Ratio(X)	1.16	0.00	0.58	0.23	0.00	0.00	0.85	0.67	0.67	0.73	0.88	0.12
Avail Cap(c_a), veh/h	276	0	812	249	0	0	914	1572	1651	122	2447	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	92.2	0.0	65.7	101.3	0.0	0.0	91.5	21.9	22.0	100.3	38.7	20.0
Incr Delay (d2), s/veh	103.6	0.0	0.7	0.6	0.0	0.0	1.7	0.9	0.9	14.9	4.0	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	24.6	0.0	12.1	1.0	0.0	0.0	12.5	28.6	30.1	5.3	48.6	2.9
LnGrp Delay(d),s/veh	195.8	0.0	66.4	101.9	0.0	0.0	93.1	22.9	22.8	115.3	42.7	20.1
LnGrp LOS	F		E	F			F	C	C	F	D	C
Approach Vol, veh/h		789			17			2027			2028	
Approach Delay, s/veh		118.9			101.9			37.4			44.4	
Approach LOS		F			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	35.0	132.2		13.1	17.9	149.3		38.0
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	56.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	27.9	99.3		4.0	11.9	60.3		36.0
Green Ext Time (p_c), s	1.1	26.9		0.0	0.0	21.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	53.8
HCM 2010 LOS	D

Notes

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	1962	96	92	2446	5
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	2	10	182	96	58	22	2599	126	118	2936	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	1235	26	115	1410	1092	655	1774	3436	167	1774	3624	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	1376	0	0	1410	0	1747	1774	1770	1833	1774	1770	1861
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	53.1	53.2
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	53.1	53.2
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	1338	1386	118	1434	1508
V/C Ratio(X)	0.07	0.00	0.00	0.54	0.00	0.05	0.50	0.75	0.76	0.78	0.83	0.83
Avail Cap(c_a), veh/h	299	0	0	308	0	311	145	1338	1386	250	1434	1508
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	56.5	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	3.8	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	3.7	0.0	0.3	0.4	0.9	0.9	3.5	27.5	29.2
LnGrp Delay(d),s/veh	57.0	0.0	0.0	62.5	0.0	56.7	69.1	2.4	2.4	66.2	13.3	13.0
LnGrp LOS	E			E		E	E	A	A	E	B	B
Approach Vol, veh/h		12			106			2069			2543	
Approach Delay, s/veh		57.0			62.0			2.7			15.1	
Approach LOS		E			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.7	113.4		15.9	13.0	106.1		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	55.2		10.8	8.9	2.0		3.4
Green Ext Time (p_c), s	0.0	30.1		0.2	0.1	54.6		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	10.8
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	190	16	9	65	5	7	5	1880	21	5	2076	278
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	2662	30	7	2627	1175
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	1321	111	63	1358	132	149	1774	3585	40	1774	3539	1583
Grp Volume(v), veh/h	215	0	0	77	0	0	5	926	975	5	2076	278
Grp Sat Flow(s),veh/h/ln	1495	0	0	1639	0	0	1774	1770	1856	1774	1770	1583
Q Serve(g_s), s	13.4	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	49.3	7.4
Cycle Q Clear(g_c), s	18.8	0.0	0.0	5.4	0.0	0.0	0.4	0.0	0.0	0.4	49.3	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	319	0	0	7	1314	1378	7	2627	1175
V/C Ratio(X)	0.72	0.00	0.00	0.24	0.00	0.00	0.74	0.71	0.71	0.74	0.79	0.24
Avail Cap(c_a), veh/h	379	0	0	401	0	0	105	1314	1378	105	2627	1175
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	0.60	0.60	0.60	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	10.8	5.4
Incr Delay (d2), s/veh	4.9	0.0	0.0	0.4	0.0	0.0	29.4	1.9	1.9	20.3	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	8.2	0.0	0.0	2.6	0.0	0.0	0.2	0.7	0.7	0.2	24.0	3.2
LnGrp Delay(d),s/veh	59.5	0.0	0.0	49.7	0.0	0.0	96.3	1.9	1.9	87.4	11.8	5.6
LnGrp LOS	E			D			F	A	A	F	B	A
Approach Vol, veh/h		215			77			1906			2359	
Approach Delay, s/veh		59.5			49.7			2.1			11.3	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	104.2		26.3	4.5	104.2		26.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	84.0		29.0	8.0	84.0		29.0
Max Q Clear Time (g_c+I1), s	2.4	51.3		7.4	2.4	2.0		20.8
Green Ext Time (p_c), s	0.0	30.9		0.2	0.0	62.7		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	10.4
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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		0.97	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	196	38	8	103	27	2	60	1668	111	27	2005	159
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	268	43	307	355	340	25	76	2336	154	34	2225	174
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.19	0.09	1.00	1.00	0.04	1.00	1.00
Sat Flow, veh/h	1103	214	1545	1347	1710	127	1774	3370	223	1774	3325	260
Grp Volume(v), veh/h	234	0	8	103	0	29	60	870	909	27	1054	1110
Grp Sat Flow(s),veh/h/ln	1317	0	1545	1347	0	1837	1774	1770	1823	1774	1770	1816
Q Serve(g_s), s	21.9	0.0	0.6	0.0	0.0	1.7	4.5	0.0	0.0	2.0	0.0	0.0
Cycle Q Clear(g_c), s	23.6	0.0	0.6	7.7	0.0	1.7	4.5	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.84		1.00	1.00		0.07	1.00		0.12	1.00		0.14
Lane Grp Cap(c), veh/h	311	0	307	355	0	365	76	1227	1264	34	1184	1215
V/C Ratio(X)	0.75	0.00	0.03	0.29	0.00	0.08	0.79	0.71	0.72	0.80	0.89	0.91
Avail Cap(c_a), veh/h	333	0	332	377	0	395	105	1227	1264	105	1184	1215
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	0.38	0.38	0.38	0.50	0.50	0.50
Uniform Delay (d), s/veh	53.6	0.0	43.5	46.4	0.0	44.0	61.1	0.0	0.0	64.7	0.0	0.0
Incr Delay (d2), s/veh	8.7	0.0	0.0	0.4	0.0	0.1	6.5	1.3	1.4	7.7	5.5	6.6
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	9.3	0.0	0.2	3.3	0.0	0.9	2.3	0.5	0.5	1.1	1.8	2.2
LnGrp Delay(d),s/veh	62.3	0.0	43.6	46.9	0.0	44.1	67.6	1.3	1.4	72.4	5.5	6.6
LnGrp LOS	E		D	D		D	E	A	A	E	A	A
Approach Vol, veh/h		242			132			1839			2191	
Approach Delay, s/veh		61.7			46.3			3.5			6.9	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	94.3		30.9	6.6	97.6		30.9
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	6.5	2.0		9.7	4.0	2.0		25.6
Green Ext Time (p_c), s	0.0	62.6		0.4	0.0	43.1		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	9.7
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	185	60	125	110	695	55	940	195	630	1225	65
Future Volume (veh/h)	60	185	60	125	110	695	55	940	195	630	1225	65
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.97	1.00		0.98	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	65	201	8	136	120	454	60	1022	128	685	1332	69
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	97	239	317	234	589	492	77	1361	604	724	1887	98
Arrive On Green	0.21	0.21	0.21	0.08	0.32	0.32	0.04	0.38	0.38	0.42	1.00	1.00
Sat Flow, veh/h	310	1163	1542	1774	1863	1556	1774	3539	1571	3442	3423	177
Grp Volume(v), veh/h	266	0	8	136	120	454	60	1022	128	685	687	714
Grp Sat Flow(s),veh/h/ln	1473	0	1542	1774	1863	1556	1774	1770	1571	1721	1770	1830
Q Serve(g_s), s	20.4	0.0	0.6	7.8	6.4	38.0	4.5	33.7	7.4	25.9	0.0	0.0
Cycle Q Clear(g_c), s	23.5	0.0	0.6	7.8	6.4	38.0	4.5	33.7	7.4	25.9	0.0	0.0
Prop In Lane	0.24		1.00	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	336	0	317	234	589	492	77	1361	604	724	976	1009
V/C Ratio(X)	0.79	0.00	0.03	0.58	0.20	0.92	0.78	0.75	0.21	0.95	0.70	0.71
Avail Cap(c_a), veh/h	339	0	320	301	662	553	237	1361	604	765	976	1009
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	1.00	0.88	0.88	0.88	0.31	0.31	0.31
Uniform Delay (d), s/veh	51.6	0.0	42.8	38.4	33.7	44.6	63.9	36.0	27.8	38.4	0.0	0.0
Incr Delay (d2), s/veh	12.0	0.0	0.0	2.3	0.2	19.9	5.4	3.4	0.7	8.1	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	10.7	0.0	0.2	4.0	3.3	19.0	2.3	17.1	3.3	12.9	0.4	0.4
LnGrp Delay(d),s/veh	63.6	0.0	42.9	40.7	33.9	64.4	69.3	39.4	28.6	46.4	1.3	1.3
LnGrp LOS	E		D	D	C	E	E	D	C	D	A	A
Approach Vol, veh/h		274			710			1210			2086	
Approach Delay, s/veh		63.0			54.7			39.7			16.1	
Approach LOS		E			D			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.9	78.4	15.0	31.7	32.4	55.9		46.7
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	18.0	56.0	15.0	27.0	30.0	44.0		47.0
Max Q Clear Time (g_c+I1), s	6.5	2.0	9.8	25.5	27.9	35.7		40.0
Green Ext Time (p_c), s	0.1	22.6	0.2	0.2	0.6	5.6		1.7

Intersection Summary	
HCM 2010 Ctrl Delay	32.2
HCM 2010 LOS	C

Notes

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	49	36	49	54	10	293	337	22	22	304	28
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	204	268	199	37	380	905	767	29	536	455
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	552	1045	1566	1297	1527	283	1774	1863	1580	1774	1863	1581
Grp Volume(v), veh/h	92	0	36	49	0	64	293	337	22	22	304	28
Grp Sat Flow(s),veh/h/ln	1597	0	1566	1297	0	1809	1774	1863	1580	1774	1863	1581
Q Serve(g_s), s	0.8	0.0	0.9	1.6	0.0	1.4	6.8	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	6.8	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	330	0	204	268	0	236	380	905	767	29	536	455
V/C Ratio(X)	0.28	0.00	0.18	0.18	0.00	0.27	0.77	0.37	0.03	0.77	0.57	0.06
Avail Cap(c_a), veh/h	988	0	864	814	0	998	1224	3383	2870	612	2741	2326
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	17.4	0.0	16.8	19.2	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	3.4	0.5	0.0	34.3	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	1.1	0.0	0.4	0.6	0.0	0.7	3.6	2.7	0.1	0.5	3.3	0.3
LnGrp Delay(d),s/veh	17.8	0.0	17.2	19.5	0.0	17.7	19.5	7.6	5.9	55.6	15.2	11.4
LnGrp LOS	B		B	B		B	B	A	A	E	B	B
Approach Vol, veh/h		128			113			652			354	
Approach Delay, s/veh		17.7			18.5			12.9			17.4	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.7	27.1		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	8.8	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 2010 Ctrl Delay	15.1
HCM 2010 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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	22	23	43	16	1	147	484	0	16	527	25
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	291	84	232	310	259	16	443	854	726	436	721	611
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	954	564	1557	1337	1733	108	1774	1863	1583	1774	1863	1577
Grp Volume(v), veh/h	82	0	23	43	0	17	147	484	0	16	527	25
Grp Sat Flow(s),veh/h/ln	1518	0	1557	1337	0	1841	1774	1863	1583	1774	1863	1577
Q Serve(g_s), s	1.2	0.0	0.5	1.3	0.0	0.3	2.0	8.0	0.0	0.2	10.2	0.4
Cycle Q Clear(g_c), s	1.9	0.0	0.5	3.2	0.0	0.3	2.0	8.0	0.0	0.2	10.2	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	375	0	232	310	0	275	443	854	726	436	721	611
V/C Ratio(X)	0.22	0.00	0.10	0.14	0.00	0.06	0.33	0.57	0.00	0.04	0.73	0.04
Avail Cap(c_a), veh/h	1030	0	925	905	0	1094	927	2258	1920	1047	2258	1912
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	16.0	0.0	15.5	17.5	0.0	15.4	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	0.9	0.0	0.2	0.5	0.0	0.2	1.0	4.2	0.0	0.1	5.4	0.2
LnGrp Delay(d),s/veh	16.3	0.0	15.6	17.7	0.0	15.5	8.4	8.9	0.0	8.0	12.5	8.1
LnGrp LOS	B		B	B		B	A	A		A	B	A
Approach Vol, veh/h		105			60			631			568	
Approach Delay, s/veh		16.1			17.0			8.8			12.1	
Approach LOS		B			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	25.3		11.3	8.5	22.3		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	12.2		5.2
Green Ext Time (p_c), s	0.0	3.3		0.4	0.3	3.8		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	11.1
HCM 2010 LOS	B

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	5	7	11	5	1	87	598	9	5	734	26
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	78	110	20	166	141	115	1000	850	7	887	753
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	1774	700	980	1774	1863	1583	1774	1863	1583	1774	1863	1582
Grp Volume(v), veh/h	43	0	12	11	5	1	87	598	9	5	734	26
Grp Sat Flow(s),veh/h/ln	1774	0	1679	1774	1863	1583	1774	1863	1583	1774	1863	1582
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	20.3	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	20.3	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	188	20	166	141	115	1000	850	7	887	753
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	596	0	592	596	657	558	745	2033	1728	745	2033	1727
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	28.5	0.0	23.6	29.3	24.8	24.7	27.4	9.4	6.4	29.6	13.5	8.3
Incr Delay (d2), s/veh	14.1	0.0	0.1	22.0	0.1	0.0	9.7	0.6	0.0	81.2	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	0.9	0.0	0.2	0.3	0.1	0.0	1.7	6.8	0.1	0.2	10.7	0.2
LnGrp Delay(d),s/veh	42.6	0.0	23.8	51.3	24.8	24.7	37.1	10.0	6.4	110.8	15.5	8.3
LnGrp LOS	D		C	D	C	C	D	A	A	F	B	A
Approach Vol, veh/h		55			17			694			765	
Approach Delay, s/veh		38.5			42.0			13.3			15.9	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	37.0	5.7	11.7	8.9	33.4	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	22.3	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 2010 Ctrl Delay	15.8
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	54	11	0	11	0	1	446	647	5	0	793	17
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	15	97	206	4	8	516	2695	21	3	1376	613
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	1239	252	1583	1407	67	134	1774	3600	28	1774	3539	1577
Grp Volume(v), veh/h	65	0	0	12	0	0	446	318	334	0	793	17
Grp Sat Flow(s),veh/h/ln	1491	0	1583	1608	0	0	1774	1770	1858	1774	1770	1577
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	10.2	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	10.2	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	231	0	97	246	0	0	516	1325	1391	3	1376	613
V/C Ratio(X)	0.28	0.00	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	648	0	547	769	0	0	2176	2110	2215	2176	4219	1880
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	26.2	0.0	0.0	25.2	0.0	0.0	19.5	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	1.0	0.0	0.0	0.2	0.0	0.0	6.9	1.6	1.7	0.0	5.1	0.2
LnGrp Delay(d),s/veh	26.8	0.0	0.0	25.3	0.0	0.0	21.2	2.4	2.4	0.0	14.7	11.0
LnGrp LOS	C			C			C	A	A		B	B
Approach Vol, veh/h		65			12			1098			810	
Approach Delay, s/veh		26.8			25.3			10.1			14.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.8	28.5		8.6	0.0	49.3		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	12.2		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 2010 Ctrl Delay	12.6
HCM 2010 LOS	B

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	60	5	6	16	5	1	114	1033	21	11	1408	38
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	142	154	37	5	146	2493	51	15	2225	993
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	1370	155	1547	724	400	54	1774	3548	72	1774	3539	1580
Grp Volume(v), veh/h	65	0	6	22	0	0	114	515	539	11	1408	38
Grp Sat Flow(s),veh/h/ln	1525	0	1547	1177	0	0	1774	1770	1850	1774	1770	1580
Q Serve(g_s), s	0.0	0.0	0.3	0.1	0.0	0.0	4.5	8.7	8.7	0.4	17.4	0.7
Cycle Q Clear(g_c), s	2.4	0.0	0.3	2.5	0.0	0.0	4.5	8.7	8.7	0.4	17.4	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	259	0	142	212	0	0	146	1244	1300	15	2225	993
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	586	0	501	553	0	0	524	2141	2238	275	3784	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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.0	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	3.4	0.5	0.5	24.5	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	1.2	0.0	0.1	0.4	0.0	0.0	2.3	4.3	4.5	0.3	8.6	0.3
LnGrp Delay(d),s/veh	30.2	0.0	29.5	29.5	0.0	0.0	35.3	4.9	4.9	59.7	8.8	5.1
LnGrp LOS	C		C	C			D	A	A	E	A	A
Approach Vol, veh/h		71			22			1168			1457	
Approach Delay, s/veh		30.1			29.5			7.9			9.1	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.9	49.7		11.5	4.6	55.0		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	19.4		4.5	2.4	10.7		4.4
Green Ext Time (p_c), s	0.1	25.2		0.0	0.0	14.4		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	9.3
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	5	12	49	5	2	120	1114	34	33	1495	45
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	232	230	186	75	154	2255	1009	57	2062	922
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	1293	121	1577	1386	1265	506	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	70	0	12	49	0	7	120	1114	34	33	1495	45
Grp Sat Flow(s),veh/h/ln	1415	0	1577	1386	0	1771	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	3.4	0.0	0.5	2.7	0.0	0.3	5.4	13.6	0.7	1.5	25.0	1.0
Cycle Q Clear(g_c), s	3.6	0.0	0.5	6.3	0.0	0.3	5.4	13.6	0.7	1.5	25.0	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	311	0	232	230	0	261	154	2255	1009	57	2062	922
V/C Ratio(X)	0.23	0.00	0.05	0.21	0.00	0.03	0.78	0.49	0.03	0.58	0.73	0.05
Avail Cap(c_a), veh/h	519	0	463	433	0	520	456	2986	1336	260	2596	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	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	30.9	0.0	30.0	34.1	0.0	29.9	36.6	7.9	5.5	39.0	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	1.2	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	1.4	0.0	0.2	1.1	0.0	0.1	2.8	6.6	0.3	0.8	12.4	0.4
LnGrp Delay(d),s/veh	31.3	0.0	30.1	34.6	0.0	29.9	39.8	8.2	5.5	42.4	13.6	7.4
LnGrp LOS	C		C	C		C	D	A	A	D	B	A
Approach Vol, veh/h		82			56			1268			1573	
Approach Delay, s/veh		31.1			34.0			11.1			14.0	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.1	53.6		17.0	6.6	58.1		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	27.0		8.3	3.5	15.6		5.6
Green Ext Time (p_c), s	0.2	20.7		0.1	0.0	17.1		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	13.6
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	255	5	283	16	5	7	315	1250	16	60	1500	125
Adj No. of Lanes	0	1	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	321	6	836	45	14	20	423	2128	27	109	1888	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	1742	34	2787	992	310	434	3442	3578	46	1774	3539	1582
Grp Volume(v), veh/h	260	0	283	28	0	0	315	618	648	60	1500	125
Grp Sat Flow(s),veh/h/ln	1776	0	1393	1737	0	0	1721	1770	1855	1774	1770	1582
Q Serve(g_s), s	19.6	0.0	11.1	2.2	0.0	0.0	12.4	30.5	30.5	4.6	48.1	5.6
Cycle Q Clear(g_c), s	19.6	0.0	11.1	2.2	0.0	0.0	12.4	30.5	30.5	4.6	48.1	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	327	0	836	78	0	0	423	1052	1103	109	1888	844
V/C Ratio(X)	0.79	0.00	0.34	0.36	0.00	0.00	0.74	0.59	0.59	0.55	0.79	0.15
Avail Cap(c_a), veh/h	431	0	1000	384	0	0	1426	2452	2570	190	3817	1707
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	54.6	0.0	38.2	65.2	0.0	0.0	59.3	17.7	17.7	63.8	26.5	16.6
Incr Delay (d2), s/veh	5.4	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	10.1	0.0	4.3	1.1	0.0	0.0	6.0	15.0	15.7	2.3	23.6	2.5
LnGrp Delay(d),s/veh	60.0	0.0	38.3	66.3	0.0	0.0	60.2	18.4	18.4	65.4	27.6	16.7
LnGrp LOS	E		D	E			E	B	B	E	C	B
Approach Vol, veh/h		543			28			1581			1685	
Approach Delay, s/veh		48.7			66.3			26.7			28.1	
Approach LOS		D			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	21.2	78.7		10.3	12.6	87.3		29.8
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	14.4	50.1		4.2	6.6	32.5		21.6
Green Ext Time (p_c), s	0.9	22.6		0.0	0.0	12.5		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	30.7
HCM 2010 LOS	C

Notes

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1446	95	98	1967	11
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2402	157	124	2800	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	1140	37	235	1410	856	856	1774	3373	221	1774	3609	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	1412	0	0	1410	0	1712	1774	1770	1824	1774	1770	1859
Q Serve(g_s), s	0.0	0.0	0.0	12.4	0.0	0.7	0.4	6.8	7.0	7.1	34.8	35.0
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	6.8	7.0	7.1	34.8	35.0
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	1260	1299	124	1373	1443
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	312	0	0	318	0	316	150	1260	1299	150	1373	1443
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	55.3	0.0	50.2	64.2	1.2	1.2	59.5	7.2	7.2
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.8	0.0	0.1	8.2	1.8	1.7	16.7	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	5.3	0.0	0.3	0.2	3.3	3.8	4.1	17.7	18.9
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.3	72.4	2.9	2.9	76.2	10.2	10.1
LnGrp LOS	D			E		D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1546			2076	
Approach Delay, s/veh		50.0			57.6			3.2			13.3	
Approach LOS		D			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.8	104.9		20.3	13.1	96.6		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	37.0		15.0	9.1	9.0		2.7
Green Ext Time (p_c), s	0.0	34.6		0.3	0.0	30.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	11.0
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	147	5	13	71	5	9	16	1386	15	11	1734	207
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	228	6	16	226	17	23	19	2757	30	13	2709	1211
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	1339	46	118	1336	132	174	1774	3587	39	1774	3539	1582
Grp Volume(v), veh/h	165	0	0	85	0	0	16	684	717	11	1734	207
Grp Sat Flow(s),veh/h/ln	1503	0	0	1642	0	0	1774	1770	1856	1774	1770	1582
Q Serve(g_s), s	7.8	0.0	0.0	0.0	0.0	0.0	1.2	32.9	32.9	0.8	29.3	4.6
Cycle Q Clear(g_c), s	13.7	0.0	0.0	5.9	0.0	0.0	1.2	32.9	32.9	0.8	29.3	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	1360	1427	13	2709	1211
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	347	0	0	365	0	0	109	1360	1427	109	2709	1211
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	15.3	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	23.5	1.0	1.0	23.6	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	6.0	0.0	0.0	2.8	0.0	0.0	0.7	16.4	17.2	0.5	14.2	2.0
LnGrp Delay(d),s/veh	57.7	0.0	0.0	52.3	0.0	0.0	87.9	16.3	16.3	88.0	7.7	4.3
LnGrp LOS	E			D			F	B	B	F	A	A
Approach Vol, veh/h		165			85			1417			1952	
Approach Delay, s/veh		57.7			52.3			17.1			7.8	
Approach LOS		E			D			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	103.5		21.1	5.0	103.9		21.1
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	83.0		25.0	8.0	83.0		25.0
Max Q Clear Time (g_c+I1), s	3.2	31.3		7.9	2.8	34.9		15.7
Green Ext Time (p_c), s	0.0	42.2		0.2	0.0	28.5		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	14.8
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	207	22	11	98	22	2	65	1418	63	16	1745	137
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	286	25	305	373	326	30	83	2428	108	19	2221	172
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.06	0.94	0.93	0.02	1.00	1.00
Sat Flow, veh/h	1205	128	1576	1380	1682	153	1774	3451	153	1774	3328	258
Grp Volume(v), veh/h	229	0	11	98	0	24	65	726	755	16	918	964
Grp Sat Flow(s),veh/h/ln	1333	0	1576	1380	0	1835	1774	1770	1835	1774	1770	1817
Q Serve(g_s), s	20.6	0.0	0.7	0.0	0.0	1.4	4.7	7.6	7.7	1.2	0.0	0.0
Cycle Q Clear(g_c), s	22.0	0.0	0.7	6.5	0.0	1.4	4.7	7.6	7.7	1.2	0.0	0.0
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	311	0	305	373	0	355	83	1245	1291	19	1181	1213
V/C Ratio(X)	0.74	0.00	0.04	0.26	0.00	0.07	0.79	0.58	0.59	0.84	0.78	0.79
Avail Cap(c_a), veh/h	331	0	327	393	0	381	109	1245	1291	109	1181	1213
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	0.64	0.64	0.64	0.70	0.70	0.70
Uniform Delay (d), s/veh	51.8	0.0	42.6	44.9	0.0	42.9	60.3	1.5	1.5	63.5	0.0	0.0
Incr Delay (d2), s/veh	7.9	0.0	0.0	0.4	0.0	0.1	11.6	1.3	1.2	21.7	3.6	3.8
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	8.7	0.0	0.3	3.1	0.0	0.7	2.6	3.6	4.0	0.7	1.2	1.3
LnGrp Delay(d),s/veh	59.7	0.0	42.6	45.3	0.0	42.9	71.9	2.8	2.8	85.2	3.6	3.8
LnGrp LOS	E		D	D		D	E	A	A	F	A	A
Approach Vol, veh/h		240			122			1546			1898	
Approach Delay, s/veh		58.9			44.8			5.7			4.4	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.1	90.8		29.2	5.4	95.4		29.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	82.0		26.0	8.0	82.0		26.0
Max Q Clear Time (g_c+I1), s	6.7	2.0		8.5	3.2	9.7		24.0
Green Ext Time (p_c), s	0.0	47.6		0.4	0.0	27.7		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	9.7
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	150	90	145	130	650	80	715	195	570	950	100
Future Volume (veh/h)	60	150	90	145	130	650	80	715	195	570	950	100
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.95	1.00		0.97	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	65	163	10	158	141	317	87	777	127	620	1033	104
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	100	195	266	253	560	463	110	1423	628	706	1771	178
Arrive On Green	0.18	0.18	0.18	0.09	0.30	0.30	0.06	0.40	0.40	0.07	0.18	0.18
Sat Flow, veh/h	367	1109	1511	1774	1863	1541	1774	3539	1562	3442	3247	327
Grp Volume(v), veh/h	228	0	10	158	141	317	87	777	127	620	563	574
Grp Sat Flow(s),veh/h/ln	1476	0	1511	1774	1863	1541	1774	1770	1562	1721	1770	1805
Q Serve(g_s), s	17.1	0.0	0.7	9.1	7.4	23.6	6.3	21.9	6.9	23.2	37.9	37.9
Cycle Q Clear(g_c), s	19.4	0.0	0.7	9.1	7.4	23.6	6.3	21.9	6.9	23.2	37.9	37.9
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	296	0	266	253	560	463	110	1423	628	706	965	984
V/C Ratio(X)	0.77	0.00	0.04	0.62	0.25	0.68	0.79	0.55	0.20	0.88	0.58	0.58
Avail Cap(c_a), veh/h	330	0	302	279	630	521	328	1423	628	953	965	984
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	1.00	0.79	0.79	0.79	0.52	0.52	0.52
Uniform Delay (d), s/veh	51.8	0.0	44.4	38.5	34.4	40.0	60.2	29.8	25.3	59.0	39.8	39.8
Incr Delay (d2), s/veh	9.7	0.0	0.1	3.7	0.2	3.2	3.8	1.2	0.6	3.2	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	8.8	0.0	0.3	4.6	3.9	10.4	3.2	10.9	3.1	11.4	19.0	19.4
LnGrp Delay(d),s/veh	61.5	0.0	44.5	42.2	34.6	43.2	64.0	31.0	25.9	62.2	41.1	41.1
LnGrp LOS	E		D	D	C	D	E	C	C	E	D	D
Approach Vol, veh/h		238			616			991			1757	
Approach Delay, s/veh		60.8			41.0			33.2			48.6	
Approach LOS		E			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	12.0	74.9	16.1	26.9	30.7	56.3		43.1
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	8.3	39.9	11.1	21.4	25.2	23.9		25.6
Green Ext Time (p_c), s	0.1	5.9	0.1	0.3	1.4	6.5		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	43.9
HCM 2010 LOS	D

Notes

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	54	49	42	98	54	11	239	250	51	11	147	8
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	320	789	671	15	469	399
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	612	999	1569	1291	1500	306	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	103	0	42	98	0	65	239	250	51	11	147	8
Grp Sat Flow(s),veh/h/ln	1612	0	1569	1291	0	1806	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	0.5	0.0	0.9	2.9	0.0	1.2	5.1	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	5.1	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	320	789	671	15	469	399
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	1078	0	948	896	0	1091	1341	3706	3151	670	3003	2552
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	12.1	11.2
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.5	0.0	0.4	3.5	0.5	0.1	47.2	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	1.0	0.0	0.4	1.1	0.0	0.6	2.8	1.9	0.3	0.3	1.4	0.1
LnGrp Delay(d),s/veh	15.0	0.0	14.5	17.4	0.0	14.7	18.9	8.1	6.9	66.8	12.9	11.2
LnGrp LOS	B		B	B		B	B	A	A	E	B	B
Approach Vol, veh/h		145			163			540			166	
Approach Delay, s/veh		14.9			16.3			12.8			16.4	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.3	22.8		11.5	12.2	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	7.1	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 2010 Ctrl Delay	14.2
HCM 2010 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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	5	20	98	22	2	147	560	0	11	560	28
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	309	347	336	31	409	878	746	365	725	612
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	1209	122	1544	1351	1679	153	1774	1863	1583	1774	1863	1571
Grp Volume(v), veh/h	70	0	20	98	0	24	147	560	0	11	560	28
Grp Sat Flow(s),veh/h/ln	1331	0	1544	1351	0	1831	1774	1863	1583	1774	1863	1571
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	13.1	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	13.1	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	405	0	309	347	0	366	409	878	746	365	725	612
V/C Ratio(X)	0.17	0.00	0.06	0.28	0.00	0.07	0.36	0.64	0.00	0.03	0.77	0.05
Avail Cap(c_a), veh/h	819	0	773	754	0	917	782	1903	1618	883	1903	1605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	10.0	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	0.8	0.0	0.2	1.3	0.0	0.3	1.1	5.9	0.0	0.1	7.0	0.2
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		B	B		B	A	B		A	B	A
Approach Vol, veh/h		90			122			707			599	
Approach Delay, s/veh		17.1			19.2			10.6			14.7	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	29.5		15.0	9.5	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	13.3		4.5	4.2	15.1		7.8
Green Ext Time (p_c), s	0.0	4.0		0.4	0.3	4.1		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	13.3
HCM 2010 LOS	B

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	5	11	5	5	1	65	652	9	5	777	17
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	175	147	84	1010	858	7	929	784
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	1774	515	1132	1774	1863	1564	1774	1863	1583	1774	1863	1572
Grp Volume(v), veh/h	43	0	16	5	5	1	65	652	9	5	777	17
Grp Sat Flow(s),veh/h/ln	1774	0	1646	1774	1863	1564	1774	1863	1583	1774	1863	1572
Q Serve(g_s), s	1.5	0.0	0.5	0.2	0.1	0.0	2.2	15.1	0.2	0.2	22.0	0.3
Cycle Q Clear(g_c), s	1.5	0.0	0.5	0.2	0.1	0.0	2.2	15.1	0.2	0.2	22.0	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	202	9	175	147	84	1010	858	7	929	784
V/C Ratio(X)	0.72	0.00	0.08	0.53	0.03	0.01	0.77	0.65	0.01	0.71	0.84	0.02
Avail Cap(c_a), veh/h	578	0	563	578	637	535	723	1973	1677	723	1973	1665
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	29.4	0.0	23.9	30.4	25.3	25.2	28.9	9.9	6.5	30.5	13.2	7.8
Incr Delay (d2), s/veh	14.6	0.0	0.2	39.1	0.1	0.0	13.8	0.7	0.0	81.5	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	1.0	0.0	0.2	0.2	0.1	0.0	1.4	7.8	0.1	0.2	11.8	0.1
LnGrp Delay(d),s/veh	44.0	0.0	24.0	69.5	25.3	25.2	42.7	10.6	6.5	112.0	15.3	7.8
LnGrp LOS	D		C	E	C	C	D	B	A	F	B	A
Approach Vol, veh/h		59			11			726			799	
Approach Delay, s/veh		38.6			45.4			13.4			15.8	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	38.3	5.3	12.5	7.9	35.6	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	17.1	2.2	2.5	4.2	24.0	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 2010 Ctrl Delay	15.7
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	38	11	0	22	5	0	342	734	48	11	875	3
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	31	117	200	31	0	411	2202	144	15	1521	680
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	1112	417	1583	1143	422	0	1774	3373	220	1774	3539	1583
Grp Volume(v), veh/h	49	0	0	27	0	0	342	385	397	11	875	3
Grp Sat Flow(s),veh/h/ln	1530	0	1583	1565	0	0	1774	1770	1824	1774	1770	1583
Q Serve(g_s), s	0.8	0.0	0.0	0.0	0.0	0.0	10.4	5.5	5.5	0.3	10.6	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	0.3	10.6	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	253	0	117	258	0	0	411	1155	1190	15	1521	680
V/C Ratio(X)	0.19	0.00	0.00	0.10	0.00	0.00	0.83	0.33	0.33	0.74	0.58	0.00
Avail Cap(c_a), veh/h	667	0	560	796	0	0	2070	2315	2386	2070	4631	2072
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	24.6	0.0	0.0	24.2	0.0	0.0	20.7	4.4	4.4	28.0	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	22.7	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	0.4	0.0	0.0	5.2	2.7	2.8	0.3	5.3	0.0
LnGrp Delay(d),s/veh	25.0	0.0	0.0	24.4	0.0	0.0	22.4	4.7	4.7	50.7	13.0	9.2
LnGrp LOS	C			C			C	A	A	D	B	A
Approach Vol, veh/h		49			27			1124			889	
Approach Delay, s/veh		25.0			24.4			10.1			13.4	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	17.1	30.3		9.2	4.5	42.9		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	12.6		2.8	2.3	7.5		3.6
Green Ext Time (p_c), s	0.8	11.7		0.0	0.0	9.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.0
HCM 2010 LOS	B

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	33	0	1	11	5	1	147	1179	21	16	1386	38
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	121	19	3	186	2603	46	20	2259	1011
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	1553	0	1583	701	414	70	1774	3558	63	1774	3539	1583
Grp Volume(v), veh/h	33	0	1	17	0	0	147	586	614	16	1386	38
Grp Sat Flow(s),veh/h/ln	1553	0	1583	1185	0	0	1774	1770	1852	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	5.4	8.8	8.8	0.6	15.5	0.6
Cycle Q Clear(g_c), s	1.2	0.0	0.0	1.6	0.0	0.0	5.4	8.8	8.8	0.6	15.5	0.6
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	1295	1355	20	2259	1011
V/C Ratio(X)	0.16	0.00	0.01	0.11	0.00	0.00	0.79	0.45	0.45	0.78	0.61	0.04
Avail Cap(c_a), veh/h	625	0	548	621	0	0	561	2292	2398	294	4050	1812
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	4.4
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	0.6	0.0	0.0	0.3	0.0	0.0	2.8	4.4	4.6	0.4	7.5	0.3
LnGrp Delay(d),s/veh	30.4	0.0	30.3	30.9	0.0	0.0	31.8	4.1	4.1	53.5	7.7	4.5
LnGrp LOS	C		C	C			C	A	A	D	A	A
Approach Vol, veh/h		34			17			1347			1440	
Approach Delay, s/veh		30.4			30.9			7.1			8.1	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.0	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	7.4	17.5		3.6	2.6	10.8		3.2
Green Ext Time (p_c), s	0.1	24.9		0.0	0.0	18.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.1
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	5	1	43	16	1	120	1332	50	27	1332	35
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	153	111	168	10	142	2776	1242	39	2571	1150
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	1193	120	1578	1401	1735	108	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	65	0	1	43	0	17	120	1332	50	27	1332	35
Grp Sat Flow(s),veh/h/ln	1313	0	1578	1401	0	1843	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	6.6	0.0	0.1	4.7	0.0	1.3	10.3	20.2	1.1	2.3	25.6	1.0
Cycle Q Clear(g_c), s	7.9	0.0	0.1	12.5	0.0	1.3	10.3	20.2	1.1	2.3	25.6	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	153	111	0	178	142	2776	1242	39	2571	1150
V/C Ratio(X)	0.38	0.00	0.01	0.39	0.00	0.10	0.85	0.48	0.04	0.69	0.52	0.03
Avail Cap(c_a), veh/h	254	0	244	192	0	285	240	2776	1242	240	2571	1150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	63.8	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	7.6	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	2.7	0.0	0.0	1.9	0.0	0.7	5.2	10.0	0.5	1.2	12.7	0.4
LnGrp Delay(d),s/veh	68.7	0.0	63.3	75.0	0.0	64.1	74.1	6.2	3.8	82.9	10.0	6.0
LnGrp LOS	E		E	E		E	E	A	A	F	B	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	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.6		20.0	7.4	127.6		20.0
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	27.6		14.5	4.3	22.2		9.9
Green Ext Time (p_c), s	0.1	24.4		0.1	0.0	25.2		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	13.9
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	155	0	64	11	11	4	462	1424	16	87	1288	73
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	341	0	832	61	61	22	616	2079	23	154	1726	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	3548	0	3075	749	749	272	3442	3585	40	1774	3539	1577
Grp Volume(v), veh/h	155	0	64	26	0	0	462	703	737	87	1288	73
Grp Sat Flow(s),veh/h/ln	1774	0	1537	1770	0	0	1721	1770	1856	1774	1770	1577
Q Serve(g_s), s	4.2	0.0	1.6	1.4	0.0	0.0	13.1	28.4	28.4	4.8	30.1	2.1
Cycle Q Clear(g_c), s	4.2	0.0	1.6	1.4	0.0	0.0	13.1	28.4	28.4	4.8	30.1	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	341	0	832	144	0	0	616	1026	1076	154	1726	906
V/C Ratio(X)	0.46	0.00	0.08	0.18	0.00	0.00	0.75	0.68	0.69	0.57	0.75	0.08
Avail Cap(c_a), veh/h	1176	0	1555	535	0	0	1945	3346	3509	259	5208	2458
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	43.8	0.0	28.3	44.1	0.0	0.0	40.0	15.0	15.0	45.0	21.2	9.8
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	2.1	0.0	0.7	0.7	0.0	0.0	6.3	14.0	14.9	2.4	14.9	1.1
LnGrp Delay(d),s/veh	44.2	0.0	28.3	44.7	0.0	0.0	40.7	16.2	16.2	46.2	22.1	9.8
LnGrp LOS	D		C	D			D	B	B	D	C	A
Approach Vol, veh/h		219			26			1902			1448	
Approach Delay, s/veh		39.6			44.7			22.1			22.9	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	22.4	54.0		12.4	12.9	63.5		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	15.1	32.1		3.4	6.8	30.4		6.2
Green Ext Time (p_c), s	1.3	16.0		0.1	0.1	16.4		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	23.7
HCM 2010 LOS	C

Notes

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	1897	96	33	1505	5
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	176	0	138	11	2706	136	63	2961	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	584	895	148	1372	0	1543	1774	3429	172	1774	3618	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	1627	0	0	1372	0	1543	1774	1770	1832	1774	1770	1861
Q Serve(g_s), s	0.0	0.0	0.0	5.4	0.0	0.1	0.4	35.9	37.3	2.6	18.1	18.1
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	35.9	37.3	2.6	18.1	18.1
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	176	0	138	11	1396	1446	63	1448	1523
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.45	0.70	0.71	0.52	0.51	0.51
Avail Cap(c_a), veh/h	312	0	0	289	0	265	101	1396	1446	101	1448	1523
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	7.1	66.3	3.9	4.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	6.5	1.9	1.9	2.5	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	2.5	0.0	0.0	0.2	18.0	19.2	1.3	9.1	9.5
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	75.8	8.8	9.0	68.8	5.2	5.2
LnGrp LOS	E			E		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			6.6	
Approach LOS		E			E			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	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	20.1		8.1	4.6	39.3		2.8
Green Ext Time (p_c), s	0.0	29.0		0.1	0.0	41.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.1
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	98	5	3	114	16	12	5	1875	21	11	1337	141
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	198	20	15	7	2805	31	14	2782	1243
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	1387	71	42	1312	184	138	1774	3585	40	1774	3539	1581
Grp Volume(v), veh/h	106	0	0	142	0	0	5	924	972	11	1337	141
Grp Sat Flow(s),veh/h/ln	1500	0	0	1634	0	0	1774	1770	1856	1774	1770	1581
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.3	28.5	28.8	0.7	15.6	2.5
Cycle Q Clear(g_c), s	7.9	0.0	0.0	9.8	0.0	0.0	0.3	28.5	28.8	0.7	15.6	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	1384	1452	14	2782	1243
V/C Ratio(X)	0.48	0.00	0.00	0.61	0.00	0.00	0.73	0.67	0.67	0.81	0.48	0.11
Avail Cap(c_a), veh/h	430	0	0	450	0	0	118	1384	1452	118	2782	1243
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.64	0.64	0.64	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	6.0	59.5	4.4	3.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.5	0.0	0.0	30.1	1.7	1.6	28.7	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	3.5	0.0	0.0	4.7	0.0	0.0	0.2	14.2	15.0	0.5	7.6	1.2
LnGrp Delay(d),s/veh	52.6	0.0	0.0	54.3	0.0	0.0	89.8	7.6	7.6	88.2	4.9	3.2
LnGrp LOS	D			D			F	A	A	F	A	A
Approach Vol, veh/h		106			142			1901			1489	
Approach Delay, s/veh		52.6			54.3			7.8			5.4	
Approach LOS		D			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.3		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	17.6		11.8	2.7	30.8		9.9
Green Ext Time (p_c), s	0.0	31.2		0.5	0.0	32.5		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	9.9
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	158	33	2	158	27	5	27	1685	80	11	1380	73
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	38	265	307	259	48	34	2536	120	13	2480	131
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	1070	224	1558	1358	1525	282	1774	3441	163	1774	3420	181
Grp Volume(v), veh/h	191	0	2	158	0	32	27	862	903	11	713	740
Grp Sat Flow(s),veh/h/ln	1294	0	1558	1358	0	1807	1774	1770	1834	1774	1770	1831
Q Serve(g_s), s	18.4	0.0	0.1	0.0	0.0	2.1	2.1	0.0	0.0	0.9	25.9	26.2
Cycle Q Clear(g_c), s	20.5	0.0	0.1	13.4	0.0	2.1	2.1	0.0	0.0	0.9	25.9	26.2
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	267	0	265	307	0	307	34	1304	1352	13	1283	1328
V/C Ratio(X)	0.72	0.00	0.01	0.51	0.00	0.10	0.79	0.66	0.67	0.83	0.56	0.56
Avail Cap(c_a), veh/h	310	0	312	348	0	361	139	1304	1352	139	1283	1328
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	0.50	0.50	0.50	0.86	0.86	0.86
Uniform Delay (d), s/veh	57.8	0.0	48.3	53.8	0.0	49.2	67.0	0.0	0.0	69.4	8.8	8.9
Incr Delay (d2), s/veh	6.5	0.0	0.0	1.3	0.0	0.1	7.6	1.3	1.3	32.4	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	7.7	0.0	0.1	5.8	0.0	1.1	1.1	0.5	0.5	0.5	13.0	13.7
LnGrp Delay(d),s/veh	64.2	0.0	48.3	55.1	0.0	49.3	74.7	1.3	1.3	101.8	10.3	10.4
LnGrp LOS	E		D	E		D	E	A	A	F	B	B
Approach Vol, veh/h		193			190			1792			1464	
Approach Delay, s/veh		64.1			54.2			2.4			11.0	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	105.5		27.8	5.0	107.2		27.8
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	88.0		27.0	11.0	88.0		27.0
Max Q Clear Time (g_c+I1), s	4.1	28.2		15.4	2.9	2.0		22.5
Green Ext Time (p_c), s	0.0	25.1		0.5	0.0	43.0		0.3

Intersection Summary		
HCM 2010 Ctrl Delay		11.9
HCM 2010 LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	110	35	95	75	715	25	865	120	515	860	20
Future Volume (veh/h)	15	110	35	95	75	715	25	865	120	515	860	20
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	16	120	5	103	82	439	27	940	53	560	935	21
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	52	341	328	353	567	478	34	1527	680	614	2090	47
Arrive On Green	0.21	0.21	0.21	0.07	0.30	0.30	0.02	0.43	0.43	0.36	1.00	1.00
Sat Flow, veh/h	110	1627	1563	1774	1863	1569	1774	3539	1576	3442	3539	79
Grp Volume(v), veh/h	136	0	5	103	82	439	27	940	53	560	468	488
Grp Sat Flow(s),veh/h/ln	1737	0	1563	1774	1863	1569	1774	1770	1576	1721	1770	1849
Q Serve(g_s), s	0.0	0.0	0.4	6.1	4.5	37.8	2.1	28.8	2.8	21.7	0.0	0.0
Cycle Q Clear(g_c), s	8.7	0.0	0.4	6.1	4.5	37.8	2.1	28.8	2.8	21.7	0.0	0.0
Prop In Lane	0.12		1.00	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	393	0	328	353	567	478	34	1527	680	614	1045	1092
V/C Ratio(X)	0.35	0.00	0.02	0.29	0.14	0.92	0.79	0.62	0.08	0.91	0.45	0.45
Avail Cap(c_a), veh/h	393	0	328	528	665	560	177	1527	680	836	1045	1092
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	1.00	0.79	0.79	0.79	0.74	0.74	0.74
Uniform Delay (d), s/veh	47.1	0.0	43.8	37.9	35.4	47.0	68.4	30.8	23.4	44.0	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.5	0.1	18.7	11.4	1.5	0.2	7.4	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	4.6	0.0	0.2	3.0	2.3	18.9	1.2	14.4	1.2	10.9	0.3	0.3
LnGrp Delay(d),s/veh	47.7	0.0	43.9	38.3	35.5	65.7	79.8	32.3	23.6	51.4	1.0	1.0
LnGrp LOS	D		D	D	D	E	E	C	C	D	A	A
Approach Vol, veh/h		141			624			1020			1516	
Approach Delay, s/veh		47.5			57.2			33.1			19.6	
Approach LOS		D			E			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	86.7	13.2	33.4	29.0	64.4		46.6
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	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	8.1	10.7	23.7	30.8		39.8
Green Ext Time (p_c), s	0.0	12.0	0.3	0.4	1.2	6.8		1.8

Intersection Summary	
HCM 2010 Ctrl Delay	32.1
HCM 2010 LOS	C

Notes

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	27	24	65	27	1	413	234	45	11	304	20
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	72	184	236	207	8	501	1013	861	15	503	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	912	622	1583	1348	1785	66	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	87	0	24	65	0	28	413	234	45	11	304	20
Grp Sat Flow(s),veh/h/ln	1534	0	1583	1348	0	1851	1774	1863	1583	1774	1863	1583
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	6.9	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	6.9	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	304	0	184	236	0	215	501	1013	861	15	503	428
V/C Ratio(X)	0.29	0.00	0.13	0.28	0.00	0.13	0.82	0.23	0.05	0.73	0.60	0.05
Avail Cap(c_a), veh/h	874	0	787	749	0	920	1102	3046	2590	551	2468	2098
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	19.9	0.0	19.2	22.2	0.0	19.2	16.2	5.7	5.2	23.9	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	49.1	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	0.3	0.9	0.0	0.4	5.5	1.7	0.3	0.3	3.8	0.2
LnGrp Delay(d),s/veh	20.4	0.0	19.5	22.8	0.0	19.4	19.7	6.0	5.2	73.0	17.9	13.1
LnGrp LOS	C		B	C		B	B	A	A	E	B	B
Approach Vol, veh/h		111			93			692			335	
Approach Delay, s/veh		20.2			21.8			14.1			19.4	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	32.3		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	5.2		4.5	12.5	8.9		6.8
Green Ext Time (p_c), s	0.0	3.4		0.5	1.2	4.2		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	16.7
HCM 2010 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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	22	14	49	16	1	212	636	0	27	620	44
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	55	207	243	227	14	447	960	816	392	802	679
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	1075	422	1583	1367	1735	108	1774	1863	1583	1774	1863	1576
Grp Volume(v), veh/h	104	0	14	49	0	17	212	636	0	27	620	44
Grp Sat Flow(s),veh/h/ln	1497	0	1583	1367	0	1844	1774	1863	1583	1774	1863	1576
Q Serve(g_s), s	2.6	0.0	0.4	1.7	0.0	0.4	2.9	12.0	0.0	0.4	13.6	0.8
Cycle Q Clear(g_c), s	3.0	0.0	0.4	4.7	0.0	0.4	2.9	12.0	0.0	0.4	13.6	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	330	0	207	243	0	241	447	960	816	392	802	679
V/C Ratio(X)	0.31	0.00	0.07	0.20	0.00	0.07	0.47	0.66	0.00	0.07	0.77	0.06
Avail Cap(c_a), veh/h	907	0	828	779	0	964	820	1988	1689	916	1988	1682
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	21.6	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	1.3	0.0	0.2	0.7	0.0	0.2	1.5	6.2	0.0	0.2	7.3	0.3
LnGrp Delay(d),s/veh	19.9	0.0	18.4	22.0	0.0	18.3	9.2	9.3	0.0	8.1	13.2	8.0
LnGrp LOS	B		B	C		B	A	A		A	B	A
Approach Vol, veh/h		118			66			848			691	
Approach Delay, s/veh		19.7			21.0			9.3			12.7	
Approach LOS		B			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.9	30.6		11.2	10.0	26.6		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	14.0		5.0	4.9	15.6		6.7
Green Ext Time (p_c), s	0.0	4.7		0.5	0.4	4.7		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	11.8
HCM 2010 LOS	B

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	5	4	11	5	1	179	886	8	5	832	44
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	14	150	124	222	1169	994	7	944	801
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	1774	946	757	1774	1863	1537	1774	1863	1583	1774	1863	1580
Grp Volume(v), veh/h	65	0	9	11	5	1	179	886	8	5	832	44
Grp Sat Flow(s),veh/h/ln	1774	0	1703	1774	1863	1537	1774	1863	1583	1774	1863	1580
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	33.2	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	33.2	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	14	150	124	222	1169	994	7	944	801
V/C Ratio(X)	0.77	0.00	0.04	0.77	0.03	0.01	0.81	0.76	0.01	0.72	0.88	0.05
Avail Cap(c_a), veh/h	425	0	429	425	469	387	532	1452	1234	532	1452	1231
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	32.4	41.3	35.3	35.3	35.5	11.0	5.8	41.5	18.3	10.4
Incr Delay (d2), s/veh	13.4	0.0	0.1	57.4	0.1	0.0	6.8	1.8	0.0	84.6	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	1.8	0.0	0.2	0.5	0.1	0.0	4.4	14.9	0.1	0.3	18.0	0.5
LnGrp Delay(d),s/veh	52.6	0.0	32.5	98.7	35.4	35.3	42.4	12.9	5.8	126.1	22.7	10.5
LnGrp LOS	D		C	F	D	D	D	B	A	F	C	B
Approach Vol, veh/h		74			17			1073			881	
Approach Delay, s/veh		50.2			76.4			17.7			22.6	
Approach LOS		D			E			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	57.4	5.7	15.0	15.4	47.3	9.0	11.7
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	30.2	2.5	2.4	10.2	35.2	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 2010 Ctrl Delay	21.5
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	82	5	0	87	11	9	658	957	11	5	880	6
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	139	186	15	12	702	2681	31	7	1260	564
Arrive On Green	0.10	0.09	0.00	0.10	0.09	0.09	0.40	0.75	0.75	0.00	0.36	0.36
Sat Flow, veh/h	1461	89	1583	1320	167	137	1774	3584	41	1774	3539	1583
Grp Volume(v), veh/h	87	0	0	107	0	0	658	473	495	5	880	6
Grp Sat Flow(s),veh/h/ln	1550	0	1583	1623	0	0	1774	1770	1855	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	33.4	8.6	8.6	0.3	20.0	0.2
Cycle Q Clear(g_c), s	4.7	0.0	0.0	5.5	0.0	0.0	33.4	8.6	8.6	0.3	20.0	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	228	0	139	230	0	0	702	1324	1388	7	1260	564
V/C Ratio(X)	0.38	0.00	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	404	0	338	490	0	0	1345	1324	1388	1345	2607	1166
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	40.7	0.0	0.0	41.0	0.0	0.0	27.2	4.1	4.1	46.6	25.8	19.5
Incr Delay (d2), s/veh	1.1	0.0	0.0	1.5	0.0	0.0	2.8	0.3	0.3	40.7	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	2.2	0.0	0.0	2.7	0.0	0.0	16.8	4.2	4.4	0.2	10.0	0.1
LnGrp Delay(d),s/veh	41.7	0.0	0.0	42.5	0.0	0.0	30.0	4.4	4.4	87.3	27.4	19.5
LnGrp LOS	D			D			C	A	A	F	C	B
Approach Vol, veh/h		87			107			1626			891	
Approach Delay, s/veh		41.7			42.5			14.8			27.6	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	41.1	39.4		13.2	4.4	76.1		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	35.4	22.0		7.5	2.3	10.6		6.7
Green Ext Time (p_c), s	1.7	11.4		0.3	0.0	12.2		0.2

Intersection Summary		
HCM 2010 Ctrl Delay		20.9
HCM 2010 LOS		C

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		1.00	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	54	5	-5	16	0	1	147	1560	11	11	1614	38
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	214	16	172	227	2	9	180	2626	19	14	2248	1006
Arrive On Green	0.12	0.11	0.00	0.12	0.00	0.11	0.10	0.73	0.73	0.01	0.64	0.64
Sat Flow, veh/h	1268	149	1583	1376	20	87	1774	3602	25	1774	3539	1583
Grp Volume(v), veh/h	59	0	-5	17	0	0	147	766	805	11	1614	38
Grp Sat Flow(s),veh/h/ln	1418	0	1583	1483	0	0	1774	1770	1858	1774	1770	1583
Q Serve(g_s), s	2.5	0.0	0.0	0.0	0.0	0.0	7.4	18.8	18.8	0.6	27.7	0.8
Cycle Q Clear(g_c), s	3.3	0.0	0.0	0.8	0.0	0.0	7.4	18.8	18.8	0.6	27.7	0.8
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	246	0	172	255	0	0	180	1290	1354	14	2248	1006
V/C Ratio(X)	0.24	0.00	-0.03	0.07	0.00	0.00	0.82	0.59	0.59	0.77	0.72	0.04
Avail Cap(c_a), veh/h	447	0	401	454	0	0	411	1677	1761	215	2965	1326
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	37.0	0.0	0.0	36.0	0.0	0.0	39.9	5.9	5.9	44.9	11.1	6.2
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.0	0.0	0.0	3.4	0.9	0.9	27.4	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	1.4	0.0	0.0	0.4	0.0	0.0	3.8	9.3	9.7	0.4	13.8	0.4
LnGrp Delay(d),s/veh	37.2	0.0	0.0	36.0	0.0	0.0	43.3	6.8	6.8	72.3	12.1	6.2
LnGrp LOS	D			D			D	A	A	E	B	A
Approach Vol, veh/h		54			17			1718			1663	
Approach Delay, s/veh		40.6			36.0			9.9			12.4	
Approach LOS		D			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.2	62.6		14.9	4.7	71.1		14.9
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	9.4	29.7		2.8	2.6	20.8		5.3
Green Ext Time (p_c), s	0.1	27.9		0.0	0.0	29.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	11.7
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	5	27	76	5	1	136	1549	49	38	1788	81
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	212	12	205	142	197	39	157	2656	1187	49	2440	1091
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	1298	89	1562	1358	1504	301	1774	3539	1582	1774	3539	1583
Grp Volume(v), veh/h	87	0	27	76	0	6	136	1549	49	38	1788	81
Grp Sat Flow(s),veh/h/ln	1387	0	1562	1358	0	1805	1774	1770	1582	1774	1770	1583
Q Serve(g_s), s	9.2	0.0	2.5	9.1	0.0	0.5	12.5	32.1	1.3	3.5	52.3	2.8
Cycle Q Clear(g_c), s	9.7	0.0	2.5	18.8	0.0	0.5	12.5	32.1	1.3	3.5	52.3	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	205	142	0	237	157	2656	1187	49	2440	1091
V/C Ratio(X)	0.37	0.00	0.13	0.54	0.00	0.03	0.86	0.58	0.04	0.78	0.73	0.07
Avail Cap(c_a), veh/h	253	0	227	161	0	263	280	2656	1187	108	2440	1091
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	66.2	0.0	63.4	75.2	0.0	62.5	74.2	9.1	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	3.9	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	3.7	0.0	1.1	3.5	0.0	0.2	6.3	15.7	0.6	1.8	26.0	1.3
LnGrp Delay(d),s/veh	67.2	0.0	63.7	78.4	0.0	62.5	78.1	9.8	5.3	89.0	18.1	8.5
LnGrp LOS	E		E	E		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			19.1	
Approach LOS		E			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.6	119.7		26.6	8.6	129.8		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	14.5	54.3		20.8	5.5	34.1		11.7
Green Ext Time (p_c), s	0.2	32.1		0.1	0.0	34.5		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	19.9
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	319	0	460	16	0	1	418	1598	11	82	1837	126
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	533	0	906	70	0	4	490	2411	17	114	2090	1166
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	3548	0	3123	1653	0	103	3442	3603	25	1774	3539	1583
Grp Volume(v), veh/h	319	0	460	17	0	0	418	784	825	82	1837	126
Grp Sat Flow(s),veh/h/ln	1774	0	1562	1756	0	0	1721	1770	1858	1774	1770	1583
Q Serve(g_s), s	18.0	0.0	26.4	2.0	0.0	0.0	25.4	56.5	56.6	9.7	94.7	4.9
Cycle Q Clear(g_c), s	18.0	0.0	26.4	2.0	0.0	0.0	25.4	56.5	56.6	9.7	94.7	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	533	0	906	74	0	0	490	1184	1243	114	2090	1166
V/C Ratio(X)	0.60	0.00	0.51	0.23	0.00	0.00	0.85	0.66	0.66	0.72	0.88	0.11
Avail Cap(c_a), veh/h	563	0	932	254	0	0	931	1601	1681	124	2492	1345
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	85.1	0.0	63.7	99.4	0.0	0.0	89.7	21.1	21.1	98.5	37.4	8.1
Incr Delay (d2), s/veh	1.0	0.0	0.2	0.6	0.0	0.0	1.7	0.9	0.9	13.9	3.7	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	8.9	0.0	11.4	1.0	0.0	0.0	12.2	27.8	29.2	5.2	47.3	3.3
LnGrp Delay(d),s/veh	86.1	0.0	63.9	100.0	0.0	0.0	91.4	22.0	22.0	112.3	41.1	8.2
LnGrp LOS	F		E	F			F	C	C	F	D	A
Approach Vol, veh/h		779			17			2027			2045	
Approach Delay, s/veh		73.0			100.0			36.3			41.9	
Approach LOS		E			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	34.6	130.6		13.0	17.7	147.5		36.2
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	27.4	96.7		4.0	11.7	58.6		28.4
Green Ext Time (p_c), s	1.1	27.9		0.0	0.0	21.5		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	44.8
HCM 2010 LOS	D

Notes

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	1962	96	92	2446	5
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	2	10	182	96	58	18	2599	126	118	2945	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	0.81
Sat Flow, veh/h	1235	26	115	1410	1092	655	1774	3436	167	1774	3624	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	1376	0	0	1410	0	1747	1774	1770	1833	1774	1770	1861
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	18	1338	1386	118	1438	1513
V/C Ratio(X)	0.07	0.00	0.00	0.54	0.00	0.05	0.62	0.75	0.76	0.78	0.83	0.83
Avail Cap(c_a), veh/h	299	0	0	308	0	311	145	1338	1386	250	1438	1513
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	56.5	65.9	0.0	0.0	62.0	7.3	7.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.1	7.6	2.4	2.4	4.1	5.7	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	3.7	0.0	0.3	0.4	0.9	0.9	3.5	27.2	28.5
LnGrp Delay(d),s/veh	57.0	0.0	0.0	62.5	0.0	56.7	73.5	2.4	2.4	66.2	13.0	12.7
LnGrp LOS	E			E		E	E	A	A	E	B	B
Approach Vol, veh/h		12			106			2069			2543	
Approach Delay, s/veh		57.0			62.0			2.8			14.8	
Approach LOS		E			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	113.7		15.9	13.0	106.1		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 2010 Ctrl Delay	10.7
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	190	16	9	65	5	7	5	1880	21	5	2076	278
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	2662	30	7	2627	1175
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	1321	111	63	1358	132	149	1774	3585	40	1774	3539	1583
Grp Volume(v), veh/h	215	0	0	77	0	0	5	926	975	5	2076	278
Grp Sat Flow(s),veh/h/ln	1495	0	0	1639	0	0	1774	1770	1856	1774	1770	1583
Q Serve(g_s), s	13.4	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	49.3	7.4
Cycle Q Clear(g_c), s	18.8	0.0	0.0	5.4	0.0	0.0	0.4	0.0	0.0	0.4	49.3	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	319	0	0	7	1314	1378	7	2627	1175
V/C Ratio(X)	0.72	0.00	0.00	0.24	0.00	0.00	0.74	0.71	0.71	0.74	0.79	0.24
Avail Cap(c_a), veh/h	379	0	0	401	0	0	105	1314	1378	105	2627	1175
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	0.60	0.60	0.60	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	10.8	5.4
Incr Delay (d2), s/veh	4.9	0.0	0.0	0.4	0.0	0.0	29.4	1.9	1.9	20.3	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	8.2	0.0	0.0	2.6	0.0	0.0	0.2	0.7	0.7	0.2	24.0	3.2
LnGrp Delay(d),s/veh	59.5	0.0	0.0	49.7	0.0	0.0	96.3	1.9	1.9	87.4	11.8	5.6
LnGrp LOS	E			D			F	A	A	F	B	A
Approach Vol, veh/h		215			77			1906			2359	
Approach Delay, s/veh		59.5			49.7			2.1			11.3	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	104.2		26.3	4.5	104.2		26.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	84.0		29.0	8.0	84.0		29.0
Max Q Clear Time (g_c+I1), s	2.4	51.3		7.4	2.4	2.0		20.8
Green Ext Time (p_c), s	0.0	30.9		0.2	0.0	62.7		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	10.4
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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		0.97	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	196	38	8	103	27	2	60	1668	111	27	2005	159
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	268	43	307	355	340	25	76	2336	154	34	2225	174
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.19	0.09	1.00	1.00	0.04	1.00	1.00
Sat Flow, veh/h	1103	214	1545	1347	1710	127	1774	3370	223	1774	3325	260
Grp Volume(v), veh/h	234	0	8	103	0	29	60	870	909	27	1054	1110
Grp Sat Flow(s),veh/h/ln	1317	0	1545	1347	0	1837	1774	1770	1823	1774	1770	1816
Q Serve(g_s), s	21.9	0.0	0.6	0.0	0.0	1.7	4.5	0.0	0.0	2.0	0.0	0.0
Cycle Q Clear(g_c), s	23.6	0.0	0.6	7.7	0.0	1.7	4.5	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.84		1.00	1.00		0.07	1.00		0.12	1.00		0.14
Lane Grp Cap(c), veh/h	311	0	307	355	0	365	76	1227	1264	34	1184	1215
V/C Ratio(X)	0.75	0.00	0.03	0.29	0.00	0.08	0.79	0.71	0.72	0.80	0.89	0.91
Avail Cap(c_a), veh/h	333	0	332	377	0	395	105	1227	1264	105	1184	1215
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	0.38	0.38	0.38	0.50	0.50	0.50
Uniform Delay (d), s/veh	53.6	0.0	43.5	46.4	0.0	44.0	61.1	0.0	0.0	64.7	0.0	0.0
Incr Delay (d2), s/veh	8.7	0.0	0.0	0.4	0.0	0.1	6.5	1.3	1.4	7.7	5.5	6.6
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	9.3	0.0	0.2	3.3	0.0	0.9	2.3	0.5	0.5	1.1	1.8	2.2
LnGrp Delay(d),s/veh	62.3	0.0	43.6	46.9	0.0	44.1	67.6	1.3	1.4	72.4	5.5	6.6
LnGrp LOS	E		D	D		D	E	A	A	E	A	A
Approach Vol, veh/h		242			132			1839			2191	
Approach Delay, s/veh		61.7			46.3			3.5			6.9	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	94.3		30.9	6.6	97.6		30.9
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	6.5	2.0		9.7	4.0	2.0		25.6
Green Ext Time (p_c), s	0.0	62.6		0.4	0.0	43.1		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	9.7
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	185	60	125	110	695	55	940	195	630	1225	65
Future Volume (veh/h)	60	185	60	125	110	695	55	940	195	630	1225	65
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.97	1.00		0.98	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	65	201	8	136	120	454	60	1022	128	685	1332	69
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	97	239	317	234	589	492	77	1361	604	724	1887	98
Arrive On Green	0.21	0.21	0.21	0.08	0.32	0.32	0.04	0.38	0.38	0.42	1.00	1.00
Sat Flow, veh/h	310	1163	1542	1774	1863	1556	1774	3539	1571	3442	3423	177
Grp Volume(v), veh/h	266	0	8	136	120	454	60	1022	128	685	687	714
Grp Sat Flow(s),veh/h/ln	1473	0	1542	1774	1863	1556	1774	1770	1571	1721	1770	1830
Q Serve(g_s), s	20.4	0.0	0.6	7.8	6.4	38.0	4.5	33.7	7.4	25.9	0.0	0.0
Cycle Q Clear(g_c), s	23.5	0.0	0.6	7.8	6.4	38.0	4.5	33.7	7.4	25.9	0.0	0.0
Prop In Lane	0.24		1.00	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	336	0	317	234	589	492	77	1361	604	724	976	1009
V/C Ratio(X)	0.79	0.00	0.03	0.58	0.20	0.92	0.78	0.75	0.21	0.95	0.70	0.71
Avail Cap(c_a), veh/h	339	0	320	301	662	553	237	1361	604	765	976	1009
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	1.00	0.88	0.88	0.88	0.31	0.31	0.31
Uniform Delay (d), s/veh	51.6	0.0	42.8	38.4	33.7	44.6	63.9	36.0	27.8	38.4	0.0	0.0
Incr Delay (d2), s/veh	12.0	0.0	0.0	2.3	0.2	19.9	5.4	3.4	0.7	8.1	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	10.7	0.0	0.2	4.0	3.3	19.0	2.3	17.1	3.3	12.9	0.4	0.4
LnGrp Delay(d),s/veh	63.6	0.0	42.9	40.7	33.9	64.4	69.3	39.4	28.6	46.4	1.3	1.3
LnGrp LOS	E		D	D	C	E	E	D	C	D	A	A
Approach Vol, veh/h		274			710			1210			2086	
Approach Delay, s/veh		63.0			54.7			39.7			16.1	
Approach LOS		E			D			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.9	78.4	15.0	31.7	32.4	55.9		46.7
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	18.0	56.0	15.0	27.0	30.0	44.0		47.0
Max Q Clear Time (g_c+I1), s	6.5	2.0	9.8	25.5	27.9	35.7		40.0
Green Ext Time (p_c), s	0.1	22.6	0.2	0.2	0.6	5.6		1.7

Intersection Summary	
HCM 2010 Ctrl Delay	32.2
HCM 2010 LOS	C

Notes

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	49	35	49	54	10	293	337	22	22	304	28
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	204	268	199	37	380	905	767	29	536	455
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	552	1045	1566	1298	1527	283	1774	1863	1580	1774	1863	1581
Grp Volume(v), veh/h	92	0	35	49	0	64	293	337	22	22	304	28
Grp Sat Flow(s),veh/h/ln	1596	0	1566	1298	0	1809	1774	1863	1580	1774	1863	1581
Q Serve(g_s), s	0.8	0.0	0.9	1.6	0.0	1.4	6.8	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	6.8	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	330	0	204	268	0	236	380	905	767	29	536	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	988	0	864	815	0	998	1224	3384	2870	612	2741	2326
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	17.4	0.0	16.8	19.2	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	3.4	0.5	0.0	34.3	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	1.1	0.0	0.4	0.6	0.0	0.7	3.6	2.7	0.1	0.5	3.3	0.3
LnGrp Delay(d),s/veh	17.8	0.0	17.2	19.5	0.0	17.7	19.5	7.6	5.9	55.6	15.2	11.3
LnGrp LOS	B		B	B		B	B	A	A	E	B	B
Approach Vol, veh/h		127			113			652			354	
Approach Delay, s/veh		17.7			18.5			12.9			17.4	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.7	27.1		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	8.8	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 2010 Ctrl Delay	15.1
HCM 2010 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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	22	23	43	16	1	147	484	0	16	527	25
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	291	84	232	310	259	16	443	854	726	436	721	611
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	954	564	1557	1337	1733	108	1774	1863	1583	1774	1863	1577
Grp Volume(v), veh/h	82	0	23	43	0	17	147	484	0	16	527	25
Grp Sat Flow(s),veh/h/ln	1518	0	1557	1337	0	1841	1774	1863	1583	1774	1863	1577
Q Serve(g_s), s	1.2	0.0	0.5	1.3	0.0	0.3	2.0	8.0	0.0	0.2	10.2	0.4
Cycle Q Clear(g_c), s	1.9	0.0	0.5	3.2	0.0	0.3	2.0	8.0	0.0	0.2	10.2	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	375	0	232	310	0	275	443	854	726	436	721	611
V/C Ratio(X)	0.22	0.00	0.10	0.14	0.00	0.06	0.33	0.57	0.00	0.04	0.73	0.04
Avail Cap(c_a), veh/h	1030	0	925	905	0	1094	927	2258	1920	1047	2258	1912
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	16.0	0.0	15.5	17.5	0.0	15.4	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	0.9	0.0	0.2	0.5	0.0	0.2	1.0	4.2	0.0	0.1	5.4	0.2
LnGrp Delay(d),s/veh	16.3	0.0	15.6	17.7	0.0	15.5	8.4	8.9	0.0	8.0	12.5	8.1
LnGrp LOS	B		B	B		B	A	A		A	B	A
Approach Vol, veh/h		105			60			631			568	
Approach Delay, s/veh		16.1			17.0			8.8			12.1	
Approach LOS		B			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	25.3		11.3	8.5	22.3		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	12.2		5.2
Green Ext Time (p_c), s	0.0	3.3		0.4	0.3	3.8		0.1

Intersection Summary		
HCM 2010 Ctrl Delay		11.1
HCM 2010 LOS		B

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	5	7	11	5	1	87	598	9	5	734	26
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	78	110	20	166	141	115	1000	850	7	887	753
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	1774	700	980	1774	1863	1583	1774	1863	1583	1774	1863	1582
Grp Volume(v), veh/h	43	0	12	11	5	1	87	598	9	5	734	26
Grp Sat Flow(s),veh/h/ln	1774	0	1679	1774	1863	1583	1774	1863	1583	1774	1863	1582
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	20.3	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	20.3	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	188	20	166	141	115	1000	850	7	887	753
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	596	0	592	596	657	558	745	2033	1728	745	2033	1727
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	28.5	0.0	23.6	29.3	24.8	24.7	27.4	9.4	6.4	29.6	13.5	8.3
Incr Delay (d2), s/veh	14.1	0.0	0.1	22.0	0.1	0.0	9.7	0.6	0.0	81.2	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	0.9	0.0	0.2	0.3	0.1	0.0	1.7	6.8	0.1	0.2	10.7	0.2
LnGrp Delay(d),s/veh	42.6	0.0	23.8	51.3	24.8	24.7	37.1	10.0	6.4	110.8	15.5	8.3
LnGrp LOS	D		C	D	C	C	D	A	A	F	B	A
Approach Vol, veh/h		55			17			694			765	
Approach Delay, s/veh		38.5			42.0			13.3			15.9	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	37.0	5.7	11.7	8.9	33.4	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	22.3	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 2010 Ctrl Delay	15.8
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	54	11	0	11	0	1	446	647	5	0	793	17
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	15	97	206	4	8	516	2695	21	3	1376	613
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	1239	252	1583	1407	67	134	1774	3600	28	1774	3539	1577
Grp Volume(v), veh/h	65	0	0	12	0	0	446	318	334	0	793	17
Grp Sat Flow(s),veh/h/ln	1491	0	1583	1608	0	0	1774	1770	1858	1774	1770	1577
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	10.2	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	10.2	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	231	0	97	246	0	0	516	1325	1391	3	1376	613
V/C Ratio(X)	0.28	0.00	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	648	0	547	769	0	0	2176	2110	2215	2176	4219	1880
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	26.2	0.0	0.0	25.2	0.0	0.0	19.5	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	1.0	0.0	0.0	0.2	0.0	0.0	6.9	1.6	1.7	0.0	5.1	0.2
LnGrp Delay(d),s/veh	26.8	0.0	0.0	25.3	0.0	0.0	21.2	2.4	2.4	0.0	14.7	11.0
LnGrp LOS	C			C			C	A	A		B	B
Approach Vol, veh/h		65			12			1098			810	
Approach Delay, s/veh		26.8			25.3			10.1			14.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.8	28.5		8.6	0.0	49.3		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	12.2		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 2010 Ctrl Delay	12.6
HCM 2010 LOS	B

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		1.00	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	60	5	-3	16	5	1	114	1033	21	11	1408	38
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	215	14	143	181	45	7	146	2497	51	15	2228	994
Arrive On Green	0.10	0.09	0.00	0.10	0.09	0.09	0.08	0.70	0.70	0.01	0.63	0.63
Sat Flow, veh/h	1294	150	1583	1030	499	73	1774	3548	72	1774	3539	1580
Grp Volume(v), veh/h	65	0	-3	22	0	0	114	515	539	11	1408	38
Grp Sat Flow(s),veh/h/ln	1444	0	1583	1601	0	0	1774	1770	1850	1774	1770	1580
Q Serve(g_s), s	2.1	0.0	0.0	0.0	0.0	0.0	4.5	8.6	8.6	0.4	17.3	0.6
Cycle Q Clear(g_c), s	2.9	0.0	0.0	0.8	0.0	0.0	4.5	8.6	8.6	0.4	17.3	0.6
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	249	0	143	255	0	0	146	1245	1302	15	2228	994
V/C Ratio(X)	0.26	0.00	-0.02	0.09	0.00	0.00	0.78	0.41	0.41	0.75	0.63	0.04
Avail Cap(c_a), veh/h	578	0	514	602	0	0	526	2149	2247	276	3798	1695
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	30.1	0.0	0.0	29.3	0.0	0.0	31.9	4.4	4.4	35.0	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	24.5	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	1.2	0.0	0.0	0.4	0.0	0.0	2.3	4.3	4.5	0.3	8.6	0.3
LnGrp Delay(d),s/veh	30.3	0.0	0.0	29.4	0.0	0.0	35.2	4.9	4.8	59.6	8.7	5.0
LnGrp LOS	C			C			D	A	A	E	A	A
Approach Vol, veh/h		62			22			1168			1457	
Approach Delay, s/veh		31.8			29.4			7.8			9.0	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	49.6		11.4	4.6	54.8		11.4
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		2.8	2.4	10.6		4.9
Green Ext Time (p_c), s	0.1	25.3		0.0	0.0	14.4		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	9.2
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	5	12	49	5	2	120	1114	34	33	1495	45
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	232	230	186	75	154	2255	1009	57	2062	922
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	1293	121	1577	1386	1265	506	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	70	0	12	49	0	7	120	1114	34	33	1495	45
Grp Sat Flow(s),veh/h/ln	1415	0	1577	1386	0	1771	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	3.4	0.0	0.5	2.7	0.0	0.3	5.4	13.6	0.7	1.5	25.0	1.0
Cycle Q Clear(g_c), s	3.6	0.0	0.5	6.3	0.0	0.3	5.4	13.6	0.7	1.5	25.0	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	311	0	232	230	0	261	154	2255	1009	57	2062	922
V/C Ratio(X)	0.23	0.00	0.05	0.21	0.00	0.03	0.78	0.49	0.03	0.58	0.73	0.05
Avail Cap(c_a), veh/h	519	0	463	433	0	520	456	2986	1336	260	2596	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	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	30.9	0.0	30.0	34.1	0.0	29.9	36.6	7.9	5.5	39.0	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	1.2	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	1.4	0.0	0.2	1.1	0.0	0.1	2.8	6.6	0.3	0.8	12.4	0.4
LnGrp Delay(d),s/veh	31.3	0.0	30.1	34.6	0.0	29.9	39.8	8.2	5.5	42.4	13.6	7.4
LnGrp LOS	C		C	C		C	D	A	A	D	B	A
Approach Vol, veh/h		82			56			1268			1573	
Approach Delay, s/veh		31.1			34.0			11.1			14.0	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.1	53.6		17.0	6.6	58.1		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	27.0		8.3	3.5	15.6		5.6
Green Ext Time (p_c), s	0.2	20.7		0.1	0.0	17.1		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	13.6
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	259	0	268	16	5	7	315	1250	16	60	1500	134
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	448	0	782	51	16	22	445	2214	28	119	1970	1067
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	3548	0	3167	992	310	434	3442	3578	46	1774	3539	1582
Grp Volume(v), veh/h	259	0	268	28	0	0	315	618	648	60	1500	134
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1737	0	0	1721	1770	1855	1774	1770	1582
Q Serve(g_s), s	8.1	0.0	8.1	1.8	0.0	0.0	10.3	23.9	24.0	3.8	38.2	3.5
Cycle Q Clear(g_c), s	8.1	0.0	8.1	1.8	0.0	0.0	10.3	23.9	24.0	3.8	38.2	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	448	0	782	89	0	0	445	1095	1148	119	1970	1067
V/C Ratio(X)	0.58	0.00	0.34	0.32	0.00	0.00	0.71	0.56	0.56	0.50	0.76	0.13
Avail Cap(c_a), veh/h	1031	0	1302	460	0	0	1706	2934	3075	227	4567	2228
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	48.2	0.0	36.3	53.9	0.0	0.0	48.8	13.1	13.1	52.7	20.0	6.8
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	4.0	0.0	3.6	0.9	0.0	0.0	4.9	11.9	12.4	1.9	18.8	2.1
LnGrp Delay(d),s/veh	48.6	0.0	36.4	54.7	0.0	0.0	49.6	13.7	13.7	53.9	20.8	6.9
LnGrp LOS	D		D	D			D	B	B	D	C	A
Approach Vol, veh/h		527			28			1581			1694	
Approach Delay, s/veh		42.4			54.7			20.9			20.9	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	19.1	69.1		10.0	11.9	76.4		18.8
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	12.3	40.2		3.8	5.8	26.0		10.1
Green Ext Time (p_c), s	0.9	23.0		0.0	0.0	12.5		1.6

Intersection Summary		
HCM 2010 Ctrl Delay		24.1
HCM 2010 LOS		C

Notes

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1446	95	98	1967	11
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2402	157	124	2800	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	1140	37	235	1410	856	856	1774	3373	221	1774	3609	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	1412	0	0	1410	0	1712	1774	1770	1824	1774	1770	1859
Q Serve(g_s), s	0.0	0.0	0.0	12.4	0.0	0.7	0.4	6.8	7.0	7.1	34.8	35.0
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	6.8	7.0	7.1	34.8	35.0
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	1260	1299	124	1373	1443
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	312	0	0	318	0	316	150	1260	1299	150	1373	1443
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	55.3	0.0	50.2	64.2	1.2	1.2	59.5	7.2	7.2
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.8	0.0	0.1	8.2	1.8	1.7	16.7	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	5.3	0.0	0.3	0.2	3.3	3.8	4.1	17.7	18.9
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.3	72.4	2.9	2.9	76.2	10.2	10.1
LnGrp LOS	D			E		D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1546			2076	
Approach Delay, s/veh		50.0			57.6			3.2			13.3	
Approach LOS		D			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.8	104.9		20.3	13.1	96.6		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	37.0		15.0	9.1	9.0		2.7
Green Ext Time (p_c), s	0.0	34.6		0.3	0.0	30.2		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		11.0
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	147	5	13	71	5	9	16	1386	15	11	1734	207
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	228	6	16	226	17	23	19	2757	30	13	2709	1211
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	1339	46	118	1336	132	174	1774	3587	39	1774	3539	1582
Grp Volume(v), veh/h	165	0	0	85	0	0	16	684	717	11	1734	207
Grp Sat Flow(s),veh/h/ln	1503	0	0	1642	0	0	1774	1770	1856	1774	1770	1582
Q Serve(g_s), s	7.8	0.0	0.0	0.0	0.0	0.0	1.2	32.9	32.9	0.8	29.3	4.6
Cycle Q Clear(g_c), s	13.7	0.0	0.0	5.9	0.0	0.0	1.2	32.9	32.9	0.8	29.3	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	1360	1427	13	2709	1211
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	347	0	0	365	0	0	109	1360	1427	109	2709	1211
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	15.3	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	23.5	1.0	1.0	23.6	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	6.0	0.0	0.0	2.8	0.0	0.0	0.7	16.4	17.2	0.5	14.2	2.0
LnGrp Delay(d),s/veh	57.7	0.0	0.0	52.3	0.0	0.0	87.9	16.3	16.3	88.0	7.7	4.3
LnGrp LOS	E			D			F	B	B	F	A	A
Approach Vol, veh/h		165			85			1417			1952	
Approach Delay, s/veh		57.7			52.3			17.1			7.8	
Approach LOS		E			D			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	103.5		21.1	5.0	103.9		21.1
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	83.0		25.0	8.0	83.0		25.0
Max Q Clear Time (g_c+I1), s	3.2	31.3		7.9	2.8	34.9		15.7
Green Ext Time (p_c), s	0.0	42.2		0.2	0.0	28.5		0.4

Intersection Summary		
HCM 2010 Ctrl Delay		14.8
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	207	22	11	98	22	2	65	1418	63	16	1745	137
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	286	25	305	373	326	30	83	2428	108	19	2221	172
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.06	0.94	0.93	0.02	1.00	1.00
Sat Flow, veh/h	1205	128	1576	1380	1682	153	1774	3451	153	1774	3328	258
Grp Volume(v), veh/h	229	0	11	98	0	24	65	726	755	16	918	964
Grp Sat Flow(s),veh/h/ln	1333	0	1576	1380	0	1835	1774	1770	1835	1774	1770	1817
Q Serve(g_s), s	20.6	0.0	0.7	0.0	0.0	1.4	4.7	7.6	7.7	1.2	0.0	0.0
Cycle Q Clear(g_c), s	22.0	0.0	0.7	6.5	0.0	1.4	4.7	7.6	7.7	1.2	0.0	0.0
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	311	0	305	373	0	355	83	1245	1291	19	1181	1213
V/C Ratio(X)	0.74	0.00	0.04	0.26	0.00	0.07	0.79	0.58	0.59	0.84	0.78	0.79
Avail Cap(c_a), veh/h	331	0	327	393	0	381	109	1245	1291	109	1181	1213
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	0.64	0.64	0.64	0.70	0.70	0.70
Uniform Delay (d), s/veh	51.8	0.0	42.6	44.9	0.0	42.9	60.3	1.5	1.5	63.5	0.0	0.0
Incr Delay (d2), s/veh	7.9	0.0	0.0	0.4	0.0	0.1	11.6	1.3	1.2	21.7	3.6	3.8
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	8.7	0.0	0.3	3.1	0.0	0.7	2.6	3.6	4.0	0.7	1.2	1.3
LnGrp Delay(d),s/veh	59.7	0.0	42.6	45.3	0.0	42.9	71.9	2.8	2.8	85.2	3.6	3.8
LnGrp LOS	E		D	D		D	E	A	A	F	A	A
Approach Vol, veh/h		240			122			1546			1898	
Approach Delay, s/veh		58.9			44.8			5.7			4.4	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.1	90.8		29.2	5.4	95.4		29.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	82.0		26.0	8.0	82.0		26.0
Max Q Clear Time (g_c+I1), s	6.7	2.0		8.5	3.2	9.7		24.0
Green Ext Time (p_c), s	0.0	47.6		0.4	0.0	27.7		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	9.7
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	150	90	145	130	650	80	715	195	570	950	100
Future Volume (veh/h)	60	150	90	145	130	650	80	715	195	570	950	100
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.95	1.00		0.97	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	65	163	10	158	141	317	87	777	127	620	1033	104
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	100	195	266	253	560	463	110	1423	628	706	1771	178
Arrive On Green	0.18	0.18	0.18	0.09	0.30	0.30	0.06	0.40	0.40	0.07	0.18	0.18
Sat Flow, veh/h	367	1109	1511	1774	1863	1541	1774	3539	1562	3442	3247	327
Grp Volume(v), veh/h	228	0	10	158	141	317	87	777	127	620	563	574
Grp Sat Flow(s),veh/h/ln	1476	0	1511	1774	1863	1541	1774	1770	1562	1721	1770	1805
Q Serve(g_s), s	17.1	0.0	0.7	9.1	7.4	23.6	6.3	21.9	6.9	23.2	37.9	37.9
Cycle Q Clear(g_c), s	19.4	0.0	0.7	9.1	7.4	23.6	6.3	21.9	6.9	23.2	37.9	37.9
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	296	0	266	253	560	463	110	1423	628	706	965	984
V/C Ratio(X)	0.77	0.00	0.04	0.62	0.25	0.68	0.79	0.55	0.20	0.88	0.58	0.58
Avail Cap(c_a), veh/h	330	0	302	279	630	521	328	1423	628	953	965	984
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	1.00	0.79	0.79	0.79	0.52	0.52	0.52
Uniform Delay (d), s/veh	51.8	0.0	44.4	38.5	34.4	40.0	60.2	29.8	25.3	59.0	39.8	39.8
Incr Delay (d2), s/veh	9.7	0.0	0.1	3.7	0.2	3.2	3.8	1.2	0.6	3.2	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	8.8	0.0	0.3	4.6	3.9	10.4	3.2	10.9	3.1	11.4	19.0	19.4
LnGrp Delay(d),s/veh	61.5	0.0	44.5	42.2	34.6	43.2	64.0	31.0	25.9	62.2	41.1	41.1
LnGrp LOS	E		D	D	C	D	E	C	C	E	D	D
Approach Vol, veh/h		238			616			991			1757	
Approach Delay, s/veh		60.8			41.0			33.2			48.6	
Approach LOS		E			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	12.0	74.9	16.1	26.9	30.7	56.3		43.1
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	8.3	39.9	11.1	21.4	25.2	23.9		25.6
Green Ext Time (p_c), s	0.1	5.9	0.1	0.3	1.4	6.5		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	43.9
HCM 2010 LOS	D

Notes

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2027 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	255	100	10	205	30
Future Volume (veh/h)	50	45	295	90	50	20	220	255	100	10	205	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	54	49	38	98	54	10	239	277	54	11	223	9
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	250	46	320	790	671	15	470	399
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	614	998	1569	1296	1527	283	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	103	0	38	98	0	64	239	277	54	11	223	9
Grp Sat Flow(s),veh/h/ln	1612	0	1569	1296	0	1810	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	0.5	0.0	0.8	2.9	0.0	1.2	5.1	4.0	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	5.1	4.0	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	320	790	671	15	470	399
V/C Ratio(X)	0.26	0.00	0.15	0.30	0.00	0.22	0.75	0.35	0.08	0.72	0.47	0.02
Avail Cap(c_a), veh/h	1079	0	949	899	0	1095	1342	3710	3153	671	3005	2555
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	11.2
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.5	0.0	0.4	3.5	0.6	0.1	47.2	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	0.4	1.1	0.0	0.6	2.8	2.1	0.4	0.3	2.3	0.1
LnGrp Delay(d),s/veh	15.0	0.0	14.5	17.4	0.0	14.7	18.9	8.3	6.9	66.8	14.2	11.2
LnGrp LOS	B		B	B		B	B	A	A	E	B	B
Approach Vol, veh/h		141			162			570			243	
Approach Delay, s/veh		14.9			16.3			12.6			16.5	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.3	22.8		11.5	12.2	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	6.0		4.0	7.1	6.0		6.9
Green Ext Time (p_c), s	0.0	4.1		0.6	0.7	2.9		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	14.3
HCM 2010 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	550	15	10	590	65
Future Volume (veh/h)	60	5	180	90	20	15	135	550	15	10	590	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	5	19	98	22	2	147	598	0	11	641	30
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	364	24	303	329	330	30	377	936	796	364	796	672
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.08	0.50	0.00	0.01	0.43	0.43
Sat Flow, veh/h	1208	120	1543	1352	1679	153	1774	1863	1583	1774	1863	1572
Grp Volume(v), veh/h	70	0	19	98	0	24	147	598	0	11	641	30
Grp Sat Flow(s),veh/h/ln	1327	0	1543	1352	0	1831	1774	1863	1583	1774	1863	1572
Q Serve(g_s), s	2.2	0.0	0.5	3.7	0.0	0.6	2.3	12.9	0.0	0.2	16.4	0.6
Cycle Q Clear(g_c), s	2.8	0.0	0.5	6.4	0.0	0.6	2.3	12.9	0.0	0.2	16.4	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	388	0	303	329	0	360	377	936	796	364	796	672
V/C Ratio(X)	0.18	0.00	0.06	0.30	0.00	0.07	0.39	0.64	0.00	0.03	0.81	0.04
Avail Cap(c_a), veh/h	746	0	705	681	0	837	715	1737	1476	836	1737	1466
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	18.9	0.0	17.9	21.5	0.0	17.9	10.0	10.0	0.0	9.5	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	0.9	0.0	0.2	1.4	0.0	0.3	1.2	6.7	0.0	0.1	8.8	0.3
LnGrp Delay(d),s/veh	19.1	0.0	18.0	22.0	0.0	18.0	10.7	10.7	0.0	9.5	15.7	9.2
LnGrp LOS	B		B	C		B	B	B		A	B	A
Approach Vol, veh/h		89			122			745			682	
Approach Delay, s/veh		18.9			21.2			10.7			15.3	
Approach LOS		B			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	33.5		15.8	9.6	29.4		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	14.9		4.8	4.3	18.4		8.4
Green Ext Time (p_c), s	0.0	4.3		0.4	0.3	4.8		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	13.8
HCM 2010 LOS	B

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	635	15	5	795	30
Future Volume (veh/h)	40	5	125	5	5	5	60	635	15	5	795	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	5	8	5	5	1	65	690	11	5	864	19
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	136	85	1088	924	7	1006	850
Arrive On Green	0.03	0.11	0.11	0.01	0.09	0.09	0.05	0.58	0.58	0.00	0.54	0.54
Sat Flow, veh/h	1774	640	1025	1774	1863	1562	1774	1863	1583	1774	1863	1573
Grp Volume(v), veh/h	43	0	13	5	5	1	65	690	11	5	864	19
Grp Sat Flow(s),veh/h/ln	1774	0	1665	1774	1863	1562	1774	1863	1583	1774	1863	1573
Q Serve(g_s), s	1.6	0.0	0.5	0.2	0.2	0.0	2.5	16.7	0.2	0.2	27.2	0.4
Cycle Q Clear(g_c), s	1.6	0.0	0.5	0.2	0.2	0.0	2.5	16.7	0.2	0.2	27.2	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	136	85	1088	924	7	1006	850
V/C Ratio(X)	0.74	0.00	0.07	0.53	0.03	0.01	0.77	0.63	0.01	0.71	0.86	0.02
Avail Cap(c_a), veh/h	519	0	511	519	572	480	649	1771	1505	649	1771	1495
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	27.0	33.9	28.6	28.5	32.2	9.4	6.0	34.0	13.5	7.3
Incr Delay (d2), s/veh	16.9	0.0	0.1	39.6	0.1	0.0	13.5	0.6	0.0	82.5	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	1.1	0.0	0.2	0.2	0.1	0.0	1.5	8.6	0.1	0.3	14.3	0.2
LnGrp Delay(d),s/veh	49.7	0.0	27.2	73.5	28.7	28.5	45.7	10.0	6.0	116.5	15.8	7.3
LnGrp LOS	D		C	E	C	C	D	B	A	F	B	A
Approach Vol, veh/h		56			11			766			888	
Approach Delay, s/veh		44.5			49.0			13.0			16.1	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	44.9	5.4	12.8	8.3	41.9	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	18.7	2.2	2.5	4.5	29.2	3.6	2.2
Green Ext Time (p_c), s	0.0	5.5	0.0	0.0	0.1	7.7	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	15.9
HCM 2010 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	695	45	10	890	10
Future Volume (veh/h)	35	10	480	20	5	0	315	695	45	10	890	10
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	38	11	0	22	5	0	342	755	48	11	967	3
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	113	188	30	0	406	2284	145	15	1612	721
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	1111	421	1583	1151	418	0	1774	3380	215	1774	3539	1583
Grp Volume(v), veh/h	49	0	0	27	0	0	342	395	408	11	967	3
Grp Sat Flow(s),veh/h/ln	1532	0	1583	1569	0	0	1774	1770	1825	1774	1770	1583
Q Serve(g_s), s	0.9	0.0	0.0	0.0	0.0	0.0	11.3	5.7	5.7	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	5.7	5.7	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	113	244	0	0	406	1196	1233	15	1612	721
V/C Ratio(X)	0.21	0.00	0.00	0.11	0.00	0.00	0.84	0.33	0.33	0.74	0.60	0.00
Avail Cap(c_a), veh/h	616	0	517	735	0	0	2055	1993	2055	2055	3985	1783
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	26.8	0.0	0.0	26.4	0.0	0.0	22.6	4.1	4.1	30.3	12.5	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	23.3	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	0.0	0.4	0.0	0.0	5.7	2.9	2.9	0.3	6.2	0.0
LnGrp Delay(d),s/veh	27.2	0.0	0.0	26.6	0.0	0.0	24.4	4.5	4.5	53.6	13.3	9.1
LnGrp LOS	C			C			C	A	A	D	B	A
Approach Vol, veh/h		49			27			1145			981	
Approach Delay, s/veh		27.2			26.6			10.4			13.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.0	33.9		9.4	4.5	47.4		9.4
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	13.3	14.5		2.8	2.4	7.7		3.7
Green Ext Time (p_c), s	0.8	13.4		0.0	0.0	9.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.5
HCM 2010 LOS	B

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	1105	20	15	1370	65
Future Volume (veh/h)	30	0	70	10	5	10	135	1105	20	15	1370	65
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	33	0	1	11	5	1	147	1201	21	16	1489	44
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	112	19	3	185	2671	47	20	2328	1042
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	1555	0	1583	686	435	70	1774	3559	62	1774	3539	1583
Grp Volume(v), veh/h	33	0	1	17	0	0	147	597	625	16	1489	44
Grp Sat Flow(s),veh/h/ln	1555	0	1583	1191	0	0	1774	1770	1852	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	5.9	9.2	9.2	0.7	18.0	0.7
Cycle Q Clear(g_c), s	1.3	0.0	0.0	1.7	0.0	0.0	5.9	9.2	9.2	0.7	18.0	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	190	0	70	151	0	0	185	1328	1390	20	2328	1042
V/C Ratio(X)	0.17	0.00	0.01	0.11	0.00	0.00	0.80	0.45	0.45	0.79	0.64	0.04
Avail Cap(c_a), veh/h	575	0	504	570	0	0	515	2105	2203	270	3721	1665
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	33.1	0.0	33.0	33.5	0.0	0.0	31.6	3.4	3.4	35.6	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	21.8	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	3.0	4.5	4.7	0.4	8.9	0.3
LnGrp Delay(d),s/veh	33.3	0.0	33.1	33.6	0.0	0.0	34.6	3.9	3.9	57.5	7.9	4.4
LnGrp LOS	C		C	C			C	A	A	E	A	A
Approach Vol, veh/h		34			17			1369			1549	
Approach Delay, s/veh		33.3			33.6			7.2			8.3	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.5	52.5		8.2	4.8	59.3		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	20.0		3.7	2.7	11.2		3.3
Green Ext Time (p_c), s	0.1	27.6		0.0	0.0	18.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 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	1270	60	25	1320	45
Future Volume (veh/h)	55	5	35	40	15	45	110	1270	60	25	1320	45
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	5	1	43	16	1	120	1380	50	27	1435	36
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	153	111	168	10	142	2776	1242	39	2571	1150
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	1193	120	1578	1401	1735	108	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	65	0	1	43	0	17	120	1380	50	27	1435	36
Grp Sat Flow(s),veh/h/ln	1313	0	1578	1401	0	1843	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	6.6	0.0	0.1	4.7	0.0	1.3	10.3	21.4	1.1	2.3	28.9	1.0
Cycle Q Clear(g_c), s	7.9	0.0	0.1	12.5	0.0	1.3	10.3	21.4	1.1	2.3	28.9	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	153	111	0	178	142	2776	1242	39	2571	1150
V/C Ratio(X)	0.38	0.00	0.01	0.39	0.00	0.10	0.85	0.50	0.04	0.69	0.56	0.03
Avail Cap(c_a), veh/h	254	0	244	192	0	285	240	2776	1242	240	2571	1150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	63.8	70.4	5.9	3.7	75.2	9.7	5.9
Incr Delay (d2), s/veh	1.4	0.0	0.0	2.2	0.0	0.2	3.9	0.5	0.0	7.6	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	2.7	0.0	0.0	1.9	0.0	0.7	5.2	10.5	0.5	1.2	14.3	0.4
LnGrp Delay(d),s/veh	68.7	0.0	63.3	75.0	0.0	64.1	74.2	6.4	3.8	82.9	10.6	6.0
LnGrp LOS	E		E	E		E	E	A	A	F	B	A
Approach Vol, veh/h		66			60			1550			1498	
Approach Delay, s/veh		68.6			71.9			11.5			11.8	
Approach LOS		E			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.6		20.0	7.4	127.6		20.0
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.0	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	30.9		14.5	4.3	23.4		9.9
Green Ext Time (p_c), s	0.1	27.3		0.1	0.0	26.8		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.0
HCM 2010 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	1345	15	80	1280	110
Future Volume (veh/h)	140	10	235	10	10	10	460	1345	15	80	1280	110
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	160	0	67	11	11	3	500	1462	16	87	1391	90
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	0	839	59	59	16	636	2203	24	146	1811	938
Arrive On Green	0.09	0.00	0.08	0.08	0.08	0.05	0.18	0.61	0.60	0.08	0.51	0.51
Sat Flow, veh/h	3548	0	3071	783	783	214	3442	3586	39	1774	3539	1578
Grp Volume(v), veh/h	160	0	67	25	0	0	500	721	757	87	1391	90
Grp Sat Flow(s),veh/h/ln	1774	0	1535	1779	0	0	1721	1770	1856	1774	1770	1578
Q Serve(g_s), s	5.0	0.0	1.9	1.5	0.0	0.0	16.2	31.0	31.0	5.5	36.9	2.9
Cycle Q Clear(g_c), s	5.0	0.0	1.9	1.5	0.0	0.0	16.2	31.0	31.0	5.5	36.9	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	324	0	839	134	0	0	636	1087	1140	146	1811	938
V/C Ratio(X)	0.49	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	1033	0	1453	472	0	0	1709	2939	3082	228	4574	2170
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	50.5	0.0	32.0	50.8	0.0	0.0	45.4	14.7	14.7	51.8	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	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	2.5	0.0	0.8	0.8	0.0	0.0	7.8	15.3	16.1	2.8	18.2	1.5
LnGrp Delay(d),s/veh	51.0	0.0	32.1	51.5	0.0	0.0	46.2	15.7	15.6	53.2	24.0	10.3
LnGrp LOS	D		C	D			D	B	B	D	C	B
Approach Vol, veh/h		227			25			1978			1568	
Approach Delay, s/veh		45.4			51.5			23.4			24.8	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	25.6	63.8		12.8	13.6	75.8		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	18.2	38.9		3.5	7.5	33.0		7.0
Green Ext Time (p_c), s	1.4	18.8		0.0	0.1	17.4		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	25.5
HCM 2010 LOS	C

Notes

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	1825	90	30	1475	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1825	90	30	1475	5
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	1984	96	33	1603	5
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	176	0	138	11	2713	130	63	2962	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	584	895	148	1372	0	1543	1774	3438	165	1774	3619	11
Grp Volume(v), veh/h	11	0	0	65	0	1	5	1013	1067	33	784	824
Grp Sat Flow(s),veh/h/ln	1627	0	0	1372	0	1543	1774	1770	1833	1774	1770	1861
Q Serve(g_s), s	0.0	0.0	0.0	5.4	0.0	0.1	0.4	39.6	41.2	2.6	20.2	20.2
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	39.6	41.2	2.6	20.2	20.2
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	176	0	138	11	1396	1447	63	1448	1523
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.45	0.73	0.74	0.52	0.54	0.54
Avail Cap(c_a), veh/h	312	0	0	289	0	265	101	1396	1447	101	1448	1523
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.59	0.59	0.59	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	4.1	4.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	6.0	2.0	2.0	2.5	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	2.5	0.0	0.0	0.2	19.6	21.3	1.3	10.2	10.7
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	75.4	9.3	9.5	68.8	5.6	5.5
LnGrp LOS	E			E		E	E	A	A	E	A	A
Approach Vol, veh/h		11			66			2085			1641	
Approach Delay, s/veh		58.6			62.0			9.6			6.8	
Approach LOS		E			E			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	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	22.2		8.1	4.6	43.2		2.8
Green Ext Time (p_c), s	0.0	32.7		0.1	0.0	41.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.4
HCM 2010 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	1805	20	10	1315	185
Future Volume (veh/h)	90	5	5	105	15	15	5	1805	20	10	1315	185
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	98	5	3	114	16	12	5	1962	22	11	1429	144
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	198	20	15	7	2805	31	14	2782	1243
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	1387	71	42	1312	184	138	1774	3585	40	1774	3539	1581
Grp Volume(v), veh/h	106	0	0	142	0	0	5	967	1017	11	1429	144
Grp Sat Flow(s),veh/h/ln	1500	0	0	1634	0	0	1774	1770	1856	1774	1770	1581
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.3	31.4	31.7	0.7	17.4	2.6
Cycle Q Clear(g_c), s	7.9	0.0	0.0	9.8	0.0	0.0	0.3	31.4	31.7	0.7	17.4	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	1384	1452	14	2782	1243
V/C Ratio(X)	0.48	0.00	0.00	0.61	0.00	0.00	0.73	0.70	0.70	0.81	0.51	0.12
Avail Cap(c_a), veh/h	430	0	0	450	0	0	118	1384	1452	118	2782	1243
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.60	0.60	0.60	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	59.5	4.6	3.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.5	0.0	0.0	28.3	1.8	1.7	28.1	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	3.5	0.0	0.0	4.7	0.0	0.0	0.2	15.7	16.5	0.5	8.6	1.2
LnGrp Delay(d),s/veh	52.6	0.0	0.0	54.3	0.0	0.0	88.0	8.0	8.0	87.5	5.2	3.2
LnGrp LOS	D			D			F	A	A	F	A	A
Approach Vol, veh/h		106			142			1989			1584	
Approach Delay, s/veh		52.6			54.3			8.2			5.6	
Approach LOS		D			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.3		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	19.4		11.8	2.7	33.7		9.9
Green Ext Time (p_c), s	0.0	32.9		0.5	0.0	31.0		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	10.1
HCM 2010 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	1625	75	10	1355	70
Future Volume (veh/h)	145	30	20	145	25	35	25	1625	75	10	1355	70
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	158	33	2	158	27	5	27	1766	80	11	1473	74
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	38	265	307	259	48	34	2542	114	13	2488	125
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	1070	224	1558	1358	1525	282	1774	3450	155	1774	3430	172
Grp Volume(v), veh/h	191	0	2	158	0	32	27	901	945	11	758	789
Grp Sat Flow(s),veh/h/ln	1294	0	1558	1358	0	1807	1774	1770	1835	1774	1770	1832
Q Serve(g_s), s	18.4	0.0	0.1	0.0	0.0	2.1	2.1	0.0	0.0	0.9	28.8	29.1
Cycle Q Clear(g_c), s	20.5	0.0	0.1	13.4	0.0	2.1	2.1	0.0	0.0	0.9	28.8	29.1
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	267	0	265	307	0	307	34	1304	1353	13	1283	1329
V/C Ratio(X)	0.72	0.00	0.01	0.51	0.00	0.10	0.79	0.69	0.70	0.83	0.59	0.59
Avail Cap(c_a), veh/h	310	0	312	348	0	361	139	1304	1353	139	1283	1329
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	0.45	0.45	0.45	0.83	0.83	0.83
Uniform Delay (d), s/veh	57.8	0.0	48.3	53.8	0.0	49.2	67.0	0.0	0.0	69.4	9.2	9.3
Incr Delay (d2), s/veh	6.5	0.0	0.0	1.3	0.0	0.1	6.9	1.4	1.4	31.6	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	7.7	0.0	0.1	5.8	0.0	1.1	1.1	0.5	0.5	0.5	14.5	15.1
LnGrp Delay(d),s/veh	64.2	0.0	48.3	55.1	0.0	49.3	74.0	1.4	1.4	101.0	10.9	10.9
LnGrp LOS	E		D	E		D	E	A	A	F	B	B
Approach Vol, veh/h		193			190			1873			1558	
Approach Delay, s/veh		64.1			54.2			2.4			11.6	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	105.5		27.8	5.0	107.2		27.8
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	88.0		27.0	11.0	88.0		27.0
Max Q Clear Time (g_c+I1), s	4.1	31.1		15.4	2.9	2.0		22.5
Green Ext Time (p_c), s	0.0	27.6		0.5	0.0	47.4		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	11.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	110	35	95	75	715	25	925	120	515	935	20
Future Volume (veh/h)	15	110	35	95	75	715	25	925	120	515	935	20
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	16	120	4	103	82	457	27	1005	55	560	1016	21
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	52	345	333	356	571	481	34	1520	677	614	2087	43
Arrive On Green	0.21	0.21	0.21	0.07	0.31	0.31	0.02	0.43	0.43	0.36	1.00	1.00
Sat Flow, veh/h	111	1622	1563	1774	1863	1569	1774	3539	1576	3442	3546	73
Grp Volume(v), veh/h	136	0	4	103	82	457	27	1005	55	560	507	530
Grp Sat Flow(s),veh/h/ln	1733	0	1563	1774	1863	1569	1774	1770	1576	1721	1770	1850
Q Serve(g_s), s	0.0	0.0	0.3	6.1	4.5	39.9	2.1	31.7	2.9	21.7	0.0	0.0
Cycle Q Clear(g_c), s	8.7	0.0	0.3	6.1	4.5	39.9	2.1	31.7	2.9	21.7	0.0	0.0
Prop In Lane	0.12		1.00	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	398	0	333	356	571	481	34	1520	677	614	1041	1089
V/C Ratio(X)	0.34	0.00	0.01	0.29	0.14	0.95	0.79	0.66	0.08	0.91	0.49	0.49
Avail Cap(c_a), veh/h	398	0	333	443	572	482	177	1520	677	836	1041	1089
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	1.00	0.79	0.79	0.79	0.70	0.70	0.70
Uniform Delay (d), s/veh	46.8	0.0	43.5	37.7	35.2	47.5	68.4	31.8	23.6	44.0	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.4	0.1	28.7	11.4	1.8	0.2	7.1	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	4.5	0.0	0.1	3.0	2.3	21.1	1.2	15.9	1.3	10.9	0.3	0.3
LnGrp Delay(d),s/veh	47.3	0.0	43.5	38.1	35.3	76.2	79.8	33.6	23.8	51.1	1.1	1.1
LnGrp LOS	D		D	D	D	E	E	C	C	D	A	A
Approach Vol, veh/h		140			642			1087			1597	
Approach Delay, s/veh		47.2			64.8			34.3			18.6	
Approach LOS		D			E			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	86.4	13.1	33.8	29.0	64.1		46.9
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	14.0	70.0	15.0	22.0	34.0	50.0		42.0
Max Q Clear Time (g_c+I1), s	4.1	2.0	8.1	10.7	23.7	33.7		41.9
Green Ext Time (p_c), s	0.0	13.9	0.2	0.4	1.2	8.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	33.3
HCM 2010 LOS	C

Notes

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2027 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	275	65	10	375	75
Future Volume (veh/h)	55	25	370	60	25	5	380	275	65	10	375	75
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	27	20	65	27	1	413	299	46	11	408	24
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	194	7	489	1112	945	15	614	522
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.28	0.60	0.60	0.01	0.33	0.33
Sat Flow, veh/h	903	599	1583	1353	1785	66	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	87	0	20	65	0	28	413	299	46	11	408	24
Grp Sat Flow(s),veh/h/ln	1502	0	1583	1353	0	1851	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	2.3	0.0	0.6	2.7	0.0	0.8	12.3	4.3	0.7	0.3	10.5	0.6
Cycle Q Clear(g_c), s	3.1	0.0	0.6	5.7	0.0	0.8	12.3	4.3	0.7	0.3	10.5	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	201	489	1112	945	15	614	522
V/C Ratio(X)	0.32	0.00	0.12	0.32	0.00	0.14	0.84	0.27	0.05	0.74	0.66	0.05
Avail Cap(c_a), veh/h	752	0	679	635	0	794	952	2631	2237	476	2132	1812
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	23.5	0.0	22.5	26.3	0.0	22.6	19.1	5.4	4.7	27.7	16.1	12.8
Incr Delay (d2), s/veh	0.7	0.0	0.3	0.9	0.0	0.3	4.1	0.3	0.0	50.8	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	1.3	0.0	0.3	1.0	0.0	0.4	6.5	2.2	0.3	0.4	5.8	0.3
LnGrp Delay(d),s/veh	24.2	0.0	22.8	27.2	0.0	22.9	23.2	5.7	4.7	78.4	18.7	12.8
LnGrp LOS	C		C	C		C	C	A	A	E	B	B
Approach Vol, veh/h		107			93			758			443	
Approach Delay, s/veh		24.0			25.9			15.2			19.9	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	39.4		11.1	20.4	24.4		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	6.3		5.1	14.3	12.5		7.7
Green Ext Time (p_c), s	0.0	4.4		0.4	1.2	5.9		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	18.1
HCM 2010 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	655	45	25	675	80
Future Volume (veh/h)	75	20	150	45	15	10	195	655	45	25	675	80
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	22	12	49	16	1	212	712	0	27	734	49
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	55	204	222	224	14	400	1040	884	374	898	760
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.09	0.56	0.00	0.02	0.48	0.48
Sat Flow, veh/h	1074	423	1583	1369	1735	108	1774	1863	1583	1774	1863	1577
Grp Volume(v), veh/h	104	0	12	49	0	17	212	712	0	27	734	49
Grp Sat Flow(s),veh/h/ln	1498	0	1583	1369	0	1844	1774	1863	1583	1774	1863	1577
Q Serve(g_s), s	3.0	0.0	0.4	1.9	0.0	0.4	3.0	14.9	0.0	0.4	18.3	0.9
Cycle Q Clear(g_c), s	3.5	0.0	0.4	5.3	0.0	0.4	3.0	14.9	0.0	0.4	18.3	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	312	0	204	222	0	238	400	1040	884	374	898	760
V/C Ratio(X)	0.33	0.00	0.06	0.22	0.00	0.07	0.53	0.68	0.00	0.07	0.82	0.06
Avail Cap(c_a), veh/h	798	0	728	675	0	848	722	1748	1485	831	1748	1479
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	22.1	0.0	20.8	24.6	0.0	20.8	10.0	8.6	0.0	8.0	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	1.5	0.0	0.2	0.7	0.0	0.2	1.7	7.7	0.0	0.2	9.6	0.4
LnGrp Delay(d),s/veh	22.7	0.0	20.9	25.1	0.0	20.9	11.1	9.4	0.0	8.1	13.9	7.6
LnGrp LOS	C		C	C		C	B	A		A	B	A
Approach Vol, veh/h		116			66			924			810	
Approach Delay, s/veh		22.5			24.0			9.8			13.4	
Approach LOS		C			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.0	36.3		12.0	10.2	32.2		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	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.4	16.9		5.5	5.0	20.3		7.3
Green Ext Time (p_c), s	0.0	5.5		0.5	0.4	5.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.6
HCM 2010 LOS	B

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	890	10	5	870	75
Future Volume (veh/h)	60	5	95	10	5	10	165	890	10	5	870	75
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	5	4	11	5	1	179	967	8	5	946	44
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	83	14	130	106	216	1253	1065	7	1033	876
Arrive On Green	0.05	0.11	0.11	0.01	0.07	0.07	0.12	0.67	0.67	0.00	0.55	0.55
Sat Flow, veh/h	1774	944	756	1774	1863	1530	1774	1863	1583	1774	1863	1580
Grp Volume(v), veh/h	65	0	9	11	5	1	179	967	8	5	946	44
Grp Sat Flow(s),veh/h/ln	1774	0	1700	1774	1863	1530	1774	1863	1583	1774	1863	1580
Q Serve(g_s), s	3.5	0.0	0.5	0.6	0.2	0.1	9.6	34.3	0.2	0.3	44.6	1.2
Cycle Q Clear(g_c), s	3.5	0.0	0.5	0.6	0.2	0.1	9.6	34.3	0.2	0.3	44.6	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	186	14	130	106	216	1253	1065	7	1033	876
V/C Ratio(X)	0.77	0.00	0.05	0.78	0.04	0.01	0.83	0.77	0.01	0.72	0.92	0.05
Avail Cap(c_a), veh/h	366	0	368	366	403	331	457	1253	1065	457	1247	1058
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	45.7	0.0	38.7	48.1	42.1	42.0	41.6	10.8	5.2	48.3	19.6	9.9
Incr Delay (d2), s/veh	13.3	0.0	0.1	61.0	0.1	0.0	7.8	3.0	0.0	86.6	9.4	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	2.0	0.0	0.2	0.5	0.1	0.0	5.1	18.5	0.1	0.3	25.3	0.5
LnGrp Delay(d),s/veh	59.0	0.0	38.8	109.1	42.2	42.1	49.4	13.8	5.2	134.9	29.0	9.9
LnGrp LOS	E		D	F	D	D	D	B	A	F	C	A
Approach Vol, veh/h		74			17			1154			995	
Approach Delay, s/veh		56.5			85.5			19.3			28.7	
Approach LOS		E			F			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	70.3	5.8	15.6	16.8	58.8	9.6	11.8
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	2.3	36.3	2.6	2.5	11.6	46.6	5.5	2.2
Green Ext Time (p_c), s	0.0	8.9	0.0	0.0	0.4	7.2	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	25.2
HCM 2010 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	935	10	5	920	20
Future Volume (veh/h)	75	5	600	80	10	10	605	935	10	5	920	20
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	82	5	0	87	11	9	658	1016	11	5	1000	6
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	134	173	14	12	696	2769	30	7	1357	607
Arrive On Green	0.09	0.08	0.00	0.09	0.08	0.08	0.39	0.77	0.77	0.00	0.38	0.38
Sat Flow, veh/h	1444	88	1583	1331	168	138	1774	3587	39	1774	3539	1583
Grp Volume(v), veh/h	87	0	0	107	0	0	658	501	526	5	1000	6
Grp Sat Flow(s),veh/h/ln	1532	0	1583	1637	0	0	1774	1770	1856	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	38.6	9.7	9.7	0.3	26.2	0.3
Cycle Q Clear(g_c), s	5.6	0.0	0.0	6.4	0.0	0.0	38.6	9.7	9.7	0.3	26.2	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	134	215	0	0	696	1366	1433	7	1357	607
V/C Ratio(X)	0.42	0.00	0.00	0.50	0.00	0.00	0.95	0.37	0.37	0.73	0.74	0.01
Avail Cap(c_a), veh/h	351	0	294	429	0	0	1169	1366	1433	1169	2267	1014
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	47.2	0.0	0.0	47.6	0.0	0.0	31.6	3.9	3.9	53.6	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	42.0	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	2.5	0.0	0.0	3.1	0.0	0.0	20.1	4.7	5.0	0.2	13.1	0.1
LnGrp Delay(d),s/veh	48.5	0.0	0.0	49.4	0.0	0.0	38.4	4.3	4.2	95.5	30.2	20.6
LnGrp LOS	D			D			D	A	A	F	C	C
Approach Vol, veh/h		87			107			1685			1011	
Approach Delay, s/veh		48.5			49.4			17.6			30.5	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	46.3	47.3		14.1	4.4	89.2		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	28.2		8.4	2.3	11.7		7.6
Green Ext Time (p_c), s	1.7	13.2		0.3	0.0	13.4		0.2

Intersection Summary		
HCM 2010 Ctrl Delay		24.2
HCM 2010 LOS		C

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	1490	10	10	1610	60
Future Volume (veh/h)	50	5	140	15	0	5	135	1490	10	10	1610	60
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	54	5	5	16	0	1	147	1620	11	11	1750	40
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	178	2	7	178	2663	18	14	2288	1024
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	1357	154	1520	959	18	61	1774	3603	24	1774	3539	1583
Grp Volume(v), veh/h	59	0	5	17	0	0	147	795	836	11	1750	40
Grp Sat Flow(s),veh/h/ln	1511	0	1520	1037	0	0	1774	1770	1858	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.3	1.0	0.0	0.0	8.1	21.1	21.2	0.6	34.3	0.9
Cycle Q Clear(g_c), s	3.1	0.0	0.3	4.0	0.0	0.0	8.1	21.1	21.2	0.6	34.3	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	254	0	170	197	0	0	178	1308	1373	14	2288	1024
V/C Ratio(X)	0.23	0.00	0.03	0.09	0.00	0.00	0.82	0.61	0.61	0.78	0.76	0.04
Avail Cap(c_a), veh/h	421	0	352	360	0	0	375	1533	1610	197	2710	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	40.1	0.0	39.3	41.4	0.0	0.0	43.8	6.1	6.1	49.1	12.3	6.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.6	1.0	1.0	28.8	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	1.5	0.0	0.1	0.4	0.0	0.0	4.1	10.5	11.1	0.4	17.0	0.4
LnGrp Delay(d),s/veh	40.2	0.0	39.3	41.5	0.0	0.0	47.4	7.2	7.1	77.9	13.8	6.4
LnGrp LOS	D		D	D			D	A	A	E	B	A
Approach Vol, veh/h		64			17			1778			1801	
Approach Delay, s/veh		40.2			41.5			10.5			14.1	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.0	69.2		16.1	4.8	78.4		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	10.1	36.3		6.0	2.6	23.2		5.1
Green Ext Time (p_c), s	0.1	27.9		0.0	0.0	31.6		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.9
HCM 2010 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	1510	60	35	1770	95
Future Volume (veh/h)	75	5	175	70	5	45	125	1510	60	35	1770	95
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	5	27	76	5	1	136	1641	49	38	1924	81
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	212	12	205	142	197	39	157	2656	1187	49	2440	1091
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	1298	89	1562	1358	1504	301	1774	3539	1582	1774	3539	1583
Grp Volume(v), veh/h	87	0	27	76	0	6	136	1641	49	38	1924	81
Grp Sat Flow(s),veh/h/ln	1387	0	1562	1358	0	1805	1774	1770	1582	1774	1770	1583
Q Serve(g_s), s	9.2	0.0	2.5	9.1	0.0	0.5	12.5	35.6	1.3	3.5	61.1	2.8
Cycle Q Clear(g_c), s	9.7	0.0	2.5	18.8	0.0	0.5	12.5	35.6	1.3	3.5	61.1	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	205	142	0	237	157	2656	1187	49	2440	1091
V/C Ratio(X)	0.37	0.00	0.13	0.54	0.00	0.03	0.86	0.62	0.04	0.78	0.79	0.07
Avail Cap(c_a), veh/h	253	0	227	161	0	263	280	2656	1187	108	2440	1091
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.68	0.68	0.68	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.2	0.0	63.4	75.2	0.0	62.5	74.2	9.6	5.3	79.7	17.4	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	3.7	0.0	1.1	3.5	0.0	0.2	6.3	17.4	0.6	1.8	30.6	1.3
LnGrp Delay(d),s/veh	67.2	0.0	63.7	78.4	0.0	62.5	77.9	10.3	5.3	89.0	20.1	8.5
LnGrp LOS	E		E	E		E	E	B	A	F	C	A
Approach Vol, veh/h		114			82			1826			2043	
Approach Delay, s/veh		66.4			77.2			15.2			20.9	
Approach LOS		E			E			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.6	119.7		26.6	8.6	129.8		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	14.5	63.1		20.8	5.5	37.6		11.7
Green Ext Time (p_c), s	0.2	29.3		0.1	0.0	37.8		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	20.8
HCM 2010 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	1505	10	75	1760	190
Future Volume (veh/h)	350	5	740	15	0	5	500	1505	10	75	1760	190
Number	3	8	18	7	4	14	1	6	16	5	2	12
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		0.96	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	384	0	609	16	0	1	543	1636	11	82	1913	177
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	487	0	973	64	0	4	606	2517	17	107	2063	1134
Arrive On Green	0.14	0.00	0.13	0.04	0.00	0.03	0.18	0.70	0.69	0.06	0.58	0.58
Sat Flow, veh/h	3548	0	3119	1653	0	103	3442	3604	24	1774	3539	1583
Grp Volume(v), veh/h	384	0	609	17	0	0	543	803	844	82	1913	177
Grp Sat Flow(s),veh/h/ln	1774	0	1560	1756	0	0	1721	1770	1858	1774	1770	1583
Q Serve(g_s), s	25.9	0.0	33.0	2.3	0.0	0.0	38.2	62.0	62.2	11.3	121.5	8.8
Cycle Q Clear(g_c), s	25.9	0.0	33.0	2.3	0.0	0.0	38.2	62.0	62.2	11.3	121.5	8.8
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	487	0	973	69	0	0	606	1236	1298	107	2063	1134
V/C Ratio(X)	0.79	0.00	0.63	0.25	0.00	0.00	0.90	0.65	0.65	0.76	0.93	0.16
Avail Cap(c_a), veh/h	487	0	973	220	0	0	806	1386	1456	107	2158	1176
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	103.3	0.0	73.4	115.6	0.0	0.0	99.8	20.6	20.6	114.6	46.9	11.2
Incr Delay (d2), s/veh	7.8	0.0	1.0	0.7	0.0	0.0	8.6	1.1	1.1	24.7	7.6	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	13.3	0.0	18.1	1.1	0.0	0.0	19.0	30.5	32.3	6.3	61.4	5.7
LnGrp Delay(d),s/veh	111.1	0.0	74.3	116.3	0.0	0.0	108.4	21.7	21.7	139.3	54.5	11.3
LnGrp LOS	F		E	F			F	C	C	F	D	B
Approach Vol, veh/h		993			17			2190			2172	
Approach Delay, s/veh		88.6			116.3			43.2			54.2	
Approach LOS		F			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	47.6	148.4		13.7	19.0	177.0		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	40.2	123.5		4.3	13.3	64.2		35.0
Green Ext Time (p_c), s	1.4	18.9		0.0	0.0	22.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	56.2
HCM 2010 LOS	E

Notes

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	1975	90	85	2465	5
Future Volume (veh/h)	10	0	5	90	5	60	10	1975	90	85	2465	5
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	2147	96	92	2679	5
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	2	10	182	96	58	18	2611	116	118	2946	5
Arrive On Green	0.09	0.00	0.08	0.09	0.09	0.08	0.01	1.00	1.00	0.07	0.81	0.81
Sat Flow, veh/h	1235	26	115	1410	1092	655	1774	3452	153	1774	3624	7
Grp Volume(v), veh/h	12	0	0	98	0	8	11	1093	1150	92	1308	1376
Grp Sat Flow(s),veh/h/ln	1376	0	0	1410	0	1747	1774	1770	1836	1774	1770	1862
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	71.5	71.7
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	71.5	71.7
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	173	0	0	182	0	154	18	1338	1388	118	1438	1513
V/C Ratio(X)	0.07	0.00	0.00	0.54	0.00	0.05	0.62	0.82	0.83	0.78	0.91	0.91
Avail Cap(c_a), veh/h	299	0	0	308	0	311	145	1338	1388	250	1438	1513
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	0.49	0.49	0.49	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.9	0.0	0.0	60.0	0.0	56.5	66.3	0.0	0.0	62.0	9.1	9.1
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.1	6.2	2.8	2.9	4.1	10.0	9.7
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	1.0	1.1	3.5	38.2	40.0
LnGrp Delay(d),s/veh	57.0	0.0	0.0	62.5	0.0	56.7	72.5	2.8	2.9	66.2	19.1	18.8
LnGrp LOS	E			E		E	E	A	A	E	B	B
Approach Vol, veh/h		12			106			2254			2776	
Approach Delay, s/veh		57.0			62.0			3.2			20.5	
Approach LOS		E			E			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	113.7		15.9	13.0	106.1		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	73.7		10.8	8.9	2.2		3.4
Green Ext Time (p_c), s	0.0	13.2		0.2	0.1	61.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	13.9
HCM 2010 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	1900	20	5	2115	325
Future Volume (veh/h)	175	15	10	60	5	10	5	1900	20	5	2115	325
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	190	16	9	65	5	7	5	2065	22	5	2299	285
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	2663	28	7	2627	1175
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	1321	111	63	1358	132	149	1774	3587	38	1774	3539	1583
Grp Volume(v), veh/h	215	0	0	77	0	0	5	1017	1070	5	2299	285
Grp Sat Flow(s),veh/h/ln	1495	0	0	1639	0	0	1774	1770	1856	1774	1770	1583
Q Serve(g_s), s	13.4	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	64.5	7.6
Cycle Q Clear(g_c), s	18.8	0.0	0.0	5.4	0.0	0.0	0.4	0.0	0.0	0.4	64.5	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	319	0	0	7	1314	1378	7	2627	1175
V/C Ratio(X)	0.72	0.00	0.00	0.24	0.00	0.00	0.74	0.77	0.78	0.74	0.87	0.24
Avail Cap(c_a), veh/h	379	0	0	401	0	0	105	1314	1378	105	2627	1175
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	0.22	0.22	0.22
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	12.8	5.5
Incr Delay (d2), s/veh	4.9	0.0	0.0	0.4	0.0	0.0	26.8	2.5	2.4	12.2	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	8.2	0.0	0.0	2.6	0.0	0.0	0.2	0.9	0.9	0.2	31.4	3.4
LnGrp Delay(d),s/veh	59.5	0.0	0.0	49.7	0.0	0.0	93.8	2.5	2.4	79.4	13.8	5.6
LnGrp LOS	E			D			F	A	A	E	B	A
Approach Vol, veh/h		215			77			2092			2589	
Approach Delay, s/veh		59.5			49.7			2.6			13.0	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	104.2		26.3	4.5	104.2		26.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	84.0		29.0	8.0	84.0		29.0
Max Q Clear Time (g_c+I1), s	2.4	66.5		7.4	2.4	2.0		20.8
Green Ext Time (p_c), s	0.0	17.2		0.2	0.0	69.9		0.5

Intersection Summary		
HCM 2010 Ctrl Delay		11.2
HCM 2010 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	1700	105	25	2050	150
Future Volume (veh/h)	180	35	45	95	25	20	55	1700	105	25	2050	150
Number	3	8	18	7	4	14	1	6	16	5	2	12
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		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	196	38	7	103	27	2	60	1848	111	27	2228	159
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	252	39	286	337	317	23	76	2399	143	34	2290	161
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.18	0.09	1.00	1.00	0.03	0.91	0.90
Sat Flow, veh/h	1095	212	1542	1347	1710	127	1774	3395	202	1774	3353	236
Grp Volume(v), veh/h	234	0	7	103	0	29	60	954	1005	27	1163	1224
Grp Sat Flow(s),veh/h/ln	1307	0	1542	1347	0	1836	1774	1770	1827	1774	1770	1820
Q Serve(g_s), s	22.3	0.0	0.5	0.0	0.0	1.8	4.5	0.0	0.0	2.0	64.5	78.9
Cycle Q Clear(g_c), s	24.1	0.0	0.5	7.9	0.0	1.8	4.5	0.0	0.0	2.0	64.5	78.9
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	291	0	286	337	0	340	76	1251	1291	34	1209	1243
V/C Ratio(X)	0.80	0.00	0.02	0.31	0.00	0.09	0.79	0.76	0.78	0.80	0.96	0.98
Avail Cap(c_a), veh/h	291	0	286	337	0	340	79	1251	1291	53	1209	1243
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	0.26	0.26	0.26	0.34	0.34	0.34
Uniform Delay (d), s/veh	55.5	0.0	45.0	48.0	0.0	45.6	61.1	0.0	0.0	65.5	4.9	5.7
Incr Delay (d2), s/veh	15.0	0.0	0.0	0.5	0.0	0.1	11.4	1.2	1.2	6.9	8.5	11.6
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	9.9	0.0	0.2	3.4	0.0	0.9	2.4	0.4	0.4	1.1	31.4	40.0
LnGrp Delay(d),s/veh	70.5	0.0	45.1	48.5	0.0	45.7	72.5	1.2	1.2	72.5	13.4	17.3
LnGrp LOS	E		D	D		D	E	A	A	E	B	B
Approach Vol, veh/h		241			132			2019			2414	
Approach Delay, s/veh		69.8			47.9			3.3			16.0	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	96.2		29.0	6.6	99.4		29.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	6.0	91.0		24.0	4.0	93.0		24.0
Max Q Clear Time (g_c+I1), s	6.5	80.9		9.9	4.0	2.0		26.1
Green Ext Time (p_c), s	0.0	9.8		0.4	0.0	55.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	14.3
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	185	60	125	110	695	55	1090	195	630	1415	65
Future Volume (veh/h)	60	185	60	125	110	695	55	1090	195	630	1415	65
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.97	1.00		0.98	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	65	201	7	136	120	458	60	1185	132	685	1538	69
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	223	297	215	566	472	77	1402	622	728	1945	87
Arrive On Green	0.19	0.19	0.19	0.08	0.30	0.30	0.04	0.40	0.40	0.42	1.00	1.00
Sat Flow, veh/h	311	1157	1539	1774	1863	1555	1774	3539	1571	3442	3450	154
Grp Volume(v), veh/h	266	0	7	136	120	458	60	1185	132	685	786	821
Grp Sat Flow(s),veh/h/ln	1468	0	1539	1774	1863	1555	1774	1770	1571	1721	1770	1835
Q Serve(g_s), s	21.3	0.0	0.5	8.0	6.5	39.2	4.5	41.0	7.5	25.8	0.0	0.0
Cycle Q Clear(g_c), s	24.0	0.0	0.5	8.0	6.5	39.2	4.5	41.0	7.5	25.8	0.0	0.0
Prop In Lane	0.24		1.00	1.00		1.00	1.00		1.00	1.00		0.08
Lane Grp Cap(c), veh/h	316	0	297	215	566	472	77	1402	622	728	998	1034
V/C Ratio(X)	0.84	0.00	0.02	0.63	0.21	0.97	0.78	0.85	0.21	0.94	0.79	0.79
Avail Cap(c_a), veh/h	316	0	297	229	566	472	276	1402	622	790	998	1034
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	1.00	0.88	0.88	0.88	0.13	0.13	0.13
Uniform Delay (d), s/veh	53.3	0.0	44.2	39.8	35.0	46.4	63.9	37.0	26.9	38.2	0.0	0.0
Incr Delay (d2), s/veh	18.0	0.0	0.0	5.1	0.2	33.6	5.4	5.7	0.7	3.4	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	11.3	0.0	0.2	4.2	3.4	21.2	2.3	21.2	3.3	12.4	0.2	0.2
LnGrp Delay(d),s/veh	71.3	0.0	44.2	44.9	35.2	79.9	69.3	42.7	27.6	41.6	0.8	0.8
LnGrp LOS	E		D	D	D	E	E	D	C	D	A	A
Approach Vol, veh/h		273			714			1377			2292	
Approach Delay, s/veh		70.6			65.7			42.4			13.0	
Approach LOS		E			E			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	9.9	80.1	15.0	30.0	32.5	57.5		45.0
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.0	60.0	11.0	24.0	31.0	50.0		40.0
Max Q Clear Time (g_c+I1), s	6.5	2.0	10.0	26.0	27.8	43.0		41.2
Green Ext Time (p_c), s	0.1	29.8	0.0	0.0	0.8	5.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	33.2
HCM 2010 LOS	C

Notes

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2027 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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	49	30	49	54	10	293	418	25	22	397	34
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	172	120	188	229	183	34	372	999	847	28	637	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	534	996	1564	1303	1526	283	1774	1863	1580	1774	1863	1581
Grp Volume(v), veh/h	92	0	30	49	0	64	293	418	25	22	397	34
Grp Sat Flow(s),veh/h/ln	1530	0	1564	1303	0	1809	1774	1863	1580	1774	1863	1581
Q Serve(g_s), s	1.2	0.0	0.8	1.8	0.0	1.6	7.6	6.5	0.4	0.6	8.7	0.7
Cycle Q Clear(g_c), s	2.8	0.0	0.8	4.6	0.0	1.6	7.6	6.5	0.4	0.6	8.7	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	292	0	188	229	0	217	372	999	847	28	637	541
V/C Ratio(X)	0.32	0.00	0.16	0.21	0.00	0.29	0.79	0.42	0.03	0.78	0.62	0.06
Avail Cap(c_a), veh/h	873	0	769	713	0	890	1091	3016	2559	545	2443	2074
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	20.1	0.0	19.3	22.3	0.0	19.6	18.2	6.8	5.3	23.9	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	36.3	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	1.2	0.0	0.4	0.7	0.0	0.8	4.1	3.4	0.2	0.6	4.8	0.3
LnGrp Delay(d),s/veh	20.7	0.0	19.7	22.7	0.0	20.3	22.0	7.4	5.4	60.2	15.5	10.9
LnGrp LOS	C		B	C		C	C	A	A	E	B	B
Approach Vol, veh/h		122			113			736			453	
Approach Delay, s/veh		20.4			21.4			13.1			17.4	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.8	32.2		10.9	15.2	22.7		10.9
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	2.6	8.5		4.8	9.6	10.7		6.6
Green Ext Time (p_c), s	0.0	6.2		0.5	0.8	5.8		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	15.7
HCM 2010 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	525	25	15	575	60
Future Volume (veh/h)	55	20	195	40	15	5	135	525	25	15	575	60
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	22	17	43	16	1	147	571	0	16	625	28
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	935	795	413	811	687
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	957	559	1555	1344	1733	108	1774	1863	1583	1774	1863	1578
Grp Volume(v), veh/h	82	0	17	43	0	17	147	571	0	16	625	28
Grp Sat Flow(s),veh/h/ln	1516	0	1555	1344	0	1841	1774	1863	1583	1774	1863	1578
Q Serve(g_s), s	1.4	0.0	0.4	1.4	0.0	0.4	2.0	10.2	0.0	0.2	13.2	0.5
Cycle Q Clear(g_c), s	2.1	0.0	0.4	3.5	0.0	0.4	2.0	10.2	0.0	0.2	13.2	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	935	795	413	811	687
V/C Ratio(X)	0.24	0.00	0.08	0.15	0.00	0.07	0.36	0.61	0.00	0.04	0.77	0.04
Avail Cap(c_a), veh/h	937	0	841	820	0	996	848	2055	1747	967	2055	1741
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	19.6	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	1.0	0.0	0.2	0.5	0.0	0.2	1.0	5.2	0.0	0.1	7.0	0.2
LnGrp Delay(d),s/veh	18.3	0.0	17.4	19.9	0.0	17.4	8.8	8.9	0.0	7.7	12.7	7.5
LnGrp LOS	B		B	B		B	A	A		A	B	A
Approach Vol, veh/h		99			60			718			669	
Approach Delay, s/veh		18.2			19.2			8.9			12.4	
Approach LOS		B			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.6	29.2		11.5	8.6	26.1		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	12.2		4.1	4.0	15.2		5.5
Green Ext Time (p_c), s	0.0	4.1		0.4	0.3	4.7		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	11.4
HCM 2010 LOS	B

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	630	15	5	770	50
Future Volume (veh/h)	40	5	85	10	5	10	80	630	15	5	770	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	5	4	11	5	1	87	685	11	5	837	31
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	99	79	20	152	129	115	1093	929	7	979	832
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	1774	955	764	1774	1863	1583	1774	1863	1583	1774	1863	1582
Grp Volume(v), veh/h	43	0	9	11	5	1	87	685	11	5	837	31
Grp Sat Flow(s),veh/h/ln	1774	0	1719	1774	1863	1583	1774	1863	1583	1774	1863	1582
Q Serve(g_s), s	1.6	0.0	0.3	0.4	0.2	0.0	3.3	16.3	0.2	0.2	26.2	0.6
Cycle Q Clear(g_c), s	1.6	0.0	0.3	0.4	0.2	0.0	3.3	16.3	0.2	0.2	26.2	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	1093	929	7	979	832
V/C Ratio(X)	0.74	0.00	0.05	0.56	0.03	0.01	0.76	0.63	0.01	0.71	0.85	0.04
Avail Cap(c_a), veh/h	524	0	533	524	577	491	655	1787	1519	655	1787	1518
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	32.5	0.0	27.4	33.3	28.7	28.6	31.2	9.2	5.8	33.7	13.8	7.8
Incr Delay (d2), s/veh	16.7	0.0	0.1	22.8	0.1	0.0	9.7	0.6	0.0	82.4	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	1.1	0.0	0.2	0.3	0.1	0.0	1.9	8.4	0.1	0.3	13.9	0.3
LnGrp Delay(d),s/veh	49.1	0.0	27.5	56.1	28.7	28.6	40.9	9.8	5.8	116.1	16.1	7.8
LnGrp LOS	D		C	E	C	C	D	A	A	F	B	A
Approach Vol, veh/h		52			17			783			873	
Approach Delay, s/veh		45.4			46.5			13.2			16.4	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	44.7	5.7	12.0	9.4	40.6	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	18.3	2.4	2.3	5.3	28.2	3.6	2.2
Green Ext Time (p_c), s	0.0	5.4	0.0	0.0	0.2	7.4	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	16.1
HCM 2010 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	660	5	0	830	50
Future Volume (veh/h)	50	10	595	10	0	5	410	660	5	0	830	50
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	54	11	0	11	0	1	446	717	5	0	902	18
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	15	92	190	4	8	509	2775	19	3	1490	664
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	1240	253	1583	1422	64	135	1774	3603	25	1774	3539	1578
Grp Volume(v), veh/h	65	0	0	12	0	0	446	352	370	0	902	18
Grp Sat Flow(s),veh/h/ln	1493	0	1583	1622	0	0	1774	1770	1858	1774	1770	1578
Q Serve(g_s), s	2.3	0.0	0.0	0.0	0.0	0.0	15.4	3.7	3.7	0.0	12.7	0.4
Cycle Q Clear(g_c), s	2.7	0.0	0.0	0.4	0.0	0.0	15.4	3.7	3.7	0.0	12.7	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	213	0	92	227	0	0	509	1363	1431	3	1490	664
V/C Ratio(X)	0.31	0.00	0.00	0.05	0.00	0.00	0.88	0.26	0.26	0.00	0.61	0.03
Avail Cap(c_a), veh/h	585	0	494	696	0	0	1965	1905	2000	1965	3810	1698
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	29.2	0.0	0.0	28.2	0.0	0.0	21.8	2.1	2.1	0.0	14.4	10.9
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	0.9	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	1.1	0.0	0.0	0.2	0.0	0.0	7.7	1.8	1.9	0.0	6.3	0.2
LnGrp Delay(d),s/veh	30.0	0.0	0.0	28.3	0.0	0.0	23.7	2.3	2.3	0.0	15.3	10.9
LnGrp LOS	C			C			C	A	A		B	B
Approach Vol, veh/h		65			12			1168			920	
Approach Delay, s/veh		30.0			28.3			10.5			15.2	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	22.4	33.0		8.7	0.0	55.4		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	17.4	14.7		2.4	0.0	5.7		4.7
Green Ext Time (p_c), s	1.0	12.3		0.0	0.0	8.0		0.1

Intersection Summary		
HCM 2010 Ctrl Delay		13.2
HCM 2010 LOS		B

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	1020	20	10	1400	65
Future Volume (veh/h)	55	5	145	15	5	15	105	1020	20	10	1400	65
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	60	5	6	16	5	1	114	1109	21	11	1522	41
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	2569	49	14	2298	1026
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	1380	155	1546	704	387	52	1774	3553	67	1774	3539	1580
Grp Volume(v), veh/h	65	0	6	22	0	0	114	552	578	11	1522	41
Grp Sat Flow(s),veh/h/ln	1535	0	1546	1143	0	0	1774	1770	1851	1774	1770	1580
Q Serve(g_s), s	0.0	0.0	0.3	0.2	0.0	0.0	4.9	9.7	9.7	0.5	20.5	0.7
Cycle Q Clear(g_c), s	2.7	0.0	0.3	2.8	0.0	0.0	4.9	9.7	9.7	0.5	20.5	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	244	0	136	196	0	0	146	1280	1338	14	2298	1026
V/C Ratio(X)	0.27	0.00	0.04	0.11	0.00	0.00	0.78	0.43	0.43	0.76	0.66	0.04
Avail Cap(c_a), veh/h	538	0	458	502	0	0	480	1962	2052	252	3467	1547
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	32.4	32.5	0.0	0.0	34.9	4.3	4.3	38.4	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	25.5	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	1.3	0.0	0.1	0.4	0.0	0.0	2.5	4.8	5.0	0.3	10.2	0.3
LnGrp Delay(d),s/veh	33.2	0.0	32.4	32.6	0.0	0.0	38.4	4.8	4.8	63.9	9.1	4.9
LnGrp LOS	C		C	C			D	A	A	E	A	A
Approach Vol, veh/h		71			22			1244			1574	
Approach Delay, s/veh		33.2			32.6			7.9			9.4	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.4	55.4		11.8	4.6	61.1		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	6.9	22.5		4.8	2.5	11.7		4.7
Green Ext Time (p_c), s	0.1	27.8		0.0	0.0	16.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	9.5
HCM 2010 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	1480	75
Future Volume (veh/h)	60	5	180	45	5	35	110	1115	50	30	1480	75
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	5	11	49	5	2	120	1212	34	33	1609	47
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	263	17	223	217	179	71	153	2309	1033	56	2116	946
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	1292	121	1577	1387	1265	506	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	70	0	11	49	0	7	120	1212	34	33	1609	47
Grp Sat Flow(s),veh/h/ln	1413	0	1577	1387	0	1771	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	3.6	0.0	0.5	2.8	0.0	0.3	5.7	15.6	0.7	1.6	28.8	1.1
Cycle Q Clear(g_c), s	3.9	0.0	0.5	6.7	0.0	0.3	5.7	15.6	0.7	1.6	28.8	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	297	0	223	217	0	250	153	2309	1033	56	2116	946
V/C Ratio(X)	0.24	0.00	0.05	0.23	0.00	0.03	0.78	0.52	0.03	0.59	0.76	0.05
Avail Cap(c_a), veh/h	494	0	441	409	0	495	434	2844	1272	248	2473	1106
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	32.9	0.0	31.9	36.4	0.0	31.8	38.5	7.9	5.3	41.0	12.7	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	3.6	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	1.5	0.0	0.2	1.1	0.0	0.1	2.9	7.5	0.3	0.8	14.3	0.5
LnGrp Delay(d),s/veh	33.3	0.0	32.0	36.9	0.0	31.8	41.8	8.3	5.3	44.6	14.4	7.2
LnGrp LOS	C		C	D		C	D	A	A	D	B	A
Approach Vol, veh/h		81			56			1366			1689	
Approach Delay, s/veh		33.2			36.2			11.2			14.8	
Approach LOS		C			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.4	57.3		17.1	6.7	62.0		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	30.8		8.7	3.6	17.6		5.9
Green Ext Time (p_c), s	0.2	20.5		0.1	0.0	19.2		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	14.1
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	5	590	15	5	20	440	1175	15	55	1425	220
Future Volume (veh/h)	300	5	590	15	5	20	440	1175	15	55	1425	220
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	330	0	436	16	5	7	478	1277	16	60	1549	196
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	544	0	995	40	13	18	576	2325	29	103	1912	1088
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	3548	0	3167	992	310	434	3442	3580	45	1774	3539	1582
Grp Volume(v), veh/h	330	0	436	28	0	0	478	631	662	60	1549	196
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1737	0	0	1721	1770	1855	1774	1770	1582
Q Serve(g_s), s	14.1	0.0	17.7	2.6	0.0	0.0	21.8	31.5	31.5	5.3	58.0	7.2
Cycle Q Clear(g_c), s	14.1	0.0	17.7	2.6	0.0	0.0	21.8	31.5	31.5	5.3	58.0	7.2
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	544	0	995	71	0	0	576	1149	1205	103	1912	1088
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	0.18
Avail Cap(c_a), veh/h	745	0	1175	332	0	0	1232	2119	2221	164	3298	1708
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	64.0	0.0	44.2	76.2	0.0	0.0	65.2	15.5	15.5	74.4	30.5	9.0
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	0.1
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	7.0	0.0	7.8	1.3	0.0	0.0	10.5	15.4	16.2	2.7	28.5	4.7
LnGrp Delay(d),s/veh	64.5	0.0	44.3	77.5	0.0	0.0	66.5	16.1	16.0	76.4	31.7	9.2
LnGrp LOS	E		D	E			E	B	B	E	C	A
Approach Vol, veh/h		766			28			1771			1805	
Approach Delay, s/veh		53.0			77.5			29.7			30.7	
Approach LOS		D			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	31.1	91.5		10.6	13.4	109.2		28.8
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	23.8	60.0		4.6	7.3	33.5		19.7
Green Ext Time (p_c), s	1.3	25.5		0.0	0.0	13.1		2.1

Intersection Summary	
HCM 2010 Ctrl Delay	34.5
HCM 2010 LOS	C

Notes

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	2020	10
Future Volume (veh/h)	5	0	5	135	5	60	5	1520	90	90	2020	10
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1652	95	98	2196	11
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2424	139	124	2802	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	1140	37	235	1410	856	856	1774	3403	195	1774	3611	18
Grp Volume(v), veh/h	6	0	0	147	0	10	5	854	893	98	1075	1132
Grp Sat Flow(s),veh/h/ln	1412	0	0	1410	0	1712	1774	1770	1828	1774	1770	1860
Q Serve(g_s), s	0.0	0.0	0.0	12.4	0.0	0.7	0.4	9.2	9.7	7.1	45.1	45.3
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	9.2	9.7	7.1	45.1	45.3
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	1260	1302	124	1373	1443
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.68	0.69	0.79	0.78	0.78
Avail Cap(c_a), veh/h	312	0	0	318	0	316	150	1260	1302	150	1373	1443
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	55.3	0.0	50.2	64.2	1.2	1.3	59.5	8.3	8.3
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.8	0.0	0.1	7.5	2.2	2.2	16.7	4.5	4.3
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	5.3	0.0	0.3	0.2	4.5	5.0	4.1	23.2	24.7
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.3	71.7	3.5	3.5	76.2	12.8	12.7
LnGrp LOS	D			E		D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1752			2305	
Approach Delay, s/veh		50.0			57.6			3.7			15.5	
Approach LOS		D			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.8	104.9		20.3	13.1	96.6		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	47.3		15.0	9.1	11.7		2.7
Green Ext Time (p_c), s	0.0	30.8		0.3	0.0	38.3		0.0

Intersection Summary		
HCM 2010 Ctrl Delay	12.2	
HCM 2010 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	1795	260
Future Volume (veh/h)	135	5	15	65	5	15	15	1465	15	10	1795	260
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	147	5	13	71	5	9	16	1592	16	11	1951	217
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	228	6	16	226	17	23	19	2759	28	13	2709	1211
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	1339	46	118	1336	132	174	1774	3590	36	1774	3539	1582
Grp Volume(v), veh/h	165	0	0	85	0	0	16	784	824	11	1951	217
Grp Sat Flow(s),veh/h/ln	1503	0	0	1642	0	0	1774	1770	1856	1774	1770	1582
Q Serve(g_s), s	7.8	0.0	0.0	0.0	0.0	0.0	1.2	23.9	24.0	0.8	37.4	4.8
Cycle Q Clear(g_c), s	13.7	0.0	0.0	5.9	0.0	0.0	1.2	23.9	24.0	0.8	37.4	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	250	0	0	267	0	0	19	1360	1427	13	2709	1211
V/C Ratio(X)	0.66	0.00	0.00	0.32	0.00	0.00	0.84	0.58	0.58	0.82	0.72	0.18
Avail Cap(c_a), veh/h	347	0	0	365	0	0	109	1360	1427	109	2709	1211
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.68	0.68	0.68	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	6.3	64.4	8.0	4.1
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.7	0.0	0.0	21.1	1.2	1.2	19.7	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	6.0	0.0	0.0	2.8	0.0	0.0	0.7	12.0	12.6	0.5	18.2	2.2
LnGrp Delay(d),s/veh	57.7	0.0	0.0	52.3	0.0	0.0	85.3	7.5	7.4	84.1	8.8	4.3
LnGrp LOS	E			D			F	A	A	F	A	A
Approach Vol, veh/h		165			85			1624			2179	
Approach Delay, s/veh		57.7			52.3			8.2			8.7	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	103.5		21.1	5.0	103.9		21.1
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	83.0		25.0	8.0	83.0		25.0
Max Q Clear Time (g_c+I1), s	3.2	39.4		7.9	2.8	26.0		15.7
Green Ext Time (p_c), s	0.0	39.2		0.2	0.0	38.4		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	11.4
HCM 2010 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	1495	60	15	1810	130
Future Volume (veh/h)	190	20	50	90	20	20	60	1495	60	15	1810	130
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	207	22	11	98	22	2	65	1625	63	16	1967	137
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	286	25	305	373	326	30	83	2443	94	19	2242	154
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.05	0.70	0.70	0.02	1.00	1.00
Sat Flow, veh/h	1205	128	1576	1380	1682	153	1774	3474	134	1774	3360	231
Grp Volume(v), veh/h	229	0	11	98	0	24	65	825	863	16	1025	1079
Grp Sat Flow(s),veh/h/ln	1333	0	1576	1380	0	1835	1774	1770	1838	1774	1770	1822
Q Serve(g_s), s	20.6	0.0	0.7	0.0	0.0	1.4	4.7	33.7	34.2	1.2	0.0	0.0
Cycle Q Clear(g_c), s	22.0	0.0	0.7	6.5	0.0	1.4	4.7	33.7	34.2	1.2	0.0	0.0
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	311	0	305	373	0	355	83	1245	1293	19	1181	1216
V/C Ratio(X)	0.74	0.00	0.04	0.26	0.00	0.07	0.78	0.66	0.67	0.84	0.87	0.89
Avail Cap(c_a), veh/h	331	0	327	393	0	381	109	1245	1293	109	1181	1216
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	0.00	1.00	0.53	0.53	0.53	0.59	0.59	0.59
Uniform Delay (d), s/veh	51.8	0.0	42.6	44.9	0.0	42.9	61.3	10.7	10.8	63.5	0.0	0.0
Incr Delay (d2), s/veh	7.9	0.0	0.0	0.4	0.0	0.1	9.8	1.5	1.5	18.8	5.4	6.1
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	0.3	3.1	0.0	0.7	2.5	16.8	17.6	0.7	1.8	2.1
LnGrp Delay(d),s/veh	59.7	0.0	42.6	45.3	0.0	42.9	71.1	12.2	12.3	82.3	5.4	6.1
LnGrp LOS	E		D	D		D	E	B	B	F	A	A
Approach Vol, veh/h		240			122			1753			2120	
Approach Delay, s/veh		58.9			44.8			14.4			6.3	
Approach LOS		E			D			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.1	90.8		29.2	5.4	95.4		29.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	82.0		26.0	8.0	82.0		26.0
Max Q Clear Time (g_c+I1), s	6.7	2.0		8.5	3.2	36.2		24.0
Green Ext Time (p_c), s	0.0	58.2		0.4	0.0	28.3		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	13.8
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	150	90	145	130	650	80	890	195	570	1140	100
Future Volume (veh/h)	60	150	90	145	130	650	80	890	195	570	1140	100
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.95	1.00		0.97	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	65	163	10	158	141	323	87	967	127	620	1239	105
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	100	195	267	253	560	463	110	1428	630	700	1801	152
Arrive On Green	0.18	0.18	0.18	0.09	0.30	0.30	0.06	0.40	0.40	0.14	0.37	0.36
Sat Flow, veh/h	366	1107	1511	1774	1863	1541	1774	3539	1562	3442	3303	279
Grp Volume(v), veh/h	228	0	10	158	141	323	87	967	127	620	663	681
Grp Sat Flow(s),veh/h/ln	1473	0	1511	1774	1863	1541	1774	1770	1562	1721	1770	1813
Q Serve(g_s), s	17.2	0.0	0.7	9.1	7.4	24.1	6.3	29.1	6.9	23.0	41.2	41.5
Cycle Q Clear(g_c), s	19.5	0.0	0.7	9.1	7.4	24.1	6.3	29.1	6.9	23.0	41.2	41.5
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.15
Lane Grp Cap(c), veh/h	295	0	267	253	560	463	110	1428	630	700	965	988
V/C Ratio(X)	0.77	0.00	0.04	0.62	0.25	0.70	0.79	0.68	0.20	0.89	0.69	0.69
Avail Cap(c_a), veh/h	329	0	302	278	630	521	328	1428	630	953	965	988
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	1.00	0.79	0.79	0.79	0.36	0.36	0.36
Uniform Delay (d), s/veh	51.8	0.0	44.4	38.5	34.4	40.2	60.2	31.8	25.2	54.6	31.9	32.0
Incr Delay (d2), s/veh	9.7	0.0	0.1	3.7	0.2	3.5	3.8	2.1	0.6	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	8.8	0.0	0.3	4.7	3.9	10.7	3.2	14.6	3.1	11.2	20.6	21.2
LnGrp Delay(d),s/veh	61.6	0.0	44.4	42.2	34.6	43.7	64.0	33.9	25.7	57.1	33.3	33.4
LnGrp LOS	E		D	D	C	D	E	C	C	E	C	C
Approach Vol, veh/h		238			622			1181			1964	
Approach Delay, s/veh		60.8			41.3			35.2			40.8	
Approach LOS		E			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	12.0	74.9	16.1	26.9	30.5	56.5		43.1
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	8.3	43.5	11.1	21.5	25.0	31.1		26.1
Green Ext Time (p_c), s	0.1	4.4	0.1	0.3	1.4	4.0		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	40.4
HCM 2010 LOS	D

Notes

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	54	49	42	98	54	11	245	255	53	11	147	8
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	238	165	258	327	247	50	327	794	675	15	466	396
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	612	1000	1569	1291	1500	306	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	103	0	42	98	0	65	245	255	53	11	147	8
Grp Sat Flow(s),veh/h/ln	1612	0	1569	1291	0	1806	1774	1863	1583	1774	1863	1583
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	2.6	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	2.6	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	403	0	258	327	0	297	327	794	675	15	466	396
V/C Ratio(X)	0.26	0.00	0.16	0.30	0.00	0.22	0.75	0.32	0.08	0.72	0.32	0.02
Avail Cap(c_a), veh/h	1071	0	943	890	0	1085	1332	3684	3131	666	2984	2537
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	19.8	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	47.2	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	1.0	0.0	0.4	1.1	0.0	0.6	2.8	2.0	0.4	0.3	1.4	0.1
LnGrp Delay(d),s/veh	15.1	0.0	14.6	17.5	0.0	14.8	18.8	8.1	6.9	67.0	13.0	11.3
LnGrp LOS	B		B	B		B	B	A	A	E	B	B
Approach Vol, veh/h		145			163			553			166	
Approach Delay, s/veh		15.0			16.4			12.7			16.5	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.3	23.0		11.6	12.4	16.0		11.6
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	2.2	5.6		4.0	7.2	4.6		6.9
Green Ext Time (p_c), s	0.0	3.8		0.6	0.7	1.8		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	14.3
HCM 2010 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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	5	20	98	22	2	152	582	0	11	560	28
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	380	24	308	346	335	30	411	880	748	351	725	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	1209	122	1544	1351	1679	153	1774	1863	1583	1774	1863	1571
Grp Volume(v), veh/h	70	0	20	98	0	24	152	582	0	11	560	28
Grp Sat Flow(s),veh/h/ln	1331	0	1544	1351	0	1831	1774	1863	1583	1774	1863	1571
Q Serve(g_s), s	2.0	0.0	0.5	3.3	0.0	0.5	2.3	12.0	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	2.3	12.0	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	346	0	366	411	880	748	351	725	611
V/C Ratio(X)	0.17	0.00	0.06	0.28	0.00	0.07	0.37	0.66	0.00	0.03	0.77	0.05
Avail Cap(c_a), veh/h	817	0	771	751	0	914	779	1897	1612	867	1897	1600
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	10.1	0.0	9.8	13.4	9.5
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.4	0.0	0.1	0.6	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	0.8	0.0	0.2	1.3	0.0	0.3	1.2	6.4	0.0	0.1	7.0	0.2
LnGrp Delay(d),s/veh	17.3	0.0	16.3	20.0	0.0	16.3	9.8	11.0	0.0	9.8	15.2	9.5
LnGrp LOS	B		B	B		B	A	B		A	B	A
Approach Vol, veh/h		90			122			734			599	
Approach Delay, s/veh		17.1			19.2			10.8			14.8	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	29.7		15.0	9.6	25.5		15.0
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.6	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	14.0		4.5	4.3	15.2		7.8
Green Ext Time (p_c), s	0.0	4.2		0.4	0.3	4.1		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	13.4
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	5	125	40	15	30	60	600	25	15	715	30
Future Volume (veh/h)	40	5	125	40	15	30	60	600	25	15	715	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	5	7	43	16	1	65	652	15	16	777	17
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	86	121	59	231	194	84	985	837	20	918	780
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	1774	698	977	1774	1863	1571	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	43	0	12	43	16	1	65	652	15	16	777	17
Grp Sat Flow(s),veh/h/ln	1774	0	1675	1774	1863	1571	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	1.6	0.0	0.4	1.6	0.5	0.0	2.4	16.8	0.3	0.6	24.0	0.4
Cycle Q Clear(g_c), s	1.6	0.0	0.4	1.6	0.5	0.0	2.4	16.8	0.3	0.6	24.0	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	207	59	231	194	84	985	837	20	918	780
V/C Ratio(X)	0.73	0.00	0.06	0.73	0.07	0.01	0.77	0.66	0.02	0.78	0.85	0.02
Avail Cap(c_a), veh/h	537	0	533	537	593	500	672	1834	1559	672	1834	1559
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	31.6	0.0	25.5	31.6	25.6	25.4	31.1	11.3	7.4	32.5	14.6	8.6
Incr Delay (d2), s/veh	16.1	0.0	0.1	16.1	0.1	0.0	13.6	0.8	0.0	46.0	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	1.0	0.3	0.0	1.5	8.7	0.1	0.6	12.7	0.2
LnGrp Delay(d),s/veh	47.7	0.0	25.6	47.7	25.7	25.4	44.7	12.1	7.4	78.6	16.8	8.6
LnGrp LOS	D		C	D	C	C	D	B	A	E	B	A
Approach Vol, veh/h		55			60			732			810	
Approach Delay, s/veh		42.9			41.5			14.9			17.9	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.8	39.9	7.2	13.2	8.1	37.5	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	2.6	18.8	3.6	2.4	4.4	26.0	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 2010 Ctrl Delay	18.2
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	38	11	0	22	5	0	342	745	48	11	908	4
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	31	116	198	31	0	410	2217	143	15	1537	687
Arrive On Green	0.09	0.07	0.00	0.09	0.07	0.00	0.23	0.66	0.66	0.01	0.43	0.43
Sat Flow, veh/h	1112	418	1583	1145	421	0	1774	3377	217	1774	3539	1583
Grp Volume(v), veh/h	49	0	0	27	0	0	342	390	403	11	908	4
Grp Sat Flow(s),veh/h/ln	1530	0	1583	1566	0	0	1774	1770	1824	1774	1770	1583
Q Serve(g_s), s	0.8	0.0	0.0	0.0	0.0	0.0	10.5	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	10.5	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	250	0	116	256	0	0	410	1162	1198	15	1537	687
V/C Ratio(X)	0.20	0.00	0.00	0.11	0.00	0.00	0.83	0.34	0.34	0.74	0.59	0.01
Avail Cap(c_a), veh/h	916	0	829	836	0	0	2197	1760	1814	2197	3519	1574
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	25.0	0.0	0.0	24.6	0.0	0.0	21.0	4.3	4.3	28.4	12.3	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	22.8	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	0.0	0.4	0.0	0.0	5.3	2.7	2.8	0.3	5.6	0.0
LnGrp Delay(d),s/veh	25.3	0.0	0.0	24.8	0.0	0.0	22.7	4.7	4.7	51.1	13.1	9.2
LnGrp LOS	C			C			C	A	A	D	B	A
Approach Vol, veh/h		49			27			1135			923	
Approach Delay, s/veh		25.3			24.8			10.1			13.6	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	57.2	30.9		9.2	4.5	43.6		9.2
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	71.0	57.0		27.0	71.0	57.0		30.0
Max Q Clear Time (g_c+I1), s	12.5	13.2		2.8	2.4	7.6		3.6
Green Ext Time (p_c), s	0.8	11.7		0.1	0.0	9.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.1
HCM 2010 LOS	B

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	33	0	1	11	5	1	147	1190	21	16	1418	47
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	118	19	3	186	2628	46	20	2284	1022
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	1553	0	1583	696	422	70	1774	3558	63	1774	3539	1583
Grp Volume(v), veh/h	33	0	1	17	0	0	147	592	619	16	1418	47
Grp Sat Flow(s),veh/h/ln	1553	0	1583	1188	0	0	1774	1770	1852	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	5.5	9.0	9.0	0.6	16.2	0.7
Cycle Q Clear(g_c), s	1.2	0.0	0.0	1.7	0.0	0.0	5.5	9.0	9.0	0.6	16.2	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	198	0	72	158	0	0	186	1307	1367	20	2284	1022
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	607	0	532	603	0	0	545	2224	2328	285	3932	1759
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	31.3	0.0	31.2	31.7	0.0	0.0	29.9	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	2.9	0.5	0.5	21.1	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	2.8	4.5	4.7	0.4	7.9	0.3
LnGrp Delay(d),s/veh	31.4	0.0	31.2	31.8	0.0	0.0	32.8	4.0	4.0	54.8	7.8	4.5
LnGrp LOS	C		C	C			C	A	A	D	A	A
Approach Vol, veh/h		34			17			1358			1481	
Approach Delay, s/veh		31.4			31.8			7.1			8.2	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.2	49.2		8.1	4.8	55.5		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	18.2		3.7	2.6	11.0		3.2
Green Ext Time (p_c), s	0.1	25.9		0.0	0.0	18.6		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.1
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	5	1	43	16	1	120	1342	50	33	1359	35
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	153	111	168	10	142	2768	1238	43	2571	1150
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	1193	120	1578	1401	1735	108	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	65	0	1	43	0	17	120	1342	50	33	1359	35
Grp Sat Flow(s),veh/h/ln	1313	0	1578	1401	0	1843	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	6.6	0.0	0.1	4.7	0.0	1.3	10.3	20.6	1.1	2.9	26.4	1.0
Cycle Q Clear(g_c), s	7.9	0.0	0.1	12.5	0.0	1.3	10.3	20.6	1.1	2.9	26.4	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	153	111	0	178	142	2768	1238	43	2571	1150
V/C Ratio(X)	0.38	0.00	0.01	0.39	0.00	0.10	0.85	0.48	0.04	0.76	0.53	0.03
Avail Cap(c_a), veh/h	254	0	244	192	0	285	240	2768	1238	240	2571	1150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	63.8	70.4	5.9	3.8	75.2	9.4	5.9
Incr Delay (d2), s/veh	1.4	0.0	0.0	2.2	0.0	0.2	3.9	0.4	0.0	9.7	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	2.7	0.0	0.0	1.9	0.0	0.7	5.2	10.1	0.5	1.5	13.1	0.4
LnGrp Delay(d),s/veh	68.7	0.0	63.3	75.0	0.0	64.1	74.2	6.4	3.8	84.8	10.2	6.0
LnGrp LOS	E		E	E		E	E	A	A	F	B	A
Approach Vol, veh/h		66			60			1512			1427	
Approach Delay, s/veh		68.6			71.9			11.7			11.8	
Approach LOS		E			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.6		20.0	7.8	127.2		20.0
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.6	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	28.4		14.5	4.9	22.6		9.9
Green Ext Time (p_c), s	0.1	25.1		0.1	0.0	25.5		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.1
HCM 2010 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	1210	100
Future Volume (veh/h)	135	10	220	10	10	10	425	1315	15	80	1210	100
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	155	0	60	11	11	3	462	1429	16	87	1315	80
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	0	825	62	62	17	612	2106	24	152	1754	916
Arrive On Green	0.09	0.00	0.09	0.08	0.08	0.05	0.18	0.59	0.57	0.09	0.50	0.50
Sat Flow, veh/h	3548	0	3074	783	783	214	3442	3585	40	1774	3539	1578
Grp Volume(v), veh/h	155	0	60	25	0	0	462	705	740	87	1315	80
Grp Sat Flow(s),veh/h/ln	1774	0	1537	1780	0	0	1721	1770	1856	1774	1770	1578
Q Serve(g_s), s	4.3	0.0	1.5	1.4	0.0	0.0	13.4	28.7	28.8	5.0	31.3	2.4
Cycle Q Clear(g_c), s	4.3	0.0	1.5	1.4	0.0	0.0	13.4	28.7	28.8	5.0	31.3	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	336	0	825	142	0	0	612	1040	1090	152	1754	916
V/C Ratio(X)	0.46	0.00	0.07	0.18	0.00	0.00	0.75	0.68	0.68	0.57	0.75	0.09
Avail Cap(c_a), veh/h	1148	0	1529	525	0	0	1900	3268	3427	253	5088	2403
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	45.0	0.0	29.1	45.3	0.0	0.0	41.0	14.9	14.9	46.2	21.3	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	1.3	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	2.1	0.0	0.7	0.7	0.0	0.0	6.4	14.2	14.9	2.5	15.4	1.2
LnGrp Delay(d),s/veh	45.4	0.0	29.1	45.9	0.0	0.0	41.7	16.0	15.9	47.4	22.2	9.8
LnGrp LOS	D		C	D			D	B	B	D	C	A
Approach Vol, veh/h		215			25			1907			1482	
Approach Delay, s/veh		40.8			45.9			22.2			23.0	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.7	56.0		12.4	13.0	65.7		13.9
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	6.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	15.4	33.3		3.4	7.0	30.8		6.3
Green Ext Time (p_c), s	1.3	16.7		0.0	0.1	16.6		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	23.8
HCM 2010 LOS	C

Notes

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	1410	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1755	90	30	1410	5
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	1908	96	33	1533	5
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	176	0	138	11	2707	135	63	2962	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	584	895	148	1372	0	1543	1774	3431	171	1774	3618	12
Grp Volume(v), veh/h	11	0	0	65	0	1	5	976	1028	33	750	788
Grp Sat Flow(s),veh/h/ln	1627	0	0	1372	0	1543	1774	1770	1832	1774	1770	1861
Q Serve(g_s), s	0.0	0.0	0.0	5.4	0.0	0.1	0.4	36.3	37.8	2.6	18.7	18.7
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	36.3	37.8	2.6	18.7	18.7
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	176	0	138	11	1396	1446	63	1448	1523
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.45	0.70	0.71	0.52	0.52	0.52
Avail Cap(c_a), veh/h	312	0	0	289	0	265	101	1396	1446	101	1448	1523
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	6.4	1.9	1.9	2.5	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	0.4	0.0	0.0	2.5	0.0	0.0	0.2	18.1	19.6	1.3	9.5	10.0
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	75.8	8.8	9.0	68.8	5.3	5.3
LnGrp LOS	E			E		E	E	A	A	E	A	A
Approach Vol, veh/h		11			66			2009			1571	
Approach Delay, s/veh		58.6			62.0			9.1			6.6	
Approach LOS		E			E			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	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	20.7		8.1	4.6	39.8		2.8
Green Ext Time (p_c), s	0.0	30.1		0.1	0.0	41.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.1
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	98	5	3	114	16	12	5	1886	21	11	1359	147
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	198	20	15	7	2805	31	14	2782	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	1387	71	42	1312	184	138	1774	3585	40	1774	3539	1583
Grp Volume(v), veh/h	106	0	0	142	0	0	5	929	978	11	1359	147
Grp Sat Flow(s),veh/h/ln	1500	0	0	1634	0	0	1774	1770	1856	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.3	28.9	29.1	0.7	16.0	2.6
Cycle Q Clear(g_c), s	7.9	0.0	0.0	9.8	0.0	0.0	0.3	28.9	29.1	0.7	16.0	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	1384	1452	14	2782	1245
V/C Ratio(X)	0.48	0.00	0.00	0.61	0.00	0.00	0.73	0.67	0.67	0.81	0.49	0.12
Avail Cap(c_a), veh/h	430	0	0	450	0	0	118	1384	1452	118	2782	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	0.64	0.64	0.64	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	59.5	4.5	3.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.5	0.0	0.0	30.0	1.7	1.6	28.6	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	3.5	0.0	0.0	4.7	0.0	0.0	0.2	14.6	15.3	0.5	7.9	1.2
LnGrp Delay(d),s/veh	52.6	0.0	0.0	54.3	0.0	0.0	89.7	7.7	7.6	88.0	5.0	3.2
LnGrp LOS	D			D			F	A	A	F	A	A
Approach Vol, veh/h		106			142			1912			1517	
Approach Delay, s/veh		52.6			54.3			7.9			5.4	
Approach LOS		D			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.3		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	8.6	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.3	18.0		11.8	2.7	31.1		9.9
Green Ext Time (p_c), s	0.0	31.8		0.5	0.0	32.3		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	9.9
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	158	33	2	158	27	5	27	1690	80	11	1402	73
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	38	265	307	259	48	34	2536	119	13	2483	129
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	1070	224	1558	1358	1525	282	1774	3442	162	1774	3423	178
Grp Volume(v), veh/h	191	0	2	158	0	32	27	865	905	11	723	752
Grp Sat Flow(s),veh/h/ln	1294	0	1558	1358	0	1807	1774	1770	1834	1774	1770	1831
Q Serve(g_s), s	18.4	0.0	0.1	0.0	0.0	2.1	2.1	0.0	0.0	0.9	26.6	26.8
Cycle Q Clear(g_c), s	20.5	0.0	0.1	13.4	0.0	2.1	2.1	0.0	0.0	0.9	26.6	26.8
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	267	0	265	307	0	307	34	1304	1352	13	1283	1328
V/C Ratio(X)	0.72	0.00	0.01	0.51	0.00	0.10	0.79	0.66	0.67	0.83	0.56	0.57
Avail Cap(c_a), veh/h	310	0	312	348	0	361	139	1304	1352	139	1283	1328
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	0.50	0.50	0.50	0.85	0.85	0.85
Uniform Delay (d), s/veh	57.8	0.0	48.3	53.8	0.0	49.2	67.0	0.0	0.0	69.4	8.9	9.0
Incr Delay (d2), s/veh	6.5	0.0	0.0	1.3	0.0	0.1	7.6	1.3	1.3	32.3	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	7.7	0.0	0.1	5.8	0.0	1.1	1.1	0.5	0.5	0.5	13.4	13.9
LnGrp Delay(d),s/veh	64.2	0.0	48.3	55.1	0.0	49.3	74.6	1.3	1.3	101.7	10.5	10.5
LnGrp LOS	E		D	E		D	E	A	A	F	B	B
Approach Vol, veh/h		193			190			1797			1486	
Approach Delay, s/veh		64.1			54.2			2.4			11.2	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	105.5		27.8	5.0	107.2		27.8
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	88.0		27.0	11.0	88.0		27.0
Max Q Clear Time (g_c+I1), s	4.1	28.8		15.4	2.9	2.0		22.5
Green Ext Time (p_c), s	0.0	25.7		0.5	0.0	43.3		0.3

Intersection Summary		
HCM 2010 Ctrl Delay	11.9	
HCM 2010 LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	110	35	95	75	715	25	870	120	520	870	20
Future Volume (veh/h)	15	110	35	95	75	715	25	870	120	520	870	20
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	16	120	5	103	82	438	27	946	54	565	946	21
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	52	341	327	353	566	477	34	1524	679	619	2093	46
Arrive On Green	0.21	0.21	0.21	0.07	0.30	0.30	0.02	0.43	0.43	0.36	1.00	1.00
Sat Flow, veh/h	110	1628	1563	1774	1863	1569	1774	3539	1576	3442	3540	79
Grp Volume(v), veh/h	136	0	5	103	82	438	27	946	54	565	473	494
Grp Sat Flow(s),veh/h/ln	1738	0	1563	1774	1863	1569	1774	1770	1576	1721	1770	1849
Q Serve(g_s), s	0.0	0.0	0.4	6.1	4.5	37.7	2.1	29.1	2.8	21.9	0.0	0.0
Cycle Q Clear(g_c), s	8.7	0.0	0.4	6.1	4.5	37.7	2.1	29.1	2.8	21.9	0.0	0.0
Prop In Lane	0.12		1.00	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	392	0	327	353	566	477	34	1524	679	619	1046	1093
V/C Ratio(X)	0.35	0.00	0.02	0.29	0.14	0.92	0.79	0.62	0.08	0.91	0.45	0.45
Avail Cap(c_a), veh/h	392	0	327	527	665	560	177	1524	679	836	1046	1093
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	1.00	0.79	0.79	0.79	0.73	0.73	0.73
Uniform Delay (d), s/veh	47.2	0.0	43.9	38.0	35.5	47.1	68.4	31.0	23.5	43.8	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.5	0.1	18.6	11.4	1.5	0.2	7.5	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	4.6	0.0	0.2	3.0	2.3	18.8	1.2	14.5	1.3	11.0	0.3	0.3
LnGrp Delay(d),s/veh	47.7	0.0	43.9	38.4	35.6	65.7	79.8	32.5	23.7	51.3	1.0	1.0
LnGrp LOS	D		D	D	D	E	E	C	C	D	A	A
Approach Vol, veh/h		141			623			1027			1532	
Approach Delay, s/veh		47.6			57.2			33.3			19.6	
Approach LOS		D			E			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	86.8	13.2	33.3	29.2	64.3		46.5
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	14.6	63.0	22.0	22.0	34.0	43.0		49.0
Max Q Clear Time (g_c+I1), s	2.1	2.0	8.1	10.7	23.9	31.1		39.7
Green Ext Time (p_c), s	0.0	12.3	0.3	0.4	1.3	6.7		1.8

Intersection Summary	
HCM 2010 Ctrl Delay	32.0
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	670	0	0	790
Future Vol, veh/h	0	0	670	0	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	0	728	0	0	859

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	728	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	423	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	423	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	25	5	5	35	5	5	5	5	5	5	50
Future Vol, veh/h	15	25	5	5	35	5	5	5	5	5	5	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	-	-	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	27	5	5	38	5	5	5	5	5	5	54

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	43	0	0	32	0	0	142	115	30	118	115	41
Stage 1	-	-	-	-	-	-	62	62	-	51	51	-
Stage 2	-	-	-	-	-	-	80	53	-	67	64	-
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	1566	-	-	1580	-	-	828	775	1044	858	775	1030
Stage 1	-	-	-	-	-	-	949	843	-	962	852	-
Stage 2	-	-	-	-	-	-	929	851	-	943	842	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1566	-	-	1580	-	-	773	765	1044	840	765	1030
Mov Cap-2 Maneuver	-	-	-	-	-	-	773	765	-	840	765	-
Stage 1	-	-	-	-	-	-	940	835	-	952	849	-
Stage 2	-	-	-	-	-	-	872	848	-	922	834	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.4	0.8	9.4	8.9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	843	1566	-	-	1580	-	-	983
HCM Lane V/C Ratio	0.019	0.01	-	-	0.003	-	-	0.066
HCM Control Delay (s)	9.4	7.3	-	-	7.3	-	-	8.9
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	20	5	5	10	5	5	5	5	5	5	25
Future Vol, veh/h	10	20	5	5	10	5	5	5	5	5	5	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	11	22	5	5	11	5	5	5	5	5	5	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	16	0	0	27	0	0	87	73	25	76	73	14
Stage 1	-	-	-	-	-	-	47	47	-	24	24	-
Stage 2	-	-	-	-	-	-	40	26	-	52	49	-
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	1602	-	-	1587	-	-	899	817	1051	914	817	1066
Stage 1	-	-	-	-	-	-	967	856	-	994	875	-
Stage 2	-	-	-	-	-	-	975	874	-	961	854	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1602	-	-	1587	-	-	865	809	1051	898	809	1066
Mov Cap-2 Maneuver	-	-	-	-	-	-	865	809	-	898	809	-
Stage 1	-	-	-	-	-	-	960	850	-	987	872	-
Stage 2	-	-	-	-	-	-	941	871	-	943	848	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.1	1.8	9.1	8.8
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	897	1602	-	-	1587	-	-	994
HCM Lane V/C Ratio	0.018	0.007	-	-	0.003	-	-	0.038
HCM Control Delay (s)	9.1	7.3	0	-	7.3	0	-	8.8
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	27	24	65	27	1	418	239	45	11	310	20
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	71	182	232	205	8	505	1023	870	15	509	432
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.28	0.55	0.55	0.01	0.27	0.27
Sat Flow, veh/h	911	617	1583	1348	1785	66	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	87	0	24	65	0	28	418	239	45	11	310	20
Grp Sat Flow(s),veh/h/ln	1528	0	1583	1348	0	1851	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	1.9	0.0	0.7	2.3	0.0	0.7	10.8	3.2	0.6	0.3	7.1	0.5
Cycle Q Clear(g_c), s	2.5	0.0	0.7	4.9	0.0	0.7	10.8	3.2	0.6	0.3	7.1	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	300	0	182	232	0	213	505	1023	870	15	509	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	863	0	777	738	0	908	1088	3008	2557	544	2437	2071
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	19.5	22.6	0.0	19.5	16.4	5.7	5.1	24.2	15.5	13.1
Incr Delay (d2), s/veh	0.5	0.0	0.3	0.7	0.0	0.3	3.5	0.2	0.1	49.2	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	0.3	0.9	0.0	0.4	5.7	1.7	0.3	0.4	4.0	0.2
LnGrp Delay(d),s/veh	20.8	0.0	19.8	23.2	0.0	19.7	19.9	5.9	5.2	73.4	18.0	13.2
LnGrp LOS	C		B	C		B	B	A	A	E	B	B
Approach Vol, veh/h		111			93			702			341	
Approach Delay, s/veh		20.6			22.2			14.2			19.5	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	32.9		10.6	18.9	19.4		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	12.8	9.1		6.9
Green Ext Time (p_c), s	0.0	3.5		0.5	1.2	4.3		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	16.8
HCM 2010 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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	22	14	49	16	1	217	647	0	27	641	45
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	55	207	238	226	14	441	978	831	392	819	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	1075	423	1583	1367	1735	108	1774	1863	1583	1774	1863	1576
Grp Volume(v), veh/h	104	0	14	49	0	17	217	647	0	27	641	45
Grp Sat Flow(s),veh/h/ln	1498	0	1583	1367	0	1844	1774	1863	1583	1774	1863	1576
Q Serve(g_s), s	2.7	0.0	0.4	1.7	0.0	0.4	3.0	12.4	0.0	0.4	14.4	0.8
Cycle Q Clear(g_c), s	3.1	0.0	0.4	4.8	0.0	0.4	3.0	12.4	0.0	0.4	14.4	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	207	238	0	241	441	978	831	392	819	693
V/C Ratio(X)	0.32	0.00	0.07	0.21	0.00	0.07	0.49	0.66	0.00	0.07	0.78	0.06
Avail Cap(c_a), veh/h	883	0	806	756	0	939	798	1935	1645	901	1935	1637
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	19.9	0.0	18.7	22.2	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	0.9	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	1.4	0.0	0.2	0.7	0.0	0.2	1.5	6.5	0.0	0.2	7.7	0.4
LnGrp Delay(d),s/veh	20.4	0.0	18.9	22.6	0.0	18.9	9.6	9.3	0.0	8.1	13.4	8.0
LnGrp LOS	C		B	C		B	A	A		A	B	A
Approach Vol, veh/h		118			66			864			713	
Approach Delay, s/veh		20.2			21.6			9.3			12.9	
Approach LOS		C			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.9	31.8		11.4	10.1	27.6		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	14.4		5.1	5.0	16.4		6.8
Green Ext Time (p_c), s	0.0	4.9		0.5	0.4	4.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.0
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	15	95	30	15	25	165	815	55	25	765	75
Future Volume (veh/h)	60	15	95	30	15	25	165	815	55	25	765	75
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	16	3	33	16	1	179	886	37	27	832	42
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	185	35	45	184	154	220	1132	963	33	936	794
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	1774	1518	285	1774	1863	1554	1774	1863	1583	1774	1863	1580
Grp Volume(v), veh/h	65	0	19	33	16	1	179	886	37	27	832	42
Grp Sat Flow(s),veh/h/ln	1774	0	1803	1774	1863	1554	1774	1863	1583	1774	1863	1580
Q Serve(g_s), s	3.2	0.0	0.8	1.6	0.7	0.1	8.7	31.4	0.8	1.3	35.4	1.2
Cycle Q Clear(g_c), s	3.2	0.0	0.8	1.6	0.7	0.1	8.7	31.4	0.8	1.3	35.4	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	219	45	184	154	220	1132	963	33	936	794
V/C Ratio(X)	0.77	0.00	0.09	0.74	0.09	0.01	0.81	0.78	0.04	0.82	0.89	0.05
Avail Cap(c_a), veh/h	402	0	429	402	443	370	503	1372	1167	503	1372	1164
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	41.5	0.0	34.4	42.7	36.1	35.8	37.7	12.9	6.9	43.1	19.7	11.2
Incr Delay (d2), s/veh	13.3	0.0	0.2	21.0	0.2	0.0	7.2	2.5	0.0	37.4	5.3	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	1.9	0.0	0.4	1.1	0.4	0.0	4.7	16.8	0.4	1.0	19.4	0.5
LnGrp Delay(d),s/veh	54.8	0.0	34.6	63.7	36.3	35.8	44.8	15.4	7.0	80.5	25.0	11.2
LnGrp LOS	D		C	E	D	D	D	B	A	F	C	B
Approach Vol, veh/h		84			50			1102			901	
Approach Delay, s/veh		50.3			54.4			19.9			26.1	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	58.6	7.2	15.7	15.9	49.3	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	25.6	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	2.3	33.4	3.6	2.8	10.7	37.4	5.2	2.7
Green Ext Time (p_c), s	0.0	7.9	0.0	0.0	0.4	6.9	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	24.5
HCM 2010 LOS	C

Notes

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	920	10	5	830	20
Future Volume (veh/h)	80	5	600	80	10	10	605	920	10	5	830	20
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	87	5	0	87	11	9	658	1000	11	5	902	5
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	7	139	186	15	12	702	2685	30	7	1263	565
Arrive On Green	0.10	0.09	0.00	0.10	0.09	0.09	0.40	0.75	0.75	0.00	0.36	0.36
Sat Flow, veh/h	1466	84	1583	1329	168	137	1774	3586	39	1774	3539	1583
Grp Volume(v), veh/h	92	0	0	107	0	0	658	493	518	5	902	5
Grp Sat Flow(s),veh/h/ln	1550	0	1583	1634	0	0	1774	1770	1856	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	0.5	0.0	0.0	33.4	9.1	9.1	0.3	20.6	0.2
Cycle Q Clear(g_c), s	5.0	0.0	0.0	5.5	0.0	0.0	33.4	9.1	9.1	0.3	20.6	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	227	0	139	230	0	0	702	1325	1389	7	1263	565
V/C Ratio(X)	0.41	0.00	0.00	0.47	0.00	0.00	0.94	0.37	0.37	0.72	0.71	0.01
Avail Cap(c_a), veh/h	553	0	506	521	0	0	1342	1325	1389	1342	2150	962
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	41.1	0.0	0.0	27.2	4.1	4.1	46.7	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	0.4	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	2.3	0.0	0.0	2.7	0.0	0.0	16.8	4.5	4.7	0.2	10.3	0.1
LnGrp Delay(d),s/veh	42.1	0.0	0.0	42.6	0.0	0.0	30.0	4.5	4.5	87.4	27.7	19.5
LnGrp LOS	D			D			C	A	A	F	C	B
Approach Vol, veh/h		92			107			1669			912	
Approach Delay, s/veh		42.1			42.6			14.5			27.9	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.1	39.5		13.2	4.4	76.2		13.2
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	7.1	57.0		27.0	71.0	57.0		30.0
Max Q Clear Time (g_c+I1), s	35.4	22.6		7.5	2.3	11.1		7.0
Green Ext Time (p_c), s	1.7	10.8		0.3	0.0	12.5		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	20.9
HCM 2010 LOS	C

Notes

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	1475	10	10	1505	60
Future Volume (veh/h)	50	5	140	15	0	5	135	1475	10	10	1505	60
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	54	5	6	16	0	1	147	1603	11	11	1636	39
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	228	18	173	185	2	7	180	2622	18	14	2246	1004
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	1354	155	1521	966	19	62	1774	3603	25	1774	3539	1582
Grp Volume(v), veh/h	59	0	6	17	0	0	147	787	827	11	1636	39
Grp Sat Flow(s),veh/h/ln	1509	0	1521	1047	0	0	1774	1770	1858	1774	1770	1582
Q Serve(g_s), s	0.0	0.0	0.3	0.9	0.0	0.0	7.6	20.3	20.3	0.6	29.3	0.9
Cycle Q Clear(g_c), s	2.9	0.0	0.3	3.8	0.0	0.0	7.6	20.3	20.3	0.6	29.3	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	262	0	173	205	0	0	180	1288	1352	14	2246	1004
V/C Ratio(X)	0.23	0.00	0.03	0.08	0.00	0.00	0.82	0.61	0.61	0.78	0.73	0.04
Avail Cap(c_a), veh/h	448	0	376	387	0	0	400	1634	1716	209	2888	1291
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	37.4	0.0	36.7	38.6	0.0	0.0	41.0	6.2	6.2	46.1	11.6	6.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.5	1.0	1.0	27.8	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	1.4	0.0	0.1	0.4	0.0	0.0	3.9	10.0	10.5	0.4	14.4	0.4
LnGrp Delay(d),s/veh	37.6	0.0	36.7	38.7	0.0	0.0	44.5	7.2	7.2	73.9	12.7	6.4
LnGrp LOS	D		D	D			D	A	A	E	B	A
Approach Vol, veh/h		65			17			1761			1686	
Approach Delay, s/veh		37.5			38.7			10.3			13.0	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.4	64.1		15.6	4.7	72.8		15.6
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.6	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	19.6	31.3		5.8	2.6	22.3		4.9
Green Ext Time (p_c), s	0.1	27.8		0.0	0.0	31.2		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.2
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	5	27	76	5	1	136	1587	49	38	1804	85
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	212	12	205	142	197	39	157	2656	1187	49	2440	1091
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	1298	89	1562	1358	1504	301	1774	3539	1582	1774	3539	1583
Grp Volume(v), veh/h	87	0	27	76	0	6	136	1587	49	38	1804	85
Grp Sat Flow(s),veh/h/ln	1387	0	1562	1358	0	1805	1774	1770	1582	1774	1770	1583
Q Serve(g_s), s	9.2	0.0	2.5	9.1	0.0	0.5	12.5	33.5	1.3	3.5	53.3	2.9
Cycle Q Clear(g_c), s	9.7	0.0	2.5	18.8	0.0	0.5	12.5	33.5	1.3	3.5	53.3	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	205	142	0	237	157	2656	1187	49	2440	1091
V/C Ratio(X)	0.37	0.00	0.13	0.54	0.00	0.03	0.86	0.60	0.04	0.78	0.74	0.08
Avail Cap(c_a), veh/h	253	0	227	161	0	263	280	2656	1187	108	2440	1091
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	66.2	0.0	63.4	75.2	0.0	62.5	74.2	9.3	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	2.1	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	3.7	0.0	1.1	3.5	0.0	0.2	6.3	16.3	0.6	1.8	26.5	1.3
LnGrp Delay(d),s/veh	67.2	0.0	63.7	78.4	0.0	62.5	78.0	10.0	5.3	89.0	18.3	8.6
LnGrp LOS	E		E	E		E	E	B	A	F	B	A
Approach Vol, veh/h		114			82			1772			1927	
Approach Delay, s/veh		66.4			77.2			15.1			19.3	
Approach LOS		E			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.6	119.7		26.6	8.6	129.8		26.6
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	26.6	100.0		24.0	10.0	116.0		24.0
Max Q Clear Time (g_c+I1), s	14.5	55.3		20.8	5.5	35.5		11.7
Green Ext Time (p_c), s	0.2	31.9		0.1	0.0	35.9		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	20.0
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	325	0	460	16	0	1	418	1630	11	82	1853	126
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	531	0	903	69	0	4	490	2419	16	113	2098	1168
Arrive On Green	0.15	0.00	0.14	0.04	0.00	0.03	0.14	0.67	0.66	0.06	0.59	0.59
Sat Flow, veh/h	3548	0	3123	1653	0	103	3442	3604	24	1774	3539	1583
Grp Volume(v), veh/h	325	0	460	17	0	0	418	800	841	82	1853	126
Grp Sat Flow(s),veh/h/ln	1774	0	1561	1756	0	0	1721	1770	1858	1774	1770	1583
Q Serve(g_s), s	18.6	0.0	26.8	2.0	0.0	0.0	25.8	58.9	59.1	9.9	97.2	4.9
Cycle Q Clear(g_c), s	18.6	0.0	26.8	2.0	0.0	0.0	25.8	58.9	59.1	9.9	97.2	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	531	0	903	73	0	0	490	1188	1247	113	2098	1168
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	555	0	925	251	0	0	919	1580	1659	122	2460	1330
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	64.7	100.8	0.0	0.0	91.0	21.4	21.5	99.8	37.8	8.1
Incr Delay (d2), s/veh	1.3	0.0	0.2	0.6	0.0	0.0	1.7	1.0	0.9	14.6	4.0	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	11.6	1.0	0.0	0.0	12.4	29.0	30.5	5.3	48.5	3.4
LnGrp Delay(d),s/veh	87.8	0.0	64.9	101.4	0.0	0.0	92.7	22.4	22.4	114.5	41.8	8.2
LnGrp LOS	F		E	F			F	C	C	F	D	A
Approach Vol, veh/h		785			17			2059			2061	
Approach Delay, s/veh		74.4			101.4			36.7			42.6	
Approach LOS		E			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	34.9	132.8		13.1	17.9	149.8		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	27.8	99.2		4.0	11.9	61.1		28.8
Green Ext Time (p_c), s	1.1	27.6		0.0	0.0	22.6		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	45.4
HCM 2010 LOS	D

Notes

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	11	0	1	98	5	2	11	1995	96	92	2462	5
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	156	2	10	176	110	44	22	2631	126	116	2964	6
Arrive On Green	0.09	0.00	0.08	0.09	0.09	0.08	0.02	1.00	1.00	0.07	0.82	0.81
Sat Flow, veh/h	1244	24	115	1410	1267	507	1774	3439	164	1774	3624	7
Grp Volume(v), veh/h	12	0	0	98	0	7	11	1019	1072	92	1202	1265
Grp Sat Flow(s),veh/h/ln	1384	0	0	1410	0	1773	1774	1770	1834	1774	1770	1861
Q Serve(g_s), s	0.9	0.0	0.0	8.1	0.0	0.5	0.9	0.0	0.0	7.4	55.9	56.0
Cycle Q Clear(g_c), s	1.4	0.0	0.0	9.5	0.0	0.5	0.9	0.0	0.0	7.4	55.9	56.0
Prop In Lane	0.92		0.08	1.00		0.29	1.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	168	0	0	176	0	154	22	1354	1403	116	1447	1522
V/C Ratio(X)	0.07	0.00	0.00	0.56	0.00	0.05	0.50	0.75	0.76	0.79	0.83	0.83
Avail Cap(c_a), veh/h	279	0	0	287	0	294	61	1354	1403	184	1447	1522
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	61.2	0.0	0.0	64.6	0.0	60.8	70.3	0.0	0.0	66.8	7.5	7.5
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.7	0.0	0.1	3.9	2.4	2.4	4.7	5.7	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	0.5	0.0	0.0	4.0	0.0	0.3	0.5	0.9	0.9	3.8	29.0	30.4
LnGrp Delay(d),s/veh	61.4	0.0	0.0	67.4	0.0	60.9	74.2	2.4	2.4	71.5	13.2	12.9
LnGrp LOS	E			E		E	E	A	A	E	B	B
Approach Vol, veh/h		12			105			2102			2559	
Approach Delay, s/veh		61.4			66.9			2.8			15.1	
Approach LOS		E			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.8	122.6		16.6	13.5	114.9		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	58.0		11.5	9.4	2.0		3.4
Green Ext Time (p_c), s	0.0	42.0		0.2	0.1	62.9		0.0

Intersection Summary		
HCM 2010 Ctrl Delay	11.0	
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	196	16	9	65	5	7	5	1908	21	5	2087	275
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	275	22	25	7	2674	29	7	2639	1180
Arrive On Green	0.17	0.17	0.16	0.17	0.17	0.16	0.01	0.99	0.98	0.00	0.75	0.75
Sat Flow, veh/h	1320	108	61	1367	130	150	1774	3586	39	1774	3539	1583
Grp Volume(v), veh/h	221	0	0	77	0	0	5	940	989	5	2087	275
Grp Sat Flow(s),veh/h/ln	1488	0	0	1647	0	0	1774	1770	1856	1774	1770	1583
Q Serve(g_s), s	15.1	0.0	0.0	0.0	0.0	0.0	0.4	2.2	2.3	0.4	53.0	7.8
Cycle Q Clear(g_c), s	20.9	0.0	0.0	5.8	0.0	0.0	0.4	2.2	2.3	0.4	53.0	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	297	0	0	322	0	0	7	1319	1384	7	2639	1180
V/C Ratio(X)	0.74	0.00	0.00	0.24	0.00	0.00	0.75	0.71	0.71	0.75	0.79	0.23
Avail Cap(c_a), veh/h	362	0	0	387	0	0	37	1319	1384	37	2639	1180
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	0.61	0.61	0.61	0.40	0.40	0.40
Uniform Delay (d), s/veh	58.6	0.0	0.0	52.6	0.0	0.0	72.1	0.2	0.2	72.2	11.4	5.7
Incr Delay (d2), s/veh	6.5	0.0	0.0	0.4	0.0	0.0	30.7	2.0	2.0	21.5	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	9.2	0.0	0.0	2.7	0.0	0.0	0.3	1.1	1.1	0.2	25.9	3.4
LnGrp Delay(d),s/veh	65.1	0.0	0.0	53.0	0.0	0.0	102.8	2.2	2.1	93.6	12.5	5.9
LnGrp LOS	E			D			F	A	A	F	B	A
Approach Vol, veh/h		221			77			1934			2367	
Approach Delay, s/veh		65.1			53.0			2.4			11.9	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	112.1		28.3	4.5	112.1		28.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	3.6	98.0		30.0	3.0	98.0		30.0
Max Q Clear Time (g_c+I1), s	2.4	55.0		7.8	2.4	4.3		22.9
Green Ext Time (p_c), s	0.0	40.2		0.2	0.0	70.7		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	11.1
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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		0.97	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	196	38	10	103	27	2	60	1696	111	27	2016	159
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	262	42	304	348	336	25	73	2367	154	34	2260	176
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.19	0.08	1.00	1.00	0.04	1.00	1.00
Sat Flow, veh/h	1102	214	1545	1347	1710	127	1774	3374	219	1774	3327	259
Grp Volume(v), veh/h	234	0	10	103	0	29	60	883	924	27	1060	1115
Grp Sat Flow(s),veh/h/ln	1316	0	1545	1347	0	1837	1774	1770	1824	1774	1770	1816
Q Serve(g_s), s	23.6	0.0	0.8	0.0	0.0	1.9	4.8	0.0	0.0	2.2	0.0	0.0
Cycle Q Clear(g_c), s	25.5	0.0	0.8	8.3	0.0	1.9	4.8	0.0	0.0	2.2	0.0	0.0
Prop In Lane	0.84		1.00	1.00		0.07	1.00		0.12	1.00		0.14
Lane Grp Cap(c), veh/h	304	0	304	348	0	361	73	1241	1279	34	1202	1234
V/C Ratio(X)	0.77	0.00	0.03	0.30	0.00	0.08	0.82	0.71	0.72	0.79	0.88	0.90
Avail Cap(c_a), veh/h	309	0	309	353	0	367	73	1241	1279	73	1202	1234
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	0.38	0.38	0.38	0.51	0.51	0.51
Uniform Delay (d), s/veh	57.9	0.0	47.1	50.1	0.0	47.6	66.0	0.0	0.0	69.4	0.0	0.0
Incr Delay (d2), s/veh	11.0	0.0	0.0	0.5	0.0	0.1	21.9	1.3	1.4	7.7	5.1	6.1
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	10.1	0.0	0.3	3.6	0.0	1.0	2.8	0.5	0.5	1.1	1.7	2.1
LnGrp Delay(d),s/veh	68.9	0.0	47.1	50.6	0.0	47.7	87.9	1.3	1.4	77.1	5.1	6.1
LnGrp LOS	E		D	D		D	F	A	A	E	A	A
Approach Vol, veh/h		244			132			1867			2202	
Approach Delay, s/veh		68.0			50.0			4.1			6.5	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	102.5		32.5	6.8	105.7		32.5
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	6.0	97.0		28.0	6.0	97.0		28.0
Max Q Clear Time (g_c+I1), s	10.3	2.0		10.3	4.2	2.0		27.5
Green Ext Time (p_c), s	0.0	67.5		0.4	0.0	45.2		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	10.2
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	185	60	125	110	705	55	950	195	630	1230	65
Future Volume (veh/h)	60	185	60	125	110	705	55	950	195	630	1230	65
Number	7	4	14	3	8	18	1	6	16	5	2	12
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	1.00		0.98	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	65	201	12	136	120	445	60	1033	135	685	1337	69
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	100	256	341	219	578	483	77	1400	622	727	1930	99
Arrive On Green	0.22	0.22	0.22	0.06	0.31	0.31	0.04	0.40	0.40	0.42	1.00	1.00
Sat Flow, veh/h	313	1163	1545	1774	1863	1556	1774	3539	1571	3442	3424	176
Grp Volume(v), veh/h	266	0	12	136	120	445	60	1033	135	685	690	716
Grp Sat Flow(s),veh/h/ln	1476	0	1545	1774	1863	1556	1774	1770	1571	1721	1770	1830
Q Serve(g_s), s	21.2	0.0	0.9	8.5	6.9	40.1	4.9	36.1	8.2	27.7	0.0	0.0
Cycle Q Clear(g_c), s	24.6	0.0	0.9	8.5	6.9	40.1	4.9	36.1	8.2	27.7	0.0	0.0
Prop In Lane	0.24		1.00	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	356	0	341	219	578	483	77	1400	622	727	998	1032
V/C Ratio(X)	0.75	0.00	0.04	0.62	0.21	0.92	0.78	0.74	0.22	0.94	0.69	0.69
Avail Cap(c_a), veh/h	426	0	415	219	668	558	110	1400	622	807	998	1032
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	1.00	0.88	0.88	0.88	0.32	0.32	0.32
Uniform Delay (d), s/veh	53.2	0.0	44.4	41.6	36.9	48.3	68.7	37.4	29.0	41.0	0.0	0.0
Incr Delay (d2), s/veh	5.8	0.0	0.0	5.3	0.2	19.4	11.0	3.1	0.7	7.3	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	10.7	0.0	0.4	4.4	3.6	19.8	2.6	18.3	3.7	13.8	0.4	0.4
LnGrp Delay(d),s/veh	59.0	0.0	44.4	46.9	37.0	67.7	79.7	40.5	29.7	48.3	1.3	1.3
LnGrp LOS	E		D	D	D	E	E	D	C	D	A	A
Approach Vol, veh/h		278			701			1228			2091	
Approach Delay, s/veh		58.4			58.4			41.2			16.7	
Approach LOS		E			E			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	10.3	85.8	13.0	36.0	34.6	61.4		49.0
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	9.6	71.0	8.0	38.0	34.0	46.0		51.0
Max Q Clear Time (g_c+I1), s	10.9	2.0	10.5	26.6	29.7	38.1		42.1
Green Ext Time (p_c), s	0.0	24.6	0.0	1.0	1.0	5.5		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	33.2
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	895	0	0	790
Future Vol, veh/h	0	0	895	0	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	0	973	0	0	859

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	973	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	306	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	306	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1005	0	0	890
Future Vol, veh/h	0	0	1005	0	0	890
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	967

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2059	1092	0	0	1092	0
Stage 1	1092	-	-	-	-	-
Stage 2	967	-	-	-	-	-
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	369	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	60	261	-	-	639	-
Mov Cap-2 Maneuver	184	-	-	-	-	-
Stage 1	322	-	-	-	-	-
Stage 2	369	-	-	-	-	-

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	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	40	5	5	35	5	5	5	5	5	5	30
Future Vol, veh/h	55	40	5	5	35	5	5	5	5	5	5	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	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	60	43	5	5	38	5	5	5	5	5	5	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	43	0	0	48	0	0	236	219	46	222	219	41
Stage 1	-	-	-	-	-	-	166	166	-	51	51	-
Stage 2	-	-	-	-	-	-	70	53	-	171	168	-
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	1566	-	-	1559	-	-	718	679	1023	734	679	1030
Stage 1	-	-	-	-	-	-	836	761	-	962	852	-
Stage 2	-	-	-	-	-	-	940	851	-	831	759	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1566	-	-	1559	-	-	669	651	1023	702	651	1030
Mov Cap-2 Maneuver	-	-	-	-	-	-	669	651	-	702	651	-
Stage 1	-	-	-	-	-	-	804	732	-	925	849	-
Stage 2	-	-	-	-	-	-	902	848	-	789	730	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4.1	0.8	9.9	9.2
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	748	1566	-	-	1559	-	-	911
HCM Lane V/C Ratio	0.022	0.038	-	-	0.003	-	-	0.048
HCM Control Delay (s)	9.9	7.4	-	-	7.3	-	-	9.2
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	15	5	5	20	5	5	5	5	5	5	15
Future Vol, veh/h	30	15	5	5	20	5	5	5	5	5	5	15
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	33	16	5	5	22	5	5	5	5	5	5	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	27	0	0	21	0	0	130	122	19	125	122	25
Stage 1	-	-	-	-	-	-	85	85	-	35	35	-
Stage 2	-	-	-	-	-	-	45	37	-	90	87	-
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	1587	-	-	1595	-	-	843	768	1059	849	768	1051
Stage 1	-	-	-	-	-	-	923	824	-	981	866	-
Stage 2	-	-	-	-	-	-	969	864	-	917	823	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1587	-	-	1595	-	-	810	750	1059	824	750	1051
Mov Cap-2 Maneuver	-	-	-	-	-	-	810	750	-	824	750	-
Stage 1	-	-	-	-	-	-	904	807	-	960	863	-
Stage 2	-	-	-	-	-	-	945	861	-	887	806	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4.4	1.2	9.3	9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	854	1587	-	-	1595	-	-	926
HCM Lane V/C Ratio	0.019	0.021	-	-	0.003	-	-	0.029
HCM Control Delay (s)	9.3	7.3	0	-	7.3	0	-	9
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	49	35	49	54	10	299	342	23	22	310	28
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	134	202	263	197	36	386	916	777	29	541	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	549	1038	1566	1298	1526	283	1774	1863	1580	1774	1863	1581
Grp Volume(v), veh/h	92	0	35	49	0	64	299	342	23	22	310	28
Grp Sat Flow(s),veh/h/ln	1587	0	1566	1298	0	1809	1774	1863	1580	1774	1863	1581
Q Serve(g_s), s	0.9	0.0	0.9	1.6	0.0	1.4	7.0	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	7.0	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	325	0	202	263	0	233	386	916	777	29	541	459
V/C Ratio(X)	0.28	0.00	0.17	0.19	0.00	0.27	0.78	0.37	0.03	0.77	0.57	0.06
Avail Cap(c_a), veh/h	974	0	853	802	0	985	1208	3340	2833	604	2705	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	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.7	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	3.4	0.5	0.0	34.5	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	1.1	0.0	0.4	0.6	0.0	0.7	3.8	2.7	0.1	0.5	3.5	0.3
LnGrp Delay(d),s/veh	18.1	0.0	17.5	19.9	0.0	18.0	19.6	7.5	5.8	56.1	15.3	11.4
LnGrp LOS	B		B	B		B	B	A	A	E	B	B
Approach Vol, veh/h		127			113			664			360	
Approach Delay, s/veh		18.0			18.8			12.9			17.5	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.7	27.7		10.7	14.6	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	9.0	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 2010 Ctrl Delay	15.2
HCM 2010 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
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	22	24	43	16	1	147	500	0	16	538	25
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	288	84	231	307	257	16	439	863	733	429	731	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	955	563	1557	1336	1733	108	1774	1863	1583	1774	1863	1577
Grp Volume(v), veh/h	82	0	24	43	0	17	147	500	0	16	538	25
Grp Sat Flow(s),veh/h/ln	1518	0	1557	1336	0	1841	1774	1863	1583	1774	1863	1577
Q Serve(g_s), s	1.2	0.0	0.6	1.3	0.0	0.3	2.0	8.4	0.0	0.2	10.5	0.4
Cycle Q Clear(g_c), s	1.9	0.0	0.6	3.2	0.0	0.3	2.0	8.4	0.0	0.2	10.5	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	372	0	231	307	0	273	439	863	733	429	731	619
V/C Ratio(X)	0.22	0.00	0.10	0.14	0.00	0.06	0.33	0.58	0.00	0.04	0.74	0.04
Avail Cap(c_a), veh/h	1019	0	915	894	0	1082	918	2234	1899	1033	2234	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	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	15.7	17.7	0.0	15.6	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	1.5	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	0.9	0.0	0.3	0.5	0.0	0.2	1.0	4.3	0.0	0.1	5.7	0.2
LnGrp Delay(d),s/veh	16.5	0.0	15.9	17.9	0.0	15.7	8.4	9.0	0.0	8.0	12.5	8.0
LnGrp LOS	B		B	B		B	A	A		A	B	A
Approach Vol, veh/h		106			60			647			579	
Approach Delay, s/veh		16.3			17.3			8.9			12.2	
Approach LOS		B			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	25.7		11.3	8.5	22.7		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	10.4		3.9	4.0	12.5		5.2
Green Ext Time (p_c), s	0.0	3.4		0.4	0.3	3.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	11.2
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	15	85	35	15	30	80	550	45	25	675	50
Future Volume (veh/h)	40	15	85	35	15	30	80	550	45	25	675	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	16	4	38	16	1	87	598	27	27	734	26
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	177	44	54	224	191	115	963	818	32	875	743
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	1774	1436	359	1774	1863	1583	1774	1863	1583	1774	1863	1582
Grp Volume(v), veh/h	43	0	20	38	16	1	87	598	27	27	734	26
Grp Sat Flow(s),veh/h/ln	1774	0	1795	1774	1863	1583	1774	1863	1583	1774	1863	1582
Q Serve(g_s), s	1.5	0.0	0.6	1.4	0.5	0.0	3.1	14.7	0.5	1.0	22.1	0.6
Cycle Q Clear(g_c), s	1.5	0.0	0.6	1.4	0.5	0.0	3.1	14.7	0.5	1.0	22.1	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	221	54	224	191	115	963	818	32	875	743
V/C Ratio(X)	0.73	0.00	0.09	0.70	0.07	0.01	0.76	0.62	0.03	0.85	0.84	0.03
Avail Cap(c_a), veh/h	553	0	587	553	609	518	691	1886	1603	691	1886	1601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	30.7	0.0	25.0	30.8	25.1	24.9	29.5	11.0	7.6	31.4	14.9	9.2
Incr Delay (d2), s/veh	15.5	0.0	0.2	14.9	0.1	0.0	9.7	0.7	0.0	42.5	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	1.0	0.0	0.3	0.9	0.3	0.0	1.8	7.7	0.2	0.8	11.8	0.2
LnGrp Delay(d),s/veh	46.2	0.0	25.1	45.7	25.2	24.9	39.3	11.7	7.6	73.9	17.1	9.2
LnGrp LOS	D		C	D	C	C	D	B	A	E	B	A
Approach Vol, veh/h		63			55			712			787	
Approach Delay, s/veh		39.5			39.4			14.9			18.8	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.2	38.2	7.0	12.9	9.2	35.2	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	16.7	3.4	2.6	5.1	24.1	3.5	2.5
Green Ext Time (p_c), s	0.0	4.5	0.0	0.0	0.2	6.0	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	18.6
HCM 2010 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	625	5	0	750	55
Future Volume (veh/h)	55	10	595	10	0	5	410	625	5	0	750	55
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	60	11	0	11	0	1	446	679	5	0	815	19
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	192	15	100	207	4	9	515	2700	20	3	1386	618
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	1255	230	1583	1424	65	135	1774	3601	27	1774	3539	1577
Grp Volume(v), veh/h	71	0	0	12	0	0	446	334	350	0	815	19
Grp Sat Flow(s),veh/h/ln	1486	0	1583	1624	0	0	1774	1770	1858	1774	1770	1577
Q Serve(g_s), s	2.3	0.0	0.0	0.0	0.0	0.0	14.0	3.4	3.4	0.0	10.7	0.4
Cycle Q Clear(g_c), s	2.7	0.0	0.0	0.4	0.0	0.0	14.0	3.4	3.4	0.0	10.7	0.4
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	232	0	100	248	0	0	515	1327	1393	3	1386	618
V/C Ratio(X)	0.31	0.00	0.00	0.05	0.00	0.00	0.87	0.25	0.25	0.00	0.59	0.03
Avail Cap(c_a), veh/h	886	0	808	807	0	0	2143	1716	1802	2143	3432	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	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	0.0	0.0	25.5	0.0	0.0	19.8	2.3	2.3	0.0	14.1	11.0
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.1	0.0	0.0	1.8	0.2	0.2	0.0	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	1.1	0.0	0.0	0.2	0.0	0.0	7.1	1.7	1.8	0.0	5.4	0.2
LnGrp Delay(d),s/veh	27.3	0.0	0.0	25.6	0.0	0.0	21.6	2.5	2.5	0.0	15.0	11.1
LnGrp LOS	C			C			C	A	A		B	B
Approach Vol, veh/h		71			12			1130			834	
Approach Delay, s/veh		27.3			25.6			10.0			14.9	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	21.0	29.0		8.7	0.0	50.1		8.7
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	17.0	57.0		27.0	71.0	57.0		30.0
Max Q Clear Time (g_c+I1), s	16.0	12.7		2.4	0.0	5.4		4.7
Green Ext Time (p_c), s	1.0	10.3		0.0	0.0	7.3		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	12.7
HCM 2010 LOS	B

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
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	65	5	7	16	5	1	114	1065	21	11	1429	42
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	13	143	150	36	5	146	2508	49	15	2238	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	1390	144	1547	695	388	52	1774	3550	70	1774	3539	1580
Grp Volume(v), veh/h	70	0	7	22	0	0	114	531	555	11	1429	42
Grp Sat Flow(s),veh/h/ln	1534	0	1547	1134	0	0	1774	1770	1850	1774	1770	1580
Q Serve(g_s), s	0.0	0.0	0.3	0.1	0.0	0.0	4.6	9.1	9.1	0.4	18.1	0.7
Cycle Q Clear(g_c), s	2.7	0.0	0.3	2.8	0.0	0.0	4.6	9.1	9.1	0.4	18.1	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	258	0	143	206	0	0	146	1250	1307	15	2238	999
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	575	0	491	536	0	0	514	2099	2194	269	3709	1655
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	30.0	30.0	0.0	0.0	32.6	4.5	4.5	35.9	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	24.7	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	1.3	0.0	0.1	0.4	0.0	0.0	2.4	4.4	4.8	0.3	8.9	0.3
LnGrp Delay(d),s/veh	30.9	0.0	30.1	30.1	0.0	0.0	36.0	5.0	4.9	60.6	8.9	5.1
LnGrp LOS	C		C	C			D	A	A	E	A	A
Approach Vol, veh/h		77			22			1200			1482	
Approach Delay, s/veh		30.8			30.1			7.9			9.1	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	50.9		11.7	4.6	56.2		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	6.6	20.1		4.8	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 2010 Ctrl Delay	9.4
HCM 2010 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	1050	50	30	1390	75
Future Volume (veh/h)	65	5	180	45	5	35	110	1050	50	30	1390	75
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	71	5	12	49	5	2	120	1141	33	33	1511	45
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	16	232	223	186	74	154	2262	1012	57	2069	926
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	111	1577	1386	1265	506	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	76	0	12	49	0	7	120	1141	33	33	1511	45
Grp Sat Flow(s),veh/h/ln	1411	0	1577	1386	0	1771	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	3.7	0.0	0.5	2.7	0.0	0.3	5.5	14.2	0.6	1.5	25.5	1.0
Cycle Q Clear(g_c), s	4.0	0.0	0.5	6.7	0.0	0.3	5.5	14.2	0.6	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	309	0	232	223	0	260	154	2262	1012	57	2069	926
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	513	0	459	423	0	515	452	2960	1324	258	2574	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	31.3	0.0	30.2	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	1.6	0.0	0.2	1.1	0.0	0.1	2.8	6.9	0.3	0.8	12.8	0.4
LnGrp Delay(d),s/veh	31.8	0.0	30.3	35.3	0.0	30.2	40.2	8.3	5.5	42.8	13.7	7.4
LnGrp LOS	C		C	D		C	D	A	A	D	B	A
Approach Vol, veh/h		88			56			1294			1589	
Approach Delay, s/veh		31.6			34.6			11.2			14.1	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.1	54.2		17.1	6.7	58.7		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	17.5	27.5		8.7	3.5	16.2		6.0
Green Ext Time (p_c), s	0.2	20.7		0.1	0.0	17.6		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	13.8
HCM 2010 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
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	265	0	268	16	5	7	315	1272	16	60	1516	134
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	448	0	780	50	16	22	442	2227	28	118	1983	1073
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	3548	0	3167	992	310	434	3442	3579	45	1774	3539	1582
Grp Volume(v), veh/h	265	0	268	28	0	0	315	629	659	60	1516	134
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1737	0	0	1721	1770	1855	1774	1770	1582
Q Serve(g_s), s	8.4	0.0	8.3	1.9	0.0	0.0	10.5	24.8	24.8	3.9	39.2	3.5
Cycle Q Clear(g_c), s	8.4	0.0	8.3	1.9	0.0	0.0	10.5	24.8	24.8	3.9	39.2	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	448	0	780	88	0	0	442	1101	1154	118	1983	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	1013	0	1285	452	0	0	1676	2882	3021	223	4487	2193
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	49.1	0.0	36.9	54.9	0.0	0.0	49.8	13.2	13.2	53.7	20.1	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	1.3	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	4.2	0.0	3.6	0.9	0.0	0.0	5.0	12.3	12.8	2.0	19.2	2.1
LnGrp Delay(d),s/veh	49.6	0.0	37.0	55.7	0.0	0.0	50.6	13.8	13.8	55.0	21.0	6.8
LnGrp LOS	D		D	E			D	B	B	D	C	A
Approach Vol, veh/h		533			28			1603			1710	
Approach Delay, s/veh		43.3			55.7			21.1			21.1	
Approach LOS		D			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	19.3	70.7		10.0	11.9	78.1		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	12.5	41.2		3.9	5.9	26.8		10.4
Green Ext Time (p_c), s	0.9	23.5		0.0	0.0	13.0		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	24.4
HCM 2010 LOS	C

Notes

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	1825	10
Future Volume (veh/h)	5	0	5	135	5	60	5	1345	90	90	1825	10
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1462	95	98	1984	11
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2404	156	124	2800	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	1140	37	235	1410	856	856	1774	3375	218	1774	3609	20
Grp Volume(v), veh/h	6	0	0	147	0	10	5	764	793	98	972	1023
Grp Sat Flow(s),veh/h/ln	1412	0	0	1410	0	1712	1774	1770	1824	1774	1770	1859
Q Serve(g_s), s	0.0	0.0	0.0	12.4	0.0	0.7	0.4	6.9	7.2	7.1	35.5	35.7
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	6.9	7.2	7.1	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	1260	1299	124	1373	1443
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.61	0.61	0.79	0.71	0.71
Avail Cap(c_a), veh/h	312	0	0	318	0	316	150	1260	1299	150	1373	1443
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	55.3	0.0	50.2	64.2	1.2	1.2	59.5	7.2	7.3
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.8	0.0	0.1	8.2	1.8	1.8	16.7	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	5.3	0.0	0.3	0.2	3.6	3.8	4.1	18.2	19.1
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.3	72.4	3.0	3.0	76.2	10.3	10.2
LnGrp LOS	D			E		D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1562			2093	
Approach Delay, s/veh		50.0			57.6			3.2			13.4	
Approach LOS		D			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.8	104.9		20.3	13.1	96.6		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	9.1	9.2		2.7
Green Ext Time (p_c), s	0.0	34.5		0.3	0.0	30.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	11.1
HCM 2010 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	1605	265
Future Volume (veh/h)	135	5	15	65	5	15	15	1290	15	10	1605	265
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	147	5	13	71	5	9	16	1402	15	11	1745	212
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	228	6	16	226	17	23	19	2757	29	13	2709	1211
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	1339	46	118	1336	132	174	1774	3587	38	1774	3539	1582
Grp Volume(v), veh/h	165	0	0	85	0	0	16	691	726	11	1745	212
Grp Sat Flow(s),veh/h/ln	1503	0	0	1642	0	0	1774	1770	1856	1774	1770	1582
Q Serve(g_s), s	7.8	0.0	0.0	0.0	0.0	0.0	1.2	19.3	19.3	0.8	29.6	4.7
Cycle Q Clear(g_c), s	13.7	0.0	0.0	5.9	0.0	0.0	1.2	19.3	19.3	0.8	29.6	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	1360	1427	13	2709	1211
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	0.18
Avail Cap(c_a), veh/h	347	0	0	365	0	0	109	1360	1427	109	2709	1211
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.75	0.75	0.75	0.61	0.61	0.61
Uniform Delay (d), s/veh	54.8	0.0	0.0	51.7	0.0	0.0	64.2	5.7	5.7	64.4	7.1	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	23.3	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	6.0	0.0	0.0	2.8	0.0	0.0	0.7	9.6	10.1	0.5	14.6	2.1
LnGrp Delay(d),s/veh	57.7	0.0	0.0	52.3	0.0	0.0	87.3	6.7	6.7	87.7	7.8	4.3
LnGrp LOS	E			D			F	A	A	F	A	A
Approach Vol, veh/h		165			85			1433			1968	
Approach Delay, s/veh		57.7			52.3			7.6			7.9	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	103.5		21.1	5.0	103.9		21.1
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.6	83.0		25.0	8.0	83.0		25.0
Max Q Clear Time (g_c+I1), s	3.2	31.6		7.9	2.8	21.3		15.7
Green Ext Time (p_c), s	0.0	42.2		0.2	0.0	33.3		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	11.1
HCM 2010 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	1615	130
Future Volume (veh/h)	190	20	50	90	20	20	60	1320	60	15	1615	130
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	207	22	11	98	22	4	65	1435	63	16	1755	137
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	288	25	310	378	301	55	83	2419	106	19	2212	171
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	1197	127	1576	1380	1533	279	1774	3453	151	1774	3330	257
Grp Volume(v), veh/h	229	0	11	98	0	26	65	734	764	16	923	969
Grp Sat Flow(s),veh/h/ln	1325	0	1576	1380	0	1812	1774	1770	1835	1774	1770	1817
Q Serve(g_s), s	20.6	0.0	0.7	0.0	0.0	1.5	4.7	8.2	8.4	1.2	25.7	28.0
Cycle Q Clear(g_c), s	22.1	0.0	0.7	6.5	0.0	1.5	4.7	8.2	8.4	1.2	25.7	28.0
Prop In Lane	0.90		1.00	1.00		0.15	1.00		0.08	1.00		0.14
Lane Grp Cap(c), veh/h	313	0	310	378	0	356	83	1239	1285	19	1176	1207
V/C Ratio(X)	0.73	0.00	0.04	0.26	0.00	0.07	0.79	0.59	0.59	0.84	0.78	0.80
Avail Cap(c_a), veh/h	372	0	376	435	0	432	109	1239	1285	109	1176	1207
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	0.63	0.63	0.63	0.69	0.69	0.69
Uniform Delay (d), s/veh	51.6	0.0	42.3	44.6	0.0	42.6	60.3	1.6	1.6	64.0	4.0	4.2
Incr Delay (d2), s/veh	5.9	0.0	0.0	0.4	0.0	0.1	11.4	1.3	1.3	21.5	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	8.5	0.0	0.3	3.0	0.0	0.8	2.6	4.2	4.3	0.7	13.0	14.5
LnGrp Delay(d),s/veh	57.5	0.0	42.3	44.9	0.0	42.7	71.7	2.9	2.9	85.5	7.8	8.2
LnGrp LOS	E		D	D		D	E	A	A	F	A	A
Approach Vol, veh/h		240			124			1563			1908	
Approach Delay, s/veh		56.8			44.5			5.8			8.7	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.1	90.4		29.6	5.4	95.1		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	78.0		30.0	8.0	78.0		30.0
Max Q Clear Time (g_c+I1), s	10.7	30.0		8.5	3.2	10.4		24.1
Green Ext Time (p_c), s	0.0	34.5		0.4	0.0	27.7		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	11.7
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	150	90	145	130	655	80	720	195	575	955	100
Future Volume (veh/h)	60	150	90	145	130	655	80	720	195	575	955	100
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.95	1.00		0.97	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	65	163	10	158	141	322	87	783	127	625	1038	104
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	100	195	267	253	560	463	110	1423	628	705	1771	177
Arrive On Green	0.18	0.18	0.18	0.09	0.30	0.30	0.06	0.40	0.40	0.14	0.37	0.36
Sat Flow, veh/h	366	1107	1511	1774	1863	1541	1774	3539	1562	3442	3249	325
Grp Volume(v), veh/h	228	0	10	158	141	322	87	783	127	625	565	577
Grp Sat Flow(s),veh/h/ln	1473	0	1511	1774	1863	1541	1774	1770	1562	1721	1770	1805
Q Serve(g_s), s	17.2	0.0	0.7	9.1	7.4	24.0	6.3	22.1	6.9	23.2	33.5	33.6
Cycle Q Clear(g_c), s	19.5	0.0	0.7	9.1	7.4	24.0	6.3	22.1	6.9	23.2	33.5	33.6
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	296	0	267	253	560	463	110	1423	628	705	965	984
V/C Ratio(X)	0.77	0.00	0.04	0.62	0.25	0.70	0.79	0.55	0.20	0.89	0.59	0.59
Avail Cap(c_a), veh/h	329	0	302	278	630	521	328	1423	628	953	965	984
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	1.00	0.79	0.79	0.79	0.50	0.50	0.50
Uniform Delay (d), s/veh	51.8	0.0	44.4	38.5	34.4	40.2	60.2	29.8	25.3	54.6	29.4	29.5
Incr Delay (d2), s/veh	9.7	0.0	0.1	3.7	0.2	3.5	3.8	1.2	0.6	3.4	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	8.8	0.0	0.3	4.7	3.9	10.6	3.2	11.0	3.1	11.4	16.8	17.1
LnGrp Delay(d),s/veh	61.6	0.0	44.4	42.2	34.6	43.7	64.0	31.0	25.9	58.0	30.7	30.8
LnGrp LOS	E		D	D	C	D	E	C	C	E	C	C
Approach Vol, veh/h		238			621			997			1767	
Approach Delay, s/veh		60.8			41.2			33.3			40.4	
Approach LOS		E			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	12.0	74.9	16.1	26.9	30.6	56.3		43.1
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	9.3	35.6	11.1	21.5	25.2	24.1		26.0
Green Ext Time (p_c), s	0.1	8.0	0.1	0.3	1.5	6.5		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	39.9
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	615	0	0	735
Future Vol, veh/h	0	0	615	0	0	735
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	0	668	0	0	799

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	668	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	458	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	458	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	680	0	0	790
Future Vol, veh/h	0	0	680	0	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	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	739	0	0	859

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1598	739	0	0	739	0
Stage 1	739	-	-	-	-	-
Stage 2	859	-	-	-	-	-
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	117	417	-	-	867	-
Stage 1	472	-	-	-	-	-
Stage 2	415	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	117	417	-	-	867	-
Mov Cap-2 Maneuver	255	-	-	-	-	-
Stage 1	472	-	-	-	-	-
Stage 2	415	-	-	-	-	-

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)	-	-	-	-	867	-
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	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	40	5	5	40	5	5	5	5	5	5	35
Future Vol, veh/h	40	40	5	5	40	5	5	5	5	5	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	43	43	5	5	43	5	5	5	5	5	5	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	48	0	0	48	0	0	209	190	46	193	190	46
Stage 1	-	-	-	-	-	-	132	132	-	56	56	-
Stage 2	-	-	-	-	-	-	77	58	-	137	134	-
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	-	-	1559	-	-	748	705	1023	767	705	1023
Stage 1	-	-	-	-	-	-	871	787	-	956	848	-
Stage 2	-	-	-	-	-	-	932	847	-	866	785	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1559	-	-	1559	-	-	699	683	1023	741	683	1023
Mov Cap-2 Maneuver	-	-	-	-	-	-	699	683	-	741	683	-
Stage 1	-	-	-	-	-	-	847	765	-	929	845	-
Stage 2	-	-	-	-	-	-	889	844	-	832	763	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.5	0.7	9.7	9.1
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	775	1559	-	-	1559	-	-	932
HCM Lane V/C Ratio	0.021	0.028	-	-	0.003	-	-	0.052
HCM Control Delay (s)	9.7	7.4	-	-	7.3	-	-	9.1
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	20	5	5	25	5	5	5	5	5	5	20
Future Vol, veh/h	20	20	5	5	25	5	5	5	5	5	5	20
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	22	22	5	5	27	5	5	5	5	5	5	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	32	0	0	27	0	0	122	111	25	114	111	30
Stage 1	-	-	-	-	-	-	69	69	-	40	40	-
Stage 2	-	-	-	-	-	-	53	42	-	74	71	-
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	1580	-	-	1587	-	-	853	779	1051	863	779	1044
Stage 1	-	-	-	-	-	-	941	837	-	975	862	-
Stage 2	-	-	-	-	-	-	960	860	-	935	836	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1580	-	-	1587	-	-	820	766	1051	843	766	1044
Mov Cap-2 Maneuver	-	-	-	-	-	-	820	766	-	843	766	-
Stage 1	-	-	-	-	-	-	928	825	-	961	859	-
Stage 2	-	-	-	-	-	-	931	857	-	911	824	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.2	1	9.3	8.9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	863	1580	-	-	1587	-	-	949
HCM Lane V/C Ratio	0.019	0.014	-	-	0.003	-	-	0.034
HCM Control Delay (s)	9.3	7.3	0	-	7.3	0	-	8.9
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2022 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	305	95	50	20	240	250	110	10	140	30
Future Volume (veh/h)	50	45	305	95	50	20	240	250	110	10	140	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	54	49	43	103	54	11	261	272	57	11	152	8
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	329	253	52	346	803	682	15	456	387
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.19	0.43	0.43	0.01	0.24	0.24
Sat Flow, veh/h	609	1004	1569	1290	1500	306	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	103	0	43	103	0	65	261	272	57	11	152	8
Grp Sat Flow(s),veh/h/ln	1613	0	1569	1290	0	1806	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	0.4	0.0	1.0	3.1	0.0	1.3	5.7	4.0	0.9	0.3	2.7	0.2
Cycle Q Clear(g_c), s	2.1	0.0	1.0	5.2	0.0	1.3	5.7	4.0	0.9	0.3	2.7	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	329	0	305	346	803	682	15	456	387
V/C Ratio(X)	0.25	0.00	0.16	0.31	0.00	0.21	0.75	0.34	0.08	0.72	0.33	0.02
Avail Cap(c_a), veh/h	1048	0	922	869	0	1060	1302	3601	3061	651	2917	2480
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	17.3	0.0	14.6	15.5	7.7	6.9	20.2	12.7	11.7
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.5	0.0	0.3	3.4	0.5	0.1	47.4	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	1.0	0.0	0.4	1.2	0.0	0.7	3.1	2.2	0.4	0.3	1.5	0.1
LnGrp Delay(d),s/veh	15.3	0.0	14.8	17.8	0.0	15.0	18.9	8.3	7.0	67.6	13.6	11.8
LnGrp LOS	B		B	B		B	B	A	A	E	B	B
Approach Vol, veh/h		146			168			590			171	
Approach Delay, s/veh		15.1			16.7			12.8			17.0	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	23.6		11.9	13.0	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		4.1	7.7	4.7		7.2
Green Ext Time (p_c), s	0.0	4.1		0.6	0.7	1.9		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	14.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	185	95	20	15	150	560	15	10	530	65
Future Volume (veh/h)	60	5	185	95	20	15	150	560	15	10	530	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	5	21	103	22	2	163	609	0	11	576	29
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	379	24	312	345	339	31	406	894	760	338	736	621
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	1211	121	1544	1350	1679	153	1774	1863	1583	1774	1863	1571
Grp Volume(v), veh/h	70	0	21	103	0	24	163	609	0	11	576	29
Grp Sat Flow(s),veh/h/ln	1331	0	1544	1350	0	1831	1774	1863	1583	1774	1863	1571
Q Serve(g_s), s	2.0	0.0	0.6	3.6	0.0	0.5	2.5	13.1	0.0	0.2	14.0	0.6
Cycle Q Clear(g_c), s	2.6	0.0	0.6	6.2	0.0	0.5	2.5	13.1	0.0	0.2	14.0	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	403	0	312	345	0	370	406	894	760	338	736	621
V/C Ratio(X)	0.17	0.00	0.07	0.30	0.00	0.06	0.40	0.68	0.00	0.03	0.78	0.05
Avail Cap(c_a), veh/h	790	0	746	725	0	885	755	1837	1561	837	1837	1549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	16.7	20.1	0.0	16.7	9.6	10.4	0.0	10.0	13.7	9.6
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.5	0.0	0.1	0.6	0.9	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	1.4	0.0	0.3	1.3	6.8	0.0	0.1	7.4	0.3
LnGrp Delay(d),s/veh	17.8	0.0	16.8	20.6	0.0	16.8	10.2	11.3	0.0	10.0	15.6	9.7
LnGrp LOS	B		B	C		B	B	B		B	B	A
Approach Vol, veh/h		91			127			772			616	
Approach Delay, s/veh		17.6			19.9			11.1			15.2	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	30.8		15.5	9.8	26.4		15.5
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	15.1		4.6	4.5	16.0		8.2
Green Ext Time (p_c), s	0.0	4.4		0.4	0.3	4.2		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	13.7
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	20	125	85	35	40	60	625	45	35	715	30
Future Volume (veh/h)	45	20	125	85	35	40	60	625	45	35	715	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	49	22	7	92	38	4	65	679	24	38	777	16
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	180	57	121	310	261	85	939	798	47	900	765
Arrive On Green	0.04	0.13	0.13	0.07	0.17	0.17	0.05	0.50	0.50	0.03	0.48	0.48
Sat Flow, veh/h	1774	1350	429	1774	1863	1572	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	49	0	29	92	38	4	65	679	24	38	777	16
Grp Sat Flow(s),veh/h/ln	1774	0	1779	1774	1863	1572	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	2.0	0.0	1.1	3.8	1.3	0.2	2.7	21.3	0.6	1.6	27.6	0.4
Cycle Q Clear(g_c), s	2.0	0.0	1.1	3.8	1.3	0.2	2.7	21.3	0.6	1.6	27.6	0.4
Prop In Lane	1.00		0.24	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	62	0	237	121	310	261	85	939	798	47	900	765
V/C Ratio(X)	0.79	0.00	0.12	0.76	0.12	0.02	0.77	0.72	0.03	0.80	0.86	0.02
Avail Cap(c_a), veh/h	475	0	500	475	523	442	593	1620	1377	593	1620	1377
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	35.8	0.0	28.5	34.2	26.5	26.0	35.2	14.5	9.3	36.2	17.1	10.1
Incr Delay (d2), s/veh	19.0	0.0	0.2	9.5	0.2	0.0	13.3	1.1	0.0	26.0	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	1.3	0.0	0.5	2.2	0.7	0.1	1.6	11.0	0.3	1.1	14.7	0.2
LnGrp Delay(d),s/veh	54.8	0.0	28.8	43.7	26.7	26.1	48.5	15.5	9.3	62.2	19.8	10.1
LnGrp LOS	D		C	D	C	C	D	B	A	E	B	B
Approach Vol, veh/h		78			134			768			831	
Approach Delay, s/veh		45.1			38.3			18.1			21.5	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.0	42.7	10.1	15.0	8.6	41.1	7.6	17.4
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	3.6	23.3	5.8	3.1	4.7	29.6	4.0	3.3
Green Ext Time (p_c), s	0.1	5.4	0.2	0.1	0.1	6.5	0.1	0.1

Intersection Summary	
HCM 2010 Ctrl Delay	22.3
HCM 2010 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	725	45	10	875	15
Future Volume (veh/h)	35	10	480	20	5	0	315	725	45	10	875	15
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	38	11	0	22	5	0	342	788	48	11	951	6
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	30	114	193	30	0	407	2262	138	15	1579	706
Arrive On Green	0.09	0.07	0.00	0.09	0.07	0.00	0.23	0.67	0.67	0.01	0.45	0.45
Sat Flow, veh/h	1111	420	1583	1148	419	0	1774	3389	206	1774	3539	1583
Grp Volume(v), veh/h	49	0	0	27	0	0	342	411	425	11	951	6
Grp Sat Flow(s),veh/h/ln	1531	0	1583	1568	0	0	1774	1770	1826	1774	1770	1583
Q Serve(g_s), s	0.9	0.0	0.0	0.0	0.0	0.0	10.9	6.0	6.0	0.4	12.1	0.1
Cycle Q Clear(g_c), s	1.7	0.0	0.0	0.8	0.0	0.0	10.9	6.0	6.0	0.4	12.1	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	243	0	114	249	0	0	407	1181	1219	15	1579	706
V/C Ratio(X)	0.20	0.00	0.00	0.11	0.00	0.00	0.84	0.35	0.35	0.74	0.60	0.01
Avail Cap(c_a), veh/h	883	0	798	806	0	0	2117	1695	1750	2117	3391	1517
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	26.0	0.0	0.0	25.6	0.0	0.0	21.9	4.3	4.3	29.4	12.5	9.2
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	1.8	0.4	0.4	23.1	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	0.0	0.4	0.0	0.0	5.5	3.0	3.1	0.3	6.0	0.1
LnGrp Delay(d),s/veh	26.4	0.0	0.0	25.8	0.0	0.0	23.7	4.7	4.7	52.5	13.3	9.2
LnGrp LOS	C			C			C	A	A	D	B	A
Approach Vol, veh/h		49			27			1178			968	
Approach Delay, s/veh		26.4			25.8			10.2			13.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	17.7	32.5		9.3	4.5	45.7		9.3
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	13.0	57.0		27.0	71.0	57.0		30.0
Max Q Clear Time (g_c+I1), s	12.9	14.1		2.8	2.4	8.0		3.7
Green Ext Time (p_c), s	0.8	12.4		0.1	0.0	9.6		0.1

Intersection Summary		
HCM 2010 Ctrl Delay		12.3
HCM 2010 LOS		B

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	1135	20	15	1345	70
Future Volume (veh/h)	35	0	70	10	5	10	135	1135	20	15	1345	70
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	38	0	1	11	5	1	147	1234	21	16	1462	47
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	0	74	114	22	3	185	2653	45	20	2308	1032
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	1552	0	1583	657	461	70	1774	3561	61	1774	3539	1583
Grp Volume(v), veh/h	38	0	1	17	0	0	147	613	642	16	1462	47
Grp Sat Flow(s),veh/h/ln	1552	0	1583	1188	0	0	1774	1770	1852	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	0.3	0.0	0.0	5.8	9.6	9.6	0.6	17.4	0.8
Cycle Q Clear(g_c), s	1.5	0.0	0.0	1.7	0.0	0.0	5.8	9.6	9.6	0.6	17.4	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	196	0	74	156	0	0	185	1318	1380	20	2308	1032
V/C Ratio(X)	0.19	0.00	0.01	0.11	0.00	0.00	0.79	0.47	0.47	0.79	0.63	0.05
Avail Cap(c_a), veh/h	584	0	512	578	0	0	523	2138	2237	274	3778	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	32.5	0.0	32.3	32.7	0.0	0.0	31.1	3.5	3.5	35.1	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	21.6	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	0.7	0.0	0.0	0.3	0.0	0.0	3.0	4.8	5.0	0.4	8.5	0.3
LnGrp Delay(d),s/veh	32.7	0.0	32.4	32.8	0.0	0.0	34.1	4.1	4.1	56.7	8.0	4.5
LnGrp LOS	C		C	C			C	A	A	E	A	A
Approach Vol, veh/h		39			17			1402			1525	
Approach Delay, s/veh		32.7			32.8			7.2			8.4	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.4	51.4		8.3	4.8	58.0		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	7.8	19.4		3.7	2.6	11.6		3.5
Green Ext Time (p_c), s	0.1	27.0		0.0	0.0	19.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.3
HCM 2010 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	1270	60	30	1290	45
Future Volume (veh/h)	55	5	35	40	15	50	110	1270	60	30	1290	45
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	5	1	43	16	1	120	1380	49	33	1402	35
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	153	111	168	10	142	2768	1238	43	2571	1150
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	1193	120	1578	1401	1735	108	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	65	0	1	43	0	17	120	1380	49	33	1402	35
Grp Sat Flow(s),veh/h/ln	1313	0	1578	1401	0	1843	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	6.6	0.0	0.1	4.7	0.0	1.3	10.3	21.6	1.1	2.9	27.8	1.0
Cycle Q Clear(g_c), s	7.9	0.0	0.1	12.5	0.0	1.3	10.3	21.6	1.1	2.9	27.8	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	153	111	0	178	142	2768	1238	43	2571	1150
V/C Ratio(X)	0.38	0.00	0.01	0.39	0.00	0.10	0.85	0.50	0.04	0.76	0.55	0.03
Avail Cap(c_a), veh/h	254	0	244	192	0	285	240	2768	1238	240	2571	1150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	63.8	70.4	6.0	3.8	75.2	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	9.7	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	2.7	0.0	0.0	1.9	0.0	0.7	5.2	10.5	0.5	1.5	13.7	0.4
LnGrp Delay(d),s/veh	68.7	0.0	63.3	75.0	0.0	64.1	74.1	6.5	3.8	84.8	10.4	6.0
LnGrp LOS	E		E	E		E	E	A	A	F	B	A
Approach Vol, veh/h		66			60			1549			1470	
Approach Delay, s/veh		68.6			71.9			11.7			12.0	
Approach LOS		E			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.6		20.0	7.8	127.2		20.0
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.6	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	29.8		14.5	4.9	23.6		9.9
Green Ext Time (p_c), s	0.1	26.3		0.1	0.0	26.7		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.2
HCM 2010 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	1350	15	85	1240	100
Future Volume (veh/h)	135	10	220	10	10	10	425	1350	15	85	1240	100
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	155	0	61	11	11	3	462	1467	16	92	1348	80
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	331	0	817	61	61	17	608	2127	23	155	1784	928
Arrive On Green	0.09	0.00	0.08	0.08	0.08	0.05	0.18	0.59	0.57	0.09	0.50	0.50
Sat Flow, veh/h	3548	0	3072	783	783	214	3442	3586	39	1774	3539	1578
Grp Volume(v), veh/h	155	0	61	25	0	0	462	723	760	92	1348	80
Grp Sat Flow(s),veh/h/ln	1774	0	1536	1780	0	0	1721	1770	1856	1774	1770	1578
Q Serve(g_s), s	4.5	0.0	1.6	1.4	0.0	0.0	13.8	30.5	30.5	5.4	33.0	2.4
Cycle Q Clear(g_c), s	4.5	0.0	1.6	1.4	0.0	0.0	13.8	30.5	30.5	5.4	33.0	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	331	0	817	140	0	0	608	1050	1101	155	1784	928
V/C Ratio(X)	0.47	0.00	0.07	0.18	0.00	0.00	0.76	0.69	0.69	0.59	0.76	0.09
Avail Cap(c_a), veh/h	1114	0	1496	510	0	0	1844	3171	3326	246	4937	2334
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	46.5	0.0	30.2	46.8	0.0	0.0	42.4	15.2	15.2	47.5	21.5	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	1.3	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	2.2	0.0	0.7	0.7	0.0	0.0	6.6	15.0	15.7	2.7	16.3	1.3
LnGrp Delay(d),s/veh	46.9	0.0	30.2	47.4	0.0	0.0	43.1	16.3	16.3	48.9	22.5	9.7
LnGrp LOS	D		C	D			D	B	B	D	C	A
Approach Vol, veh/h		216			25			1945			1520	
Approach Delay, s/veh		42.2			47.4			22.7			23.4	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	23.1	58.6		12.5	13.5	68.2		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	15.8	35.0		3.4	7.4	32.5		6.5
Green Ext Time (p_c), s	1.3	17.5		0.0	0.1	17.6		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	24.3
HCM 2010 LOS	C

Notes

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	1440	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1785	90	30	1440	5
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	1940	96	33	1565	5
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	176	0	138	11	2709	133	63	2962	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	584	895	148	1372	0	1543	1774	3434	168	1774	3619	12
Grp Volume(v), veh/h	11	0	0	65	0	1	5	992	1044	33	765	805
Grp Sat Flow(s),veh/h/ln	1627	0	0	1372	0	1543	1774	1770	1833	1774	1770	1861
Q Serve(g_s), s	0.0	0.0	0.0	5.4	0.0	0.1	0.4	37.7	39.2	2.6	19.4	19.4
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	37.7	39.2	2.6	19.4	19.4
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	176	0	138	11	1396	1446	63	1448	1523
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.45	0.71	0.72	0.52	0.53	0.53
Avail Cap(c_a), veh/h	312	0	0	289	0	265	101	1396	1446	101	1448	1523
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	7.1	7.3	66.3	4.1	4.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	6.3	1.9	2.0	2.5	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	2.5	0.0	0.0	0.2	18.9	20.2	1.3	9.9	10.4
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	75.6	9.0	9.2	68.8	5.4	5.4
LnGrp LOS	E			E		E	E	A	A	E	A	A
Approach Vol, veh/h		11			66			2041			1603	
Approach Delay, s/veh		58.6			62.0			9.3			6.7	
Approach LOS		E			E			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	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	21.4		8.1	4.6	41.2		2.8
Green Ext Time (p_c), s	0.0	31.3		0.1	0.0	41.3		0.0

Intersection Summary		
HCM 2010 Ctrl Delay	9.3	
HCM 2010 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	1760	20	10	1275	195
Future Volume (veh/h)	90	5	5	105	15	15	5	1760	20	10	1275	195
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	98	5	3	114	16	12	5	1913	21	11	1386	151
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	198	20	15	7	2806	31	14	2782	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	1387	71	42	1312	184	138	1774	3586	39	1774	3539	1583
Grp Volume(v), veh/h	106	0	0	142	0	0	5	942	992	11	1386	151
Grp Sat Flow(s),veh/h/ln	1500	0	0	1634	0	0	1774	1770	1856	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.3	29.7	30.0	0.7	16.5	2.7
Cycle Q Clear(g_c), s	7.9	0.0	0.0	9.8	0.0	0.0	0.3	29.7	30.0	0.7	16.5	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	1384	1452	14	2782	1245
V/C Ratio(X)	0.48	0.00	0.00	0.61	0.00	0.00	0.73	0.68	0.68	0.81	0.50	0.12
Avail Cap(c_a), veh/h	430	0	0	450	0	0	118	1384	1452	118	2782	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	0.84	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	59.5	4.5	3.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.5	0.0	0.0	29.3	1.7	1.6	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	3.5	0.0	0.0	4.7	0.0	0.0	0.2	14.8	15.8	0.5	8.1	1.2
LnGrp Delay(d),s/veh	52.6	0.0	0.0	54.3	0.0	0.0	89.0	7.8	7.8	87.8	5.0	3.2
LnGrp LOS	D			D			F	A	A	F	A	A
Approach Vol, veh/h		106			142			1939			1548	
Approach Delay, s/veh		52.6			54.3			8.0			5.5	
Approach LOS		D			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.3		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	8.6	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.3	18.5		11.8	2.7	32.0		9.9
Green Ext Time (p_c), s	0.0	32.3		0.5	0.0	31.9		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	10.0
HCM 2010 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	1315	75
Future Volume (veh/h)	150	30	20	145	25	35	25	1585	75	10	1315	75
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	163	33	2	158	27	5	27	1723	80	11	1429	79
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	234	38	270	313	264	49	34	2527	117	13	2462	136
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.04	1.00	1.00	0.01	0.72	0.71
Sat Flow, veh/h	1077	218	1559	1359	1525	282	1774	3445	159	1774	3411	188
Grp Volume(v), veh/h	196	0	2	158	0	32	27	880	923	11	739	769
Grp Sat Flow(s),veh/h/ln	1295	0	1559	1359	0	1807	1774	1770	1835	1774	1770	1830
Q Serve(g_s), s	18.9	0.0	0.1	0.0	0.0	2.1	2.1	0.0	0.0	0.9	27.9	28.3
Cycle Q Clear(g_c), s	21.0	0.0	0.1	13.3	0.0	2.1	2.1	0.0	0.0	0.9	27.9	28.3
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	272	0	270	313	0	313	34	1298	1346	13	1277	1321
V/C Ratio(X)	0.72	0.00	0.01	0.50	0.00	0.10	0.79	0.68	0.69	0.83	0.58	0.58
Avail Cap(c_a), veh/h	309	0	312	350	0	361	139	1298	1346	139	1277	1321
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	0.46	0.46	0.46	0.85	0.85	0.85
Uniform Delay (d), s/veh	57.5	0.0	47.9	53.3	0.0	48.8	67.0	0.0	0.0	69.4	9.3	9.4
Incr Delay (d2), s/veh	6.9	0.0	0.0	1.3	0.0	0.1	7.0	1.3	1.3	32.0	1.6	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	7.9	0.0	0.1	5.7	0.0	1.1	1.1	0.5	0.5	0.5	14.1	14.7
LnGrp Delay(d),s/veh	64.5	0.0	47.9	54.6	0.0	48.9	74.1	1.3	1.3	101.4	10.9	11.0
LnGrp LOS	E		D	D		D	E	A	A	F	B	B
Approach Vol, veh/h		198			190			1830			1519	
Approach Delay, s/veh		64.3			53.6			2.4			11.6	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	105.1		28.3	5.0	106.7		28.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	88.0		27.0	11.0	88.0		27.0
Max Q Clear Time (g_c+I1), s	4.1	30.3		15.3	2.9	2.0		23.0
Green Ext Time (p_c), s	0.0	26.5		0.5	0.0	45.1		0.3

Intersection Summary		
HCM 2010 Ctrl Delay	12.0	
HCM 2010 LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	110	35	95	75	730	25	880	120	530	885	20
Future Volume (veh/h)	15	110	35	95	75	730	25	880	120	530	885	20
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	16	120	5	103	82	459	27	957	52	576	962	21
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	54	359	347	369	588	496	34	1471	655	629	2051	45
Arrive On Green	0.22	0.22	0.22	0.07	0.32	0.32	0.02	0.42	0.42	0.37	1.00	1.00
Sat Flow, veh/h	113	1617	1564	1774	1863	1570	1774	3539	1576	3442	3541	77
Grp Volume(v), veh/h	136	0	5	103	82	459	27	957	52	576	481	502
Grp Sat Flow(s),veh/h/ln	1730	0	1564	1774	1863	1570	1774	1770	1576	1721	1770	1849
Q Serve(g_s), s	0.0	0.0	0.3	6.0	4.4	39.6	2.1	30.3	2.8	22.3	0.0	0.0
Cycle Q Clear(g_c), s	8.6	0.0	0.3	6.0	4.4	39.6	2.1	30.3	2.8	22.3	0.0	0.0
Prop In Lane	0.12		1.00	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	413	0	347	369	588	496	34	1471	655	629	1025	1071
V/C Ratio(X)	0.33	0.00	0.01	0.28	0.14	0.93	0.79	0.65	0.08	0.92	0.47	0.47
Avail Cap(c_a), veh/h	413	0	347	544	665	561	177	1471	655	836	1025	1071
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	1.00	0.79	0.79	0.79	0.71	0.71	0.71
Uniform Delay (d), s/veh	45.7	0.0	42.5	36.7	34.3	46.3	68.4	32.8	24.7	43.4	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.4	0.1	20.2	11.4	1.8	0.2	7.8	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	4.5	0.0	0.2	3.0	2.3	20.0	1.2	15.1	1.2	11.2	0.3	0.3
LnGrp Delay(d),s/veh	46.2	0.0	42.5	37.1	34.4	66.5	79.8	34.6	24.9	51.2	1.1	1.1
LnGrp LOS	D		D	D	C	E	E	C	C	D	A	A
Approach Vol, veh/h		141			644			1036			1559	
Approach Delay, s/veh		46.0			57.7			35.3			19.6	
Approach LOS		D			E			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	85.1	13.1	35.1	29.6	62.2		48.2
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	14.6	63.0	22.0	22.0	34.0	43.0		49.0
Max Q Clear Time (g_c+I1), s	2.1	2.0	8.0	10.6	24.3	32.3		41.6
Green Ext Time (p_c), s	0.0	12.6	0.3	0.4	1.3	6.3		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	32.8
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	30	680	25	0	815
Future Vol, veh/h	0	30	680	25	0	815
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	33	739	27	0	886

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	739	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	417	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	417	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	417	-
HCM Lane V/C Ratio	-	-	0.078	-
HCM Control Delay (s)	-	-	14.4	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.3	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	35	35	5	65	5	40	5	5	5	5	50
Future Vol, veh/h	30	35	35	5	65	5	40	5	5	5	5	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	-	-	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	33	38	38	5	71	5	43	5	5	5	5	54

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	76	0	0	76	0	0	236	209	57	212	226	74
Stage 1	-	-	-	-	-	-	123	123	-	84	84	-
Stage 2	-	-	-	-	-	-	113	86	-	128	142	-
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	-	-	1523	-	-	718	688	1009	745	673	988
Stage 1	-	-	-	-	-	-	881	794	-	924	825	-
Stage 2	-	-	-	-	-	-	892	824	-	876	779	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1523	-	-	1523	-	-	661	671	1009	723	656	988
Mov Cap-2 Maneuver	-	-	-	-	-	-	661	671	-	723	656	-
Stage 1	-	-	-	-	-	-	862	777	-	904	823	-
Stage 2	-	-	-	-	-	-	835	822	-	846	762	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.2	0.5	10.7	9.2
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	686	1523	-	-	1523	-	-	921
HCM Lane V/C Ratio	0.079	0.021	-	-	0.004	-	-	0.071
HCM Control Delay (s)	10.7	7.4	-	-	7.4	-	-	9.2
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	20	10	5	10	5	30	5	5	5	5	25
Future Vol, veh/h	10	20	10	5	10	5	30	5	5	5	5	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	11	22	11	5	11	5	33	5	5	5	5	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	16	0	0	33	0	0	90	76	28	79	79	14
Stage 1	-	-	-	-	-	-	50	50	-	24	24	-
Stage 2	-	-	-	-	-	-	40	26	-	55	55	-
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	1602	-	-	1579	-	-	895	814	1047	910	811	1066
Stage 1	-	-	-	-	-	-	963	853	-	994	875	-
Stage 2	-	-	-	-	-	-	975	874	-	957	849	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1602	-	-	1579	-	-	861	806	1047	894	803	1066
Mov Cap-2 Maneuver	-	-	-	-	-	-	861	806	-	894	803	-
Stage 1	-	-	-	-	-	-	956	847	-	987	872	-
Stage 2	-	-	-	-	-	-	941	871	-	939	843	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	1.8	9.3	8.8
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	873	1602	-	-	1579	-	-	992
HCM Lane V/C Ratio	0.05	0.007	-	-	0.003	-	-	0.038
HCM Control Delay (s)	9.3	7.3	0	-	7.3	0	-	8.8
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2022 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	405	60	25	5	410	230	70	10	300	75
Future Volume (veh/h)	55	25	405	60	25	5	410	230	70	10	300	75
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	27	28	65	27	1	446	250	48	11	326	21
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	66	175	216	198	7	530	1061	902	15	521	443
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.30	0.57	0.57	0.01	0.28	0.28
Sat Flow, veh/h	906	599	1583	1343	1785	66	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	87	0	28	65	0	28	446	250	48	11	326	21
Grp Sat Flow(s),veh/h/ln	1504	0	1583	1343	0	1851	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	2.1	0.0	0.8	2.5	0.0	0.7	12.1	3.4	0.7	0.3	7.9	0.5
Cycle Q Clear(g_c), s	2.8	0.0	0.8	5.3	0.0	0.7	12.1	3.4	0.7	0.3	7.9	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	285	0	175	216	0	205	530	1061	902	15	521	443
V/C Ratio(X)	0.31	0.00	0.16	0.30	0.00	0.14	0.84	0.24	0.05	0.73	0.63	0.05
Avail Cap(c_a), veh/h	818	0	739	694	0	864	1035	2861	2432	517	2318	1970
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	21.6	0.0	20.7	24.1	0.0	20.6	16.9	5.5	4.9	25.4	16.2	13.5
Incr Delay (d2), s/veh	0.6	0.0	0.4	0.8	0.0	0.3	3.7	0.2	0.1	49.8	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	1.2	0.0	0.4	0.9	0.0	0.4	6.4	1.8	0.3	0.4	4.4	0.2
LnGrp Delay(d),s/veh	22.2	0.0	21.1	24.8	0.0	20.9	20.6	5.7	5.0	75.2	18.8	13.6
LnGrp LOS	C		C	C		C	C	A	A	E	B	B
Approach Vol, veh/h		115			93			744			358	
Approach Delay, s/veh		21.9			23.7			14.6			20.2	
Approach LOS		C			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	35.3		10.7	20.4	20.4		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	5.4		4.8	14.1	9.9		7.3
Green Ext Time (p_c), s	0.0	3.6		0.5	1.3	4.5		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	17.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	20	165	50	15	10	215	635	45	25	630	80
Future Volume (veh/h)	75	20	165	50	15	10	215	635	45	25	630	80
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	22	14	54	16	1	234	690	0	27	685	47
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	265	57	211	233	231	14	425	1013	861	376	852	721
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.11	0.54	0.00	0.02	0.46	0.46
Sat Flow, veh/h	1070	429	1583	1367	1735	108	1774	1863	1583	1774	1863	1576
Grp Volume(v), veh/h	104	0	14	54	0	17	234	690	0	27	685	47
Grp Sat Flow(s),veh/h/ln	1499	0	1583	1367	0	1844	1774	1863	1583	1774	1863	1576
Q Serve(g_s), s	2.8	0.0	0.4	2.0	0.0	0.4	3.3	14.1	0.0	0.4	16.6	0.9
Cycle Q Clear(g_c), s	3.3	0.0	0.4	5.3	0.0	0.4	3.3	14.1	0.0	0.4	16.6	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	322	0	211	233	0	246	425	1013	861	376	852	721
V/C Ratio(X)	0.32	0.00	0.07	0.23	0.00	0.07	0.55	0.68	0.00	0.07	0.80	0.07
Avail Cap(c_a), veh/h	824	0	752	700	0	876	745	1805	1534	849	1805	1528
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	21.1	0.0	19.9	23.7	0.0	19.9	9.7	8.7	0.0	8.2	12.2	8.0
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	1.8	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	0.2	0.8	0.0	0.2	1.8	7.3	0.0	0.2	8.8	0.4
LnGrp Delay(d),s/veh	21.7	0.0	20.1	24.2	0.0	20.1	10.8	9.5	0.0	8.3	14.1	8.0
LnGrp LOS	C		C	C		C	B	A		A	B	A
Approach Vol, veh/h		118			71			924			759	
Approach Delay, s/veh		21.5			23.2			9.8			13.5	
Approach LOS		C			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.0	34.6		12.0	10.5	30.1		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	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.4	16.1		5.3	5.3	18.6		7.3
Green Ext Time (p_c), s	0.0	5.3		0.5	0.5	5.4		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	12.6
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	45	95	115	50	55	165	860	105	95	750	75
Future Volume (veh/h)	60	45	95	115	50	55	165	860	105	95	750	75
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	49	48	125	54	5	179	935	69	103	815	36
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	94	92	156	279	234	214	1006	855	131	920	780
Arrive On Green	0.05	0.11	0.11	0.09	0.15	0.15	0.12	0.54	0.54	0.07	0.49	0.49
Sat Flow, veh/h	1774	850	833	1774	1863	1561	1774	1863	1583	1774	1863	1580
Grp Volume(v), veh/h	65	0	97	125	54	5	179	935	69	103	815	36
Grp Sat Flow(s),veh/h/ln	1774	0	1684	1774	1863	1561	1774	1863	1583	1774	1863	1580
Q Serve(g_s), s	3.8	0.0	5.8	7.3	2.7	0.3	10.5	49.3	2.2	6.1	41.9	1.3
Cycle Q Clear(g_c), s	3.8	0.0	5.8	7.3	2.7	0.3	10.5	49.3	2.2	6.1	41.9	1.3
Prop In Lane	1.00		0.49	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	85	0	185	156	279	234	214	1006	855	131	920	780
V/C Ratio(X)	0.77	0.00	0.52	0.80	0.19	0.02	0.84	0.93	0.08	0.78	0.89	0.05
Avail Cap(c_a), veh/h	334	0	333	334	368	309	417	1139	968	417	1139	967
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	50.0	0.0	44.7	47.6	39.5	38.5	45.7	22.6	11.8	48.4	24.2	13.9
Incr Delay (d2), s/veh	13.4	0.0	2.3	9.3	0.3	0.0	8.5	12.3	0.0	9.7	7.4	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	2.2	0.0	2.8	4.0	1.4	0.1	5.6	28.6	1.0	3.3	23.4	0.6
LnGrp Delay(d),s/veh	63.4	0.0	46.9	56.8	39.9	38.5	54.2	34.8	11.8	58.1	31.6	14.0
LnGrp LOS	E		D	E	D	D	D	C	B	E	C	B
Approach Vol, veh/h		162			184			1183			954	
Approach Delay, s/veh		53.6			51.4			36.4			33.8	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.9	62.4	14.3	16.7	17.8	57.5	10.1	20.9
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	9.1	51.3	9.3	7.8	12.5	43.9	5.8	4.7
Green Ext Time (p_c), s	0.2	6.1	0.2	0.3	0.4	6.1	0.1	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	37.6
HCM 2010 LOS	D

Notes

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	1005	10	5	900	20
Future Volume (veh/h)	85	5	600	80	10	10	605	1005	10	5	900	20
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	92	5	0	87	11	9	658	1092	11	5	978	6
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	7	135	179	14	12	699	2739	28	7	1321	591
Arrive On Green	0.09	0.09	0.00	0.09	0.09	0.09	0.39	0.76	0.76	0.00	0.37	0.37
Sat Flow, veh/h	1460	79	1583	1345	170	139	1774	3590	36	1774	3539	1583
Grp Volume(v), veh/h	97	0	0	107	0	0	658	538	565	5	978	6
Grp Sat Flow(s),veh/h/ln	1540	0	1583	1655	0	0	1774	1770	1856	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	36.2	10.5	10.5	0.3	24.3	0.2
Cycle Q Clear(g_c), s	5.8	0.0	0.0	5.9	0.0	0.0	36.2	10.5	10.5	0.3	24.3	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	215	0	135	221	0	0	699	1350	1417	7	1321	591
V/C Ratio(X)	0.45	0.00	0.00	0.48	0.00	0.00	0.94	0.40	0.40	0.73	0.74	0.01
Avail Cap(c_a), veh/h	511	0	469	485	0	0	1243	1350	1417	1243	1991	891
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	44.6	0.0	0.0	44.7	0.0	0.0	29.6	4.1	4.1	50.4	27.5	20.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	1.6	0.0	0.0	4.7	0.4	0.4	41.4	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	2.7	0.0	0.0	3.0	0.0	0.0	18.6	5.2	5.5	0.2	12.1	0.1
LnGrp Delay(d),s/veh	46.1	0.0	0.0	46.3	0.0	0.0	34.3	4.5	4.5	91.8	29.3	20.0
LnGrp LOS	D			D			C	A	A	F	C	C
Approach Vol, veh/h		97			107			1761			989	
Approach Delay, s/veh		46.1			46.3			15.6			29.5	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.9	43.8		13.6	4.4	83.3		13.6
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	7.0	57.0		27.0	7.0	57.0		30.0
Max Q Clear Time (g_c+I1), s	9.2	26.3		7.9	2.3	12.5		7.8
Green Ext Time (p_c), s	1.7	11.6		0.3	0.0	14.2		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	22.4
HCM 2010 LOS	C

Notes

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	1560	10	10	1575	60
Future Volume (veh/h)	55	5	140	15	0	5	135	1560	10	10	1575	60
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	60	5	5	16	0	1	147	1696	11	11	1712	39
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	16	175	179	2	7	179	2646	17	14	2270	1015
Arrive On Green	0.13	0.11	0.11	0.13	0.00	0.11	0.10	0.73	0.73	0.01	0.64	0.64
Sat Flow, veh/h	1376	140	1521	936	18	60	1774	3605	23	1774	3539	1582
Grp Volume(v), veh/h	65	0	5	17	0	0	147	832	875	11	1712	39
Grp Sat Flow(s),veh/h/ln	1516	0	1521	1013	0	0	1774	1770	1858	1774	1770	1582
Q Serve(g_s), s	0.0	0.0	0.3	1.0	0.0	0.0	7.9	23.1	23.1	0.6	32.9	0.9
Cycle Q Clear(g_c), s	3.3	0.0	0.3	4.3	0.0	0.0	7.9	23.1	23.1	0.6	32.9	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	260	0	175	198	0	0	179	1299	1364	14	2270	1015
V/C Ratio(X)	0.25	0.00	0.03	0.09	0.00	0.00	0.82	0.64	0.64	0.78	0.75	0.04
Avail Cap(c_a), veh/h	428	0	358	362	0	0	381	1556	1634	200	2750	1229
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	39.4	0.0	38.4	40.8	0.0	0.0	43.1	6.5	6.5	48.4	12.2	6.5
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.6	1.2	1.2	28.5	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	1.6	0.0	0.1	0.4	0.0	0.0	4.1	11.5	12.1	0.4	16.4	0.4
LnGrp Delay(d),s/veh	39.5	0.0	38.5	40.8	0.0	0.0	46.7	7.8	7.7	77.0	13.6	6.5
LnGrp LOS	D		D	D			D	A	A	E	B	A
Approach Vol, veh/h		70			17			1854			1762	
Approach Delay, s/veh		39.5			40.8			10.8			13.9	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.8	67.7		16.2	4.8	76.8		16.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.6	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	19.9	34.9		6.3	2.6	25.1		5.3
Green Ext Time (p_c), s	0.1	27.8		0.0	0.0	33.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.9
HCM 2010 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	50	125	1540	60	35	1725	100
Future Volume (veh/h)	80	5	175	70	5	50	125	1540	60	35	1725	100
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	87	5	37	76	5	2	136	1674	49	38	1875	86
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	217	11	211	140	170	68	157	2643	1182	49	2427	1086
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	1296	79	1562	1346	1261	504	1774	3539	1582	1774	3539	1583
Grp Volume(v), veh/h	92	0	37	76	0	7	136	1674	49	38	1875	86
Grp Sat Flow(s),veh/h/ln	1376	0	1562	1346	0	1766	1774	1770	1582	1774	1770	1583
Q Serve(g_s), s	9.9	0.0	3.5	9.2	0.0	0.6	12.5	37.5	1.3	3.5	58.4	3.0
Cycle Q Clear(g_c), s	10.5	0.0	3.5	19.6	0.0	0.6	12.5	37.5	1.3	3.5	58.4	3.0
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	236	0	211	140	0	238	157	2643	1182	49	2427	1086
V/C Ratio(X)	0.39	0.00	0.18	0.54	0.00	0.03	0.86	0.63	0.04	0.78	0.77	0.08
Avail Cap(c_a), veh/h	251	0	227	154	0	257	280	2643	1182	108	2427	1086
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.65	0.65	0.65	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.1	0.0	63.3	75.4	0.0	62.0	74.2	10.0	5.5	79.7	17.3	8.6
Incr Delay (d2), s/veh	1.0	0.0	0.4	3.3	0.0	0.0	3.6	0.8	0.0	9.3	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	3.9	0.0	1.5	3.5	0.0	0.3	6.3	18.4	0.6	1.8	29.2	1.3
LnGrp Delay(d),s/veh	67.1	0.0	63.7	78.7	0.0	62.1	77.8	10.8	5.5	89.0	19.8	8.8
LnGrp LOS	E		E	E		E	E	B	A	F	B	A
Approach Vol, veh/h		129			83			1859			1999	
Approach Delay, s/veh		66.1			77.3			15.6			20.6	
Approach LOS		E			E			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.6	119.1		27.2	8.6	129.2		27.2
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	26.6	100.0		24.0	10.0	116.0		24.0
Max Q Clear Time (g_c+I1), s	14.5	60.4		21.6	5.5	39.5		12.5
Green Ext Time (p_c), s	0.2	30.3		0.0	0.0	38.8		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	20.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	310	5	615	15	0	5	385	1570	10	80	1755	140
Future Volume (veh/h)	310	5	615	15	0	5	385	1570	10	80	1755	140
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	341	0	464	16	0	1	418	1707	11	87	1908	131
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	525	0	896	68	0	4	486	2433	16	117	2121	1176
Arrive On Green	0.15	0.00	0.14	0.04	0.00	0.03	0.14	0.67	0.67	0.07	0.60	0.60
Sat Flow, veh/h	3548	0	3123	1653	0	103	3442	3605	23	1774	3539	1583
Grp Volume(v), veh/h	341	0	464	17	0	0	418	837	881	87	1908	131
Grp Sat Flow(s),veh/h/ln	1774	0	1561	1756	0	0	1721	1770	1859	1774	1770	1583
Q Serve(g_s), s	20.6	0.0	28.3	2.1	0.0	0.0	26.9	66.3	66.4	10.9	106.3	5.3
Cycle Q Clear(g_c), s	20.6	0.0	28.3	2.1	0.0	0.0	26.9	66.3	66.4	10.9	106.3	5.3
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	525	0	896	72	0	0	486	1194	1254	117	2121	1176
V/C Ratio(X)	0.65	0.00	0.52	0.24	0.00	0.00	0.86	0.70	0.70	0.75	0.90	0.11
Avail Cap(c_a), veh/h	532	0	902	240	0	0	880	1513	1589	117	2355	1281
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	91.1	0.0	68.1	105.5	0.0	0.0	95.2	22.8	22.8	104.1	39.5	8.2
Incr Delay (d2), s/veh	2.1	0.0	0.2	0.6	0.0	0.0	1.8	1.3	1.3	20.1	5.0	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	10.2	0.0	12.3	1.0	0.0	0.0	12.9	32.8	34.5	6.0	53.4	3.6
LnGrp Delay(d),s/veh	93.2	0.0	68.4	106.1	0.0	0.0	97.0	24.1	24.1	124.2	44.6	8.2
LnGrp LOS	F		E	F			F	C	C	F	D	A
Approach Vol, veh/h		805			17			2136			2126	
Approach Delay, s/veh		78.9			106.1			38.4			45.6	
Approach LOS		E			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	36.1	140.0		13.3	18.9	157.1		37.6
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+I2), s	22.9	108.3		4.1	12.9	68.4		30.3
Green Ext Time (p_c), s	1.1	25.6		0.0	0.0	25.5		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	48.0
HCM 2010 LOS	D

Notes

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	1900	90	90	2310	5
Future Volume (veh/h)	10	0	5	90	5	60	10	1900	90	90	2310	5
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	11	0	1	98	5	2	11	2065	96	98	2511	5
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	156	2	10	176	110	44	22	2624	121	122	2964	6
Arrive On Green	0.09	0.00	0.08	0.09	0.09	0.08	0.02	1.00	1.00	0.07	0.82	0.81
Sat Flow, veh/h	1244	24	115	1410	1267	507	1774	3445	159	1774	3624	7
Grp Volume(v), veh/h	12	0	0	98	0	7	11	1053	1108	98	1226	1290
Grp Sat Flow(s),veh/h/ln	1384	0	0	1410	0	1773	1774	1770	1835	1774	1770	1861
Q Serve(g_s), s	0.9	0.0	0.0	8.1	0.0	0.5	0.9	0.0	0.0	7.9	59.5	59.6
Cycle Q Clear(g_c), s	1.4	0.0	0.0	9.5	0.0	0.5	0.9	0.0	0.0	7.9	59.5	59.6
Prop In Lane	0.92		0.08	1.00		0.29	1.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	168	0	0	176	0	154	22	1348	1397	122	1447	1522
V/C Ratio(X)	0.07	0.00	0.00	0.56	0.00	0.05	0.50	0.78	0.79	0.80	0.85	0.85
Avail Cap(c_a), veh/h	279	0	0	287	0	294	61	1348	1397	184	1447	1522
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	0.56	0.56	0.56	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.2	0.0	0.0	64.6	0.0	60.8	70.3	0.0	0.0	66.6	7.8	7.8
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.7	0.0	0.1	3.6	2.6	2.7	8.0	6.3	6.0
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	4.0	0.0	0.3	0.5	1.0	1.0	4.1	30.8	32.7
LnGrp Delay(d),s/veh	61.4	0.0	0.0	67.4	0.0	60.9	73.9	2.6	2.7	74.5	14.1	13.9
LnGrp LOS	E			E		E	E	A	A	E	B	B
Approach Vol, veh/h		12			105			2172			2614	
Approach Delay, s/veh		61.4			66.9			3.0			16.3	
Approach LOS		E			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.8	122.6		16.6	14.0	114.4		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	61.6		11.5	9.9	2.0		3.4
Green Ext Time (p_c), s	0.0	39.2		0.2	0.1	66.7		0.0

Intersection Summary		
HCM 2010 Ctrl Delay	11.6	
HCM 2010 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	335
Future Volume (veh/h)	185	15	10	60	5	10	5	1815	20	5	1960	335
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	201	16	9	65	5	7	5	1973	21	5	2130	285
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	273	18	10	281	22	26	7	2662	28	7	2627	1175
Arrive On Green	0.17	0.17	0.16	0.17	0.17	0.16	0.01	0.99	0.98	0.00	0.74	0.74
Sat Flow, veh/h	1322	105	59	1371	130	150	1774	3587	38	1774	3539	1583
Grp Volume(v), veh/h	226	0	0	77	0	0	5	971	1023	5	2130	285
Grp Sat Flow(s),veh/h/ln	1486	0	0	1651	0	0	1774	1770	1856	1774	1770	1583
Q Serve(g_s), s	15.7	0.0	0.0	0.0	0.0	0.0	0.4	3.8	3.9	0.4	56.5	8.2
Cycle Q Clear(g_c), s	21.4	0.0	0.0	5.7	0.0	0.0	0.4	3.8	3.9	0.4	56.5	8.2
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	302	0	0	329	0	0	7	1313	1377	7	2627	1175
V/C Ratio(X)	0.75	0.00	0.00	0.23	0.00	0.00	0.75	0.74	0.74	0.75	0.81	0.24
Avail Cap(c_a), veh/h	362	0	0	389	0	0	37	1313	1377	37	2627	1175
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	0.56	0.56	0.56	0.37	0.37	0.37
Uniform Delay (d), s/veh	58.3	0.0	0.0	52.2	0.0	0.0	72.1	0.3	0.3	72.2	12.1	5.9
Incr Delay (d2), s/veh	6.9	0.0	0.0	0.4	0.0	0.0	28.4	2.1	2.1	20.0	1.1	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	9.4	0.0	0.0	2.7	0.0	0.0	0.3	1.5	1.6	0.2	27.6	3.6
LnGrp Delay(d),s/veh	65.2	0.0	0.0	52.5	0.0	0.0	100.4	2.4	2.3	92.2	13.2	6.1
LnGrp LOS	E			D			F	A	A	F	B	A
Approach Vol, veh/h		226			77			1999			2420	
Approach Delay, s/veh		65.2			52.5			2.6			12.5	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	111.6		28.8	4.5	111.6		28.8
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	3.6	98.0		30.0	3.0	98.0		30.0
Max Q Clear Time (g_c+I1), s	2.4	58.5		7.7	2.4	5.9		23.4
Green Ext Time (p_c), s	0.0	37.4		0.2	0.0	73.0		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	11.5
HCM 2010 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	30	1890	155
Future Volume (veh/h)	185	35	45	95	25	20	55	1610	105	30	1890	155
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	201	38	10	103	27	2	60	1750	111	33	2054	164
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	267	42	309	355	342	25	73	2346	147	42	2247	177
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.19	0.08	1.00	1.00	0.05	1.00	1.00
Sat Flow, veh/h	1107	209	1545	1347	1710	127	1774	3382	213	1774	3323	262
Grp Volume(v), veh/h	239	0	10	103	0	29	60	908	953	33	1081	1137
Grp Sat Flow(s),veh/h/ln	1317	0	1545	1347	0	1837	1774	1770	1825	1774	1770	1816
Q Serve(g_s), s	24.1	0.0	0.8	0.0	0.0	1.9	4.8	0.0	0.0	2.7	0.0	0.0
Cycle Q Clear(g_c), s	26.0	0.0	0.8	8.3	0.0	1.9	4.8	0.0	0.0	2.7	0.0	0.0
Prop In Lane	0.84		1.00	1.00		0.07	1.00		0.12	1.00		0.14
Lane Grp Cap(c), veh/h	309	0	309	355	0	367	73	1228	1266	42	1196	1227
V/C Ratio(X)	0.77	0.00	0.03	0.29	0.00	0.08	0.82	0.74	0.75	0.79	0.90	0.93
Avail Cap(c_a), veh/h	309	0	309	355	0	367	73	1228	1266	73	1196	1227
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	0.30	0.30	0.30	0.47	0.47	0.47
Uniform Delay (d), s/veh	57.7	0.0	46.7	49.7	0.0	47.2	66.0	0.0	0.0	68.7	0.0	0.0
Incr Delay (d2), s/veh	11.5	0.0	0.0	0.4	0.0	0.1	18.0	1.2	1.3	5.6	5.9	7.2
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	10.4	0.0	0.3	3.6	0.0	1.0	2.7	0.4	0.5	1.4	2.0	2.5
LnGrp Delay(d),s/veh	69.3	0.0	46.8	50.2	0.0	47.3	83.9	1.2	1.3	74.3	5.9	7.2
LnGrp LOS	E		D	D		D	F	A	A	E	A	A
Approach Vol, veh/h		249			132			1921			2251	
Approach Delay, s/veh		68.4			49.5			3.8			7.6	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	102.0		33.0	7.4	104.6		33.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	6.0	97.0		28.0	6.0	97.0		28.0
Max Q Clear Time (g_c+I1), s	10.3	2.0		10.3	4.7	2.0		28.0
Green Ext Time (p_c), s	0.0	69.9		0.4	0.0	48.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	10.5
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	185	60	125	110	725	55	980	195	645	1255	65
Future Volume (veh/h)	65	185	60	125	110	725	55	980	195	645	1255	65
Number	7	4	14	3	8	18	1	6	16	5	2	12
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	1.00		0.98	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	71	201	12	136	120	475	60	1065	133	701	1364	69
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	110	262	367	231	609	509	77	1326	588	741	1875	95
Arrive On Green	0.24	0.24	0.24	0.06	0.33	0.33	0.04	0.37	0.37	0.43	1.00	1.00
Sat Flow, veh/h	330	1104	1547	1774	1863	1557	1774	3539	1571	3442	3428	173
Grp Volume(v), veh/h	272	0	12	136	120	475	60	1065	133	701	703	730
Grp Sat Flow(s),veh/h/ln	1435	0	1547	1774	1863	1557	1774	1770	1571	1721	1770	1831
Q Serve(g_s), s	22.4	0.0	0.9	8.3	6.7	42.8	4.9	39.0	8.4	28.4	0.0	0.0
Cycle Q Clear(g_c), s	25.5	0.0	0.9	8.3	6.7	42.8	4.9	39.0	8.4	28.4	0.0	0.0
Prop In Lane	0.26		1.00	1.00		1.00	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	372	0	367	231	609	509	77	1326	588	741	968	1001
V/C Ratio(X)	0.73	0.00	0.03	0.59	0.20	0.93	0.78	0.80	0.23	0.95	0.73	0.73
Avail Cap(c_a), veh/h	416	0	416	231	668	558	110	1326	588	807	968	1001
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	1.00	0.88	0.88	0.88	0.28	0.28	0.28
Uniform Delay (d), s/veh	51.5	0.0	42.5	40.0	35.1	47.2	68.7	40.6	31.0	40.4	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.0	0.0	3.9	0.2	21.8	11.0	4.6	0.8	7.0	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	10.8	0.0	0.4	4.3	3.5	21.5	2.6	19.9	3.7	14.1	0.4	0.4
LnGrp Delay(d),s/veh	57.2	0.0	42.5	43.8	35.2	69.0	79.7	45.2	31.8	47.4	1.4	1.3
LnGrp LOS	E		D	D	D	E	E	D	C	D	A	A
Approach Vol, veh/h		284			731			1258			2134	
Approach Delay, s/veh		56.6			58.8			45.4			16.5	
Approach LOS		E			E			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	10.3	83.3	13.0	38.4	35.2	58.3		51.4
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	9.6	71.0	8.0	38.0	34.0	46.0		51.0
Max Q Clear Time (g_c+I1), s	10.9	2.0	10.3	27.5	30.4	41.0		44.8
Green Ext Time (p_c), s	0.0	25.6	0.0	1.0	0.9	3.7		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	34.3
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	50	905	75	0	845
Future Vol, veh/h	0	50	905	75	0	845
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	54	984	82	0	918

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	984	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	301	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	301	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.6	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	301	-
HCM Lane V/C Ratio	-	-	0.181	-
HCM Control Delay (s)	-	-	19.6	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.6	-

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	80	65	100	5	50	5	90	10	5	10	5	80
Future Vol, veh/h	80	65	100	5	50	5	90	10	5	10	5	80
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	87	71	109	5	54	5	98	11	5	11	5	87

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	59	0	0	180	0	0	413	369	126	375	421	57
Stage 1	-	-	-	-	-	-	300	300	-	67	67	-
Stage 2	-	-	-	-	-	-	113	69	-	308	354	-
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	1545	-	-	1396	-	-	549	560	924	582	524	1009
Stage 1	-	-	-	-	-	-	709	666	-	943	839	-
Stage 2	-	-	-	-	-	-	892	837	-	702	630	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1545	-	-	1396	-	-	475	526	924	544	493	1009
Mov Cap-2 Maneuver	-	-	-	-	-	-	475	526	-	544	493	-
Stage 1	-	-	-	-	-	-	669	629	-	890	836	-
Stage 2	-	-	-	-	-	-	807	834	-	647	595	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.4	0.6	14.5	9.6
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	491	1545	-	-	1396	-	-	881
HCM Lane V/C Ratio	0.232	0.056	-	-	0.004	-	-	0.117
HCM Control Delay (s)	14.5	7.5	-	-	7.6	-	-	9.6
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.9	0.2	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	15	35	5	20	5	20	5	5	5	5	15
Future Vol, veh/h	30	15	35	5	20	5	20	5	5	5	5	15
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	33	16	38	5	22	5	22	5	5	5	5	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	27	0	0	54	0	0	146	138	35	141	155	25
Stage 1	-	-	-	-	-	-	101	101	-	35	35	-
Stage 2	-	-	-	-	-	-	45	37	-	106	120	-
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	1587	-	-	1551	-	-	823	753	1038	829	737	1051
Stage 1	-	-	-	-	-	-	905	811	-	981	866	-
Stage 2	-	-	-	-	-	-	969	864	-	900	796	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1587	-	-	1551	-	-	790	734	1038	804	719	1051
Mov Cap-2 Maneuver	-	-	-	-	-	-	790	734	-	804	719	-
Stage 1	-	-	-	-	-	-	885	793	-	959	863	-
Stage 2	-	-	-	-	-	-	945	861	-	870	778	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.7	1.2	9.6	9.1
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	812	1587	-	-	1551	-	-	911
HCM Lane V/C Ratio	0.04	0.021	-	-	0.004	-	-	0.03
HCM Control Delay (s)	9.6	7.3	0	-	7.3	0	-	9.1
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2022 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	365	45	50	20	305	350	40	20	310	90
Future Volume (veh/h)	40	45	365	45	50	20	305	350	40	20	310	90
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	49	34	49	54	10	332	380	23	22	337	30
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	122	191	237	186	34	417	973	825	28	564	479
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.24	0.52	0.52	0.02	0.30	0.30
Sat Flow, veh/h	537	1002	1565	1299	1526	283	1774	1863	1580	1774	1863	1581
Grp Volume(v), veh/h	92	0	34	49	0	64	332	380	23	22	337	30
Grp Sat Flow(s),veh/h/ln	1539	0	1565	1299	0	1809	1774	1863	1580	1774	1863	1581
Q Serve(g_s), s	1.2	0.0	0.9	1.7	0.0	1.5	8.3	5.8	0.3	0.6	7.2	0.6
Cycle Q Clear(g_c), s	2.7	0.0	0.9	4.4	0.0	1.5	8.3	5.8	0.3	0.6	7.2	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	300	0	191	237	0	221	417	973	825	28	564	479
V/C Ratio(X)	0.31	0.00	0.18	0.21	0.00	0.29	0.80	0.39	0.03	0.78	0.60	0.06
Avail Cap(c_a), veh/h	906	0	798	742	0	923	1131	3127	2653	566	2534	2150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	19.3	0.0	18.5	21.4	0.0	18.8	16.9	6.7	5.5	23.1	14.0	11.7
Incr Delay (d2), s/veh	0.6	0.0	0.4	0.4	0.0	0.7	3.5	0.5	0.0	35.6	2.2	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	1.2	0.0	0.4	0.6	0.0	0.8	4.5	3.1	0.1	0.6	4.0	0.3
LnGrp Delay(d),s/veh	19.8	0.0	19.0	21.8	0.0	19.5	20.4	7.3	5.5	58.7	16.1	11.8
LnGrp LOS	B		B	C		B	C	A	A	E	B	B
Approach Vol, veh/h		126			113			735			389	
Approach Delay, s/veh		19.6			20.5			13.2			18.2	
Approach LOS		B			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.7	30.6		10.7	16.1	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	2.6	7.8		4.7	10.3	9.2		6.4
Green Ext Time (p_c), s	0.0	5.5		0.5	0.9	4.8		0.4

Intersection Summary		
HCM 2010 Ctrl Delay	15.8	
HCM 2010 LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	20	225	45	15	5	155	525	30	15	550	60
Future Volume (veh/h)	55	20	225	45	15	5	155	525	30	15	550	60
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	22	21	49	16	1	168	571	0	16	598	27
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	79	222	286	247	15	430	925	786	408	783	663
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.09	0.50	0.00	0.01	0.42	0.42
Sat Flow, veh/h	958	557	1556	1339	1733	108	1774	1863	1583	1774	1863	1578
Grp Volume(v), veh/h	82	0	21	49	0	17	168	571	0	16	598	27
Grp Sat Flow(s),veh/h/ln	1515	0	1556	1339	0	1841	1774	1863	1583	1774	1863	1578
Q Serve(g_s), s	1.4	0.0	0.5	1.6	0.0	0.4	2.3	10.2	0.0	0.2	12.6	0.5
Cycle Q Clear(g_c), s	2.1	0.0	0.5	3.7	0.0	0.4	2.3	10.2	0.0	0.2	12.6	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	352	0	222	286	0	263	430	925	786	408	783	663
V/C Ratio(X)	0.23	0.00	0.09	0.17	0.00	0.06	0.39	0.62	0.00	0.04	0.76	0.04
Avail Cap(c_a), veh/h	944	0	847	825	0	1003	853	2070	1760	966	2070	1753
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	17.7	0.0	17.1	19.4	0.0	17.0	8.2	8.4	0.0	8.0	11.4	7.9
Incr Delay (d2), s/veh	0.3	0.0	0.2	0.3	0.0	0.1	0.6	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	1.0	0.0	0.2	0.6	0.0	0.2	1.2	5.2	0.0	0.1	6.7	0.2
LnGrp Delay(d),s/veh	18.1	0.0	17.3	19.7	0.0	17.1	8.8	9.1	0.0	8.0	13.0	7.9
LnGrp LOS	B		B	B		B	A	A		A	B	A
Approach Vol, veh/h		103			66			739			641	
Approach Delay, s/veh		17.9			19.1			9.0			12.6	
Approach LOS		B			B			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.6	28.8		11.5	9.1	25.3		11.5
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.6	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	12.2		4.1	4.3	14.6		5.7
Green Ext Time (p_c), s	0.0	4.1		0.4	0.3	4.4		0.2

Intersection Summary		
HCM 2010 Ctrl Delay	11.5	
HCM 2010 LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	60	85	170	65	85	80	605	145	130	655	50
Future Volume (veh/h)	45	60	85	170	65	85	80	605	145	130	655	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	49	65	55	185	71	15	87	658	100	141	712	21
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	63	114	96	226	400	340	114	763	649	179	832	706
Arrive On Green	0.04	0.12	0.12	0.13	0.21	0.21	0.06	0.41	0.41	0.10	0.45	0.45
Sat Flow, veh/h	1774	928	785	1774	1863	1583	1774	1863	1583	1774	1863	1582
Grp Volume(v), veh/h	49	0	120	185	71	15	87	658	100	141	712	21
Grp Sat Flow(s),veh/h/ln	1774	0	1713	1774	1863	1583	1774	1863	1583	1774	1863	1582
Q Serve(g_s), s	2.3	0.0	5.5	8.5	2.6	0.6	4.0	27.0	3.3	6.5	28.7	0.6
Cycle Q Clear(g_c), s	2.3	0.0	5.5	8.5	2.6	0.6	4.0	27.0	3.3	6.5	28.7	0.6
Prop In Lane	1.00		0.46	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	63	0	210	226	400	340	114	763	649	179	832	706
V/C Ratio(X)	0.78	0.00	0.57	0.82	0.18	0.04	0.76	0.86	0.15	0.79	0.86	0.03
Avail Cap(c_a), veh/h	423	0	429	423	467	397	529	1444	1228	529	1444	1226
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	40.1	0.0	34.7	35.6	26.9	26.1	38.6	22.6	15.6	36.8	20.8	13.0
Incr Delay (d2), s/veh	18.4	0.0	2.4	7.1	0.2	0.1	10.0	3.0	0.1	7.4	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	1.4	0.0	2.8	4.6	1.4	0.3	2.3	14.4	1.5	3.5	15.3	0.3
LnGrp Delay(d),s/veh	58.5	0.0	37.1	42.7	27.1	26.1	48.5	25.6	15.7	44.2	23.4	13.0
LnGrp LOS	E		D	D	C	C	D	C	B	D	C	B
Approach Vol, veh/h		169			271			845			874	
Approach Delay, s/veh		43.3			37.7			26.8			26.5	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	39.4	15.7	15.3	10.4	42.4	8.0	23.0
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	10.5	29.0	10.5	7.5	6.0	30.7	4.3	4.6
Green Ext Time (p_c), s	0.3	5.3	0.3	0.5	0.2	5.6	0.1	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	29.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	10	595	10	0	5	410	765	5	0	860	60
Future Volume (veh/h)	65	10	595	10	0	5	410	765	5	0	860	60
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	71	11	0	11	0	1	446	832	5	0	935	26
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	113	207	4	10	506	2759	17	3	1488	663
Arrive On Green	0.09	0.07	0.00	0.09	0.00	0.07	0.29	0.76	0.76	0.00	0.42	0.42
Sat Flow, veh/h	1279	198	1583	1451	52	137	1774	3607	22	1774	3539	1578
Grp Volume(v), veh/h	82	0	0	12	0	0	446	408	429	0	935	26
Grp Sat Flow(s),veh/h/ln	1477	0	1583	1640	0	0	1774	1770	1859	1774	1770	1578
Q Serve(g_s), s	3.2	0.0	0.0	0.0	0.0	0.0	16.2	4.7	4.7	0.0	14.0	0.7
Cycle Q Clear(g_c), s	3.6	0.0	0.0	0.4	0.0	0.0	16.2	4.7	4.7	0.0	14.0	0.7
Prop In Lane	0.87		1.00	0.92		0.08	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	228	0	113	244	0	0	506	1354	1422	3	1488	663
V/C Ratio(X)	0.36	0.00	0.00	0.05	0.00	0.00	0.88	0.30	0.30	0.00	0.63	0.04
Avail Cap(c_a), veh/h	771	0	706	709	0	0	1871	1498	1574	1871	2997	1336
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	30.2	0.0	0.0	28.8	0.0	0.0	23.0	2.4	2.4	0.0	15.4	11.5
Incr Delay (d2), s/veh	1.0	0.0	0.0	0.1	0.0	0.0	2.0	0.3	0.3	0.0	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	1.5	0.0	0.0	0.2	0.0	0.0	8.2	2.4	2.5	0.0	6.9	0.3
LnGrp Delay(d),s/veh	31.2	0.0	0.0	28.9	0.0	0.0	25.0	2.7	2.7	0.0	16.3	11.6
LnGrp LOS	C			C			C	A	A		B	B
Approach Vol, veh/h		82			12			1283			961	
Approach Delay, s/veh		31.2			28.9			10.4			16.2	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.2	34.3		9.8	0.0	57.5		9.8
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	7.0	57.0		27.0	71.0	57.0		30.0
Max Q Clear Time (g_c+I1), s	18.2	16.0		2.4	0.0	6.7		5.6
Green Ext Time (p_c), s	1.0	12.3		0.0	0.0	9.6		0.2

Intersection Summary		
HCM 2010 Ctrl Delay	13.6	
HCM 2010 LOS	B	

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	1110	20	10	1415	70
Future Volume (veh/h)	60	5	145	15	5	15	105	1110	20	10	1415	70
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	65	5	6	16	5	1	114	1207	21	11	1538	46
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	13	138	140	34	4	145	2580	45	14	2304	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	1399	143	1546	679	375	50	1774	3560	62	1774	3539	1580
Grp Volume(v), veh/h	70	0	6	22	0	0	114	600	628	11	1538	46
Grp Sat Flow(s),veh/h/ln	1543	0	1546	1105	0	0	1774	1770	1852	1774	1770	1580
Q Serve(g_s), s	0.0	0.0	0.3	0.2	0.0	0.0	5.0	11.1	11.1	0.5	21.2	0.8
Cycle Q Clear(g_c), s	2.9	0.0	0.3	3.1	0.0	0.0	5.0	11.1	11.1	0.5	21.2	0.8
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	246	0	138	192	0	0	145	1283	1342	14	2304	1029
V/C Ratio(X)	0.28	0.00	0.04	0.11	0.00	0.00	0.78	0.47	0.47	0.76	0.67	0.04
Avail Cap(c_a), veh/h	530	0	451	489	0	0	472	1929	2019	247	3410	1522
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	32.8	33.0	0.0	0.0	35.5	4.5	4.5	39.0	8.5	4.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.5	0.6	0.5	25.6	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	1.4	0.0	0.1	0.5	0.0	0.0	2.6	5.5	5.8	0.3	10.5	0.4
LnGrp Delay(d),s/veh	33.8	0.0	32.9	33.1	0.0	0.0	39.0	5.1	5.1	64.7	9.2	5.0
LnGrp LOS	C		C	C			D	A	A	E	A	A
Approach Vol, veh/h		76			22			1342			1595	
Approach Delay, s/veh		33.8			33.1			8.0			9.5	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.5	56.4		12.1	4.6	62.2		12.1
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	7.1	23.2		5.1	2.5	13.1		4.9
Green Ext Time (p_c), s	0.1	28.2		0.0	0.0	19.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	9.6
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	5	180	45	5	40	110	1175	50	35	1485	80
Future Volume (veh/h)	70	5	180	45	5	40	110	1175	50	35	1485	80
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	76	5	12	49	5	3	120	1277	34	38	1614	49
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	265	15	224	206	155	93	153	2298	1028	61	2115	946
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	1296	104	1577	1386	1090	654	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	81	0	12	49	0	8	120	1277	34	38	1614	49
Grp Sat Flow(s),veh/h/ln	1400	0	1577	1386	0	1744	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	4.3	0.0	0.6	2.9	0.0	0.3	5.7	17.1	0.7	1.8	29.1	1.1
Cycle Q Clear(g_c), s	4.6	0.0	0.6	7.5	0.0	0.3	5.7	17.1	0.7	1.8	29.1	1.1
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	296	0	224	206	0	248	153	2298	1028	61	2115	946
V/C Ratio(X)	0.27	0.00	0.05	0.24	0.00	0.03	0.78	0.56	0.03	0.62	0.76	0.05
Avail Cap(c_a), veh/h	489	0	439	395	0	485	432	2831	1267	247	2462	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	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.4	0.0	32.0	37.1	0.0	31.9	38.6	8.3	5.4	41.1	12.8	7.2
Incr Delay (d2), s/veh	0.5	0.0	0.1	0.6	0.0	0.1	3.3	0.5	0.0	3.7	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	1.8	0.0	0.3	1.1	0.0	0.2	2.9	8.3	0.3	1.0	14.4	0.5
LnGrp Delay(d),s/veh	33.8	0.0	32.1	37.7	0.0	31.9	41.9	8.7	5.4	44.8	14.5	7.3
LnGrp LOS	C		C	D		C	D	A	A	D	B	A
Approach Vol, veh/h		93			57			1431			1701	
Approach Delay, s/veh		33.6			36.9			11.5			15.0	
Approach LOS		C			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.4	57.6		17.3	7.0	62.0		17.3
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	31.1		9.5	3.8	19.1		6.6
Green Ext Time (p_c), s	0.2	20.5		0.1	0.0	20.6		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	14.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	265	5	445	15	5	20	290	1265	15	60	1470	165
Future Volume (veh/h)	265	5	445	15	5	20	290	1265	15	60	1470	165
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	292	0	272	16	5	7	315	1375	16	65	1598	146
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	457	0	780	47	15	20	430	2282	27	117	2046	1107
Arrive On Green	0.13	0.00	0.12	0.05	0.05	0.02	0.12	0.64	0.62	0.07	0.58	0.58
Sat Flow, veh/h	3548	0	3167	992	310	434	3442	3583	42	1774	3539	1583
Grp Volume(v), veh/h	292	0	272	28	0	0	315	679	712	65	1598	146
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1737	0	0	1721	1770	1855	1774	1770	1583
Q Serve(g_s), s	10.3	0.0	9.4	2.1	0.0	0.0	11.6	29.8	29.9	4.7	45.9	4.0
Cycle Q Clear(g_c), s	10.3	0.0	9.4	2.1	0.0	0.0	11.6	29.8	29.9	4.7	45.9	4.0
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	457	0	780	82	0	0	430	1127	1182	117	2046	1107
V/C Ratio(X)	0.64	0.00	0.35	0.34	0.00	0.00	0.73	0.60	0.60	0.55	0.78	0.13
Avail Cap(c_a), veh/h	913	0	1187	408	0	0	1511	2599	2725	201	4047	2001
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	54.6	0.0	41.0	61.3	0.0	0.0	55.7	14.1	14.2	59.8	21.4	6.6
Incr Delay (d2), s/veh	0.6	0.0	0.1	0.9	0.0	0.0	0.9	0.7	0.7	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	5.1	0.0	4.1	1.0	0.0	0.0	5.6	14.8	15.5	2.4	22.5	2.5
LnGrp Delay(d),s/veh	55.2	0.0	41.1	62.2	0.0	0.0	56.6	14.9	14.9	61.3	22.4	6.7
LnGrp LOS	E		D	E			E	B	B	E	C	A
Approach Vol, veh/h		564			28			1706			1809	
Approach Delay, s/veh		48.4			62.2			22.6			22.5	
Approach LOS		D			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.5	80.3		10.2	12.7	88.1		21.0
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	11.6	47.9		4.1	6.7	31.9		12.3
Green Ext Time (p_c), s	0.9	26.5		0.0	0.0	15.2		1.7

Intersection Summary	
HCM 2010 Ctrl Delay	26.4
HCM 2010 LOS	C

Notes

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	1440	90	90	1890	10
Future Volume (veh/h)	5	0	5	135	5	65	5	1440	90	90	1890	10
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1565	95	98	2054	11
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2416	146	124	2801	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	1140	37	235	1410	856	856	1774	3391	205	1774	3610	19
Grp Volume(v), veh/h	6	0	0	147	0	10	5	813	847	98	1006	1059
Grp Sat Flow(s),veh/h/ln	1412	0	0	1410	0	1712	1774	1770	1827	1774	1770	1859
Q Serve(g_s), s	0.0	0.0	0.0	12.4	0.0	0.7	0.4	8.1	8.5	7.1	38.4	38.6
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	8.1	8.5	7.1	38.4	38.6
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	1260	1301	124	1373	1443
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.64	0.65	0.79	0.73	0.73
Avail Cap(c_a), veh/h	312	0	0	318	0	316	150	1260	1301	150	1373	1443
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	0.79	0.79	0.79	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	0.0	0.0	55.3	0.0	50.2	64.2	1.2	1.2	59.5	7.6	7.6
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.8	0.0	0.1	7.8	2.0	2.0	16.7	3.5	3.3
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	5.3	0.0	0.3	0.2	4.2	4.4	4.1	19.8	20.8
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.3	72.0	3.2	3.2	76.2	11.1	10.9
LnGrp LOS	D			E		D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1665			2163	
Approach Delay, s/veh		50.0			57.6			3.4			14.0	
Approach LOS		D			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.8	104.9		20.3	13.1	96.6		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	12.4	40.6		15.0	9.1	10.5		2.7
Green Ext Time (p_c), s	0.0	33.9		0.3	0.0	34.9		0.0

Intersection Summary		
HCM 2010 Ctrl Delay	11.3	
HCM 2010 LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	5	15	65	5	15	15	1375	15	10	1665	275
Future Volume (veh/h)	145	5	15	65	5	15	15	1375	15	10	1665	275
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	158	5	14	71	5	9	16	1495	15	11	1810	222
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	6	17	238	18	24	19	2730	27	13	2680	1198
Arrive On Green	0.14	0.14	0.13	0.14	0.14	0.13	0.01	0.76	0.75	0.01	0.76	0.76
Sat Flow, veh/h	1336	42	118	1342	130	174	1774	3590	36	1774	3539	1582
Grp Volume(v), veh/h	177	0	0	85	0	0	16	737	773	11	1810	222
Grp Sat Flow(s),veh/h/ln	1497	0	0	1647	0	0	1774	1770	1856	1774	1770	1582
Q Serve(g_s), s	8.9	0.0	0.0	0.0	0.0	0.0	1.2	22.2	22.3	0.8	33.0	5.2
Cycle Q Clear(g_c), s	14.8	0.0	0.0	5.9	0.0	0.0	1.2	22.2	22.3	0.8	33.0	5.2
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	262	0	0	281	0	0	19	1345	1411	13	2680	1198
V/C Ratio(X)	0.68	0.00	0.00	0.30	0.00	0.00	0.84	0.55	0.55	0.82	0.68	0.19
Avail Cap(c_a), veh/h	347	0	0	367	0	0	109	1345	1411	109	2680	1198
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.71	0.71	0.71	0.58	0.58	0.58
Uniform Delay (d), s/veh	54.2	0.0	0.0	50.7	0.0	0.0	64.2	6.4	6.4	64.4	7.8	4.5
Incr Delay (d2), s/veh	3.3	0.0	0.0	0.6	0.0	0.0	22.0	1.1	1.1	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	6.4	0.0	0.0	2.8	0.0	0.0	0.7	11.1	11.6	0.5	16.1	2.3
LnGrp Delay(d),s/veh	57.5	0.0	0.0	51.3	0.0	0.0	86.2	7.5	7.5	86.6	8.6	4.7
LnGrp LOS	E			D			F	A	A	F	A	A
Approach Vol, veh/h		177			85			1526			2043	
Approach Delay, s/veh		57.5			51.3			8.3			8.6	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	102.4		22.2	5.0	102.8		22.2
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.6	83.0		25.0	8.0	83.0		25.0
Max Q Clear Time (g_c+I1), s	3.2	35.0		7.9	2.8	24.3		16.8
Green Ext Time (p_c), s	0.0	41.0		0.2	0.0	35.8		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	11.7
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	20	50	90	20	20	60	1395	60	15	1670	135
Future Volume (veh/h)	200	20	50	90	20	20	60	1395	60	15	1670	135
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	217	22	12	98	22	4	65	1516	63	16	1815	143
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	298	25	321	390	312	57	83	2402	100	19	2188	170
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.06	0.92	0.91	0.01	0.87	0.86
Sat Flow, veh/h	1205	122	1576	1381	1533	279	1774	3463	143	1774	3328	259
Grp Volume(v), veh/h	239	0	12	98	0	26	65	773	806	16	954	1004
Grp Sat Flow(s),veh/h/ln	1327	0	1576	1381	0	1812	1774	1770	1836	1774	1770	1817
Q Serve(g_s), s	21.5	0.0	0.8	0.0	0.0	1.5	4.7	10.5	10.7	1.2	31.0	34.2
Cycle Q Clear(g_c), s	23.0	0.0	0.8	6.4	0.0	1.5	4.7	10.5	10.7	1.2	31.0	34.2
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	323	0	321	390	0	368	83	1227	1274	19	1164	1195
V/C Ratio(X)	0.74	0.00	0.04	0.25	0.00	0.07	0.79	0.63	0.63	0.84	0.82	0.84
Avail Cap(c_a), veh/h	372	0	376	439	0	432	109	1227	1274	109	1164	1195
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	0.56	0.56	0.56	0.65	0.65	0.65
Uniform Delay (d), s/veh	51.1	0.0	41.6	43.8	0.0	41.9	60.3	1.9	2.0	64.0	4.7	5.0
Incr Delay (d2), s/veh	6.6	0.0	0.0	0.3	0.0	0.1	10.3	1.4	1.4	20.6	4.4	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	9.0	0.0	0.3	3.0	0.0	0.8	2.5	5.2	5.5	0.7	15.7	17.8
LnGrp Delay(d),s/veh	57.8	0.0	41.6	44.1	0.0	42.0	70.6	3.3	3.3	84.5	9.1	9.8
LnGrp LOS	E		D	D		D	E	A	A	F	A	A
Approach Vol, veh/h		251			124			1644			1974	
Approach Delay, s/veh		57.0			43.7			6.0			10.1	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.1	89.5		30.4	5.4	94.2		30.4
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	78.0		30.0	8.0	78.0		30.0
Max Q Clear Time (g_c+I1), s	10.7	36.2		8.4	3.2	12.7		25.0
Green Ext Time (p_c), s	0.0	32.4		0.4	0.0	30.4		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	12.4
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	150	90	145	130	690	80	760	195	595	990	105
Future Volume (veh/h)	60	150	90	145	130	690	80	760	195	595	990	105
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.95	1.00		0.97	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	65	163	10	158	141	362	87	826	126	647	1076	109
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	100	194	268	252	562	465	110	1397	616	727	1766	179
Arrive On Green	0.18	0.18	0.18	0.09	0.30	0.30	0.06	0.39	0.39	0.14	0.36	0.36
Sat Flow, veh/h	360	1093	1511	1774	1863	1541	1774	3539	1561	3442	3245	329
Grp Volume(v), veh/h	228	0	10	158	141	362	87	826	126	647	586	599
Grp Sat Flow(s),veh/h/ln	1453	0	1511	1774	1863	1541	1774	1770	1561	1721	1770	1804
Q Serve(g_s), s	17.4	0.0	0.7	9.1	7.4	27.9	6.3	24.0	6.9	24.0	35.2	35.3
Cycle Q Clear(g_c), s	19.8	0.0	0.7	9.1	7.4	27.9	6.3	24.0	6.9	24.0	35.2	35.3
Prop In Lane	0.29		1.00	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	294	0	268	252	562	465	110	1397	616	727	963	982
V/C Ratio(X)	0.78	0.00	0.04	0.63	0.25	0.78	0.79	0.59	0.20	0.89	0.61	0.61
Avail Cap(c_a), veh/h	325	0	302	277	630	522	328	1397	616	953	963	982
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	1.00	0.79	0.79	0.79	0.44	0.44	0.44
Uniform Delay (d), s/veh	51.8	0.0	44.3	38.4	34.3	41.4	60.2	31.1	25.9	54.3	30.0	30.1
Incr Delay (d2), s/veh	10.3	0.0	0.1	3.8	0.2	6.6	3.8	1.5	0.6	3.4	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	8.8	0.0	0.3	4.7	3.9	12.7	3.2	12.0	3.1	11.8	17.6	18.0
LnGrp Delay(d),s/veh	62.0	0.0	44.3	42.3	34.5	48.1	64.0	32.5	26.5	57.7	31.3	31.3
LnGrp LOS	E		D	D	C	D	E	C	C	E	C	C
Approach Vol, veh/h		238			661			1039			1832	
Approach Delay, s/veh		61.3			43.8			34.4			40.6	
Approach LOS		E			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	12.0	74.7	16.1	27.1	31.5	55.3		43.2
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	9.3	37.3	11.1	21.8	26.0	26.0		29.9
Green Ext Time (p_c), s	0.1	7.5	0.1	0.3	1.5	6.0		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	40.8
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	70	635	95	0	820
Future Vol, veh/h	0	70	635	95	0	820
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	76	690	103	0	891

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	690	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	445	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	445	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	445	-
HCM Lane V/C Ratio	-	-	0.171	-
HCM Control Delay (s)	-	-	14.8	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.6	-

Intersection	
Int Delay, s/veh	7.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	115	65	150	5	60	5	135	5	5	5	5	120
Future Vol, veh/h	115	65	150	5	60	5	135	5	5	5	5	120
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	125	71	163	5	65	5	147	5	5	5	5	130

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	70	0	0	234	0	0	548	483	153	486	562	68
Stage 1	-	-	-	-	-	-	403	403	-	78	78	-
Stage 2	-	-	-	-	-	-	145	80	-	408	484	-
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	1531	-	-	1333	-	-	447	483	893	492	436	995
Stage 1	-	-	-	-	-	-	624	600	-	931	830	-
Stage 2	-	-	-	-	-	-	858	828	-	620	552	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1531	-	-	1333	-	-	359	441	893	453	399	995
Mov Cap-2 Maneuver	-	-	-	-	-	-	359	441	-	453	399	-
Stage 1	-	-	-	-	-	-	573	551	-	855	827	-
Stage 2	-	-	-	-	-	-	738	825	-	560	507	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.6	0.6	21.8	9.7
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	369	1531	-	-	1333	-	-	902
HCM Lane V/C Ratio	0.427	0.082	-	-	0.004	-	-	0.157
HCM Control Delay (s)	21.8	7.6	-	-	7.7	-	-	9.7
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	2.1	0.3	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	20	25	5	25	5	25	5	5	5	5	20
Future Vol, veh/h	20	20	25	5	25	5	25	5	5	5	5	20
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	22	22	27	5	27	5	27	5	5	5	5	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	32	0	0	49	0	0	133	122	36	125	133	30
Stage 1	-	-	-	-	-	-	80	80	-	40	40	-
Stage 2	-	-	-	-	-	-	53	42	-	85	93	-
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	1580	-	-	1558	-	-	839	768	1037	849	758	1044
Stage 1	-	-	-	-	-	-	929	828	-	975	862	-
Stage 2	-	-	-	-	-	-	960	860	-	923	818	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1580	-	-	1558	-	-	806	755	1037	829	745	1044
Mov Cap-2 Maneuver	-	-	-	-	-	-	806	755	-	829	745	-
Stage 1	-	-	-	-	-	-	916	816	-	961	859	-
Stage 2	-	-	-	-	-	-	931	857	-	899	807	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.2	1	9.6	9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	824	1580	-	-	1558	-	-	940
HCM Lane V/C Ratio	0.046	0.014	-	-	0.003	-	-	0.035
HCM Control Delay (s)	9.6	7.3	0	-	7.3	0	-	9
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2022 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	310	95	50	20	255	265	115	10	140	30
Future Volume (veh/h)	50	45	310	95	50	20	255	265	115	10	140	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	54	49	44	103	54	11	277	288	60	11	152	8
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	265	326	254	52	364	814	692	15	448	381
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	611	1001	1569	1289	1500	306	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	103	0	44	103	0	65	277	288	60	11	152	8
Grp Sat Flow(s),veh/h/ln	1612	0	1569	1289	0	1806	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	0.4	0.0	1.0	3.2	0.0	1.3	6.1	4.3	0.9	0.3	2.8	0.2
Cycle Q Clear(g_c), s	2.1	0.0	1.0	5.3	0.0	1.3	6.1	4.3	0.9	0.3	2.8	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	405	0	265	326	0	305	364	814	692	15	448	381
V/C Ratio(X)	0.25	0.00	0.17	0.32	0.00	0.21	0.76	0.35	0.09	0.72	0.34	0.02
Avail Cap(c_a), veh/h	1031	0	907	853	0	1043	1281	3543	3011	641	2870	2440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	15.2	0.0	14.8	17.5	0.0	14.9	15.6	7.8	6.8	20.5	13.0	12.0
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.5	0.0	0.3	3.3	0.6	0.1	47.6	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	1.1	0.0	0.4	1.2	0.0	0.7	3.3	2.3	0.4	0.3	1.6	0.1
LnGrp Delay(d),s/veh	15.5	0.0	15.0	18.1	0.0	15.2	18.9	8.3	7.0	68.1	14.0	12.1
LnGrp LOS	B		B	B		B	B	A	A	E	B	B
Approach Vol, veh/h		147			168			625			171	
Approach Delay, s/veh		15.4			17.0			12.9			17.4	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	24.2		12.0	13.5	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	6.3		4.1	8.1	4.8		7.3
Green Ext Time (p_c), s	0.0	4.3		0.6	0.8	1.9		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	14.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	190	95	20	15	155	595	20	10	540	65
Future Volume (veh/h)	60	5	190	95	20	15	155	595	20	10	540	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	5	21	103	22	2	168	647	0	11	587	29
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	376	24	311	342	338	31	403	904	769	317	745	629
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.09	0.49	0.00	0.01	0.40	0.40
Sat Flow, veh/h	1210	120	1544	1350	1679	153	1774	1863	1583	1774	1863	1571
Grp Volume(v), veh/h	70	0	21	103	0	24	168	647	0	11	587	29
Grp Sat Flow(s),veh/h/ln	1331	0	1544	1350	0	1831	1774	1863	1583	1774	1863	1571
Q Serve(g_s), s	2.1	0.0	0.6	3.7	0.0	0.6	2.6	14.4	0.0	0.2	14.5	0.6
Cycle Q Clear(g_c), s	2.6	0.0	0.6	6.3	0.0	0.6	2.6	14.4	0.0	0.2	14.5	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	400	0	311	342	0	369	403	904	769	317	745	629
V/C Ratio(X)	0.17	0.00	0.07	0.30	0.00	0.07	0.42	0.72	0.00	0.03	0.79	0.05
Avail Cap(c_a), veh/h	778	0	735	712	0	871	743	1808	1537	808	1808	1525
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	17.9	0.0	17.0	20.5	0.0	17.0	9.7	10.7	0.0	10.2	13.8	9.6
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.5	0.0	0.1	0.7	1.1	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	0.3	1.4	0.0	0.3	1.3	7.5	0.0	0.1	7.7	0.3
LnGrp Delay(d),s/veh	18.1	0.0	17.1	21.0	0.0	17.0	10.4	11.7	0.0	10.2	15.7	9.7
LnGrp LOS	B		B	C		B	B	B		B	B	A
Approach Vol, veh/h		91			127			815			627	
Approach Delay, s/veh		17.9			20.2			11.5			15.3	
Approach LOS		B			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	31.5		15.6	9.9	27.0		15.6
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.6	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	16.4		4.6	4.6	16.5		8.3
Green Ext Time (p_c), s	0.0	4.8		0.4	0.3	4.3		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	13.9
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	20	125	115	50	65	60	645	55	40	720	30
Future Volume (veh/h)	45	20	125	115	50	65	60	645	55	40	720	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	49	22	6	125	54	8	65	701	28	43	783	16
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	63	182	50	161	345	291	85	929	790	55	897	763
Arrive On Green	0.04	0.13	0.13	0.09	0.19	0.19	0.05	0.50	0.50	0.03	0.48	0.48
Sat Flow, veh/h	1774	1405	383	1774	1863	1573	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	49	0	28	125	54	8	65	701	28	43	783	16
Grp Sat Flow(s),veh/h/ln	1774	0	1788	1774	1863	1573	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	2.2	0.0	1.1	5.5	1.9	0.3	2.9	24.2	0.7	1.9	30.1	0.4
Cycle Q Clear(g_c), s	2.2	0.0	1.1	5.5	1.9	0.3	2.9	24.2	0.7	1.9	30.1	0.4
Prop In Lane	1.00		0.21	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	63	0	232	161	345	291	85	929	790	55	897	763
V/C Ratio(X)	0.78	0.00	0.12	0.78	0.16	0.03	0.76	0.75	0.04	0.79	0.87	0.02
Avail Cap(c_a), veh/h	444	0	470	444	489	413	555	1514	1287	555	1514	1287
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	38.3	0.0	30.8	35.6	27.3	26.7	37.6	16.1	10.2	38.5	18.5	10.9
Incr Delay (d2), s/veh	18.7	0.0	0.2	7.8	0.2	0.0	13.2	1.3	0.0	21.7	3.2	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	1.4	0.0	0.6	3.1	1.0	0.1	1.7	12.6	0.3	1.3	16.0	0.2
LnGrp Delay(d),s/veh	56.9	0.0	31.0	43.3	27.6	26.7	50.8	17.4	10.2	60.2	21.7	10.9
LnGrp LOS	E		C	D	C	C	D	B	B	E	C	B
Approach Vol, veh/h		77			187			794			842	
Approach Delay, s/veh		47.5			38.1			19.9			23.5	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.5	44.9	12.3	15.4	8.8	43.5	7.8	19.8
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	3.9	26.2	7.5	3.1	4.9	32.1	4.2	3.9
Green Ext Time (p_c), s	0.1	5.6	0.2	0.1	0.1	6.5	0.1	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	24.4
HCM 2010 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	750	45	10	955	15
Future Volume (veh/h)	40	10	480	20	5	0	315	750	45	10	955	15
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	43	11	0	22	5	0	342	815	48	11	1038	7
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	26	113	185	30	0	403	2333	137	15	1656	741
Arrive On Green	0.09	0.07	0.00	0.09	0.07	0.00	0.23	0.69	0.69	0.01	0.47	0.47
Sat Flow, veh/h	1158	366	1583	1167	416	0	1774	3397	200	1774	3539	1583
Grp Volume(v), veh/h	54	0	0	27	0	0	342	425	438	11	1038	7
Grp Sat Flow(s),veh/h/ln	1524	0	1583	1583	0	0	1774	1770	1827	1774	1770	1583
Q Serve(g_s), s	1.1	0.0	0.0	0.0	0.0	0.0	11.8	6.3	6.3	0.4	14.2	0.2
Cycle Q Clear(g_c), s	2.0	0.0	0.0	0.9	0.0	0.0	11.8	6.3	6.3	0.4	14.2	0.2
Prop In Lane	0.80		1.00	0.81		0.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	233	0	113	239	0	0	403	1215	1255	15	1656	741
V/C Ratio(X)	0.23	0.00	0.00	0.11	0.00	0.00	0.85	0.35	0.35	0.74	0.63	0.01
Avail Cap(c_a), veh/h	816	0	740	749	0	0	1962	1571	1622	1962	3142	1406
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	28.2	0.0	0.0	27.7	0.0	0.0	23.8	4.1	4.1	31.8	12.9	9.1
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	2.0	0.4	0.4	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	0.9	0.0	0.0	0.5	0.0	0.0	6.0	3.2	3.3	0.3	7.0	0.1
LnGrp Delay(d),s/veh	28.7	0.0	0.0	27.9	0.0	0.0	25.7	4.5	4.5	55.4	13.7	9.1
LnGrp LOS	C			C			C	A	A	E	B	A
Approach Vol, veh/h		54			27			1205			1056	
Approach Delay, s/veh		28.7			27.9			10.5			14.1	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.6	36.0		9.6	4.5	50.1		9.6
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	7.6	57.0		27.0	7.0	57.0		30.0
Max Q Clear Time (g_c+I1), s	13.8	16.2		2.9	2.4	8.3		4.0
Green Ext Time (p_c), s	0.8	13.9		0.1	0.0	10.1		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.8
HCM 2010 LOS	B

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	1160	20	15	1420	70
Future Volume (veh/h)	35	0	70	10	5	10	135	1160	20	15	1420	70
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	38	0	1	11	5	1	147	1261	21	16	1543	48
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	0	72	108	21	3	184	2700	45	20	2356	1054
Arrive On Green	0.06	0.00	0.05	0.06	0.05	0.05	0.10	0.76	0.76	0.01	0.67	0.67
Sat Flow, veh/h	1555	0	1583	644	470	70	1774	3563	59	1774	3539	1583
Grp Volume(v), veh/h	38	0	1	17	0	0	147	626	656	16	1543	48
Grp Sat Flow(s),veh/h/ln	1555	0	1583	1184	0	0	1774	1770	1852	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	0.3	0.0	0.0	6.1	10.0	10.0	0.7	19.6	0.8
Cycle Q Clear(g_c), s	1.6	0.0	0.0	1.8	0.0	0.0	6.1	10.0	10.0	0.7	19.6	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	187	0	72	148	0	0	184	1341	1404	20	2356	1054
V/C Ratio(X)	0.20	0.00	0.01	0.11	0.00	0.00	0.80	0.47	0.47	0.80	0.65	0.05
Avail Cap(c_a), veh/h	549	0	481	543	0	0	492	2011	2105	258	3554	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	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	34.7	0.0	34.5	34.8	0.0	0.0	33.1	3.4	3.4	37.3	7.5	4.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.0	0.5	0.5	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	0.8	0.0	0.0	0.3	0.0	0.0	3.1	4.9	5.1	0.5	9.6	0.4
LnGrp Delay(d),s/veh	34.9	0.0	34.5	34.9	0.0	0.0	36.2	4.0	3.9	59.9	8.2	4.4
LnGrp LOS	C		C	C			D	A	A	E	A	A
Approach Vol, veh/h		39			17			1429			1607	
Approach Delay, s/veh		34.9			34.9			7.3			8.6	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.8	55.4		8.5	4.9	62.4		8.5
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.8	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	12.1	21.6		3.8	2.7	12.0		3.6
Green Ext Time (p_c), s	0.1	28.8		0.0	0.0	20.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.4
HCM 2010 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	1295	60	30	1360	45
Future Volume (veh/h)	55	5	35	40	15	50	110	1295	60	30	1360	45
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	5	1	43	16	1	120	1408	49	33	1478	35
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	153	111	168	10	142	2768	1238	43	2571	1150
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	1193	120	1578	1401	1735	108	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	65	0	1	43	0	17	120	1408	49	33	1478	35
Grp Sat Flow(s),veh/h/ln	1313	0	1578	1401	0	1843	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	6.6	0.0	0.1	4.7	0.0	1.3	10.3	22.3	1.1	2.9	30.4	1.0
Cycle Q Clear(g_c), s	7.9	0.0	0.1	12.5	0.0	1.3	10.3	22.3	1.1	2.9	30.4	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	153	111	0	178	142	2768	1238	43	2571	1150
V/C Ratio(X)	0.38	0.00	0.01	0.39	0.00	0.10	0.85	0.51	0.04	0.76	0.57	0.03
Avail Cap(c_a), veh/h	254	0	244	192	0	285	240	2768	1238	240	2571	1150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	63.8	70.4	6.1	3.8	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	9.7	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	2.7	0.0	0.0	1.9	0.0	0.7	5.2	10.9	0.5	1.5	15.1	0.4
LnGrp Delay(d),s/veh	68.7	0.0	63.3	75.0	0.0	64.1	74.1	6.6	3.8	84.8	10.9	6.0
LnGrp LOS	E		E	E		E	E	A	A	F	B	A
Approach Vol, veh/h		66			60			1577			1546	
Approach Delay, s/veh		68.6			71.9			11.6			12.4	
Approach LOS		E			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.6		20.0	7.8	127.2		20.0
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.6	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	32.4		14.5	4.9	24.3		9.9
Green Ext Time (p_c), s	0.1	28.4		0.1	0.0	27.6		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	10	220	10	10	10	425	1370	15	85	1295	105
Future Volume (veh/h)	140	10	220	10	10	10	425	1370	15	85	1295	105
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	160	0	61	11	11	3	462	1489	16	92	1408	86
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	0	806	59	59	16	599	2181	23	151	1838	951
Arrive On Green	0.09	0.00	0.08	0.08	0.08	0.05	0.17	0.61	0.59	0.09	0.52	0.52
Sat Flow, veh/h	3548	0	3071	783	783	214	3442	3587	39	1774	3539	1578
Grp Volume(v), veh/h	160	0	61	25	0	0	462	734	771	92	1408	86
Grp Sat Flow(s),veh/h/ln	1774	0	1536	1780	0	0	1721	1770	1856	1774	1770	1578
Q Serve(g_s), s	4.9	0.0	1.7	1.5	0.0	0.0	14.7	32.0	32.1	5.8	36.6	2.6
Cycle Q Clear(g_c), s	4.9	0.0	1.7	1.5	0.0	0.0	14.7	32.0	32.1	5.8	36.6	2.6
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	325	0	806	135	0	0	599	1076	1128	151	1838	951
V/C Ratio(X)	0.49	0.00	0.08	0.18	0.00	0.00	0.77	0.68	0.68	0.61	0.77	0.09
Avail Cap(c_a), veh/h	1048	0	1432	479	0	0	1734	2982	3128	231	4643	2201
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	49.7	0.0	32.4	50.0	0.0	0.0	45.4	15.1	15.1	50.8	22.1	9.6
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.7	0.0	0.0	0.8	1.1	1.1	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	7.1	15.8	16.6	2.9	18.0	1.4
LnGrp Delay(d),s/veh	50.2	0.0	32.4	50.7	0.0	0.0	46.2	16.2	16.2	52.3	23.1	9.7
LnGrp LOS	D		C	D			D	B	B	D	C	A
Approach Vol, veh/h		221			25			1967			1586	
Approach Delay, s/veh		45.3			50.7			23.2			24.0	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.0	63.8		12.7	13.8	74.0		14.6
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	8.0	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	16.7	38.6		3.5	7.8	34.1		6.9
Green Ext Time (p_c), s	1.3	19.2		0.0	0.1	18.2		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	25.0
HCM 2010 LOS	C

Notes

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	1805	90	30	1490	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1805	90	30	1490	5
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	1962	96	33	1620	5
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	176	0	138	11	2711	132	63	2962	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	584	895	148	1372	0	1543	1774	3436	167	1774	3619	11
Grp Volume(v), veh/h	11	0	0	65	0	1	5	1003	1055	33	792	833
Grp Sat Flow(s),veh/h/ln	1627	0	0	1372	0	1543	1774	1770	1833	1774	1770	1861
Q Serve(g_s), s	0.0	0.0	0.0	5.4	0.0	0.1	0.4	38.6	40.2	2.6	20.6	20.6
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	38.6	40.2	2.6	20.6	20.6
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	176	0	138	11	1396	1446	63	1448	1523
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.45	0.72	0.73	0.52	0.55	0.55
Avail Cap(c_a), veh/h	312	0	0	289	0	265	101	1396	1446	101	1448	1523
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.61	0.61	0.61	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	7.2	7.4	66.3	4.2	4.2
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	6.2	2.0	2.0	2.5	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	2.5	0.0	0.0	0.2	19.1	20.8	1.3	10.5	11.0
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	75.5	9.1	9.4	68.8	5.7	5.6
LnGrp LOS	E			E		E	E	A	A	E	A	A
Approach Vol, veh/h		11			66			2063			1658	
Approach Delay, s/veh		58.6			62.0			9.4			6.9	
Approach LOS		E			E			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	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	22.6		8.1	4.6	42.2		2.8
Green Ext Time (p_c), s	0.0	33.4		0.1	0.0	41.2		0.0

Intersection Summary		
HCM 2010 Ctrl Delay	9.4	
HCM 2010 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	1785	20	10	1320	200
Future Volume (veh/h)	90	5	5	105	15	15	5	1785	20	10	1320	200
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	98	5	3	114	16	12	5	1940	21	11	1435	157
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	198	20	15	7	2806	30	14	2782	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	1387	71	42	1312	184	138	1774	3587	39	1774	3539	1583
Grp Volume(v), veh/h	106	0	0	142	0	0	5	955	1006	11	1435	157
Grp Sat Flow(s),veh/h/ln	1500	0	0	1634	0	0	1774	1770	1856	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.3	30.6	30.9	0.7	17.5	2.8
Cycle Q Clear(g_c), s	7.9	0.0	0.0	9.8	0.0	0.0	0.3	30.6	30.9	0.7	17.5	2.8
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	1384	1452	14	2782	1245
V/C Ratio(X)	0.48	0.00	0.00	0.61	0.00	0.00	0.73	0.69	0.69	0.81	0.52	0.13
Avail Cap(c_a), veh/h	430	0	0	450	0	0	118	1384	1452	118	2782	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	0.83	0.83	0.83
Uniform Delay (d), s/veh	51.1	0.0	0.0	51.8	0.0	0.0	59.7	6.2	6.2	59.5	4.6	3.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.5	0.0	0.0	29.0	1.8	1.7	27.9	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	3.5	0.0	0.0	4.7	0.0	0.0	0.2	15.3	16.3	0.5	8.6	1.3
LnGrp Delay(d),s/veh	52.6	0.0	0.0	54.3	0.0	0.0	88.7	7.9	7.9	87.4	5.2	3.2
LnGrp LOS	D			D			F	A	A	F	A	A
Approach Vol, veh/h		106			142			1966			1603	
Approach Delay, s/veh		52.6			54.3			8.1			5.6	
Approach LOS		D			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.3		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	8.6	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.3	19.5		11.8	2.7	32.9		9.9
Green Ext Time (p_c), s	0.0	33.2		0.5	0.0	31.5		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	10.0
HCM 2010 LOS	B

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	1600	75	10	1355	75
Future Volume (veh/h)	150	30	20	145	25	35	25	1600	75	10	1355	75
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	163	33	2	158	27	5	27	1739	80	11	1473	79
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	234	38	270	313	264	49	34	2528	116	13	2467	132
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.04	1.00	1.00	0.01	0.72	0.71
Sat Flow, veh/h	1077	218	1559	1359	1525	282	1774	3447	158	1774	3417	183
Grp Volume(v), veh/h	196	0	2	158	0	32	27	888	931	11	760	792
Grp Sat Flow(s),veh/h/ln	1295	0	1559	1359	0	1807	1774	1770	1835	1774	1770	1831
Q Serve(g_s), s	18.9	0.0	0.1	0.0	0.0	2.1	2.1	0.0	0.0	0.9	29.3	29.7
Cycle Q Clear(g_c), s	21.0	0.0	0.1	13.3	0.0	2.1	2.1	0.0	0.0	0.9	29.3	29.7
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	272	0	270	313	0	313	34	1298	1346	13	1277	1321
V/C Ratio(X)	0.72	0.00	0.01	0.50	0.00	0.10	0.79	0.68	0.69	0.83	0.60	0.60
Avail Cap(c_a), veh/h	309	0	312	350	0	361	139	1298	1346	139	1277	1321
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	0.43	0.43	0.43	0.83	0.83	0.83
Uniform Delay (d), s/veh	57.5	0.0	47.9	53.3	0.0	48.8	67.0	0.0	0.0	69.4	9.5	9.6
Incr Delay (d2), s/veh	6.9	0.0	0.0	1.3	0.0	0.1	6.6	1.3	1.3	31.6	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	7.9	0.0	0.1	5.7	0.0	1.1	1.1	0.5	0.5	0.5	14.8	15.6
LnGrp Delay(d),s/veh	64.5	0.0	47.9	54.6	0.0	48.9	73.7	1.3	1.3	101.0	11.2	11.2
LnGrp LOS	E		D	D		D	E	A	A	F	B	B
Approach Vol, veh/h		198			190			1846			1563	
Approach Delay, s/veh		64.3			53.6			2.3			11.9	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	105.1		28.3	5.0	106.7		28.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	11.0	88.0		27.0	11.0	88.0		27.0
Max Q Clear Time (g_c+I1), s	4.1	31.7		15.3	2.9	2.0		23.0
Green Ext Time (p_c), s	0.0	27.6		0.5	0.0	45.9		0.3

Intersection Summary		
HCM 2010 Ctrl Delay	12.1	
HCM 2010 LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	110	35	95	75	735	25	895	120	545	915	20
Future Volume (veh/h)	15	110	35	95	75	735	25	895	120	545	915	20
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	16	120	5	103	82	469	27	973	51	592	995	21
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	55	368	357	376	599	505	34	1435	639	645	2033	43
Arrive On Green	0.23	0.23	0.23	0.06	0.32	0.32	0.02	0.41	0.41	0.37	1.00	1.00
Sat Flow, veh/h	114	1612	1565	1774	1863	1570	1774	3539	1576	3442	3544	75
Grp Volume(v), veh/h	136	0	5	103	82	469	27	973	51	592	497	519
Grp Sat Flow(s),veh/h/ln	1726	0	1565	1774	1863	1570	1774	1770	1576	1721	1770	1849
Q Serve(g_s), s	0.0	0.0	0.3	6.0	4.4	40.5	2.1	31.6	2.8	23.0	0.0	0.0
Cycle Q Clear(g_c), s	8.5	0.0	0.3	6.0	4.4	40.5	2.1	31.6	2.8	23.0	0.0	0.0
Prop In Lane	0.12		1.00	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	422	0	357	376	599	505	34	1435	639	645	1015	1061
V/C Ratio(X)	0.32	0.00	0.01	0.27	0.14	0.93	0.79	0.68	0.08	0.92	0.49	0.49
Avail Cap(c_a), veh/h	422	0	357	553	665	561	177	1435	639	836	1015	1061
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	1.00	0.79	0.79	0.79	0.69	0.69	0.69
Uniform Delay (d), s/veh	45.0	0.0	41.8	36.1	33.7	45.9	68.4	34.1	25.6	42.8	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.4	0.1	21.0	11.4	2.1	0.2	8.2	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	4.4	0.0	0.2	2.9	2.3	20.5	1.2	15.8	1.3	11.6	0.3	0.3
LnGrp Delay(d),s/veh	45.4	0.0	41.9	36.5	33.8	66.9	79.8	36.2	25.8	51.0	1.2	1.1
LnGrp LOS	D		D	D	C	E	E	D	C	D	A	A
Approach Vol, veh/h		141			654			1051			1608	
Approach Delay, s/veh		45.3			58.0			36.8			19.5	
Approach LOS		D			E			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	84.3	13.1	35.9	30.2	60.8		49.0
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	14.6	63.0	22.0	22.0	34.0	43.0		49.0
Max Q Clear Time (g_c+I1), s	2.1	2.0	8.0	10.5	25.0	33.6		42.5
Green Ext Time (p_c), s	0.0	13.3	0.3	0.4	1.3	5.8		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	33.1
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	30	725	25	0	830
Future Vol, veh/h	0	30	725	25	0	830
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	33	788	27	0	902

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	788	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	391	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	391	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	391	-
HCM Lane V/C Ratio	-	-	0.083	-
HCM Control Delay (s)	-	-	15	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.3	-

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	25	765	20	10	950
Future Vol, veh/h	50	25	765	20	10	950
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	832	22	11	1033

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1887	832	0	0	854	0
Stage 1	832	-	-	-	-	-
Stage 2	1055	-	-	-	-	-
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	77	369	-	-	785	-
Stage 1	427	-	-	-	-	-
Stage 2	335	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	76	369	-	-	785	-
Mov Cap-2 Maneuver	201	-	-	-	-	-
Stage 1	421	-	-	-	-	-
Stage 2	335	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.8	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	201	369	785	-
HCM Lane V/C Ratio	-	-	0.27	0.074	0.014	-
HCM Control Delay (s)	-	-	29.4	15.5	9.7	-
HCM Lane LOS	-	-	D	C	A	-
HCM 95th %tile Q(veh)	-	-	1.1	0.2	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	30	55	35	5	135	5	40	5	5	5	5	50
Future Vol, veh/h	30	55	35	5	135	5	40	5	5	5	5	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	-	-	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	33	60	38	5	147	5	43	5	5	5	5	54

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	152	0	0	98	0	0	334	307	79	310	324	150
Stage 1	-	-	-	-	-	-	145	145	-	160	160	-
Stage 2	-	-	-	-	-	-	189	162	-	150	164	-
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	1429	-	-	1495	-	-	620	607	981	642	594	896
Stage 1	-	-	-	-	-	-	858	777	-	842	766	-
Stage 2	-	-	-	-	-	-	813	764	-	853	762	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1429	-	-	1495	-	-	567	591	981	621	579	896
Mov Cap-2 Maneuver	-	-	-	-	-	-	567	591	-	621	579	-
Stage 1	-	-	-	-	-	-	838	759	-	823	764	-
Stage 2	-	-	-	-	-	-	756	762	-	823	744	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	0.3	11.7	9.7
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	595	1429	-	-	1495	-	-	828
HCM Lane V/C Ratio	0.091	0.023	-	-	0.004	-	-	0.079
HCM Control Delay (s)	11.7	7.6	-	-	7.4	-	-	9.7
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	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	15	20	25	5	10	5	80	5	5	5	5	50
Future Vol, veh/h	15	20	25	5	10	5	80	5	5	5	5	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	-	-	-	-	-	-	-	-	-	-	-	-
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	27	5	11	5	87	5	5	5	5	54

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	16	0	0	49	0	0	121	94	36	97	105	14
Stage 1	-	-	-	-	-	-	68	68	-	24	24	-
Stage 2	-	-	-	-	-	-	53	26	-	73	81	-
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	1602	-	-	1558	-	-	854	796	1037	885	785	1066
Stage 1	-	-	-	-	-	-	942	838	-	994	875	-
Stage 2	-	-	-	-	-	-	960	874	-	937	828	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1602	-	-	1558	-	-	798	786	1037	867	775	1066
Mov Cap-2 Maneuver	-	-	-	-	-	-	798	786	-	867	775	-
Stage 1	-	-	-	-	-	-	933	830	-	984	872	-
Stage 2	-	-	-	-	-	-	903	871	-	917	820	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	1.8	10.1	8.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	808	1602	-	-	1558	-	-	1015
HCM Lane V/C Ratio	0.121	0.01	-	-	0.003	-	-	0.064
HCM Control Delay (s)	10.1	7.3	0	-	7.3	0	-	8.8
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	20	5	5	65	5	5	5	5	5	5	10
Future Vol, veh/h	10	20	5	5	65	5	5	5	5	5	5	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	11	22	5	5	71	5	5	5	5	5	5	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	76	0	0	27	0	0	139	133	25	133	133	74
Stage 1	-	-	-	-	-	-	47	47	-	84	84	-
Stage 2	-	-	-	-	-	-	92	86	-	49	49	-
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	-	-	831	758	1051	839	758	988
Stage 1	-	-	-	-	-	-	967	856	-	924	825	-
Stage 2	-	-	-	-	-	-	915	824	-	964	854	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1523	-	-	1587	-	-	811	750	1051	824	750	988
Mov Cap-2 Maneuver	-	-	-	-	-	-	811	750	-	824	750	-
Stage 1	-	-	-	-	-	-	960	850	-	918	823	-
Stage 2	-	-	-	-	-	-	896	822	-	946	848	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.1	0.5	8.1	9.2
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1169	1523	-	-	1587	-	-	875
HCM Lane V/C Ratio	0.014	0.007	-	-	0.003	-	-	0.025
HCM Control Delay (s)	8.1	7.4	0	-	7.3	0	-	9.2
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	10	10	5	35	35	5
Future Vol, veh/h	10	10	5	35	35	5
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	5	38	38	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	22	0	65	17
Stage 1	-	-	-	-	17	-
Stage 2	-	-	-	-	48	-
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	-	941	1062
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	974	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1593	-	938	1062
Mov Cap-2 Maneuver	-	-	-	-	938	-
Stage 1	-	-	-	-	1003	-
Stage 2	-	-	-	-	974	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	952	-	-	1593	-
HCM Lane V/C Ratio	0.046	-	-	0.003	-
HCM Control Delay (s)	9	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2022 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	420	240	70	10	315	75
Future Volume (veh/h)	55	25	420	65	25	5	420	240	70	10	315	75
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	27	29	71	27	1	457	261	48	11	342	21
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	70	179	216	202	7	537	1082	920	15	534	454
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.30	0.58	0.58	0.01	0.29	0.29
Sat Flow, veh/h	909	621	1583	1342	1785	66	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	87	0	29	71	0	28	457	261	48	11	342	21
Grp Sat Flow(s),veh/h/ln	1529	0	1583	1342	0	1851	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	2.1	0.0	0.9	2.8	0.0	0.7	13.0	3.7	0.7	0.3	8.6	0.5
Cycle Q Clear(g_c), s	2.8	0.0	0.9	5.6	0.0	0.7	13.0	3.7	0.7	0.3	8.6	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	286	0	179	216	0	209	537	1082	920	15	534	454
V/C Ratio(X)	0.30	0.00	0.16	0.33	0.00	0.13	0.85	0.24	0.05	0.73	0.64	0.05
Avail Cap(c_a), veh/h	785	0	707	663	0	826	990	2738	2327	495	2218	1885
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	22.3	0.0	21.5	25.0	0.0	21.5	17.6	5.5	4.9	26.6	16.8	13.9
Incr Delay (d2), s/veh	0.6	0.0	0.4	0.9	0.0	0.3	3.9	0.2	0.0	50.3	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	1.3	0.0	0.4	1.1	0.0	0.4	6.9	2.0	0.3	0.4	4.8	0.2
LnGrp Delay(d),s/veh	22.9	0.0	22.0	25.9	0.0	21.8	21.5	5.7	4.9	76.9	19.5	14.0
LnGrp LOS	C		C	C		C	C	A	A	E	B	B
Approach Vol, veh/h		116			99			766			374	
Approach Delay, s/veh		22.7			24.7			15.1			20.9	
Approach LOS		C			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	37.2		11.1	21.3	21.4		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	5.7		4.8	15.0	10.6		7.6
Green Ext Time (p_c), s	0.0	3.8		0.5	1.3	4.8		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	18.0
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	20	175	50	15	10	220	655	50	25	665	80
Future Volume (veh/h)	75	20	175	50	15	10	220	655	50	25	665	80
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	22	14	54	16	1	239	712	0	27	723	48
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	259	56	210	226	231	14	411	1041	884	373	883	747
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.10	0.56	0.00	0.02	0.47	0.47
Sat Flow, veh/h	1074	424	1583	1367	1735	108	1774	1863	1583	1774	1863	1577
Grp Volume(v), veh/h	104	0	14	54	0	17	239	712	0	27	723	48
Grp Sat Flow(s),veh/h/ln	1498	0	1583	1367	0	1844	1774	1863	1583	1774	1863	1577
Q Serve(g_s), s	3.0	0.0	0.4	2.1	0.0	0.4	3.4	15.1	0.0	0.4	18.4	0.9
Cycle Q Clear(g_c), s	3.5	0.0	0.4	5.6	0.0	0.4	3.4	15.1	0.0	0.4	18.4	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	316	0	210	226	0	245	411	1041	884	373	883	747
V/C Ratio(X)	0.33	0.00	0.07	0.24	0.00	0.07	0.58	0.68	0.00	0.07	0.82	0.06
Avail Cap(c_a), veh/h	786	0	718	663	0	835	710	1722	1464	822	1722	1458
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	22.2	0.0	20.9	24.9	0.0	20.9	10.3	8.7	0.0	8.2	12.5	7.9
Incr Delay (d2), s/veh	0.6	0.0	0.1	0.5	0.0	0.1	1.3	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	1.5	0.0	0.2	0.8	0.0	0.2	1.9	7.7	0.0	0.2	9.7	0.4
LnGrp Delay(d),s/veh	22.8	0.0	21.1	25.4	0.0	21.0	11.7	9.5	0.0	8.3	14.4	7.9
LnGrp LOS	C		C	C		C	B	A		A	B	A
Approach Vol, veh/h		118			71			951			798	
Approach Delay, s/veh		22.6			24.4			10.0			13.8	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.0	36.8		12.3	10.7	32.1		12.3
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	17.1		5.5	5.4	20.4		7.6
Green Ext Time (p_c), s	0.0	5.5		0.5	0.5	5.7		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	12.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	50	100	120	50	65	170	885	135	110	780	75
Future Volume (veh/h)	60	50	100	120	50	65	170	885	135	110	780	75
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	54	56	130	54	6	185	962	101	120	848	36
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	86	89	160	274	229	218	1013	861	150	942	799
Arrive On Green	0.05	0.10	0.10	0.09	0.15	0.15	0.12	0.54	0.54	0.08	0.51	0.51
Sat Flow, veh/h	1774	823	854	1774	1863	1561	1774	1863	1583	1774	1863	1580
Grp Volume(v), veh/h	65	0	110	130	54	6	185	962	101	120	848	36
Grp Sat Flow(s),veh/h/ln	1774	0	1677	1774	1863	1561	1774	1863	1583	1774	1863	1580
Q Serve(g_s), s	4.1	0.0	7.1	8.1	2.9	0.4	11.5	55.0	3.5	7.5	46.6	1.3
Cycle Q Clear(g_c), s	4.1	0.0	7.1	8.1	2.9	0.4	11.5	55.0	3.5	7.5	46.6	1.3
Prop In Lane	1.00		0.51	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	85	0	175	160	274	229	218	1013	861	150	942	799
V/C Ratio(X)	0.77	0.00	0.63	0.81	0.20	0.03	0.85	0.95	0.12	0.80	0.90	0.05
Avail Cap(c_a), veh/h	314	0	312	314	347	290	393	1073	912	393	1073	910
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	53.1	0.0	48.4	50.4	42.3	41.2	48.5	24.3	12.5	50.8	25.3	14.1
Incr Delay (d2), s/veh	13.5	0.0	3.7	9.6	0.3	0.0	8.9	16.3	0.1	9.6	9.6	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	2.3	0.0	3.5	4.4	1.5	0.2	6.2	32.6	1.5	4.1	26.3	0.6
LnGrp Delay(d),s/veh	66.7	0.0	52.1	60.0	42.7	41.3	57.4	40.5	12.6	60.3	34.9	14.1
LnGrp LOS	E		D	E	D	D	E	D	B	E	C	B
Approach Vol, veh/h		175			190			1248			1004	
Approach Delay, s/veh		57.5			54.5			40.8			37.2	
Approach LOS		E			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.5	66.4	15.2	16.8	18.9	62.1	10.4	21.6
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	9.5	57.0	10.1	9.1	13.5	48.6	6.1	4.9
Green Ext Time (p_c), s	0.2	4.4	0.2	0.4	0.4	5.8	0.1	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	41.5
HCM 2010 LOS	D

Notes

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	1085	10	5	955	20
Future Volume (veh/h)	95	5	600	80	10	10	605	1085	10	5	955	20
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	103	5	0	87	11	9	658	1179	11	5	1038	6
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	192	6	138	180	15	12	696	2770	26	7	1354	606
Arrive On Green	0.10	0.09	0.00	0.10	0.09	0.09	0.39	0.77	0.77	0.00	0.38	0.38
Sat Flow, veh/h	1453	71	1583	1368	173	141	1774	3593	34	1774	3539	1583
Grp Volume(v), veh/h	108	0	0	107	0	0	658	581	609	5	1038	6
Grp Sat Flow(s),veh/h/ln	1524	0	1583	1682	0	0	1774	1770	1857	1774	1770	1583
Q Serve(g_s), s	0.9	0.0	0.0	0.0	0.0	0.0	39.0	12.2	12.2	0.3	27.9	0.3
Cycle Q Clear(g_c), s	7.2	0.0	0.0	6.3	0.0	0.0	39.0	12.2	12.2	0.3	27.9	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	212	0	138	223	0	0	696	1364	1431	7	1354	606
V/C Ratio(X)	0.51	0.00	0.00	0.48	0.00	0.00	0.95	0.43	0.43	0.73	0.77	0.01
Avail Cap(c_a), veh/h	475	0	436	456	0	0	1157	1364	1431	1157	1853	829
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	48.1	0.0	0.0	47.8	0.0	0.0	32.0	4.3	4.3	54.2	29.4	20.8
Incr Delay (d2), s/veh	1.9	0.0	0.0	1.6	0.0	0.0	7.2	0.5	0.4	42.1	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	3.2	0.0	0.0	3.2	0.0	0.0	20.4	6.0	6.3	0.2	14.0	0.1
LnGrp Delay(d),s/veh	50.0	0.0	0.0	49.4	0.0	0.0	39.2	4.7	4.7	96.2	31.6	20.8
LnGrp LOS	D			D			D	A	A	F	C	C
Approach Vol, veh/h		108			107			1848			1049	
Approach Delay, s/veh		50.0			49.4			17.0			31.9	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.7	47.6		14.5	4.4	89.9		14.5
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	7.0	57.0		27.0	7.0	57.0		30.0
Max Q Clear Time (g_c+I1), s	11.3	29.9		8.3	2.3	14.2		9.2
Green Ext Time (p_c), s	1.7	11.7		0.3	0.0	15.8		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	24.2
HCM 2010 LOS	C

Notes

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	1640	10	10	1625	60
Future Volume (veh/h)	55	5	140	15	0	5	135	1640	10	10	1625	60
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	60	5	5	16	0	1	147	1783	11	11	1766	40
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	226	16	173	176	2	7	178	2664	16	14	2287	1023
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	1377	140	1521	932	17	59	1774	3606	22	1774	3539	1582
Grp Volume(v), veh/h	65	0	5	17	0	0	147	874	920	11	1766	40
Grp Sat Flow(s),veh/h/ln	1517	0	1521	1008	0	0	1774	1770	1859	1774	1770	1582
Q Serve(g_s), s	0.0	0.0	0.3	1.0	0.0	0.0	8.2	25.6	25.7	0.6	35.4	0.9
Cycle Q Clear(g_c), s	3.4	0.0	0.3	4.4	0.0	0.0	8.2	25.6	25.7	0.6	35.4	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	257	0	173	195	0	0	178	1307	1373	14	2287	1023
V/C Ratio(X)	0.25	0.00	0.03	0.09	0.00	0.00	0.83	0.67	0.67	0.79	0.77	0.04
Avail Cap(c_a), veh/h	417	0	348	351	0	0	371	1514	1590	194	2676	1196
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	39.6	42.0	0.0	0.0	44.4	6.8	6.8	49.8	12.5	6.5
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.7	1.5	1.4	29.0	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	1.6	0.0	0.1	0.4	0.0	0.0	4.2	12.9	13.6	0.4	17.7	0.4
LnGrp Delay(d),s/veh	40.7	0.0	39.6	42.1	0.0	0.0	48.0	8.3	8.2	78.8	14.2	6.5
LnGrp LOS	D		D	D			D	A	A	E	B	A
Approach Vol, veh/h		70			17			1941			1817	
Approach Delay, s/veh		40.6			42.1			11.3			14.4	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.1	70.0		16.5	4.8	79.3		16.5
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.6	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	10.2	37.4		6.4	2.6	27.7		5.4
Green Ext Time (p_c), s	0.1	27.6		0.0	0.0	36.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	13.4
HCM 2010 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	1615	60	35	1770	105
Future Volume (veh/h)	85	5	175	70	5	50	125	1615	60	35	1770	105
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	92	5	44	76	5	2	136	1755	48	38	1924	91
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	216	138	174	70	157	2632	1177	49	2415	1081
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	1300	71	1563	1338	1261	505	1774	3539	1582	1774	3539	1583
Grp Volume(v), veh/h	97	0	44	76	0	7	136	1755	48	38	1924	91
Grp Sat Flow(s),veh/h/ln	1371	0	1563	1338	0	1766	1774	1770	1582	1774	1770	1583
Q Serve(g_s), s	10.5	0.0	4.1	9.2	0.0	0.6	12.5	41.6	1.3	3.5	62.4	3.2
Cycle Q Clear(g_c), s	11.1	0.0	4.1	20.3	0.0	0.6	12.5	41.6	1.3	3.5	62.4	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	216	138	0	244	157	2632	1177	49	2415	1081
V/C Ratio(X)	0.40	0.00	0.20	0.55	0.00	0.03	0.86	0.67	0.04	0.78	0.80	0.08
Avail Cap(c_a), veh/h	250	0	227	148	0	257	280	2632	1177	108	2415	1081
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.62	0.62	0.62	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	10.8	5.6	79.7	18.2	8.8
Incr Delay (d2), s/veh	1.1	0.0	0.5	3.7	0.0	0.0	3.5	0.9	0.0	9.3	2.8	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	4.1	0.0	1.8	3.6	0.0	0.3	6.3	20.5	0.6	1.8	31.1	1.4
LnGrp Delay(d),s/veh	67.0	0.0	63.6	79.2	0.0	61.6	77.7	11.6	5.6	89.0	21.1	9.0
LnGrp LOS	E		E	E		E	E	B	A	F	C	A
Approach Vol, veh/h		141			83			1939			2053	
Approach Delay, s/veh		65.9			77.7			16.1			21.8	
Approach LOS		E			E			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.6	118.6		27.8	8.6	128.7		27.8
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	26.6	100.0		24.0	10.0	116.0		24.0
Max Q Clear Time (g_c+I1), s	14.5	64.4		22.3	5.5	43.6		13.1
Green Ext Time (p_c), s	0.2	28.6		0.0	0.0	40.9		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	21.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	5	615	15	0	5	385	1625	10	80	1795	145
Future Volume (veh/h)	320	5	615	15	0	5	385	1625	10	80	1795	145
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	352	0	465	16	0	1	418	1766	11	87	1951	137
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	518	0	889	67	0	4	485	2453	15	114	2138	1181
Arrive On Green	0.15	0.00	0.14	0.04	0.00	0.03	0.14	0.68	0.67	0.06	0.60	0.60
Sat Flow, veh/h	3548	0	3122	1653	0	103	3442	3606	22	1774	3539	1583
Grp Volume(v), veh/h	352	0	465	17	0	0	418	866	911	87	1951	137
Grp Sat Flow(s),veh/h/ln	1774	0	1561	1756	0	0	1721	1770	1859	1774	1770	1583
Q Serve(g_s), s	21.9	0.0	29.2	2.2	0.0	0.0	27.6	71.3	71.5	11.2	113.2	5.6
Cycle Q Clear(g_c), s	21.9	0.0	29.2	2.2	0.0	0.0	27.6	71.3	71.5	11.2	113.2	5.6
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	518	0	889	71	0	0	485	1204	1265	114	2138	1181
V/C Ratio(X)	0.68	0.00	0.52	0.24	0.00	0.00	0.86	0.72	0.72	0.76	0.91	0.12
Avail Cap(c_a), veh/h	518	0	889	234	0	0	858	1475	1549	114	2296	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	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	94.2	0.0	70.4	108.3	0.0	0.0	97.8	23.3	23.3	107.1	40.7	8.2
Incr Delay (d2), s/veh	2.9	0.0	0.3	0.6	0.0	0.0	1.8	1.6	1.6	23.1	6.0	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	11.0	0.0	12.7	1.1	0.0	0.0	13.3	35.2	37.0	6.2	57.1	3.8
LnGrp Delay(d),s/veh	97.1	0.0	70.6	108.9	0.0	0.0	99.6	24.9	24.9	130.2	46.7	8.3
LnGrp LOS	F		E	F			F	C	C	F	D	A
Approach Vol, veh/h		817			17			2195			2175	
Approach Delay, s/veh		82.0			108.9			39.1			47.6	
Approach LOS		F			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	36.8	144.6		13.4	19.0	162.3		38.0
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	30.8	149.0		28.0	13.0	192.0		31.0
Max Q Clear Time (g_c+I1), s	29.6	115.2		4.2	13.2	73.5		31.2
Green Ext Time (p_c), s	1.1	23.4		0.0	0.0	28.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	49.6
HCM 2010 LOS	D

Notes

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	1955	90	90	2350	5
Future Volume (veh/h)	10	0	5	90	5	65	10	1955	90	90	2350	5
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	2125	96	98	2554	5
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	155	2	10	176	95	57	22	2628	118	122	2964	6
Arrive On Green	0.09	0.00	0.08	0.09	0.09	0.08	0.02	1.00	1.00	0.07	0.82	0.81
Sat Flow, veh/h	1234	24	114	1410	1092	655	1774	3450	155	1774	3624	7
Grp Volume(v), veh/h	12	0	0	98	0	8	11	1082	1139	98	1247	1312
Grp Sat Flow(s),veh/h/ln	1373	0	0	1410	0	1747	1774	1770	1835	1774	1770	1861
Q Serve(g_s), s	0.9	0.0	0.0	8.0	0.0	0.6	0.9	0.0	0.0	7.9	62.9	63.1
Cycle Q Clear(g_c), s	1.5	0.0	0.0	9.5	0.0	0.6	0.9	0.0	0.0	7.9	62.9	63.1
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	1348	1398	122	1448	1523
V/C Ratio(X)	0.07	0.00	0.00	0.56	0.00	0.05	0.50	0.80	0.81	0.80	0.86	0.86
Avail Cap(c_a), veh/h	278	0	0	287	0	289	61	1348	1398	184	1448	1523
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	0.52	0.52	0.52	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.3	0.0	0.0	64.6	0.0	60.9	70.3	0.0	0.0	66.6	8.1	8.1
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.7	0.0	0.1	3.4	2.7	2.9	8.0	6.9	6.7
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	0.5	0.0	0.0	4.0	0.0	0.3	0.5	1.0	1.1	4.1	32.6	34.5
LnGrp Delay(d),s/veh	61.5	0.0	0.0	67.4	0.0	61.0	73.7	2.7	2.9	74.5	15.1	14.8
LnGrp LOS	E			E		E	E	A	A	E	B	B
Approach Vol, veh/h		12			106			2232			2657	
Approach Delay, s/veh		61.5			66.9			3.1			17.1	
Approach LOS		E			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.8	122.6		16.6	14.0	114.4		16.6
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	5.8	103.0		23.0	15.0	93.0		23.0
Max Q Clear Time (g_c+I1), s	2.9	65.1		11.5	9.9	2.0		3.5
Green Ext Time (p_c), s	0.0	36.4		0.2	0.1	69.7		0.0

Intersection Summary		
HCM 2010 Ctrl Delay	12.1	
HCM 2010 LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	15	10	60	5	10	5	1865	20	5	1990	340
Future Volume (veh/h)	190	15	10	60	5	10	5	1865	20	5	1990	340
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	207	16	9	65	5	7	5	2027	21	5	2163	290
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	287	23	26	7	2649	27	7	2612	1169
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	1324	102	58	1375	130	151	1774	3589	37	1774	3539	1583
Grp Volume(v), veh/h	232	0	0	77	0	0	5	998	1050	5	2163	290
Grp Sat Flow(s),veh/h/ln	1484	0	0	1656	0	0	1774	1770	1856	1774	1770	1583
Q Serve(g_s), s	16.3	0.0	0.0	0.0	0.0	0.0	0.4	6.0	6.2	0.4	59.7	8.5
Cycle Q Clear(g_c), s	22.0	0.0	0.0	5.7	0.0	0.0	0.4	6.0	6.2	0.4	59.7	8.5
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	307	0	0	336	0	0	7	1306	1370	7	2612	1169
V/C Ratio(X)	0.75	0.00	0.00	0.23	0.00	0.00	0.75	0.76	0.77	0.75	0.83	0.25
Avail Cap(c_a), veh/h	362	0	0	391	0	0	37	1306	1370	37	2612	1169
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	0.52	0.52	0.52	0.34	0.34	0.34
Uniform Delay (d), s/veh	58.0	0.0	0.0	51.7	0.0	0.0	72.1	0.4	0.4	72.2	12.8	6.1
Incr Delay (d2), s/veh	7.4	0.0	0.0	0.3	0.0	0.0	26.8	2.3	2.2	18.6	1.1	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	9.7	0.0	0.0	2.7	0.0	0.0	0.2	2.7	2.8	0.2	29.2	3.8
LnGrp Delay(d),s/veh	65.4	0.0	0.0	52.0	0.0	0.0	98.9	2.7	2.6	90.8	13.9	6.3
LnGrp LOS	E			D			F	A	A	F	B	A
Approach Vol, veh/h		232			77			2053			2458	
Approach Delay, s/veh		65.4			52.0			2.9			13.2	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	111.0		29.4	4.5	111.0		29.4
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	3.6	98.0		30.0	3.0	98.0		30.0
Max Q Clear Time (g_c+I1), s	2.4	61.7		7.7	2.4	8.2		24.0
Green Ext Time (p_c), s	0.0	34.7		0.2	0.0	73.9		0.4

Intersection Summary		
HCM 2010 Ctrl Delay	11.9	
HCM 2010 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	1655	105	30	1920	160
Future Volume (veh/h)	190	35	45	95	25	20	55	1655	105	30	1920	160
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	207	38	10	103	27	2	60	1799	111	33	2087	170
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	268	41	309	357	342	25	73	2350	144	42	2242	180
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.19	0.08	1.00	1.00	0.05	1.00	1.00
Sat Flow, veh/h	1111	204	1545	1347	1710	127	1774	3388	207	1774	3318	267
Grp Volume(v), veh/h	245	0	10	103	0	29	60	931	979	33	1100	1157
Grp Sat Flow(s),veh/h/ln	1315	0	1545	1347	0	1837	1774	1770	1826	1774	1770	1815
Q Serve(g_s), s	24.9	0.0	0.8	0.0	0.0	1.9	4.8	0.0	0.0	2.7	0.0	0.0
Cycle Q Clear(g_c), s	26.7	0.0	0.8	8.2	0.0	1.9	4.8	0.0	0.0	2.7	0.0	0.0
Prop In Lane	0.84		1.00	1.00		0.07	1.00		0.11	1.00		0.15
Lane Grp Cap(c), veh/h	309	0	309	357	0	367	73	1227	1266	42	1196	1227
V/C Ratio(X)	0.79	0.00	0.03	0.29	0.00	0.08	0.82	0.76	0.77	0.79	0.92	0.94
Avail Cap(c_a), veh/h	309	0	309	357	0	367	73	1227	1266	73	1196	1227
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	0.23	0.23	0.23	0.45	0.45	0.45
Uniform Delay (d), s/veh	58.0	0.0	46.7	49.7	0.0	47.2	66.0	0.0	0.0	68.7	0.0	0.0
Incr Delay (d2), s/veh	13.2	0.0	0.0	0.4	0.0	0.1	14.4	1.1	1.1	5.3	6.5	8.3
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	10.8	0.0	0.3	3.6	0.0	1.0	2.6	0.4	0.4	1.4	2.2	2.8
LnGrp Delay(d),s/veh	71.2	0.0	46.7	50.1	0.0	47.3	80.3	1.1	1.1	74.0	6.5	8.3
LnGrp LOS	E		D	D		D	F	A	A	E	A	A
Approach Vol, veh/h		255			132			1970			2290	
Approach Delay, s/veh		70.3			49.5			3.5			8.4	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	102.0		33.0	7.4	104.6		33.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	6.0	97.0		28.0	6.0	97.0		28.0
Max Q Clear Time (g_c+I1), s	10.8	2.0		10.2	4.7	2.0		28.7
Green Ext Time (p_c), s	0.0	72.1		0.4	0.0	51.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	10.9
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	185	60	125	110	740	55	1005	195	655	1270	65
Future Volume (veh/h)	65	185	60	125	110	740	55	1005	195	655	1270	65
Number	7	4	14	3	8	18	1	6	16	5	2	12
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	1.00		0.98	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	71	201	13	136	120	496	60	1092	132	712	1380	69
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	112	273	385	246	630	527	77	1276	566	751	1837	92
Arrive On Green	0.25	0.25	0.25	0.06	0.34	0.34	0.04	0.36	0.36	0.44	1.00	1.00
Sat Flow, veh/h	326	1099	1549	1774	1863	1558	1774	3539	1570	3442	3430	171
Grp Volume(v), veh/h	272	0	13	136	120	496	60	1092	132	712	711	738
Grp Sat Flow(s),veh/h/ln	1425	0	1549	1774	1863	1558	1774	1770	1570	1721	1770	1831
Q Serve(g_s), s	21.9	0.0	0.9	8.1	6.6	44.8	4.9	41.4	8.5	28.8	0.0	0.0
Cycle Q Clear(g_c), s	25.3	0.0	0.9	8.1	6.6	44.8	4.9	41.4	8.5	28.8	0.0	0.0
Prop In Lane	0.26		1.00	1.00		1.00	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	386	0	385	246	630	527	77	1276	566	751	948	981
V/C Ratio(X)	0.70	0.00	0.03	0.55	0.19	0.94	0.78	0.86	0.23	0.95	0.75	0.75
Avail Cap(c_a), veh/h	414	0	417	246	668	559	110	1276	566	807	948	981
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	1.00	0.88	0.88	0.88	0.24	0.24	0.24
Uniform Delay (d), s/veh	50.0	0.0	41.3	38.7	33.9	46.6	68.7	42.9	32.4	40.1	0.0	0.0
Incr Delay (d2), s/veh	5.0	0.0	0.0	2.6	0.1	23.7	11.0	6.7	0.8	6.4	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	10.7	0.0	0.4	4.1	3.4	22.7	2.6	21.4	3.8	14.2	0.4	0.4
LnGrp Delay(d),s/veh	54.9	0.0	41.3	41.4	34.1	70.2	79.7	49.5	33.2	46.5	1.3	1.3
LnGrp LOS	D		D	D	C	E	E	D	C	D	A	A
Approach Vol, veh/h		285			752			1284			2161	
Approach Delay, s/veh		54.3			59.2			49.3			16.2	
Approach LOS		D			E			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	10.3	81.7	13.0	40.1	35.6	56.3		53.1
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	9.6	71.0	8.0	38.0	34.0	46.0		51.0
Max Q Clear Time (g_c+I1), s	10.9	2.0	10.1	27.3	30.8	43.4		46.8
Green Ext Time (p_c), s	0.0	26.1	0.0	1.0	0.8	2.1		1.3

Intersection Summary	
HCM 2010 Ctrl Delay	35.3
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	45	935	75	0	890
Future Vol, veh/h	0	45	935	75	0	890
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	49	1016	82	0	967

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1016	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	289	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	289	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	289	-
HCM Lane V/C Ratio	-	-	0.169	-
HCM Control Delay (s)	-	-	20	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.6	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	55	35	1125	70	35	965
Future Vol, veh/h	55	35	1125	70	35	965
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	38	1223	76	38	1049

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2348	1223	0	0	1299	0
Stage 1	1223	-	-	-	-	-
Stage 2	1125	-	-	-	-	-
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	~ 40	219	-	-	533	-
Stage 1	278	-	-	-	-	-
Stage 2	310	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 37	219	-	-	533	-
Mov Cap-2 Maneuver	138	-	-	-	-	-
Stage 1	258	-	-	-	-	-
Stage 2	310	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	40.1	0	0.4
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	138	219	533	-
HCM Lane V/C Ratio	-	-	0.433	0.174	0.071	-
HCM Control Delay (s)	-	-	49.7	24.9	12.3	-
HCM Lane LOS	-	-	E	C	B	-
HCM 95th %tile Q(veh)	-	-	1.9	0.6	0.2	-

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

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	75	125	95	5	85	5	80	15	5	10	20	70
Future Vol, veh/h	75	125	95	5	85	5	80	15	5	10	20	70
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	82	136	103	5	92	5	87	16	5	11	22	76

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	97	0	0	239	0	0	506	459	188	467	508	95
Stage 1	-	-	-	-	-	-	352	352	-	105	105	-
Stage 2	-	-	-	-	-	-	154	107	-	362	403	-
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	1496	-	-	1328	-	-	477	499	854	506	468	962
Stage 1	-	-	-	-	-	-	665	632	-	901	808	-
Stage 2	-	-	-	-	-	-	848	807	-	657	600	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1496	-	-	1328	-	-	404	470	854	468	440	962
Mov Cap-2 Maneuver	-	-	-	-	-	-	404	470	-	468	440	-
Stage 1	-	-	-	-	-	-	628	597	-	851	805	-
Stage 2	-	-	-	-	-	-	757	804	-	600	567	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	0.4	16.4	10.9
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	424	1496	-	-	1328	-	-	716
HCM Lane V/C Ratio	0.256	0.054	-	-	0.004	-	-	0.152
HCM Control Delay (s)	16.4	7.5	-	-	7.7	-	-	10.9
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1	0.2	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	50	15	80	5	20	5	45	5	5	5	5	30
Future Vol, veh/h	50	15	80	5	20	5	45	5	5	5	5	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	54	16	87	5	22	5	49	5	5	5	5	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	27	0	0	103	0	0	222	205	60	208	246	25
Stage 1	-	-	-	-	-	-	168	168	-	35	35	-
Stage 2	-	-	-	-	-	-	54	37	-	173	211	-
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	1587	-	-	1489	-	-	734	691	1005	749	656	1051
Stage 1	-	-	-	-	-	-	834	759	-	981	866	-
Stage 2	-	-	-	-	-	-	958	864	-	829	728	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1587	-	-	1489	-	-	686	664	1005	718	630	1051
Mov Cap-2 Maneuver	-	-	-	-	-	-	686	664	-	718	630	-
Stage 1	-	-	-	-	-	-	804	732	-	946	863	-
Stage 2	-	-	-	-	-	-	920	861	-	789	702	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.5	1.2	10.6	9.1
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	704	1587	-	-	1489	-	-	921
HCM Lane V/C Ratio	0.085	0.034	-	-	0.004	-	-	0.047
HCM Control Delay (s)	10.6	7.3	0	-	7.4	0	-	9.1
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	65	15	5	40	10	25	5	5	30	5	25
Future Vol, veh/h	30	65	15	5	40	10	25	5	5	30	5	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	33	71	16	5	43	11	27	5	5	33	5	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	54	0	0	87	0	0	220	209	79	209	212	49
Stage 1	-	-	-	-	-	-	145	145	-	59	59	-
Stage 2	-	-	-	-	-	-	75	64	-	150	153	-
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	-	-	736	688	981	748	685	1020
Stage 1	-	-	-	-	-	-	858	777	-	953	846	-
Stage 2	-	-	-	-	-	-	934	842	-	853	771	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1551	-	-	1509	-	-	698	671	981	726	668	1020
Mov Cap-2 Maneuver	-	-	-	-	-	-	698	671	-	726	668	-
Stage 1	-	-	-	-	-	-	839	760	-	932	843	-
Stage 2	-	-	-	-	-	-	901	839	-	824	754	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2	0.7	10.2	9.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	724	1551	-	-	1509	-	-	818
HCM Lane V/C Ratio	0.053	0.021	-	-	0.004	-	-	0.08
HCM Control Delay (s)	10.2	7.4	0	-	7.4	0	-	9.8
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	45	45	5	25	25	5
Future Vol, veh/h	45	45	5	25	25	5
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	49	5	27	27	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	98	0	111	74
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	37	-
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	-	-	1495	-	886	988
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	985	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1495	-	883	988
Mov Cap-2 Maneuver	-	-	-	-	883	-
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	985	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	899	-	-	1495	-
HCM Lane V/C Ratio	0.036	-	-	0.004	-
HCM Control Delay (s)	9.2	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2022 Scenario 3 WE Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	45	385	45	50	20	325	365	40	20	325	90
Future Volume (veh/h)	40	45	385	45	50	20	325	365	40	20	325	90
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	49	34	49	54	10	353	397	25	22	353	28
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	120	188	228	183	34	437	1004	852	28	575	488
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.25	0.54	0.54	0.02	0.31	0.31
Sat Flow, veh/h	534	998	1564	1299	1526	283	1774	1863	1580	1774	1863	1581
Grp Volume(v), veh/h	92	0	34	49	0	64	353	397	25	22	353	28
Grp Sat Flow(s),veh/h/ln	1532	0	1564	1299	0	1809	1774	1863	1580	1774	1863	1581
Q Serve(g_s), s	1.2	0.0	1.0	1.8	0.0	1.6	9.2	6.1	0.4	0.6	8.0	0.6
Cycle Q Clear(g_c), s	2.8	0.0	1.0	4.6	0.0	1.6	9.2	6.1	0.4	0.6	8.0	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	291	0	188	228	0	217	437	1004	852	28	575	488
V/C Ratio(X)	0.32	0.00	0.18	0.22	0.00	0.29	0.81	0.40	0.03	0.78	0.61	0.06
Avail Cap(c_a), veh/h	866	0	763	705	0	882	1082	2991	2537	541	2423	2056
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	19.5	22.5	0.0	19.7	17.5	6.6	5.3	24.1	14.5	12.0
Incr Delay (d2), s/veh	0.6	0.0	0.5	0.5	0.0	0.7	3.6	0.5	0.0	36.4	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	1.2	0.0	0.4	0.7	0.0	0.8	4.9	3.2	0.2	0.6	4.4	0.3
LnGrp Delay(d),s/veh	20.8	0.0	19.9	22.9	0.0	20.5	21.1	7.2	5.3	60.5	16.8	12.1
LnGrp LOS	C		B	C		C	C	A	A	E	B	B
Approach Vol, veh/h		126			113			775			403	
Approach Delay, s/veh		20.6			21.6			13.4			18.8	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.8	32.5		10.9	17.1	21.2		10.9
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	2.6	8.1		4.8	11.2	10.0		6.6
Green Ext Time (p_c), s	0.0	5.8		0.5	1.0	5.0		0.4

Intersection Summary		
HCM 2010 Ctrl Delay		16.3
HCM 2010 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	560	30	15	590	60
Future Volume (veh/h)	55	20	240	50	15	5	170	560	30	15	590	60
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	22	21	54	16	1	185	609	0	16	641	27
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	265	78	222	276	248	15	420	966	821	398	817	692
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.09	0.52	0.00	0.01	0.44	0.44
Sat Flow, veh/h	966	547	1556	1339	1733	108	1774	1863	1583	1774	1863	1578
Grp Volume(v), veh/h	82	0	21	54	0	17	185	609	0	16	641	27
Grp Sat Flow(s),veh/h/ln	1513	0	1556	1339	0	1841	1774	1863	1583	1774	1863	1578
Q Serve(g_s), s	1.5	0.0	0.6	1.9	0.0	0.4	2.6	11.5	0.0	0.2	14.4	0.5
Cycle Q Clear(g_c), s	2.3	0.0	0.6	4.1	0.0	0.4	2.6	11.5	0.0	0.2	14.4	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	344	0	222	276	0	263	420	966	821	398	817	692
V/C Ratio(X)	0.24	0.00	0.09	0.20	0.00	0.06	0.44	0.63	0.00	0.04	0.79	0.04
Avail Cap(c_a), veh/h	884	0	794	768	0	939	800	1938	1648	920	1938	1642
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	18.9	0.0	18.2	20.8	0.0	18.2	8.7	8.4	0.0	8.1	11.8	7.9
Incr Delay (d2), s/veh	0.4	0.0	0.2	0.3	0.0	0.1	0.7	0.7	0.0	0.0	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	1.0	0.0	0.3	0.7	0.0	0.2	1.3	5.9	0.0	0.1	7.7	0.2
LnGrp Delay(d),s/veh	19.3	0.0	18.4	21.2	0.0	18.3	9.5	9.1	0.0	8.1	13.5	7.9
LnGrp LOS	B		B	C		B	A	A		A	B	A
Approach Vol, veh/h		103			71			794			684	
Approach Delay, s/veh		19.1			20.5			9.2			13.1	
Approach LOS		B			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.6	31.4		12.0	9.5	27.5		12.0
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.6	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.2	13.5		4.3	4.6	16.4		6.1
Green Ext Time (p_c), s	0.0	4.5		0.4	0.3	4.8		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	11.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	70	90	190	75	100	85	635	175	145	690	50
Future Volume (veh/h)	45	70	90	190	75	100	85	635	175	145	690	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	49	76	64	207	82	18	92	690	125	158	750	22
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	63	104	88	245	400	340	120	788	670	196	867	736
Arrive On Green	0.04	0.11	0.11	0.14	0.21	0.21	0.07	0.42	0.42	0.11	0.47	0.47
Sat Flow, veh/h	1774	929	783	1774	1863	1583	1774	1863	1583	1774	1863	1582
Grp Volume(v), veh/h	49	0	140	207	82	18	92	690	125	158	750	22
Grp Sat Flow(s),veh/h/ln	1774	0	1712	1774	1863	1583	1774	1863	1583	1774	1863	1582
Q Serve(g_s), s	2.5	0.0	7.3	10.5	3.3	0.8	4.7	31.4	4.6	8.0	33.3	0.7
Cycle Q Clear(g_c), s	2.5	0.0	7.3	10.5	3.3	0.8	4.7	31.4	4.6	8.0	33.3	0.7
Prop In Lane	1.00		0.46	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	63	0	192	245	400	340	120	788	670	196	867	736
V/C Ratio(X)	0.78	0.00	0.73	0.84	0.21	0.05	0.77	0.88	0.19	0.81	0.86	0.03
Avail Cap(c_a), veh/h	384	0	389	384	423	360	480	1311	1114	480	1311	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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.2	0.0	39.7	38.8	29.8	28.8	42.4	24.4	16.7	40.1	22.1	13.4
Incr Delay (d2), s/veh	18.0	0.0	5.3	9.6	0.3	0.1	9.8	3.9	0.1	7.6	4.1	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	3.7	5.8	1.7	0.4	2.6	17.0	2.0	4.4	18.1	0.3
LnGrp Delay(d),s/veh	62.2	0.0	44.9	48.4	30.0	28.9	52.1	28.3	16.8	47.8	26.2	13.4
LnGrp LOS	E		D	D	C	C	D	C	B	D	C	B
Approach Vol, veh/h		189			307			907			930	
Approach Delay, s/veh		49.4			42.4			29.2			29.5	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.2	44.1	17.8	15.3	11.2	48.0	8.3	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	10.3	33.4	12.5	9.3	6.7	35.3	4.5	5.3
Green Ext Time (p_c), s	0.3	5.7	0.3	0.5	0.2	5.9	0.1	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	32.7
HCM 2010 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	865	5	0	945	70
Future Volume (veh/h)	75	10	595	10	0	5	410	865	5	0	945	70
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	82	11	0	11	0	1	446	940	5	0	1027	40
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	14	128	211	3	11	500	2791	15	2	1552	692
Arrive On Green	0.09	0.08	0.00	0.09	0.00	0.08	0.28	0.77	0.77	0.00	0.44	0.44
Sat Flow, veh/h	1296	174	1583	1470	43	138	1774	3610	19	1774	3539	1578
Grp Volume(v), veh/h	93	0	0	12	0	0	446	461	484	0	1027	40
Grp Sat Flow(s),veh/h/ln	1469	0	1583	1650	0	0	1774	1770	1859	1774	1770	1578
Q Serve(g_s), s	4.1	0.0	0.0	0.0	0.0	0.0	18.2	6.0	6.0	0.0	17.3	1.1
Cycle Q Clear(g_c), s	4.6	0.0	0.0	0.5	0.0	0.0	18.2	6.0	6.0	0.0	17.3	1.1
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	228	0	128	247	0	0	500	1368	1438	2	1552	692
V/C Ratio(X)	0.41	0.00	0.00	0.05	0.00	0.00	0.89	0.34	0.34	0.00	0.66	0.06
Avail Cap(c_a), veh/h	687	0	630	638	0	0	1670	1368	1438	1670	2675	1193
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	33.5	0.0	0.0	31.6	0.0	0.0	26.0	2.6	2.6	0.0	16.7	12.2
Incr Delay (d2), s/veh	1.2	0.0	0.0	0.1	0.0	0.0	2.3	0.3	0.3	0.0	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	1.9	0.0	0.0	0.2	0.0	0.0	9.2	2.9	3.1	0.0	8.6	0.5
LnGrp Delay(d),s/veh	34.6	0.0	0.0	31.7	0.0	0.0	28.3	2.9	2.9	0.0	17.8	12.3
LnGrp LOS	C			C			C	A	A		B	B
Approach Vol, veh/h		93			12			1391			1067	
Approach Delay, s/veh		34.6			31.7			11.1			17.6	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.2	39.1		11.1	0.0	64.3		11.1
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	7.0	57.0		27.0	71.0	57.0		30.0
Max Q Clear Time (g_c+I1), s	0.2	19.3		2.5	0.0	8.0		6.6
Green Ext Time (p_c), s	1.0	13.8		0.0	0.0	11.4		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	14.7
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	5	145	15	5	15	105	1210	20	10	1495	70
Future Volume (veh/h)	65	5	145	15	5	15	105	1210	20	10	1495	70
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	71	5	5	16	5	1	114	1315	21	11	1625	47
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	142	134	33	4	145	2618	42	14	2339	1044
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	1423	130	1547	653	354	48	1774	3565	57	1774	3539	1580
Grp Volume(v), veh/h	76	0	5	22	0	0	114	652	684	11	1625	47
Grp Sat Flow(s),veh/h/ln	1553	0	1547	1055	0	0	1774	1770	1853	1774	1770	1580
Q Serve(g_s), s	0.0	0.0	0.2	0.3	0.0	0.0	5.3	13.1	13.1	0.5	24.3	0.9
Cycle Q Clear(g_c), s	3.4	0.0	0.2	3.7	0.0	0.0	5.3	13.1	13.1	0.5	24.3	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	244	0	142	183	0	0	145	1299	1360	14	2339	1044
V/C Ratio(X)	0.31	0.00	0.04	0.12	0.00	0.00	0.79	0.50	0.50	0.77	0.69	0.05
Avail Cap(c_a), veh/h	497	0	421	448	0	0	441	1800	1885	231	3182	1420
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	35.9	0.0	35.0	35.4	0.0	0.0	38.1	4.7	4.7	41.8	9.0	5.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.1	0.0	0.0	3.6	0.6	0.6	26.5	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	1.7	0.0	0.1	0.5	0.0	0.0	2.7	6.6	6.9	0.4	12.0	0.4
LnGrp Delay(d),s/veh	36.2	0.0	35.0	35.5	0.0	0.0	41.7	5.4	5.3	68.3	9.8	5.0
LnGrp LOS	D		C	D			D	A	A	E	A	A
Approach Vol, veh/h		81			22			1450			1683	
Approach Delay, s/veh		36.1			35.5			8.2			10.1	
Approach LOS		D			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.9	60.9		12.8	4.7	67.1		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	7.3	26.3		5.7	2.5	15.1		5.4
Green Ext Time (p_c), s	0.1	29.5		0.0	0.0	22.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	10.1
HCM 2010 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	1265	50	35	1560	85
Future Volume (veh/h)	75	5	180	45	5	40	110	1265	50	35	1560	85
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	5	12	49	5	3	120	1375	34	38	1696	53
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	259	13	219	193	152	91	153	2328	1042	61	2145	960
Arrive On Green	0.15	0.14	0.14	0.14	0.14	0.14	0.09	0.66	0.66	0.03	0.61	0.61
Sat Flow, veh/h	1300	96	1576	1386	1090	654	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	87	0	12	49	0	8	120	1375	34	38	1696	53
Grp Sat Flow(s),veh/h/ln	1396	0	1576	1386	0	1744	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	4.8	0.0	0.6	3.0	0.0	0.4	5.9	19.3	0.7	1.9	32.2	1.2
Cycle Q Clear(g_c), s	5.1	0.0	0.6	8.1	0.0	0.4	5.9	19.3	0.7	1.9	32.2	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	289	0	219	193	0	242	153	2328	1042	61	2145	960
V/C Ratio(X)	0.30	0.00	0.05	0.25	0.00	0.03	0.79	0.59	0.03	0.63	0.79	0.06
Avail Cap(c_a), veh/h	474	0	426	375	0	471	419	2749	1230	240	2391	1070
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	34.8	0.0	33.2	38.9	0.0	33.1	39.8	8.5	5.3	42.3	13.2	7.1
Incr Delay (d2), s/veh	0.6	0.0	0.1	0.7	0.0	0.1	3.4	0.5	0.0	3.9	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	2.0	0.0	0.3	1.2	0.0	0.2	3.0	9.5	0.3	1.0	16.2	0.5
LnGrp Delay(d),s/veh	35.4	0.0	33.3	39.6	0.0	33.1	43.2	9.0	5.3	46.2	15.4	7.2
LnGrp LOS	D		C	D		C	D	A	A	D	B	A
Approach Vol, veh/h		99			57			1529			1787	
Approach Delay, s/veh		35.1			38.7			11.6			15.8	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.6	59.8		17.3	7.0	64.4		17.3
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.6	60.0		24.0	12.0	69.0		24.0
Max Q Clear Time (g_c+I1), s	7.9	34.2		10.1	3.9	21.3		7.1
Green Ext Time (p_c), s	0.2	19.6		0.1	0.0	22.6		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	14.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	5	445	15	5	20	290	1340	15	60	1525	170
Future Volume (veh/h)	280	5	445	15	5	20	290	1340	15	60	1525	170
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	308	0	271	16	5	7	315	1457	16	65	1658	156
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	461	0	777	44	14	19	422	2328	26	113	2090	1129
Arrive On Green	0.13	0.00	0.12	0.04	0.04	0.02	0.12	0.65	0.64	0.06	0.59	0.59
Sat Flow, veh/h	3548	0	3167	992	310	434	3442	3586	39	1774	3539	1583
Grp Volume(v), veh/h	308	0	271	28	0	0	315	719	754	65	1658	156
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1737	0	0	1721	1770	1856	1774	1770	1583
Q Serve(g_s), s	11.8	0.0	10.1	2.2	0.0	0.0	12.6	34.2	34.2	5.1	51.4	4.5
Cycle Q Clear(g_c), s	11.8	0.0	10.1	2.2	0.0	0.0	12.6	34.2	34.2	5.1	51.4	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	461	0	777	77	0	0	422	1149	1205	113	2090	1129
V/C Ratio(X)	0.67	0.00	0.35	0.36	0.00	0.00	0.75	0.63	0.63	0.57	0.79	0.14
Avail Cap(c_a), veh/h	848	0	1122	378	0	0	1402	2412	2529	187	3754	1873
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	59.0	0.0	44.3	66.4	0.0	0.0	60.3	14.8	14.8	64.7	22.4	6.5
Incr Delay (d2), s/veh	0.6	0.0	0.1	1.1	0.0	0.0	1.0	0.8	0.8	1.7	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	5.8	0.0	4.4	1.1	0.0	0.0	6.1	16.8	17.7	2.5	25.2	2.8
LnGrp Delay(d),s/veh	59.6	0.0	44.4	67.5	0.0	0.0	61.3	15.6	15.5	66.4	23.5	6.6
LnGrp LOS	E		D	E			E	B	B	E	C	A
Approach Vol, veh/h		579			28			1788			1879	
Approach Delay, s/veh		52.5			67.4			23.6			23.5	
Approach LOS		D			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	21.4	88.1		10.3	13.1	96.4		22.5
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	14.6	53.4		4.2	7.1	36.2		13.8
Green Ext Time (p_c), s	0.9	28.7		0.0	0.0	17.3		1.7

Intersection Summary	
HCM 2010 Ctrl Delay	27.8
HCM 2010 LOS	C

Notes

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	1510	90	95	1945	10
Future Volume (veh/h)	5	0	5	135	5	70	5	1510	90	95	1945	10
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1641	95	103	2114	11
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2414	139	129	2801	15
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	1140	37	235	1410	856	856	1774	3402	196	1774	3610	19
Grp Volume(v), veh/h	6	0	0	147	0	10	5	849	887	103	1035	1090
Grp Sat Flow(s),veh/h/ln	1412	0	0	1410	0	1712	1774	1770	1828	1774	1770	1859
Q Serve(g_s), s	0.0	0.0	0.0	12.4	0.0	0.7	0.4	9.7	10.2	7.4	41.1	41.3
Cycle Q Clear(g_c), s	0.7	0.0	0.0	13.0	0.0	0.7	0.4	9.7	10.2	7.4	41.1	41.3
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	1256	1297	129	1373	1443
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.68	0.68	0.80	0.75	0.76
Avail Cap(c_a), veh/h	312	0	0	318	0	316	150	1256	1297	150	1373	1443
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	0.76	0.76	0.76	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	0.0	0.0	55.3	0.0	50.2	64.2	1.3	1.4	59.3	7.9	7.9
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.8	0.0	0.1	7.5	2.2	2.2	19.3	3.9	3.7
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	5.3	0.0	0.3	0.2	4.8	5.3	4.3	21.0	22.4
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.3	71.8	3.6	3.6	78.6	11.7	11.6
LnGrp LOS	D			E		D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1741			2228	
Approach Delay, s/veh		50.0			57.6			3.8			14.8	
Approach LOS		D			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.8	104.9		20.3	13.5	96.2		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	12.4	43.3		15.0	9.4	12.2		2.7
Green Ext Time (p_c), s	0.0	32.9		0.3	0.0	37.7		0.0

Intersection Summary		
HCM 2010 Ctrl Delay	11.8	
HCM 2010 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	1435	15	10	1710	280
Future Volume (veh/h)	150	5	15	65	5	15	15	1435	15	10	1710	280
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	163	5	14	71	5	9	16	1560	15	11	1859	227
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	2718	26	13	2668	1193
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	1338	41	115	1347	129	175	1774	3592	35	1774	3539	1582
Grp Volume(v), veh/h	182	0	0	85	0	0	16	768	807	11	1859	227
Grp Sat Flow(s),veh/h/ln	1494	0	0	1651	0	0	1774	1770	1857	1774	1770	1582
Q Serve(g_s), s	9.4	0.0	0.0	0.0	0.0	0.0	1.2	24.2	24.3	0.8	35.4	5.4
Cycle Q Clear(g_c), s	15.2	0.0	0.0	5.8	0.0	0.0	1.2	24.2	24.3	0.8	35.4	5.4
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	287	0	0	19	1339	1405	13	2668	1193
V/C Ratio(X)	0.68	0.00	0.00	0.30	0.00	0.00	0.84	0.57	0.57	0.82	0.70	0.19
Avail Cap(c_a), veh/h	347	0	0	368	0	0	109	1339	1405	109	2668	1193
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.68	0.68	0.68	0.55	0.55	0.55
Uniform Delay (d), s/veh	54.0	0.0	0.0	50.2	0.0	0.0	64.2	6.8	6.8	64.4	8.3	4.6
Incr Delay (d2), s/veh	3.6	0.0	0.0	0.6	0.0	0.0	21.2	1.2	1.2	21.2	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	6.6	0.0	0.0	2.8	0.0	0.0	0.7	12.2	12.8	0.5	17.4	2.4
LnGrp Delay(d),s/veh	57.6	0.0	0.0	50.8	0.0	0.0	85.4	8.0	8.0	85.6	9.1	4.8
LnGrp LOS	E			D			F	A	A	F	A	A
Approach Vol, veh/h		182			85			1591			2097	
Approach Delay, s/veh		57.6			50.8			8.8			9.1	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	15.4	102.0		22.6	5.0	102.4		22.6
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.6	83.0		25.0	8.0	83.0		25.0
Max Q Clear Time (g_c+I1), s	13.2	37.4		7.8	2.8	26.3		17.2
Green Ext Time (p_c), s	0.0	39.9		0.2	0.0	37.2		0.4

Intersection Summary		
HCM 2010 Ctrl Delay	12.1	
HCM 2010 LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	205	20	50	90	20	20	60	1450	60	15	1710	140
Future Volume (veh/h)	205	20	50	90	20	20	60	1450	60	15	1710	140
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	223	22	12	98	22	4	65	1576	63	16	1859	148
Adj No. of Lanes	0	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	304	25	327	398	318	58	83	2392	95	19	2173	171
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.20	0.06	0.92	0.91	0.01	0.87	0.86
Sat Flow, veh/h	1209	119	1576	1381	1533	279	1774	3469	138	1774	3325	261
Grp Volume(v), veh/h	245	0	12	98	0	26	65	801	838	16	978	1029
Grp Sat Flow(s),veh/h/ln	1328	0	1576	1381	0	1812	1774	1770	1837	1774	1770	1816
Q Serve(g_s), s	22.1	0.0	0.8	0.0	0.0	1.5	4.7	12.3	12.6	1.2	35.4	39.3
Cycle Q Clear(g_c), s	23.6	0.0	0.8	6.3	0.0	1.5	4.7	12.3	12.6	1.2	35.4	39.3
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	328	0	327	398	0	376	83	1220	1267	19	1157	1187
V/C Ratio(X)	0.75	0.00	0.04	0.25	0.00	0.07	0.79	0.66	0.66	0.84	0.85	0.87
Avail Cap(c_a), veh/h	372	0	376	441	0	432	109	1220	1267	109	1157	1187
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	0.51	0.51	0.51	0.62	0.62	0.62
Uniform Delay (d), s/veh	50.9	0.0	41.1	43.3	0.0	41.5	60.3	2.2	2.2	64.0	5.3	5.6
Incr Delay (d2), s/veh	7.1	0.0	0.0	0.3	0.0	0.1	9.4	1.4	1.4	19.8	5.0	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	9.2	0.0	0.3	3.0	0.0	0.8	2.5	6.0	6.3	0.7	17.7	20.4
LnGrp Delay(d),s/veh	58.0	0.0	41.2	43.7	0.0	41.6	69.7	3.6	3.6	83.8	10.2	11.2
LnGrp LOS	E		D	D		D	E	A	A	F	B	B
Approach Vol, veh/h		257			124			1704			2023	
Approach Delay, s/veh		57.2			43.2			6.1			11.3	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.1	89.0		31.0	5.4	93.6		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	78.0		30.0	8.0	78.0		30.0
Max Q Clear Time (g_c+I1), s	10.7	41.3		8.3	3.2	14.6		25.6
Green Ext Time (p_c), s	0.0	29.9		0.4	0.0	32.2		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	13.0
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	150	90	145	130	715	80	785	195	610	1010	105
Future Volume (veh/h)	65	150	90	145	130	715	80	785	195	610	1010	105
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.96	1.00		0.97	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	71	163	11	158	141	392	87	853	125	663	1098	109
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	107	192	281	250	576	477	110	1354	597	743	1745	173
Arrive On Green	0.19	0.19	0.19	0.09	0.31	0.31	0.06	0.38	0.38	0.14	0.36	0.35
Sat Flow, veh/h	379	1032	1514	1774	1863	1542	1774	3539	1561	3442	3252	323
Grp Volume(v), veh/h	234	0	11	158	141	392	87	853	125	663	597	610
Grp Sat Flow(s),veh/h/ln	1411	0	1514	1774	1863	1542	1774	1770	1561	1721	1770	1805
Q Serve(g_s), s	18.8	0.0	0.8	9.0	7.4	30.6	6.3	25.5	7.0	24.6	36.3	36.4
Cycle Q Clear(g_c), s	20.9	0.0	0.8	9.0	7.4	30.6	6.3	25.5	7.0	24.6	36.3	36.4
Prop In Lane	0.30		1.00	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	298	0	281	250	576	477	110	1354	597	743	950	969
V/C Ratio(X)	0.78	0.00	0.04	0.63	0.24	0.82	0.79	0.63	0.21	0.89	0.63	0.63
Avail Cap(c_a), veh/h	318	0	303	276	630	522	328	1354	597	953	950	969
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	1.00	0.79	0.79	0.79	0.39	0.39	0.39
Uniform Delay (d), s/veh	51.3	0.0	43.4	37.9	33.6	41.6	60.2	32.6	26.9	54.1	30.9	31.0
Incr Delay (d2), s/veh	11.5	0.0	0.1	4.0	0.2	9.5	3.8	1.8	0.6	3.3	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	9.1	0.0	0.3	4.6	3.8	14.3	3.2	12.8	3.1	12.1	18.1	18.5
LnGrp Delay(d),s/veh	62.8	0.0	43.5	41.9	33.8	51.1	64.0	34.4	27.6	57.4	32.2	32.2
LnGrp LOS	E		D	D	C	D	E	C	C	E	C	C
Approach Vol, veh/h		245			691			1065			1870	
Approach Delay, s/veh		61.9			45.5			36.0			41.1	
Approach LOS		E			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	12.0	73.8	16.0	28.2	32.1	53.7		44.2
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	9.3	38.4	11.0	22.9	26.6	27.5		32.6
Green Ext Time (p_c), s	0.1	7.1	0.1	0.2	1.5	5.5		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	41.8
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	70	685	95	0	880
Future Vol, veh/h	0	70	685	95	0	880
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	76	745	103	0	957

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	745	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	414	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	414	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.6	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	414	-
HCM Lane V/C Ratio	-	-	0.184	-
HCM Control Delay (s)	-	-	15.6	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.7	-

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	75	45	855	90	50	925
Future Vol, veh/h	75	45	855	90	50	925
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	82	49	929	98	54	1005

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2042	929	0	0	1027	0
Stage 1	929	-	-	-	-	-
Stage 2	1113	-	-	-	-	-
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	~ 62	324	-	-	676	-
Stage 1	385	-	-	-	-	-
Stage 2	314	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 57	324	-	-	676	-
Mov Cap-2 Maneuver	162	-	-	-	-	-
Stage 1	354	-	-	-	-	-
Stage 2	314	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	36.7	0	0.6
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	162	324	676	-
HCM Lane V/C Ratio	-	-	0.503	0.151	0.08	-
HCM Control Delay (s)	-	-	47.8	18.1	10.8	-
HCM Lane LOS	-	-	E	C	B	-
HCM 95th %tile Q(veh)	-	-	2.4	0.5	0.3	-

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

Intersection	
Int Delay, s/veh	8.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	115	125	150	5	110	5	135	5	5	5	5	120
Future Vol, veh/h	115	125	150	5	110	5	135	5	5	5	5	120
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	125	136	163	5	120	5	147	5	5	5	5	130

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	125	0	0	299	0	0	668	603	218	606	682	123
Stage 1	-	-	-	-	-	-	468	468	-	133	133	-
Stage 2	-	-	-	-	-	-	200	135	-	473	549	-
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	1462	-	-	1262	-	-	372	413	822	409	372	928
Stage 1	-	-	-	-	-	-	575	561	-	870	786	-
Stage 2	-	-	-	-	-	-	802	785	-	572	516	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1462	-	-	1262	-	-	294	376	822	375	339	928
Mov Cap-2 Maneuver	-	-	-	-	-	-	294	376	-	375	339	-
Stage 1	-	-	-	-	-	-	526	513	-	796	783	-
Stage 2	-	-	-	-	-	-	682	782	-	514	472	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0.3	29.1	10.3
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	303	1462	-	-	1262	-	-	826
HCM Lane V/C Ratio	0.52	0.085	-	-	0.004	-	-	0.171
HCM Control Delay (s)	29.1	7.7	-	-	7.9	-	-	10.3
HCM Lane LOS	D	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	2.8	0.3	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	20	70	5	25	5	55	5	5	5	5	35
Future Vol, veh/h	40	20	70	5	25	5	55	5	5	5	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	-	-	-	-	-	-	-	-	-	-	-	-
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	43	22	76	5	27	5	60	5	5	5	5	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	32	0	0	98	0	0	207	188	60	191	224	30
Stage 1	-	-	-	-	-	-	146	146	-	40	40	-
Stage 2	-	-	-	-	-	-	61	42	-	151	184	-
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	1580	-	-	1495	-	-	751	707	1005	769	675	1044
Stage 1	-	-	-	-	-	-	857	776	-	975	862	-
Stage 2	-	-	-	-	-	-	950	860	-	851	747	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1580	-	-	1495	-	-	701	684	1005	742	653	1044
Mov Cap-2 Maneuver	-	-	-	-	-	-	701	684	-	742	653	-
Stage 1	-	-	-	-	-	-	832	753	-	947	859	-
Stage 2	-	-	-	-	-	-	907	857	-	816	725	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	1.1	10.6	9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	716	1580	-	-	1495	-	-	939
HCM Lane V/C Ratio	0.099	0.028	-	-	0.004	-	-	0.052
HCM Control Delay (s)	10.6	7.3	0	-	7.4	0	-	9
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	50	55	35	5	45	5	30	5	5	5	5	45
Future Vol, veh/h	50	55	35	5	45	5	30	5	5	5	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	-	-	-	-	-	-	-	-	-	-	-	-
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	60	38	5	49	5	33	5	5	5	5	49

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	54	0	0	98	0	0	276	251	79	254	268	52
Stage 1	-	-	-	-	-	-	187	187	-	62	62	-
Stage 2	-	-	-	-	-	-	89	64	-	192	206	-
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	-	-	1495	-	-	676	652	981	699	638	1016
Stage 1	-	-	-	-	-	-	815	745	-	949	843	-
Stage 2	-	-	-	-	-	-	918	842	-	810	731	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1551	-	-	1495	-	-	620	626	981	670	612	1016
Mov Cap-2 Maneuver	-	-	-	-	-	-	620	626	-	670	612	-
Stage 1	-	-	-	-	-	-	785	717	-	914	840	-
Stage 2	-	-	-	-	-	-	866	839	-	770	704	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.6	0.7	10.9	9.2
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	651	1551	-	-	1495	-	-	918
HCM Lane V/C Ratio	0.067	0.035	-	-	0.004	-	-	0.065
HCM Control Delay (s)	10.9	7.4	0	-	7.4	0	-	9.2
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	30	30	5	25	25	5
Future Vol, veh/h	30	30	5	25	25	5
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	33	33	5	27	27	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	66	0	87	50
Stage 1	-	-	-	-	50	-
Stage 2	-	-	-	-	37	-
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	-	-	1536	-	914	1018
Stage 1	-	-	-	-	972	-
Stage 2	-	-	-	-	985	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1536	-	911	1018
Mov Cap-2 Maneuver	-	-	-	-	911	-
Stage 1	-	-	-	-	969	-
Stage 2	-	-	-	-	985	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	927	-	-	1536	-
HCM Lane V/C Ratio	0.035	-	-	0.004	-
HCM Control Delay (s)	9	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2027 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	310	95	50	20	255	280	115	10	210	30
Future Volume (veh/h)	50	45	310	95	50	20	255	280	115	10	210	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	54	49	40	103	54	10	277	304	63	11	228	9
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	326	257	48	364	815	693	15	449	382
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	611	1002	1569	1294	1527	283	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	103	0	40	103	0	64	277	304	63	11	228	9
Grp Sat Flow(s),veh/h/ln	1613	0	1569	1294	0	1810	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	0.4	0.0	0.9	3.2	0.0	1.3	6.1	4.6	1.0	0.3	4.4	0.2
Cycle Q Clear(g_c), s	2.1	0.0	0.9	5.3	0.0	1.3	6.1	4.6	1.0	0.3	4.4	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	326	0	305	364	815	693	15	449	382
V/C Ratio(X)	0.26	0.00	0.15	0.32	0.00	0.21	0.76	0.37	0.09	0.72	0.51	0.02
Avail Cap(c_a), veh/h	1033	0	908	856	0	1047	1282	3546	3014	641	2873	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	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.2	0.0	14.7	17.5	0.0	14.9	15.5	7.8	6.8	20.5	13.6	12.0
Incr Delay (d2), s/veh	0.3	0.0	0.3	0.6	0.0	0.3	3.3	0.6	0.1	47.6	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	1.1	0.0	0.4	1.2	0.0	0.7	3.3	2.4	0.4	0.3	2.5	0.1
LnGrp Delay(d),s/veh	15.5	0.0	15.0	18.1	0.0	15.2	18.8	8.5	7.0	68.1	15.5	12.1
LnGrp LOS	B		B	B		B	B	A	A	E	B	B
Approach Vol, veh/h		143			167			644			248	
Approach Delay, s/veh		15.4			17.0			12.8			17.7	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	24.2		12.0	13.5	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	6.6		4.1	8.1	6.4		7.3
Green Ext Time (p_c), s	0.0	4.6		0.6	0.8	3.0		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	14.7
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	5	190	95	20	15	155	620	20	10	615	65
Future Volume (veh/h)	60	5	190	95	20	15	155	620	20	10	615	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	5	19	103	22	2	168	674	0	11	668	31
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	360	23	305	324	332	30	371	961	817	323	815	688
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.09	0.52	0.00	0.01	0.44	0.44
Sat Flow, veh/h	1208	118	1543	1352	1679	153	1774	1863	1583	1774	1863	1572
Grp Volume(v), veh/h	70	0	19	103	0	24	168	674	0	11	668	31
Grp Sat Flow(s),veh/h/ln	1326	0	1543	1352	0	1831	1774	1863	1583	1774	1863	1572
Q Serve(g_s), s	2.3	0.0	0.6	4.1	0.0	0.6	2.7	15.8	0.0	0.2	18.1	0.7
Cycle Q Clear(g_c), s	2.9	0.0	0.6	7.0	0.0	0.6	2.7	15.8	0.0	0.2	18.1	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	383	0	305	324	0	362	371	961	817	323	815	688
V/C Ratio(X)	0.18	0.00	0.06	0.32	0.00	0.07	0.45	0.70	0.00	0.03	0.82	0.05
Avail Cap(c_a), veh/h	707	0	669	643	0	794	678	1648	1401	770	1648	1391
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	19.9	0.0	18.8	22.7	0.0	18.8	10.7	10.6	0.0	10.0	14.2	9.3
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.6	0.0	0.1	0.9	0.9	0.0	0.0	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	1.0	0.0	0.3	1.6	0.0	0.3	1.4	8.3	0.0	0.1	9.8	0.3
LnGrp Delay(d),s/veh	20.1	0.0	18.9	23.2	0.0	18.9	11.6	11.5	0.0	10.1	16.3	9.3
LnGrp LOS	C		B	C		B	B	B		B	B	A
Approach Vol, veh/h		89			127			842			710	
Approach Delay, s/veh		19.8			22.4			11.5			15.9	
Approach LOS		B			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	35.7		16.4	10.0	31.2		16.4
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	17.8		4.9	4.7	20.1		9.0
Green Ext Time (p_c), s	0.0	5.1		0.4	0.3	5.1		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	14.5
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	20	125	175	50	135	60	600	130	130	715	30
Future Volume (veh/h)	45	20	125	175	50	135	60	600	130	130	715	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	49	22	4	190	54	20	65	652	88	141	777	16
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	63	186	34	230	402	339	85	781	664	178	879	748
Arrive On Green	0.04	0.12	0.12	0.13	0.22	0.22	0.05	0.42	0.42	0.10	0.47	0.47
Sat Flow, veh/h	1774	1530	278	1774	1863	1575	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	49	0	26	190	54	20	65	652	88	141	777	16
Grp Sat Flow(s),veh/h/ln	1774	0	1808	1774	1863	1575	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	2.4	0.0	1.1	9.1	2.0	0.9	3.2	27.3	3.0	6.8	33.0	0.5
Cycle Q Clear(g_c), s	2.4	0.0	1.1	9.1	2.0	0.9	3.2	27.3	3.0	6.8	33.0	0.5
Prop In Lane	1.00		0.15	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	63	0	219	230	402	339	85	781	664	178	879	748
V/C Ratio(X)	0.78	0.00	0.12	0.83	0.13	0.06	0.76	0.83	0.13	0.79	0.88	0.02
Avail Cap(c_a), veh/h	406	0	434	406	448	378	507	1385	1177	507	1385	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	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	41.8	0.0	34.2	37.1	27.7	27.2	41.1	22.7	15.6	38.4	20.9	12.3
Incr Delay (d2), s/veh	18.2	0.0	0.2	7.3	0.2	0.1	13.1	2.4	0.1	7.6	4.5	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	1.5	0.0	0.6	5.0	1.1	0.4	1.9	14.5	1.3	3.7	17.9	0.2
LnGrp Delay(d),s/veh	60.0	0.0	34.5	44.4	27.8	27.3	54.3	25.1	15.7	46.0	25.3	12.3
LnGrp LOS	E		C	D	C	C	D	C	B	D	C	B
Approach Vol, veh/h		75			264			805			934	
Approach Delay, s/veh		51.2			39.7			26.4			28.2	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.8	41.7	16.3	15.6	9.2	46.3	8.1	23.8
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	11.8	29.3	11.1	3.1	5.2	35.0	4.4	4.0
Green Ext Time (p_c), s	0.3	5.2	0.3	0.1	0.1	6.3	0.1	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	29.8
HCM 2010 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	760	45	10	1005	15
Future Volume (veh/h)	40	10	480	20	5	0	315	760	45	10	1005	15
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	43	11	0	22	5	0	342	826	48	11	1092	7
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	177	25	111	179	29	0	401	2374	138	15	1701	761
Arrive On Green	0.08	0.07	0.00	0.08	0.07	0.00	0.23	0.70	0.70	0.01	0.48	0.48
Sat Flow, veh/h	1160	364	1583	1172	414	0	1774	3400	198	1774	3539	1583
Grp Volume(v), veh/h	54	0	0	27	0	0	342	430	444	11	1092	7
Grp Sat Flow(s),veh/h/ln	1525	0	1583	1586	0	0	1774	1770	1828	1774	1770	1583
Q Serve(g_s), s	1.2	0.0	0.0	0.0	0.0	0.0	12.4	6.5	6.5	0.4	15.5	0.2
Cycle Q Clear(g_c), s	2.1	0.0	0.0	0.9	0.0	0.0	12.4	6.5	6.5	0.4	15.5	0.2
Prop In Lane	0.80		1.00	0.81		0.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	226	0	111	232	0	0	401	1236	1276	15	1701	761
V/C Ratio(X)	0.24	0.00	0.00	0.12	0.00	0.00	0.85	0.35	0.35	0.75	0.64	0.01
Avail Cap(c_a), veh/h	781	0	708	717	0	0	1878	1504	1554	1878	3008	1346
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	29.6	0.0	0.0	29.1	0.0	0.0	24.9	4.0	4.0	33.2	13.1	9.1
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	2.0	0.4	0.3	24.1	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	1.0	0.0	0.0	0.5	0.0	0.0	6.3	3.2	3.3	0.3	7.8	0.1
LnGrp Delay(d),s/veh	30.1	0.0	0.0	29.3	0.0	0.0	26.9	4.4	4.4	57.2	13.9	9.1
LnGrp LOS	C			C			C	A	A	E	B	A
Approach Vol, veh/h		54			27			1216			1110	
Approach Delay, s/veh		30.1			29.3			10.7			14.3	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.1	38.2		9.7	4.6	52.8		9.7
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	7.1	57.0		27.0	71.0	57.0		30.0
Max Q Clear Time (g_c+I1), s	14.4	17.5		2.9	2.4	8.5		4.1
Green Ext Time (p_c), s	0.8	14.7		0.1	0.0	10.2		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	13.0
HCM 2010 LOS	B

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	1170	20	20	1480	75
Future Volume (veh/h)	35	0	70	10	5	10	135	1170	20	20	1480	75
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	38	0	1	11	5	1	147	1272	21	22	1609	53
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	0	71	103	21	3	183	2724	45	26	2391	1070
Arrive On Green	0.06	0.00	0.04	0.06	0.04	0.04	0.10	0.76	0.76	0.01	0.68	0.68
Sat Flow, veh/h	1559	0	1583	633	475	69	1774	3563	59	1774	3539	1583
Grp Volume(v), veh/h	38	0	1	17	0	0	147	632	661	22	1609	53
Grp Sat Flow(s),veh/h/ln	1559	0	1583	1178	0	0	1774	1770	1852	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	0.3	0.0	0.0	6.4	10.4	10.4	1.0	21.4	0.9
Cycle Q Clear(g_c), s	1.6	0.0	0.0	1.9	0.0	0.0	6.4	10.4	10.4	1.0	21.4	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	180	0	71	142	0	0	183	1353	1416	26	2391	1070
V/C Ratio(X)	0.21	0.00	0.01	0.12	0.00	0.00	0.80	0.47	0.47	0.85	0.67	0.05
Avail Cap(c_a), veh/h	524	0	459	517	0	0	469	1918	2008	246	3390	1516
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	36.5	0.0	36.2	36.6	0.0	0.0	34.8	3.4	3.4	39.0	7.7	4.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.1	0.5	0.5	23.9	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	0.8	0.0	0.0	0.4	0.0	0.0	3.3	5.1	5.3	0.6	10.5	0.4
LnGrp Delay(d),s/veh	36.7	0.0	36.3	36.7	0.0	0.0	37.9	4.0	3.9	62.9	8.4	4.4
LnGrp LOS	D		D	D			D	A	A	E	A	A
Approach Vol, veh/h		39			17			1440			1684	
Approach Delay, s/veh		36.7			36.7			7.4			8.9	
Approach LOS		D			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.2	58.6		8.5	5.2	65.7		8.5
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	8.4	23.4		3.9	3.0	12.4		3.6
Green Ext Time (p_c), s	0.1	30.2		0.0	0.0	21.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.7
HCM 2010 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	1325	60	30	1415	50
Future Volume (veh/h)	60	5	35	40	15	50	110	1325	60	30	1415	50
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	5	1	43	16	1	120	1440	48	33	1538	39
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	2756	1233	43	2560	1145
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	1202	111	1579	1401	1735	108	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	70	0	1	43	0	17	120	1440	48	33	1538	39
Grp Sat Flow(s),veh/h/ln	1313	0	1579	1401	0	1843	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	7.1	0.0	0.1	4.7	0.0	1.3	10.3	23.5	1.1	2.9	33.0	1.1
Cycle Q Clear(g_c), s	8.4	0.0	0.1	13.1	0.0	1.3	10.3	23.5	1.1	2.9	33.0	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	2756	1233	43	2560	1145
V/C Ratio(X)	0.40	0.00	0.01	0.39	0.00	0.09	0.85	0.52	0.04	0.76	0.60	0.03
Avail Cap(c_a), veh/h	254	0	244	187	0	285	240	2756	1233	240	2560	1145
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	67.0	0.0	62.8	72.8	0.0	63.4	70.4	6.4	3.9	75.2	10.5	6.1
Incr Delay (d2), s/veh	1.4	0.0	0.0	2.2	0.0	0.2	3.8	0.5	0.0	9.7	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	0.0	1.9	0.0	0.7	5.2	11.6	0.5	1.5	16.4	0.5
LnGrp Delay(d),s/veh	68.5	0.0	62.8	75.0	0.0	63.6	74.2	6.9	4.0	84.8	11.6	6.1
LnGrp LOS	E		E	E		E	E	A	A	F	B	A
Approach Vol, veh/h		71			60			1608			1610	
Approach Delay, s/veh		68.4			71.8			11.8			12.9	
Approach LOS		E			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.4	118.1		20.5	7.8	126.7		20.5
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	21.6	95.0		24.0	21.0	95.0		24.0
Max Q Clear Time (g_c+I1), s	12.3	35.0		15.1	4.9	25.5		10.4
Green Ext Time (p_c), s	0.1	29.9		0.1	0.0	28.5		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.6
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	10	235	10	10	10	460	1380	15	85	1335	125
Future Volume (veh/h)	155	10	235	10	10	10	460	1380	15	85	1335	125
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	176	0	70	11	11	3	500	1500	16	92	1451	101
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	329	0	837	57	57	15	626	2244	24	146	1861	964
Arrive On Green	0.09	0.00	0.08	0.07	0.07	0.05	0.18	0.63	0.61	0.08	0.53	0.53
Sat Flow, veh/h	3548	0	3073	783	783	213	3442	3587	38	1774	3539	1578
Grp Volume(v), veh/h	176	0	70	25	0	0	500	740	776	92	1451	101
Grp Sat Flow(s),veh/h/ln	1774	0	1537	1779	0	0	1721	1770	1856	1774	1770	1578
Q Serve(g_s), s	6.0	0.0	2.2	1.7	0.0	0.0	17.5	33.8	33.9	6.3	41.5	3.4
Cycle Q Clear(g_c), s	6.0	0.0	2.2	1.7	0.0	0.0	17.5	33.8	33.9	6.3	41.5	3.4
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	329	0	837	129	0	0	626	1107	1161	146	1861	964
V/C Ratio(X)	0.54	0.00	0.08	0.19	0.00	0.00	0.80	0.67	0.67	0.63	0.78	0.10
Avail Cap(c_a), veh/h	958	0	1382	438	0	0	1586	2727	2861	211	4246	2027
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	54.5	0.0	34.6	55.1	0.0	0.0	49.3	15.2	15.2	55.9	24.0	10.2
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.7	0.0	0.0	0.9	1.0	1.0	1.7	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	0.9	0.8	0.0	0.0	8.4	16.7	17.6	3.2	20.4	1.8
LnGrp Delay(d),s/veh	55.0	0.0	34.6	55.8	0.0	0.0	50.2	16.2	16.2	57.6	25.0	10.3
LnGrp LOS	E		C	E			D	B	B	E	C	B
Approach Vol, veh/h		246			25			2016			1644	
Approach Delay, s/veh		49.2			55.8			24.6			25.9	
Approach LOS		D			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.9	70.2		13.1	14.4	82.7		15.7
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	10.5	43.5		3.7	8.3	35.9		8.0
Green Ext Time (p_c), s	1.4	20.7		0.0	0.1	18.5		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	26.9
HCM 2010 LOS	C

Notes

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	1860	90	35	1525	5
Future Volume (veh/h)	5	5	5	60	0	45	5	1860	90	35	1525	5
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	5	1	65	0	1	5	2022	96	38	1658	5
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	80	13	176	0	138	11	2715	128	63	2963	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	584	895	148	1372	0	1543	1774	3441	162	1774	3619	11
Grp Volume(v), veh/h	11	0	0	65	0	1	5	1032	1086	38	810	853
Grp Sat Flow(s),veh/h/ln	1627	0	0	1372	0	1543	1774	1770	1834	1774	1770	1861
Q Serve(g_s), s	0.0	0.0	0.0	5.4	0.0	0.1	0.4	41.3	43.0	3.0	21.5	21.5
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.1	0.0	0.1	0.4	41.3	43.0	3.0	21.5	21.5
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	176	0	138	11	1396	1447	63	1448	1523
V/C Ratio(X)	0.06	0.00	0.00	0.37	0.00	0.01	0.45	0.74	0.75	0.60	0.56	0.56
Avail Cap(c_a), veh/h	312	0	0	289	0	265	101	1396	1447	101	1448	1523
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	7.5	7.7	66.5	4.3	4.3
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	5.9	2.1	2.1	3.4	1.6	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	2.5	0.0	0.0	0.2	20.6	22.3	1.5	11.0	11.5
LnGrp Delay(d),s/veh	58.6	0.0	0.0	62.0	0.0	58.6	75.2	9.5	9.8	69.9	5.8	5.7
LnGrp LOS	E			E		E	E	A	A	E	A	A
Approach Vol, veh/h		11			66			2123			1701	
Approach Delay, s/veh		58.6			62.0			9.8			7.2	
Approach LOS		E			E			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	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	23.5		8.1	5.0	45.0		2.8
Green Ext Time (p_c), s	0.0	34.8		0.1	0.0	40.8		0.0

Intersection Summary		
HCM 2010 Ctrl Delay	9.7	
HCM 2010 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	15	5	1830	20	10	1345	210
Future Volume (veh/h)	95	5	5	105	15	15	5	1830	20	10	1345	210
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	103	5	3	114	16	12	5	1989	22	11	1462	166
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	15	7	2808	31	14	2785	1246
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	1391	68	41	1323	186	139	1774	3586	40	1774	3539	1583
Grp Volume(v), veh/h	111	0	0	142	0	0	5	980	1031	11	1462	166
Grp Sat Flow(s),veh/h/ln	1499	0	0	1647	0	0	1774	1770	1856	1774	1770	1583
Q Serve(g_s), s	0.0	0.0	0.0	1.3	0.0	0.0	0.3	32.3	32.6	0.7	18.0	3.0
Cycle Q Clear(g_c), s	8.3	0.0	0.0	9.6	0.0	0.0	0.3	32.3	32.6	0.7	18.0	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	221	0	0	234	0	0	7	1386	1453	14	2785	1246
V/C Ratio(X)	0.50	0.00	0.00	0.61	0.00	0.00	0.73	0.71	0.71	0.81	0.52	0.13
Avail Cap(c_a), veh/h	430	0	0	451	0	0	118	1386	1453	118	2785	1246
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.82	0.82	0.82
Uniform Delay (d), s/veh	51.3	0.0	0.0	51.9	0.0	0.0	59.7	6.3	6.4	59.5	4.6	3.0
Incr Delay (d2), s/veh	1.8	0.0	0.0	2.5	0.0	0.0	29.4	1.9	1.9	27.6	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	3.7	0.0	0.0	4.7	0.0	0.0	0.2	16.3	17.1	0.5	8.8	1.4
LnGrp Delay(d),s/veh	53.1	0.0	0.0	54.4	0.0	0.0	89.1	8.3	8.2	87.1	5.2	3.2
LnGrp LOS	D			D			F	A	A	F	A	A
Approach Vol, veh/h		111			142			2016			1639	
Approach Delay, s/veh		53.1			54.4			8.4			5.6	
Approach LOS		D			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	98.4		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	8.6	68.0		30.0	8.0	68.0		30.0
Max Q Clear Time (g_c+I1), s	2.3	20.0		11.6	2.7	34.6		10.3
Green Ext Time (p_c), s	0.0	33.7		0.5	0.0	30.6		0.3

Intersection Summary		
HCM 2010 Ctrl Delay	10.2	
HCM 2010 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	1645	75	10	1380	75
Future Volume (veh/h)	155	30	20	145	25	35	25	1645	75	10	1380	75
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	168	33	2	158	27	3	27	1788	80	11	1500	80
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	256	287	17	252	272	30	34	2560	114	13	2495	133
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	1353	1737	105	1348	1644	183	1774	3452	153	1774	3419	182
Grp Volume(v), veh/h	168	0	35	158	0	30	27	911	957	11	774	806
Grp Sat Flow(s),veh/h/ln	1353	0	1842	1348	0	1827	1774	1770	1836	1774	1770	1831
Q Serve(g_s), s	16.8	0.0	2.3	15.8	0.0	2.0	2.1	0.0	0.0	0.9	29.4	29.8
Cycle Q Clear(g_c), s	18.8	0.0	2.3	18.1	0.0	2.0	2.1	0.0	0.0	0.9	29.4	29.8
Prop In Lane	1.00		0.06	1.00		0.10	1.00		0.08	1.00		0.10
Lane Grp Cap(c), veh/h	256	0	304	252	0	302	34	1312	1361	13	1292	1336
V/C Ratio(X)	0.66	0.00	0.12	0.63	0.00	0.10	0.79	0.69	0.70	0.83	0.60	0.60
Avail Cap(c_a), veh/h	303	0	368	299	0	365	139	1312	1361	139	1292	1336
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	0.45	0.45	0.45	0.82	0.82	0.82
Uniform Delay (d), s/veh	57.6	0.0	49.7	57.4	0.0	49.6	67.0	0.0	0.0	69.4	9.1	9.2
Incr Delay (d2), s/veh	3.9	0.0	0.2	3.1	0.0	0.1	6.9	1.4	1.4	31.3	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	6.6	0.0	1.2	6.1	0.0	1.0	1.1	0.5	0.5	0.5	14.8	15.4
LnGrp Delay(d),s/veh	61.5	0.0	49.9	60.5	0.0	49.8	73.9	1.4	1.4	100.7	10.8	10.8
LnGrp LOS	E		D	E		D	E	A	A	F	B	B
Approach Vol, veh/h		203			188			1895			1591	
Approach Delay, s/veh		59.5			58.8			2.4			11.4	
Approach LOS		E			E			A			B	

Timer	1	2	3	4	5	6	7	8
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	88.0		27.0	11.0	88.0		27.0
Max Q Clear Time (g_c+I1), s	4.1	31.8		20.1	2.9	2.0		20.8
Green Ext Time (p_c), s	0.0	28.5		0.4	0.0	48.6		0.4

Intersection Summary		
HCM 2010 Ctrl Delay	11.8	
HCM 2010 LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	110	35	95	75	720	25	935	120	515	955	20
Future Volume (veh/h)	15	110	35	95	75	720	25	935	120	515	955	20
Number	7	4	14	3	8	18	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	16	120	5	103	82	448	27	1016	53	560	1038	21
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	53	349	337	360	577	486	34	1509	672	614	2077	42
Arrive On Green	0.22	0.22	0.22	0.07	0.31	0.31	0.02	0.43	0.43	0.36	1.00	1.00
Sat Flow, veh/h	112	1623	1563	1774	1863	1570	1774	3539	1576	3442	3548	72
Grp Volume(v), veh/h	136	0	5	103	82	448	27	1016	53	560	518	541
Grp Sat Flow(s),veh/h/ln	1734	0	1563	1774	1863	1570	1774	1770	1576	1721	1770	1850
Q Serve(g_s), s	0.0	0.0	0.4	6.1	4.5	38.6	2.1	32.3	2.8	21.7	0.0	0.0
Cycle Q Clear(g_c), s	8.7	0.0	0.4	6.1	4.5	38.6	2.1	32.3	2.8	21.7	0.0	0.0
Prop In Lane	0.12		1.00	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	402	0	337	360	577	486	34	1509	672	614	1036	1083
V/C Ratio(X)	0.34	0.00	0.01	0.29	0.14	0.92	0.79	0.67	0.08	0.91	0.50	0.50
Avail Cap(c_a), veh/h	402	0	337	535	665	561	177	1509	672	836	1036	1083
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	1.00	0.79	0.79	0.79	0.74	0.74	0.74
Uniform Delay (d), s/veh	46.5	0.0	43.2	37.3	34.9	46.7	68.4	32.3	23.8	44.0	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.4	0.1	19.3	11.4	1.9	0.2	7.4	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	4.5	0.0	0.2	3.0	2.3	19.4	1.2	16.2	1.3	10.9	0.4	0.4
LnGrp Delay(d),s/veh	47.0	0.0	43.2	37.8	35.0	66.0	79.8	34.2	24.0	51.4	1.3	1.2
LnGrp LOS	D		D	D	D	E	E	C	C	D	A	A
Approach Vol, veh/h		141			633			1096			1619	
Approach Delay, s/veh		46.8			57.4			34.9			18.6	
Approach LOS		D			E			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	86.0	13.2	34.2	29.0	63.7		47.3
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	63.0	22.0	22.0	34.0	43.0		49.0
Max Q Clear Time (g_c+I1), s	2.1	2.0	8.1	10.7	23.7	34.3		40.6
Green Ext Time (p_c), s	0.0	14.2	0.3	0.4	1.2	5.6		1.7

Intersection Summary	
HCM 2010 Ctrl Delay	31.9
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	25	755	20	0	910
Future Vol, veh/h	0	25	755	20	0	910
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	27	821	22	0	989

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	821	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	374	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	374	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	374	-
HCM Lane V/C Ratio	-	-	0.073	-
HCM Control Delay (s)	-	-	15.4	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	45	25	785	20	10	1010
Future Vol, veh/h	45	25	785	20	10	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	49	27	853	22	11	1098

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1973	853	0	0	875	0
Stage 1	853	-	-	-	-	-
Stage 2	1120	-	-	-	-	-
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	68	359	-	-	771	-
Stage 1	418	-	-	-	-	-
Stage 2	312	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	67	359	-	-	771	-
Mov Cap-2 Maneuver	188	-	-	-	-	-
Stage 1	412	-	-	-	-	-
Stage 2	312	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.4	0	0.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	188	359	771	-
HCM Lane V/C Ratio	-	-	0.26	0.076	0.014	-
HCM Control Delay (s)	-	-	30.8	15.8	9.7	-
HCM Lane LOS	-	-	D	C	A	-
HCM 95th %tile Q(veh)	-	-	1	0.2	0	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	50	200	10	125	5	185	5	5	5	5	50
Future Vol, veh/h	30	50	200	10	125	5	185	5	5	5	5	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	-	-	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	33	54	217	11	136	5	201	5	5	5	5	54

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	141	0	0	271	0	0	419	392	163	395	498	139
Stage 1	-	-	-	-	-	-	229	229	-	161	161	-
Stage 2	-	-	-	-	-	-	190	163	-	234	337	-
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	1442	-	-	1292	-	-	544	544	882	565	474	909
Stage 1	-	-	-	-	-	-	774	715	-	841	765	-
Stage 2	-	-	-	-	-	-	812	763	-	769	641	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1442	-	-	1292	-	-	495	527	882	544	459	909
Mov Cap-2 Maneuver	-	-	-	-	-	-	495	527	-	544	459	-
Stage 1	-	-	-	-	-	-	756	699	-	822	758	-
Stage 2	-	-	-	-	-	-	752	756	-	741	626	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.6	17.4	9.9
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	501	1442	-	-	1292	-	-	799
HCM Lane V/C Ratio	0.423	0.023	-	-	0.008	-	-	0.082
HCM Control Delay (s)	17.4	7.6	-	-	7.8	-	-	9.9
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	2.1	0.1	-	-	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	15	20	25	5	10	5	85	5	5	5	5	50
Future Vol, veh/h	15	20	25	5	10	5	85	5	5	5	5	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	-	-	-	-	-	-	-	-	-	-	-	-
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	27	5	11	5	92	5	5	5	5	54

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	16	0	0	49	0	0	121	94	36	97	105	14
Stage 1	-	-	-	-	-	-	68	68	-	24	24	-
Stage 2	-	-	-	-	-	-	53	26	-	73	81	-
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	1602	-	-	1558	-	-	854	796	1037	885	785	1066
Stage 1	-	-	-	-	-	-	942	838	-	994	875	-
Stage 2	-	-	-	-	-	-	960	874	-	937	828	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1602	-	-	1558	-	-	798	786	1037	867	775	1066
Mov Cap-2 Maneuver	-	-	-	-	-	-	798	786	-	867	775	-
Stage 1	-	-	-	-	-	-	933	830	-	984	872	-
Stage 2	-	-	-	-	-	-	903	871	-	917	820	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	1.8	10.1	8.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	807	1602	-	-	1558	-	-	1015
HCM Lane V/C Ratio	0.128	0.01	-	-	0.003	-	-	0.064
HCM Control Delay (s)	10.1	7.3	0	-	7.3	0	-	8.8
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	15	5	5	60	10	5	5	5	5	5	10
Future Vol, veh/h	10	15	5	5	60	10	5	5	5	5	5	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	11	16	5	5	65	11	5	5	5	5	5	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	76	0	0	21	0	0	130	127	19	124	124	71
Stage 1	-	-	-	-	-	-	41	41	-	81	81	-
Stage 2	-	-	-	-	-	-	89	86	-	43	43	-
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	-	-	1595	-	-	843	764	1059	850	766	991
Stage 1	-	-	-	-	-	-	974	861	-	927	828	-
Stage 2	-	-	-	-	-	-	918	824	-	971	859	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1523	-	-	1595	-	-	823	756	1059	835	758	991
Mov Cap-2 Maneuver	-	-	-	-	-	-	823	756	-	835	758	-
Stage 1	-	-	-	-	-	-	967	855	-	921	826	-
Stage 2	-	-	-	-	-	-	899	822	-	953	853	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.5	0.5	8.1	9.2
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1182	1523	-	-	1595	-	-	882
HCM Lane V/C Ratio	0.014	0.007	-	-	0.003	-	-	0.025
HCM Control Delay (s)	8.1	7.4	0	-	7.3	0	-	9.2
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	4.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	10	10	5	35	40	5
Future Vol, veh/h	10	10	5	35	40	5
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	5	38	43	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	22	0	65	17
Stage 1	-	-	-	-	17	-
Stage 2	-	-	-	-	48	-
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	-	941	1062
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	974	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1593	-	938	1062
Mov Cap-2 Maneuver	-	-	-	-	938	-
Stage 1	-	-	-	-	1003	-
Stage 2	-	-	-	-	974	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	950	-	-	1593	-
HCM Lane V/C Ratio	0.051	-	-	0.003	-
HCM Control Delay (s)	9	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2027 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	420	295	70	10	410	75
Future Volume (veh/h)	55	25	420	65	25	5	420	295	70	10	410	75
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	27	27	71	27	1	457	321	50	11	446	25
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	199	73	181	198	204	8	523	1169	994	15	636	540
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.29	0.63	0.63	0.01	0.34	0.34
Sat Flow, veh/h	908	634	1583	1345	1785	66	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	87	0	27	71	0	28	457	321	50	11	446	25
Grp Sat Flow(s),veh/h/ln	1542	0	1583	1345	0	1851	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	2.4	0.0	1.0	3.3	0.0	0.9	15.7	5.0	0.8	0.4	13.3	0.7
Cycle Q Clear(g_c), s	3.3	0.0	1.0	6.6	0.0	0.9	15.7	5.0	0.8	0.4	13.3	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	272	0	181	198	0	212	523	1169	994	15	636	540
V/C Ratio(X)	0.32	0.00	0.15	0.36	0.00	0.13	0.87	0.27	0.05	0.74	0.70	0.05
Avail Cap(c_a), veh/h	661	0	593	547	0	693	830	2296	1952	415	1860	1581
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	26.5	0.0	25.6	29.7	0.0	25.5	21.5	5.4	4.6	31.7	18.3	14.1
Incr Delay (d2), s/veh	0.7	0.0	0.4	1.1	0.0	0.3	6.4	0.3	0.0	52.7	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	1.5	0.0	0.4	1.3	0.0	0.5	8.5	2.6	0.3	0.4	7.3	0.3
LnGrp Delay(d),s/veh	27.2	0.0	25.9	30.8	0.0	25.8	27.8	5.6	4.6	84.4	21.3	14.2
LnGrp LOS	C		C	C		C	C	A	A	F	C	B
Approach Vol, veh/h		114			99			828			482	
Approach Delay, s/veh		26.9			29.4			17.8			22.4	
Approach LOS		C			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.5	46.2		12.3	23.9	27.9		12.3
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.0	79.0		24.0	30.0	64.0		24.0
Max Q Clear Time (g_c+I1), s	2.4	7.0		5.3	17.7	15.3		8.6
Green Ext Time (p_c), s	0.0	4.8		0.5	1.2	6.6		0.2

Intersection Summary		
HCM 2010 Ctrl Delay		20.7
HCM 2010 LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	20	175	50	15	10	220	720	50	25	765	80
Future Volume (veh/h)	75	20	175	50	15	10	220	720	50	25	765	80
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	22	12	54	16	1	239	783	0	27	832	51
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	54	207	206	227	14	365	1114	947	356	974	825
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.09	0.60	0.00	0.02	0.52	0.52
Sat Flow, veh/h	1083	411	1583	1369	1735	108	1774	1863	1583	1774	1863	1577
Grp Volume(v), veh/h	104	0	12	54	0	17	239	783	0	27	832	51
Grp Sat Flow(s),veh/h/ln	1495	0	1583	1369	0	1844	1774	1863	1583	1774	1863	1577
Q Serve(g_s), s	3.5	0.0	0.4	2.4	0.0	0.5	3.5	18.4	0.0	0.4	24.3	1.0
Cycle Q Clear(g_c), s	4.0	0.0	0.4	6.5	0.0	0.5	3.5	18.4	0.0	0.4	24.3	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	298	0	207	206	0	242	365	1114	947	356	974	825
V/C Ratio(X)	0.35	0.00	0.06	0.26	0.00	0.07	0.65	0.70	0.00	0.08	0.85	0.06
Avail Cap(c_a), veh/h	686	0	626	568	0	729	621	1502	1277	745	1502	1272
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	25.6	0.0	24.1	28.6	0.0	24.1	12.7	8.8	0.0	8.3	13.0	7.4
Incr Delay (d2), s/veh	0.7	0.0	0.1	0.7	0.0	0.1	2.0	0.9	0.0	0.1	3.1	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	0.2	1.0	0.0	0.3	2.5	9.6	0.0	0.2	13.1	0.4
LnGrp Delay(d),s/veh	26.3	0.0	24.2	29.3	0.0	24.2	14.6	9.8	0.0	8.4	16.1	7.5
LnGrp LOS	C		C	C		C	B	A		A	B	A
Approach Vol, veh/h		116			71			1022			910	
Approach Delay, s/veh		26.1			28.1			10.9			15.4	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.1	43.8		13.3	10.9	39.1		13.3
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	20.4		6.0	5.5	26.3		8.5
Green Ext Time (p_c), s	0.0	6.3		0.5	0.5	6.7		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	14.2
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	50	100	140	50	90	170	930	155	135	860	75
Future Volume (veh/h)	60	50	100	140	50	90	170	930	155	135	860	75
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	65	54	62	152	54	9	185	1011	131	147	935	42
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	73	84	179	275	230	208	1059	901	170	1019	864
Arrive On Green	0.05	0.09	0.09	0.10	0.15	0.15	0.12	0.57	0.57	0.10	0.55	0.55
Sat Flow, veh/h	1774	775	890	1774	1863	1561	1774	1863	1583	1774	1863	1580
Grp Volume(v), veh/h	65	0	116	152	54	9	185	1011	131	147	935	42
Grp Sat Flow(s),veh/h/ln	1774	0	1665	1774	1863	1561	1774	1863	1583	1774	1863	1580
Q Serve(g_s), s	5.1	0.0	9.6	12.0	3.6	0.7	14.6	72.7	5.5	11.6	64.9	1.8
Cycle Q Clear(g_c), s	5.1	0.0	9.6	12.0	3.6	0.7	14.6	72.7	5.5	11.6	64.9	1.8
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	157	179	275	230	208	1059	901	170	1019	864
V/C Ratio(X)	0.77	0.00	0.74	0.85	0.20	0.04	0.89	0.95	0.15	0.87	0.92	0.05
Avail Cap(c_a), veh/h	400	0	211	400	275	230	237	1127	958	175	1062	901
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	66.9	0.0	62.7	62.9	53.2	51.9	61.8	28.9	14.4	63.4	29.3	15.0
Incr Delay (d2), s/veh	14.0	0.0	8.9	10.8	0.3	0.1	28.5	16.5	0.1	33.3	12.1	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	2.9	0.0	4.8	6.4	1.9	0.3	8.8	41.9	2.4	7.3	36.7	0.8
LnGrp Delay(d),s/veh	80.9	0.0	71.5	73.6	53.5	52.0	90.3	45.4	14.5	96.7	41.4	15.0
LnGrp LOS	F		E	E	D	D	F	D	B	F	D	B
Approach Vol, veh/h		181			215			1327			1124	
Approach Delay, s/veh		74.9			67.7			48.6			47.6	
Approach LOS		E			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.6	85.8	19.3	18.4	21.7	82.7	11.7	26.0
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	14.6	86.0	32.0	18.0	19.0	81.0	32.0	18.0
Max Q Clear Time (g_c+I1), s	13.6	74.7	14.0	11.6	16.6	66.9	7.1	5.6
Green Ext Time (p_c), s	0.0	6.1	0.4	0.3	0.1	6.1	0.1	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	51.3
HCM 2010 LOS	D

Notes

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	1130	10	5	1055	25
Future Volume (veh/h)	95	5	600	80	10	10	605	1130	10	5	1055	25
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	103	5	0	87	11	9	658	1228	11	5	1147	6
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	6	137	173	15	12	692	2820	25	7	1410	631
Arrive On Green	0.09	0.09	0.00	0.09	0.09	0.09	0.39	0.78	0.78	0.00	0.40	0.40
Sat Flow, veh/h	1443	70	1583	1374	174	142	1774	3594	32	1774	3539	1583
Grp Volume(v), veh/h	108	0	0	107	0	0	658	604	635	5	1147	6
Grp Sat Flow(s),veh/h/ln	1513	0	1583	1690	0	0	1774	1770	1857	1774	1770	1583
Q Serve(g_s), s	1.2	0.0	0.0	0.0	0.0	0.0	43.2	13.4	13.4	0.3	34.6	0.3
Cycle Q Clear(g_c), s	8.1	0.0	0.0	6.9	0.0	0.0	43.2	13.4	13.4	0.3	34.6	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	202	0	137	215	0	0	692	1388	1457	7	1410	631
V/C Ratio(X)	0.53	0.00	0.00	0.50	0.00	0.00	0.95	0.44	0.44	0.73	0.81	0.01
Avail Cap(c_a), veh/h	431	0	396	416	0	0	1049	1388	1457	1049	1680	752
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	53.3	0.0	0.0	52.9	0.0	0.0	35.5	4.2	4.2	59.8	32.2	21.8
Incr Delay (d2), s/veh	2.2	0.0	0.0	1.8	0.0	0.0	10.6	0.5	0.4	43.1	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	3.6	0.0	0.0	3.5	0.0	0.0	23.1	6.6	6.9	0.2	17.6	0.1
LnGrp Delay(d),s/veh	55.4	0.0	0.0	54.6	0.0	0.0	46.1	4.7	4.7	102.9	35.7	21.8
LnGrp LOS	E			D			D	A	A	F	D	C
Approach Vol, veh/h		108			107			1897			1158	
Approach Delay, s/veh		55.4			54.6			19.1			35.9	
Approach LOS		E			D			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	50.9	53.8		15.4	4.5	100.2		15.4
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	71.0	57.0		27.0	71.0	57.0		30.0
Max Q Clear Time (g_c+I1), s	45.2	36.6		8.9	2.3	15.4		10.1
Green Ext Time (p_c), s	1.7	11.2		0.3	0.0	16.7		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	27.4
HCM 2010 LOS	C

Notes

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	1685	10	10	1745	60
Future Volume (veh/h)	55	5	140	15	0	5	135	1685	10	10	1745	60
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	60	5	5	16	0	1	147	1832	11	11	1897	41
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	171	170	2	7	177	2697	16	14	2322	1038
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	1380	139	1520	923	17	59	1774	3607	22	1774	3539	1582
Grp Volume(v), veh/h	65	0	5	17	0	0	147	898	945	11	1897	41
Grp Sat Flow(s),veh/h/ln	1519	0	1520	999	0	0	1774	1770	1859	1774	1770	1582
Q Serve(g_s), s	0.0	0.0	0.3	1.1	0.0	0.0	8.6	27.6	27.7	0.7	42.1	1.0
Cycle Q Clear(g_c), s	3.6	0.0	0.3	4.7	0.0	0.0	8.6	27.6	27.7	0.7	42.1	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	171	188	0	0	177	1323	1390	14	2322	1038
V/C Ratio(X)	0.26	0.00	0.03	0.09	0.00	0.00	0.83	0.68	0.68	0.79	0.82	0.04
Avail Cap(c_a), veh/h	396	0	330	330	0	0	351	1435	1507	184	2536	1134
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	43.0	0.0	41.9	44.6	0.0	0.0	46.9	6.8	6.9	52.5	13.5	6.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.0	3.8	1.7	1.6	29.9	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	1.7	0.0	0.1	0.5	0.0	0.0	4.4	13.8	14.5	0.4	21.1	0.4
LnGrp Delay(d),s/veh	43.2	0.0	41.9	44.6	0.0	0.0	50.7	8.5	8.5	82.4	16.0	6.5
LnGrp LOS	D		D	D			D	A	A	F	B	A
Approach Vol, veh/h		70			17			1990			1949	
Approach Delay, s/veh		43.1			44.6			11.6			16.2	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.6	74.6		16.9	4.8	84.3		16.9
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.6	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	10.6	44.1		6.7	2.7	29.7		5.6
Green Ext Time (p_c), s	0.1	25.4		0.0	0.0	36.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.5
HCM 2010 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	1685	60	35	1890	105
Future Volume (veh/h)	85	5	175	70	5	50	125	1685	60	35	1890	105
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	92	5	44	76	5	2	136	1832	48	38	2054	92
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	216	138	174	70	157	2632	1177	49	2415	1081
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	1300	71	1563	1338	1261	505	1774	3539	1582	1774	3539	1583
Grp Volume(v), veh/h	97	0	44	76	0	7	136	1832	48	38	2054	92
Grp Sat Flow(s),veh/h/ln	1371	0	1563	1338	0	1766	1774	1770	1582	1774	1770	1583
Q Serve(g_s), s	10.5	0.0	4.1	9.2	0.0	0.6	12.5	45.4	1.3	3.5	72.5	3.2
Cycle Q Clear(g_c), s	11.1	0.0	4.1	20.3	0.0	0.6	12.5	45.4	1.3	3.5	72.5	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	216	138	0	244	157	2632	1177	49	2415	1081
V/C Ratio(X)	0.40	0.00	0.20	0.55	0.00	0.03	0.86	0.70	0.04	0.78	0.85	0.09
Avail Cap(c_a), veh/h	250	0	227	148	0	257	280	2632	1177	108	2415	1081
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.60	0.60	0.60	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	11.2	5.6	79.7	19.8	8.8
Incr Delay (d2), s/veh	1.1	0.0	0.5	3.7	0.0	0.0	3.3	0.9	0.0	9.3	4.0	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	4.1	0.0	1.8	3.6	0.0	0.3	6.3	22.2	0.6	1.8	36.4	1.5
LnGrp Delay(d),s/veh	67.0	0.0	63.6	79.2	0.0	61.6	77.5	12.2	5.6	89.0	23.8	9.0
LnGrp LOS	E		E	E		E	E	B	A	F	C	A
Approach Vol, veh/h		141			83			2016			2184	
Approach Delay, s/veh		65.9			77.7			16.4			24.3	
Approach LOS		E			E			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.6	118.6		27.8	8.6	128.7		27.8
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	26.6	100.0		24.0	10.0	116.0		24.0
Max Q Clear Time (g_c+I1), s	14.5	74.5		22.3	5.5	47.4		13.1
Green Ext Time (p_c), s	0.2	22.5		0.0	0.0	42.5		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	23.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	385	5	740	15	0	5	500	1645	10	80	1850	200
Future Volume (veh/h)	385	5	740	15	0	5	500	1645	10	80	1850	200
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	422	0	663	16	0	1	543	1788	11	87	2011	185
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	471	0	945	40	0	3	590	2599	16	112	2168	1174
Arrive On Green	0.13	0.00	0.13	0.02	0.00	0.01	0.17	0.72	0.71	0.06	0.61	0.61
Sat Flow, veh/h	3548	0	3118	1650	0	103	3442	3606	22	1774	3539	1583
Grp Volume(v), veh/h	422	0	663	17	0	0	543	877	922	87	2011	185
Grp Sat Flow(s),veh/h/ln	1774	0	1559	1754	0	0	1721	1770	1859	1774	1770	1583
Q Serve(g_s), s	31.8	0.0	35.0	2.6	0.0	0.0	42.1	74.4	74.7	13.1	138.3	9.3
Cycle Q Clear(g_c), s	31.8	0.0	35.0	2.6	0.0	0.0	42.1	74.4	74.7	13.1	138.3	9.3
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	471	0	945	43	0	0	590	1275	1340	112	2168	1174
V/C Ratio(X)	0.90	0.00	0.70	0.40	0.00	0.00	0.92	0.69	0.69	0.77	0.93	0.16
Avail Cap(c_a), veh/h	471	0	945	162	0	0	609	1278	1343	177	2282	1225
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	115.8	0.0	84.3	130.5	0.0	0.0	110.6	21.0	21.0	125.2	47.1	10.3
Incr Delay (d2), s/veh	19.0	0.0	2.0	2.2	0.0	0.0	18.7	1.7	1.7	4.2	7.3	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	16.9	0.0	22.3	1.3	0.0	0.0	21.6	36.9	38.8	6.6	69.8	6.1
LnGrp Delay(d),s/veh	134.9	0.0	86.3	132.7	0.0	0.0	129.3	22.7	22.7	129.4	54.4	10.3
LnGrp LOS	F		F	F			F	C	C	F	D	B
Approach Vol, veh/h		1085			17			2342			2283	
Approach Delay, s/veh		105.2			132.7			47.4			53.7	
Approach LOS		F			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	50.5	170.3		10.6	21.2	199.6		40.0
Change Period (Y+Rc), s	6.0	6.0		7.0	6.0	6.0		7.0
Max Green Setting (Gmax), s	46.0	173.0		22.0	25.0	194.0		33.0
Max Q Clear Time (g_c+I1), s	44.1	140.3		4.6	15.1	76.7		37.0
Green Ext Time (p_c), s	0.4	23.9		0.0	0.1	29.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	61.1
HCM 2010 LOS	E

Notes

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	2110	90	90	2550	5
Future Volume (veh/h)	10	0	5	90	5	65	10	2110	90	90	2550	5
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	11	0	1	98	5	3	11	2293	96	98	2772	5
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	155	2	10	176	95	57	22	2638	110	122	2965	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	1234	24	114	1410	1092	655	1774	3463	144	1774	3625	7
Grp Volume(v), veh/h	12	0	0	98	0	8	11	1164	1225	98	1353	1424
Grp Sat Flow(s),veh/h/ln	1373	0	0	1410	0	1747	1774	1770	1837	1774	1770	1862
Q Serve(g_s), s	0.9	0.0	0.0	8.0	0.0	0.6	0.9	0.0	0.0	7.9	85.7	85.9
Cycle Q Clear(g_c), s	1.5	0.0	0.0	9.5	0.0	0.6	0.9	0.0	0.0	7.9	85.7	85.9
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	167	0	0	176	0	152	22	1348	1399	122	1448	1523
V/C Ratio(X)	0.07	0.00	0.00	0.56	0.00	0.05	0.50	0.86	0.88	0.80	0.93	0.94
Avail Cap(c_a), veh/h	278	0	0	287	0	289	61	1348	1399	184	1448	1523
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	0.41	0.41	0.41	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.3	0.0	0.0	64.6	0.0	60.9	70.3	0.0	0.0	66.6	10.2	10.2
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.7	0.0	0.1	2.7	3.3	3.5	8.0	12.5	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	0.5	0.0	0.0	4.0	0.0	0.3	0.5	1.2	1.4	4.1	45.6	48.2
LnGrp Delay(d),s/veh	61.5	0.0	0.0	67.4	0.0	61.0	73.0	3.3	3.5	74.5	22.7	22.3
LnGrp LOS	E			E		E	E	A	A	E	C	C
Approach Vol, veh/h		12			106			2400			2875	
Approach Delay, s/veh		61.5			66.9			3.7			24.3	
Approach LOS		E			E			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.8	122.6		16.6	14.0	114.4		16.6
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	5.8	103.0		23.0	15.0	93.0		23.0
Max Q Clear Time (g_c+I1), s	2.9	87.9		11.5	9.9	2.0		3.5
Green Ext Time (p_c), s	0.0	15.0		0.2	0.1	77.2		0.0

Intersection Summary		
HCM 2010 Ctrl Delay	16.0	
HCM 2010 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	2015	20	5	2180	340
Future Volume (veh/h)	195	15	10	60	5	10	5	2015	20	5	2180	340
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	212	16	9	65	5	7	5	2190	21	5	2370	296
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	2639	25	7	2600	1163
Arrive On Green	0.18	0.18	0.17	0.18	0.18	0.17	0.01	0.98	0.97	0.00	0.73	0.73
Sat Flow, veh/h	1326	100	56	1379	130	151	1774	3592	34	1774	3539	1583
Grp Volume(v), veh/h	237	0	0	77	0	0	5	1077	1134	5	2370	296
Grp Sat Flow(s),veh/h/ln	1482	0	0	1660	0	0	1774	1770	1857	1774	1770	1583
Q Serve(g_s), s	16.9	0.0	0.0	0.0	0.0	0.0	0.4	10.6	10.9	0.4	78.0	8.8
Cycle Q Clear(g_c), s	22.5	0.0	0.0	5.6	0.0	0.0	0.4	10.6	10.9	0.4	78.0	8.8
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	312	0	0	343	0	0	7	1300	1364	7	2600	1163
V/C Ratio(X)	0.76	0.00	0.00	0.22	0.00	0.00	0.75	0.83	0.83	0.75	0.91	0.25
Avail Cap(c_a), veh/h	362	0	0	392	0	0	37	1300	1364	37	2600	1163
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	0.45	0.45	0.45	0.18	0.18	0.18
Uniform Delay (d), s/veh	57.8	0.0	0.0	51.2	0.0	0.0	72.1	0.6	0.6	72.2	15.5	6.3
Incr Delay (d2), s/veh	7.8	0.0	0.0	0.3	0.0	0.0	23.5	2.9	2.8	10.6	1.3	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	10.0	0.0	0.0	2.7	0.0	0.0	0.2	4.2	4.8	0.2	38.0	3.9
LnGrp Delay(d),s/veh	65.6	0.0	0.0	51.6	0.0	0.0	95.6	3.4	3.4	82.7	16.7	6.4
LnGrp LOS	E			D			F	A	A	F	B	A
Approach Vol, veh/h		237			77			2216			2671	
Approach Delay, s/veh		65.6			51.6			3.6			15.7	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.5	110.5		29.9	4.5	110.5		29.9
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	3.6	98.0		30.0	3.0	98.0		30.0
Max Q Clear Time (g_c+I1), s	2.4	80.0		7.6	2.4	12.9		24.5
Green Ext Time (p_c), s	0.0	17.8		0.2	0.0	76.1		0.4

Intersection Summary		
HCM 2010 Ctrl Delay	13.3	
HCM 2010 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	1800	105	30	2110	160
Future Volume (veh/h)	190	35	45	95	25	20	55	1800	105	30	2110	160
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	207	38	14	103	27	2	60	1957	111	33	2293	170
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	272	231	85	253	307	23	73	2433	137	42	2329	171
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.17	0.08	1.00	1.00	0.05	1.00	1.00
Sat Flow, veh/h	1341	1289	475	1316	1710	127	1774	3407	191	1774	3344	245
Grp Volume(v), veh/h	207	0	52	103	0	29	60	1007	1061	33	1200	1263
Grp Sat Flow(s),veh/h/ln	1341	0	1764	1316	0	1836	1774	1770	1829	1774	1770	1819
Q Serve(g_s), s	22.1	0.0	3.6	10.4	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	3.6	14.0	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	272	0	316	253	0	329	73	1264	1306	42	1233	1267
V/C Ratio(X)	0.76	0.00	0.16	0.41	0.00	0.09	0.82	0.80	0.81	0.79	0.97	1.00
Avail Cap(c_a), veh/h	272	0	316	253	0	329	73	1264	1306	73	1233	1267
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	0.13	0.13	0.13	0.29	0.29	0.29
Uniform Delay (d), s/veh	59.6	0.0	50.3	56.2	0.0	49.6	66.0	0.0	0.0	68.7	0.0	0.0
Incr Delay (d2), s/veh	11.7	0.0	0.2	1.1	0.0	0.1	8.8	0.7	0.8	3.5	8.9	12.9
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	9.1	0.0	1.8	3.9	0.0	1.0	2.5	0.3	0.3	1.4	3.0	4.6
LnGrp Delay(d),s/veh	71.3	0.0	50.6	57.3	0.0	49.8	74.8	0.7	0.8	72.2	8.9	12.9
LnGrp LOS	E		D	E		D	E	A	A	E	A	B
Approach Vol, veh/h		259			132			2128			2496	
Approach Delay, s/veh		67.2			55.6			2.9			11.8	
Approach LOS		E			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	30.0	105.0		30.0	7.4	107.6		30.0
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	26.0	100.0		25.0	6.0	100.0		25.0
Max Q Clear Time (g_c+I1), s	16.0	2.0		16.0	4.7	2.0		26.0
Green Ext Time (p_c), s	0.0	83.8		0.3	0.0	62.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	12.0
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	185	60	125	110	735	55	1145	195	645	1455	65
Future Volume (veh/h)	65	185	60	125	110	735	55	1145	195	645	1455	65
Number	7	4	14	3	8	18	1	6	16	5	2	12
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	1.00		0.98	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	71	201	8	136	120	535	60	1245	137	701	1582	69
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	117	277	337	360	604	505	77	1367	607	712	1900	83
Arrive On Green	0.22	0.22	0.22	0.08	0.32	0.32	0.04	0.39	0.39	0.41	1.00	1.00
Sat Flow, veh/h	393	1272	1544	1774	1863	1557	1774	3539	1571	3442	3455	150
Grp Volume(v), veh/h	272	0	8	136	120	535	60	1245	137	701	807	844
Grp Sat Flow(s),veh/h/ln	1665	0	1544	1774	1863	1557	1774	1770	1571	1721	1770	1835
Q Serve(g_s), s	19.3	0.0	0.6	8.3	6.7	47.0	4.9	48.3	8.5	29.2	0.0	0.0
Cycle Q Clear(g_c), s	22.0	0.0	0.6	8.3	6.7	47.0	4.9	48.3	8.5	29.2	0.0	0.0
Prop In Lane	0.26		1.00	1.00		1.00	1.00		1.00	1.00		0.08
Lane Grp Cap(c), veh/h	394	0	337	360	604	505	77	1367	607	712	973	1009
V/C Ratio(X)	0.69	0.00	0.02	0.38	0.20	1.06	0.78	0.91	0.23	0.98	0.83	0.84
Avail Cap(c_a), veh/h	394	0	337	404	604	505	122	1367	607	712	973	1009
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	1.00	0.88	0.88	0.88	0.13	0.13	0.13
Uniform Delay (d), s/veh	52.8	0.0	44.6	37.3	35.4	49.0	68.7	42.1	29.9	42.3	0.0	0.0
Incr Delay (d2), s/veh	5.0	0.0	0.0	0.7	0.2	56.9	5.7	9.6	0.8	8.9	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	10.8	0.0	0.3	4.1	3.5	28.2	2.5	25.3	3.8	14.6	0.3	0.3
LnGrp Delay(d),s/veh	57.8	0.0	44.6	38.0	35.6	105.9	74.4	51.7	30.7	51.2	1.2	1.2
LnGrp LOS	E		D	D	D	F	E	D	C	D	A	A
Approach Vol, veh/h		280			791			1442			2352	
Approach Delay, s/veh		57.5			83.6			50.7			16.1	
Approach LOS		E			F			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	10.3	83.7	15.4	35.6	34.0	60.0		51.0
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	10.3	75.0	14.0	27.0	30.0	55.0		46.0
Max Q Clear Time (g_c+I1), s	6.9	2.0	10.3	24.0	31.2	50.3		49.0
Green Ext Time (p_c), s	0.0	34.8	0.1	0.3	0.0	3.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	39.7
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	45	1005	75	0	995
Future Vol, veh/h	0	45	1005	75	0	995
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	49	1092	82	0	1082

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1092	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	261	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	261	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	261	-
HCM Lane V/C Ratio	-	-	0.187	-
HCM Control Delay (s)	-	-	21.9	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.7	-

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	30	1175	70	35	1075
Future Vol, veh/h	50	30	1175	70	35	1075
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	1277	76	38	1168

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2521	1277	0	0	1353	0
Stage 1	1277	-	-	-	-	-
Stage 2	1244	-	-	-	-	-
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	~ 31	203	-	-	509	-
Stage 1	262	-	-	-	-	-
Stage 2	272	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 29	203	-	-	509	-
Mov Cap-2 Maneuver	122	-	-	-	-	-
Stage 1	242	-	-	-	-	-
Stage 2	272	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	45	0	0.4
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	122	203	509	-
HCM Lane V/C Ratio	-	-	0.445	0.161	0.075	-
HCM Control Delay (s)	-	-	56.3	26.1	12.6	-
HCM Lane LOS	-	-	F	D	B	-
HCM 95th %tile Q(veh)	-	-	2	0.6	0.2	-

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

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	75	120	145	5	85	5	130	15	10	10	20	70
Future Vol, veh/h	75	120	145	5	85	5	130	15	10	10	20	70
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	82	130	158	5	92	5	141	16	11	11	22	76

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	97	0	0	288	0	0	527	480	209	492	557	95
Stage 1	-	-	-	-	-	-	373	373	-	105	105	-
Stage 2	-	-	-	-	-	-	154	107	-	387	452	-
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	1496	-	-	1274	-	-	462	485	831	487	439	962
Stage 1	-	-	-	-	-	-	648	618	-	901	808	-
Stage 2	-	-	-	-	-	-	848	807	-	637	570	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1496	-	-	1274	-	-	390	456	831	447	413	962
Mov Cap-2 Maneuver	-	-	-	-	-	-	390	456	-	447	413	-
Stage 1	-	-	-	-	-	-	612	584	-	851	805	-
Stage 2	-	-	-	-	-	-	757	804	-	578	539	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0.4	19.8	11.1
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	410	1496	-	-	1274	-	-	697
HCM Lane V/C Ratio	0.411	0.054	-	-	0.004	-	-	0.156
HCM Control Delay (s)	19.8	7.5	-	-	7.8	-	-	11.1
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	2	0.2	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	50	15	80	5	20	5	45	5	5	5	5	30
Future Vol, veh/h	50	15	80	5	20	5	45	5	5	5	5	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	54	16	87	5	22	5	49	5	5	5	5	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	27	0	0	103	0	0	222	205	60	208	246	25
Stage 1	-	-	-	-	-	-	168	168	-	35	35	-
Stage 2	-	-	-	-	-	-	54	37	-	173	211	-
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	1587	-	-	1489	-	-	734	691	1005	749	656	1051
Stage 1	-	-	-	-	-	-	834	759	-	981	866	-
Stage 2	-	-	-	-	-	-	958	864	-	829	728	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1587	-	-	1489	-	-	686	664	1005	718	630	1051
Mov Cap-2 Maneuver	-	-	-	-	-	-	686	664	-	718	630	-
Stage 1	-	-	-	-	-	-	804	732	-	946	863	-
Stage 2	-	-	-	-	-	-	920	861	-	789	702	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.5	1.2	10.6	9.1
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	704	1587	-	-	1489	-	-	921
HCM Lane V/C Ratio	0.085	0.034	-	-	0.004	-	-	0.047
HCM Control Delay (s)	10.6	7.3	0	-	7.4	0	-	9.1
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	60	15	5	35	15	25	5	5	30	5	25
Future Vol, veh/h	30	60	15	5	35	15	25	5	5	30	5	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	33	65	16	5	38	16	27	5	5	33	5	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	54	0	0	81	0	0	211	203	73	200	203	46
Stage 1	-	-	-	-	-	-	139	139	-	56	56	-
Stage 2	-	-	-	-	-	-	72	64	-	144	147	-
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	-	-	1517	-	-	746	693	989	759	693	1023
Stage 1	-	-	-	-	-	-	864	782	-	956	848	-
Stage 2	-	-	-	-	-	-	938	842	-	859	775	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1551	-	-	1517	-	-	708	676	989	736	676	1023
Mov Cap-2 Maneuver	-	-	-	-	-	-	708	676	-	736	676	-
Stage 1	-	-	-	-	-	-	845	765	-	935	845	-
Stage 2	-	-	-	-	-	-	904	839	-	830	758	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.1	0.7	10.2	9.7
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	733	1551	-	-	1517	-	-	827
HCM Lane V/C Ratio	0.052	0.021	-	-	0.004	-	-	0.079
HCM Control Delay (s)	10.2	7.4	0	-	7.4	0	-	9.7
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	45	45	5	25	25	5
Future Vol, veh/h	45	45	5	25	25	5
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	49	5	27	27	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	98	0	111	74
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	37	-
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	-	-	1495	-	886	988
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	985	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1495	-	883	988
Mov Cap-2 Maneuver	-	-	-	-	883	-
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	985	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	899	-	-	1495	-
HCM Lane V/C Ratio	0.036	-	-	0.004	-
HCM Control Delay (s)	9.2	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2027 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	45	50	20	325	430	40	20	400	90
Future Volume (veh/h)	40	45	385	45	50	20	325	430	40	20	400	90
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	43	49	31	49	54	10	353	467	26	22	435	33
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	159	121	187	212	183	34	428	1076	913	28	656	557
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.24	0.58	0.58	0.02	0.35	0.35
Sat Flow, veh/h	533	1012	1563	1302	1526	283	1774	1863	1581	1774	1863	1581
Grp Volume(v), veh/h	92	0	31	49	0	64	353	467	26	22	435	33
Grp Sat Flow(s),veh/h/ln	1545	0	1563	1302	0	1809	1774	1863	1581	1774	1863	1581
Q Serve(g_s), s	1.3	0.0	1.0	2.0	0.0	1.8	10.5	7.9	0.4	0.7	11.0	0.8
Cycle Q Clear(g_c), s	3.1	0.0	1.0	5.2	0.0	1.8	10.5	7.9	0.4	0.7	11.0	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	280	0	187	212	0	216	428	1076	913	28	656	557
V/C Ratio(X)	0.33	0.00	0.17	0.23	0.00	0.30	0.83	0.43	0.03	0.80	0.66	0.06
Avail Cap(c_a), veh/h	766	0	674	617	0	780	956	2643	2243	478	2141	1817
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	22.9	0.0	22.0	25.4	0.0	22.4	20.0	6.6	5.1	27.3	15.2	11.9
Incr Delay (d2), s/veh	0.7	0.0	0.4	0.6	0.0	0.8	4.1	0.6	0.0	39.0	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	1.4	0.0	0.4	0.8	0.0	0.9	5.6	4.2	0.2	0.6	6.0	0.3
LnGrp Delay(d),s/veh	23.6	0.0	22.4	25.9	0.0	23.1	24.1	7.2	5.1	66.3	17.7	12.0
LnGrp LOS	C		C	C		C	C	A	A	E	B	B
Approach Vol, veh/h		123			113			846			490	
Approach Delay, s/veh		23.3			24.3			14.2			19.5	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.9	38.2		11.7	18.4	25.6		11.7
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	2.7	9.9		5.1	12.5	13.0		7.2
Green Ext Time (p_c), s	0.0	7.2		0.5	1.0	6.5		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	17.3
HCM 2010 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	625	30	15	665	60
Future Volume (veh/h)	55	20	240	50	15	5	170	625	30	15	665	60
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	60	22	19	54	16	1	185	679	0	16	723	29
Adj No. of Lanes	0	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	220	260	245	15	388	1025	871	376	886	751
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	974	535	1555	1341	1733	108	1774	1863	1583	1774	1863	1578
Grp Volume(v), veh/h	82	0	19	54	0	17	185	679	0	16	723	29
Grp Sat Flow(s),veh/h/ln	1509	0	1555	1341	0	1841	1774	1863	1583	1774	1863	1578
Q Serve(g_s), s	1.8	0.0	0.6	2.0	0.0	0.4	2.6	13.9	0.0	0.3	17.9	0.5
Cycle Q Clear(g_c), s	2.5	0.0	0.6	4.6	0.0	0.4	2.6	13.9	0.0	0.3	17.9	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	329	0	220	260	0	260	388	1025	871	376	886	751
V/C Ratio(X)	0.25	0.00	0.09	0.21	0.00	0.07	0.48	0.66	0.00	0.04	0.82	0.04
Avail Cap(c_a), veh/h	804	0	721	693	0	854	728	1762	1498	848	1762	1493
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	20.9	0.0	20.1	23.0	0.0	20.1	9.8	8.6	0.0	8.1	12.1	7.6
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	1.1	0.0	0.3	0.8	0.0	0.2	1.4	7.2	0.0	0.1	9.5	0.2
LnGrp Delay(d),s/veh	21.3	0.0	20.3	23.4	0.0	20.2	10.7	9.3	0.0	8.1	14.0	7.6
LnGrp LOS	C		C	C		C	B	A		A	B	A
Approach Vol, veh/h		101			71			864			768	
Approach Delay, s/veh		21.1			22.6			9.6			13.7	
Approach LOS		C			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.6	35.7		12.6	9.7	31.6		12.6
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0
Max Green Setting (Gmax), s	15.6	51.0		25.0	15.0	51.0		25.0
Max Q Clear Time (g_c+I1), s	2.3	15.9		4.5	4.6	19.9		6.6
Green Ext Time (p_c), s	0.0	5.2		0.4	0.3	5.7		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	12.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	70	90	190	75	100	85	705	175	145	775	50
Future Volume (veh/h)	45	70	90	190	75	100	85	705	175	145	775	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	49	76	64	207	82	16	92	766	136	158	842	25
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	64	99	84	241	385	327	119	852	724	192	929	789
Arrive On Green	0.04	0.11	0.11	0.14	0.21	0.21	0.07	0.46	0.46	0.11	0.50	0.50
Sat Flow, veh/h	1774	929	782	1774	1863	1583	1774	1863	1583	1774	1863	1582
Grp Volume(v), veh/h	49	0	140	207	82	16	92	766	136	158	842	25
Grp Sat Flow(s),veh/h/ln	1774	0	1712	1774	1863	1583	1774	1863	1583	1774	1863	1582
Q Serve(g_s), s	2.9	0.0	8.3	11.9	3.8	0.8	5.3	39.5	5.3	9.1	43.1	0.8
Cycle Q Clear(g_c), s	2.9	0.0	8.3	11.9	3.8	0.8	5.3	39.5	5.3	9.1	43.1	0.8
Prop In Lane	1.00		0.46	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	64	0	183	241	385	327	119	852	724	192	929	789
V/C Ratio(X)	0.77	0.00	0.77	0.86	0.21	0.05	0.77	0.90	0.19	0.82	0.91	0.03
Avail Cap(c_a), veh/h	340	0	345	340	385	327	425	1161	987	425	1161	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	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	49.9	0.0	45.3	44.1	34.3	33.2	47.9	26.1	16.8	45.5	23.9	13.3
Incr Delay (d2), s/veh	17.6	0.0	6.6	14.4	0.3	0.1	10.2	7.5	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	1.7	0.0	4.3	6.8	2.0	0.4	2.9	22.0	2.4	4.9	24.3	0.4
LnGrp Delay(d),s/veh	67.5	0.0	51.9	58.5	34.6	33.2	58.1	33.6	16.9	54.0	32.7	13.3
LnGrp LOS	E		D	E	C	C	E	C	B	D	C	B
Approach Vol, veh/h		189			305			994			1025	
Approach Delay, s/veh		55.9			50.7			33.6			35.5	
Approach LOS		E			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.3	52.7	19.2	16.1	12.0	57.0	8.7	26.6
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	25.3	65.0	20.0	21.0	25.0	65.0	20.0	21.0
Max Q Clear Time (g_c+I1), s	11.1	41.5	13.9	10.3	7.3	45.1	4.9	5.8
Green Ext Time (p_c), s	0.3	6.2	0.3	0.5	0.2	6.2	0.1	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	38.2
HCM 2010 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	925	5	0	1030	70
Future Volume (veh/h)	75	10	595	10	0	5	410	925	5	0	1030	70
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	82	11	0	11	0	1	446	1005	5	0	1120	40
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	14	128	202	3	11	495	2835	14	2	1617	721
Arrive On Green	0.09	0.08	0.00	0.09	0.00	0.08	0.28	0.79	0.79	0.00	0.46	0.46
Sat Flow, veh/h	1296	174	1583	1461	40	136	1774	3611	18	1774	3539	1578
Grp Volume(v), veh/h	93	0	0	12	0	0	446	492	518	0	1120	40
Grp Sat Flow(s),veh/h/ln	1470	0	1583	1637	0	0	1774	1770	1860	1774	1770	1578
Q Serve(g_s), s	4.5	0.0	0.0	0.0	0.0	0.0	19.8	6.8	6.8	0.0	20.6	1.2
Cycle Q Clear(g_c), s	5.0	0.0	0.0	0.5	0.0	0.0	19.8	6.8	6.8	0.0	20.6	1.2
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	219	0	128	236	0	0	495	1389	1460	2	1617	721
V/C Ratio(X)	0.42	0.00	0.00	0.05	0.00	0.00	0.90	0.35	0.35	0.00	0.69	0.06
Avail Cap(c_a), veh/h	633	0	580	588	0	0	1538	1389	1460	1538	2464	1099
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	36.4	0.0	0.0	34.4	0.0	0.0	28.4	2.6	2.6	0.0	17.7	12.4
Incr Delay (d2), s/veh	1.3	0.0	0.0	0.1	0.0	0.0	2.5	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	2.1	0.0	0.0	0.2	0.0	0.0	10.0	3.4	3.6	0.0	10.2	0.5
LnGrp Delay(d),s/veh	37.7	0.0	0.0	34.5	0.0	0.0	30.9	2.9	2.9	0.0	18.8	12.5
LnGrp LOS	D			C			C	A	A		B	B
Approach Vol, veh/h		93			12			1456			1160	
Approach Delay, s/veh		37.7			34.5			11.5			18.6	
Approach LOS		D			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	26.9	43.4		11.6	0.0	70.3		11.6
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0
Max Green Setting (Gmax), s	7.0	57.0		27.0	71.0	57.0		30.0
Max Q Clear Time (g_c+I1), s	21.8	22.6		2.5	0.0	8.8		7.0
Green Ext Time (p_c), s	1.0	14.8		0.0	0.0	12.6		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	15.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	5	145	15	5	15	105	1270	20	10	1595	70
Future Volume (veh/h)	65	5	145	15	5	15	105	1270	20	10	1595	70
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	71	5	5	16	5	1	114	1380	22	11	1734	48
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	208	12	141	128	31	4	144	2659	42	14	2381	1063
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	1429	129	1547	646	344	47	1774	3566	57	1774	3539	1580
Grp Volume(v), veh/h	76	0	5	22	0	0	114	685	717	11	1734	48
Grp Sat Flow(s),veh/h/ln	1558	0	1547	1037	0	0	1774	1770	1853	1774	1770	1580
Q Serve(g_s), s	0.0	0.0	0.3	0.3	0.0	0.0	5.7	14.5	14.5	0.6	28.4	0.9
Cycle Q Clear(g_c), s	3.7	0.0	0.3	4.0	0.0	0.0	5.7	14.5	14.5	0.6	28.4	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	237	0	141	175	0	0	144	1320	1382	14	2381	1063
V/C Ratio(X)	0.32	0.00	0.04	0.13	0.00	0.00	0.79	0.52	0.52	0.77	0.73	0.05
Avail Cap(c_a), veh/h	465	0	393	415	0	0	412	1682	1761	216	2973	1327
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	38.6	0.0	37.5	38.1	0.0	0.0	40.8	4.8	4.8	44.8	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	0.6	27.4	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	1.8	0.0	0.1	0.5	0.0	0.0	2.9	7.1	7.4	0.4	14.1	0.4
LnGrp Delay(d),s/veh	38.9	0.0	37.5	38.3	0.0	0.0	44.5	5.4	5.4	72.2	10.6	5.0
LnGrp LOS	D		D	D			D	A	A	E	B	A
Approach Vol, veh/h		81			22			1516			1793	
Approach Delay, s/veh		38.8			38.3			8.4			10.8	
Approach LOS		D			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.3	65.9		13.3	4.7	72.5		13.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	21.6	76.0		23.0	11.0	86.0		23.0
Max Q Clear Time (g_c+I1), s	7.7	30.4		6.0	2.6	16.5		5.7
Green Ext Time (p_c), s	0.1	30.4		0.0	0.0	24.4		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	10.6
HCM 2010 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	1340	50	35	1660	85
Future Volume (veh/h)	75	5	180	45	5	40	110	1340	50	35	1660	85
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	5	11	49	5	3	120	1457	34	38	1804	54
Adj No. of Lanes	0	1	1	1	1	0	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	2360	1056	60	2176	974
Arrive On Green	0.15	0.14	0.14	0.14	0.14	0.14	0.09	0.67	0.67	0.03	0.61	0.61
Sat Flow, veh/h	1299	96	1576	1387	1090	654	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	87	0	11	49	0	8	120	1457	34	38	1804	54
Grp Sat Flow(s),veh/h/ln	1395	0	1576	1387	0	1744	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.0	0.0	0.6	3.1	0.0	0.4	6.1	21.3	0.7	1.9	36.6	1.2
Cycle Q Clear(g_c), s	5.3	0.0	0.6	8.4	0.0	0.4	6.1	21.3	0.7	1.9	36.6	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	2360	1056	60	2176	974
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	460	0	414	362	0	458	407	2670	1194	233	2322	1039
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	36.1	0.0	34.4	40.4	0.0	34.3	41.0	8.6	5.2	43.6	13.8	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	2.9	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	0.2	1.2	0.0	0.2	3.1	10.5	0.3	1.0	18.4	0.6
LnGrp Delay(d),s/veh	36.8	0.0	34.5	41.1	0.0	34.4	44.4	9.3	5.2	47.7	16.8	7.1
LnGrp LOS	D		C	D		C	D	A	A	D	B	A
Approach Vol, veh/h		98			57			1611			1896	
Approach Delay, s/veh		36.5			40.2			11.8			17.1	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.8	62.2		17.4	7.1	67.0		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	10.1	38.6		10.4	3.9	23.3		7.3
Green Ext Time (p_c), s	0.2	17.6		0.1	0.0	24.0		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	15.7
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	350	5	585	15	5	20	445	1350	15	60	1550	245
Future Volume (veh/h)	350	5	585	15	5	20	445	1350	15	60	1550	245
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	384	0	436	16	5	7	484	1467	16	65	1685	221
Adj No. of Lanes	2	0	2	0	1	0	2	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	522	0	971	36	11	16	567	2423	26	101	2010	1123
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	3548	0	3167	992	310	434	3442	3586	39	1774	3539	1582
Grp Volume(v), veh/h	384	0	436	28	0	0	484	723	760	65	1685	221
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1737	0	0	1721	1770	1856	1774	1770	1582
Q Serve(g_s), s	19.7	0.0	21.0	3.0	0.0	0.0	26.0	42.7	42.8	6.8	74.7	9.0
Cycle Q Clear(g_c), s	19.7	0.0	21.0	3.0	0.0	0.0	26.0	42.7	42.8	6.8	74.7	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	522	0	971	63	0	0	567	1195	1254	101	2010	1123
V/C Ratio(X)	0.74	0.00	0.45	0.44	0.00	0.00	0.85	0.61	0.61	0.64	0.84	0.20
Avail Cap(c_a), veh/h	635	0	1072	283	0	0	1050	1806	1894	140	2811	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	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	77.6	0.0	53.0	90.1	0.0	0.0	77.2	16.9	17.0	87.7	33.9	9.3
Incr Delay (d2), s/veh	2.6	0.0	0.1	1.8	0.0	0.0	1.5	0.7	0.7	2.5	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	9.8	0.0	9.2	1.5	0.0	0.0	12.5	20.9	22.0	3.4	36.8	5.9
LnGrp Delay(d),s/veh	80.1	0.0	53.1	91.9	0.0	0.0	78.6	17.6	17.6	90.2	35.9	9.4
LnGrp LOS	F		D	F			E	B	B	F	D	A
Approach Vol, veh/h		820			28			1967			1971	
Approach Delay, s/veh		65.8			91.9			32.6			34.7	
Approach LOS		E			F			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	35.3	111.9		10.9	14.8	132.4		31.9
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	29.0	76.7		5.0	8.8	44.8		23.0
Green Ext Time (p_c), s	1.3	29.3		0.0	0.0	17.6		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	39.5
HCM 2010 LOS	D

Notes

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	1685	90	95	2125	10
Future Volume (veh/h)	5	0	5	135	5	70	5	1685	90	95	2125	10
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	5	0	1	147	5	5	5	1832	95	103	2310	11
Adj No. of Lanes	0	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	5	30	234	107	107	11	2430	125	129	2803	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	1140	37	235	1410	856	856	1774	3425	176	1774	3612	17
Grp Volume(v), veh/h	6	0	0	147	0	10	5	939	988	103	1131	1190
Grp Sat Flow(s),veh/h/ln	1412	0	0	1410	0	1712	1774	1770	1832	1774	1770	1860
Q Serve(g_s), s	0.0	0.0	0.0	12.4	0.0	0.7	0.4	13.2	14.2	7.4	51.6	51.8
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	51.6	51.8
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	1256	1300	129	1373	1443
V/C Ratio(X)	0.03	0.00	0.00	0.63	0.00	0.05	0.44	0.75	0.76	0.80	0.82	0.82
Avail Cap(c_a), veh/h	312	0	0	318	0	316	150	1256	1300	150	1373	1443
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	55.3	0.0	50.2	64.2	1.4	1.5	59.3	9.0	9.1
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.8	0.0	0.1	6.7	2.8	2.9	19.3	5.7	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	0.2	0.0	0.0	5.3	0.0	0.3	0.2	6.4	7.2	4.3	27.0	28.3
LnGrp Delay(d),s/veh	50.0	0.0	0.0	58.1	0.0	50.3	70.9	4.2	4.4	78.6	14.8	14.6
LnGrp LOS	D			E		D	E	A	A	E	B	B
Approach Vol, veh/h		6			157			1932			2424	
Approach Delay, s/veh		50.0			57.6			4.5			17.4	
Approach LOS		D			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.8	104.9		20.3	13.5	96.2		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	53.8		15.0	9.4	16.2		2.7
Green Ext Time (p_c), s	0.0	26.2		0.3	0.0	44.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	13.3
HCM 2010 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	1610	15	10	1885	280
Future Volume (veh/h)	150	5	15	65	5	15	15	1610	15	10	1885	280
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	163	5	14	71	5	9	16	1750	16	11	2049	233
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	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	2720	25	13	2668	1193
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	1338	41	115	1347	129	175	1774	3594	33	1774	3539	1582
Grp Volume(v), veh/h	182	0	0	85	0	0	16	861	905	11	2049	233
Grp Sat Flow(s),veh/h/ln	1494	0	0	1651	0	0	1774	1770	1857	1774	1770	1582
Q Serve(g_s), s	9.4	0.0	0.0	0.0	0.0	0.0	1.2	29.9	30.1	0.8	44.0	5.5
Cycle Q Clear(g_c), s	15.2	0.0	0.0	5.8	0.0	0.0	1.2	29.9	30.1	0.8	44.0	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	287	0	0	19	1339	1405	13	2668	1193
V/C Ratio(X)	0.68	0.00	0.00	0.30	0.00	0.00	0.84	0.64	0.64	0.82	0.77	0.20
Avail Cap(c_a), veh/h	347	0	0	368	0	0	109	1339	1405	109	2668	1193
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.58	0.58	0.58	0.43	0.43	0.43
Uniform Delay (d), s/veh	54.0	0.0	0.0	50.2	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	18.6	1.4	1.3	17.4	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	6.6	0.0	0.0	2.8	0.0	0.0	0.7	14.9	15.6	0.5	21.4	2.4
LnGrp Delay(d),s/veh	57.6	0.0	0.0	50.8	0.0	0.0	82.8	8.9	8.8	81.8	10.3	4.8
LnGrp LOS	E			D			F	A	A	F	B	A
Approach Vol, veh/h		182			85			1782			2293	
Approach Delay, s/veh		57.6			50.8			9.5			10.1	
Approach LOS		E			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.4	102.0		22.6	5.0	102.4		22.6
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.6	83.0		25.0	8.0	83.0		25.0
Max Q Clear Time (g_c+I1), s	13.2	46.0		7.8	2.8	32.1		17.2
Green Ext Time (p_c), s	0.0	34.5		0.2	0.0	39.7		0.4

Intersection Summary		
HCM 2010 Ctrl Delay	12.7	
HCM 2010 LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	205	20	50	90	20	20	60	1625	60	15	1885	140
Future Volume (veh/h)	205	20	50	90	20	20	60	1625	60	15	1885	140
Number	3	8	18	7	4	14	1	6	16	5	2	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	223	22	7	98	22	2	65	1766	63	16	2049	148
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	309	265	84	305	329	30	83	2446	87	19	2230	159
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.19	0.05	0.70	0.69	0.01	0.89	0.87
Sat Flow, veh/h	1376	1354	431	1369	1682	153	1774	3486	124	1774	3351	239
Grp Volume(v), veh/h	223	0	29	98	0	24	65	892	937	16	1070	1127
Grp Sat Flow(s),veh/h/ln	1376	0	1784	1369	0	1835	1774	1770	1840	1774	1770	1820
Q Serve(g_s), s	20.5	0.0	1.7	8.2	0.0	1.4	4.7	39.5	40.3	1.2	46.2	52.5
Cycle Q Clear(g_c), s	21.9	0.0	1.7	9.9	0.0	1.4	4.7	39.5	40.3	1.2	46.2	52.5
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	309	0	349	305	0	359	83	1242	1291	19	1178	1211
V/C Ratio(X)	0.72	0.00	0.08	0.32	0.00	0.07	0.78	0.72	0.73	0.84	0.91	0.93
Avail Cap(c_a), veh/h	369	0	426	364	0	438	109	1242	1291	109	1178	1211
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	0.39	0.39	0.39	0.51	0.51	0.51
Uniform Delay (d), s/veh	51.6	0.0	42.8	46.8	0.0	42.7	61.3	11.7	11.8	64.0	5.1	5.6
Incr Delay (d2), s/veh	5.5	0.0	0.1	0.6	0.0	0.1	7.2	1.4	1.4	16.8	6.7	8.1
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	8.3	0.0	0.9	3.2	0.0	0.7	2.5	19.6	20.8	0.7	23.0	27.2
LnGrp Delay(d),s/veh	57.0	0.0	42.9	47.4	0.0	42.7	68.5	13.1	13.2	80.8	11.9	13.7
LnGrp LOS	E		D	D		D	E	B	B	F	B	B
Approach Vol, veh/h		252			122			1894			2213	
Approach Delay, s/veh		55.4			46.5			15.1			13.3	
Approach LOS		E			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.1	90.5		29.4	5.4	95.2		29.4
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	8.0	78.0		30.0	8.0	78.0		30.0
Max Q Clear Time (g_c+I1), s	10.7	54.5		11.9	3.2	42.3		23.9
Green Ext Time (p_c), s	0.0	21.5		0.4	0.0	26.5		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	17.3
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	150	90	145	130	715	80	950	195	610	1170	105
Future Volume (veh/h)	65	150	90	145	130	715	80	950	195	610	1170	105
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.96	1.00		0.97	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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	71	163	11	158	141	397	87	1033	125	663	1272	110
Adj No. of Lanes	0	1	1	1	1	1	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	106	192	282	250	577	477	110	1359	599	737	1768	153
Arrive On Green	0.19	0.19	0.19	0.09	0.31	0.31	0.06	0.38	0.38	0.21	0.54	0.53
Sat Flow, veh/h	378	1030	1514	1774	1863	1542	1774	3539	1561	3442	3297	284
Grp Volume(v), veh/h	234	0	11	158	141	397	87	1033	125	663	681	701
Grp Sat Flow(s),veh/h/ln	1408	0	1514	1774	1863	1542	1774	1770	1561	1721	1770	1812
Q Serve(g_s), s	18.9	0.0	0.8	9.0	7.4	31.1	6.3	33.0	7.0	24.4	37.7	38.1
Cycle Q Clear(g_c), s	21.0	0.0	0.8	9.0	7.4	31.1	6.3	33.0	7.0	24.4	37.7	38.1
Prop In Lane	0.30		1.00	1.00		1.00	1.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	298	0	282	250	577	477	110	1359	599	737	949	972
V/C Ratio(X)	0.78	0.00	0.04	0.63	0.24	0.83	0.79	0.76	0.21	0.90	0.72	0.72
Avail Cap(c_a), veh/h	317	0	303	276	630	522	328	1359	599	953	949	972
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.79	0.79	0.79	0.26	0.26	0.26
Uniform Delay (d), s/veh	51.3	0.0	43.4	37.9	33.5	41.7	60.2	34.8	26.8	49.7	22.7	22.9
Incr Delay (d2), s/veh	11.6	0.0	0.1	4.0	0.2	10.3	3.8	3.2	0.6	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	9.1	0.0	0.3	4.6	3.8	14.6	3.2	16.7	3.1	11.8	18.7	19.2
LnGrp Delay(d),s/veh	62.8	0.0	43.4	41.9	33.7	52.0	64.0	38.1	27.4	52.1	24.0	24.1
LnGrp LOS	E		D	D	C	D	E	D	C	D	C	C
Approach Vol, veh/h		245			696			1245			2045	
Approach Delay, s/veh		62.0			46.0			38.8			33.1	
Approach LOS		E			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	12.0	73.7	16.0	28.2	31.9	53.9		44.2
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	9.3	40.1	11.0	23.0	26.4	35.0		33.1
Green Ext Time (p_c), s	0.1	6.8	0.1	0.2	1.5	1.6		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	38.6
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	70	755	95	0	960
Future Vol, veh/h	0	70	755	95	0	960
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	76	821	103	0	1043

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	821	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	374	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	374	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	374	-
HCM Lane V/C Ratio	-	-	0.203	-
HCM Control Delay (s)	-	-	17.1	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.8	-

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	75	45	915	90	50	1010
Future Vol, veh/h	75	45	915	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	82	49	995	98	54	1098

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2201	995	0	0	1093	0
Stage 1	995	-	-	-	-	-
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	~ 49	297	-	-	638	-
Stage 1	358	-	-	-	-	-
Stage 2	283	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 45	297	-	-	638	-
Mov Cap-2 Maneuver	143	-	-	-	-	-
Stage 1	328	-	-	-	-	-
Stage 2	283	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	44.3	0	0.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	143	297	638	-
HCM Lane V/C Ratio	-	-	0.57	0.165	0.085	-
HCM Control Delay (s)	-	-	59.2	19.5	11.2	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	2.9	0.6	0.3	-

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

Intersection	
Int Delay, s/veh	8.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	115	125	150	5	110	5	135	5	5	5	5	120
Future Vol, veh/h	115	125	150	5	110	5	135	5	5	5	5	120
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	125	136	163	5	120	5	147	5	5	5	5	130

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	125	0	0	299	0	0	668	603	218	606	682	123
Stage 1	-	-	-	-	-	-	468	468	-	133	133	-
Stage 2	-	-	-	-	-	-	200	135	-	473	549	-
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	1462	-	-	1262	-	-	372	413	822	409	372	928
Stage 1	-	-	-	-	-	-	575	561	-	870	786	-
Stage 2	-	-	-	-	-	-	802	785	-	572	516	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1462	-	-	1262	-	-	294	376	822	375	339	928
Mov Cap-2 Maneuver	-	-	-	-	-	-	294	376	-	375	339	-
Stage 1	-	-	-	-	-	-	526	513	-	796	783	-
Stage 2	-	-	-	-	-	-	682	782	-	514	472	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0.3	29.1	10.3
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	303	1462	-	-	1262	-	-	826
HCM Lane V/C Ratio	0.52	0.085	-	-	0.004	-	-	0.171
HCM Control Delay (s)	29.1	7.7	-	-	7.9	-	-	10.3
HCM Lane LOS	D	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	2.8	0.3	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	20	70	5	25	5	55	5	5	5	5	35
Future Vol, veh/h	40	20	70	5	25	5	55	5	5	5	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	-	-	-	-	-	-	-	-	-	-	-	-
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	43	22	76	5	27	5	60	5	5	5	5	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	32	0	0	98	0	0	207	188	60	191	224	30
Stage 1	-	-	-	-	-	-	146	146	-	40	40	-
Stage 2	-	-	-	-	-	-	61	42	-	151	184	-
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	1580	-	-	1495	-	-	751	707	1005	769	675	1044
Stage 1	-	-	-	-	-	-	857	776	-	975	862	-
Stage 2	-	-	-	-	-	-	950	860	-	851	747	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1580	-	-	1495	-	-	701	684	1005	742	653	1044
Mov Cap-2 Maneuver	-	-	-	-	-	-	701	684	-	742	653	-
Stage 1	-	-	-	-	-	-	832	753	-	947	859	-
Stage 2	-	-	-	-	-	-	907	857	-	816	725	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	1.1	10.6	9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	716	1580	-	-	1495	-	-	939
HCM Lane V/C Ratio	0.099	0.028	-	-	0.004	-	-	0.052
HCM Control Delay (s)	10.6	7.3	0	-	7.4	0	-	9
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	50	55	35	5	45	5	30	5	5	5	5	45
Future Vol, veh/h	50	55	35	5	45	5	30	5	5	5	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	-	-	-	-	-	-	-	-	-	-	-	-
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	60	38	5	49	5	33	5	5	5	5	49

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	54	0	0	98	0	0	276	251	79	254	268	52
Stage 1	-	-	-	-	-	-	187	187	-	62	62	-
Stage 2	-	-	-	-	-	-	89	64	-	192	206	-
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	-	-	1495	-	-	676	652	981	699	638	1016
Stage 1	-	-	-	-	-	-	815	745	-	949	843	-
Stage 2	-	-	-	-	-	-	918	842	-	810	731	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1551	-	-	1495	-	-	620	626	981	670	612	1016
Mov Cap-2 Maneuver	-	-	-	-	-	-	620	626	-	670	612	-
Stage 1	-	-	-	-	-	-	785	717	-	914	840	-
Stage 2	-	-	-	-	-	-	866	839	-	770	704	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.6	0.7	10.9	9.2
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	651	1551	-	-	1495	-	-	918
HCM Lane V/C Ratio	0.067	0.035	-	-	0.004	-	-	0.065
HCM Control Delay (s)	10.9	7.4	0	-	7.4	0	-	9.2
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	30	30	5	25	25	5
Future Vol, veh/h	30	30	5	25	25	5
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	33	33	5	27	27	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	66	0	87	50
Stage 1	-	-	-	-	50	-
Stage 2	-	-	-	-	37	-
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	-	-	1536	-	914	1018
Stage 1	-	-	-	-	972	-
Stage 2	-	-	-	-	985	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1536	-	911	1018
Mov Cap-2 Maneuver	-	-	-	-	911	-
Stage 1	-	-	-	-	969	-
Stage 2	-	-	-	-	985	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	927	-	-	1536	-
HCM Lane V/C Ratio	0.035	-	-	0.004	-
HCM Control Delay (s)	9	-	-	7.4	0
HCM Lane LOS	A	-	-	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)	--	Lahaina Bypass Road	<u>Lahaina Bypass Road (LBR) Phase 1B-2</u> - Extend LBR from Hokiokio Place to its southern terminus with Honoapiilani Highway - Reroute all northbound traffic to use LBR instead of Honoapiilani Highway - Signalize and modify intersection laneage along LBR at its intersections with Kai Hele Ku Street and Hokiokio Place
		Honoapiilani Highway/ Keawe Street/ Lahaina Cannery Mall	- Construct an additional southbound left-turn lane, resulting in dual southbound left-turn lanes - Optimize signal timing plans along the coordinated corridor from Leialii Parkway to Keawe Street
		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 2027 (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	--	- No additional roadway improvements recommended
	Scenario 2	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 275 feet of storage space
		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.
		Akahele Street @ Road A & Road C intersections	- Consider installing left-turn storage lanes along Akahele Street at Road A and Road C intersections
	Scenario 3	Honoapiilani Highway/ Road J (Project South Access) [1]	- 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 and to determine if or when a traffic signal is warranted at the intersection.
Future Year 2027 (With Project)	Scenario 4	Honoapiilani Highway/ Kapunakea Street	- Consider restriping to provide exclusive eastbound left-turn lane and shared through/right-turn lane.

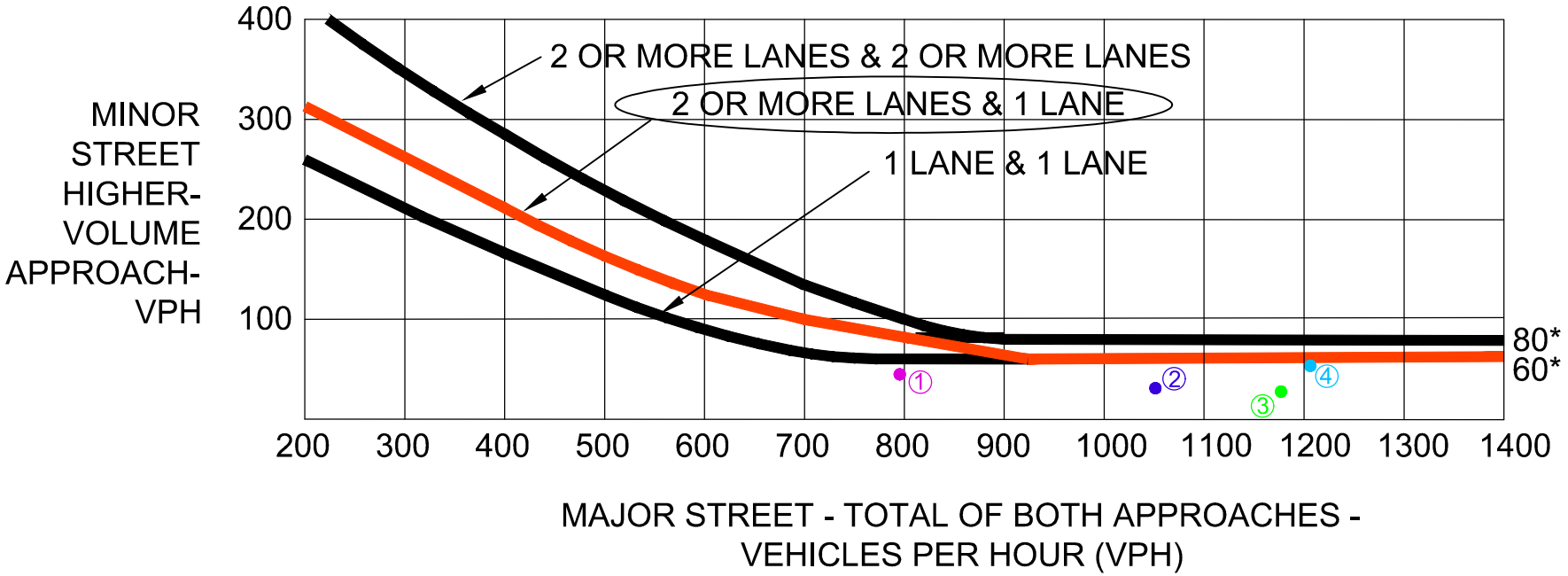
Notes:

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), (795, 45)
② (1:45 PM to 2:45 PM), (1054, 30)
③ (2:45 PM to 3:45 PM), (1178, 28)
④ (3:45 PM to 4:45 PM), (1205, 55)

PULELEHUA

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

FUTURE YEAR 2027 FOUR HOUR TRAFFIC SIGNAL WARRANT FOR HONOAPIILANI HIGHWAY/ROAD J INTERSECTION

FIGURE 1

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:

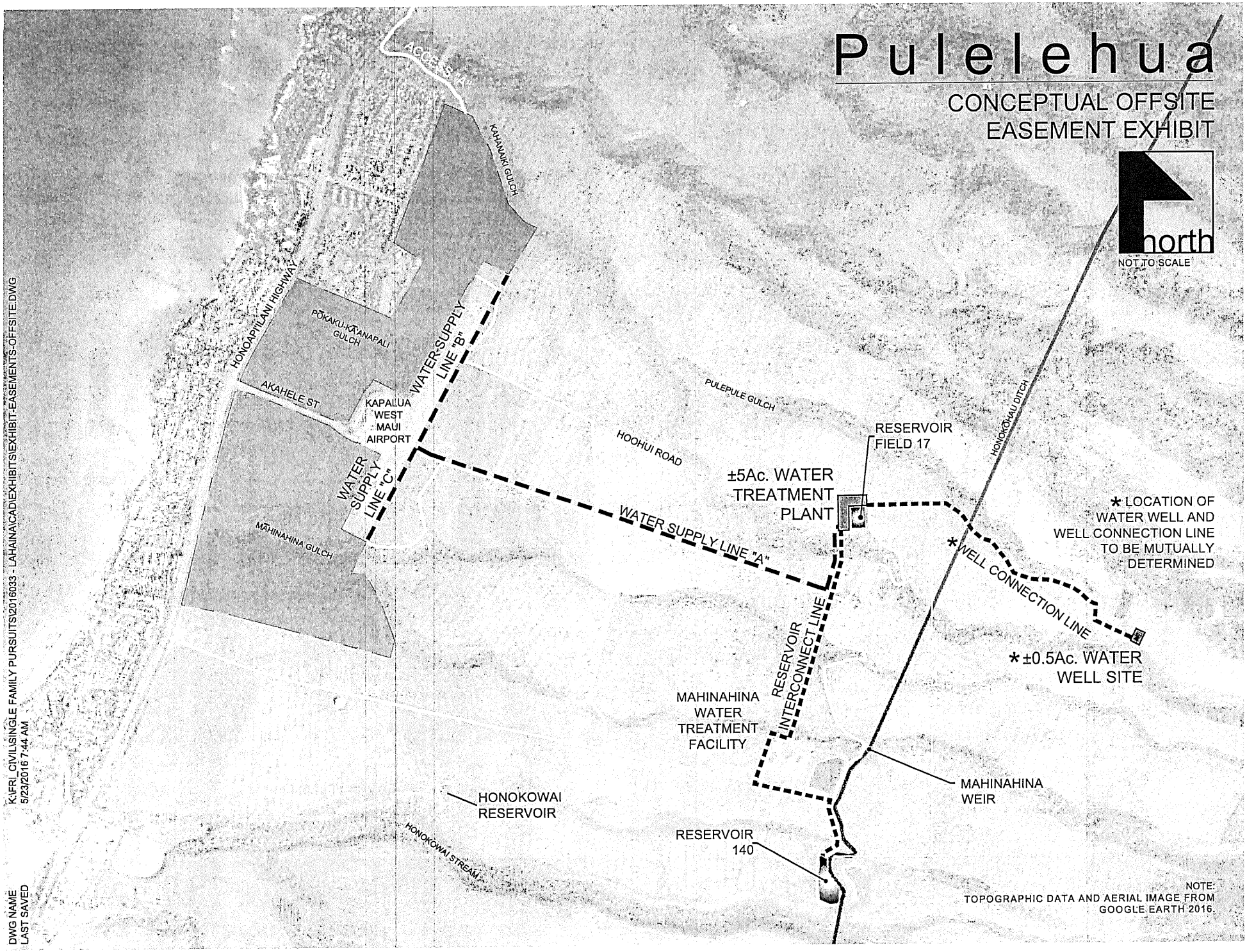
214° 27' 30" 28.78 feet;

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.



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5/23/2016 7:44 AM

DWG NAME
LAST SAVED

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

LAND COMPREHENSIVE FORMAT: 01.27.16

Notes:

- Do not delete this instruction page in the Word doc; instead, delete it once you have created a PDF of the report;
- Text-linked version; please ensure that you have the latest Word companion file (normal.dot or valuation macros.dotm) prior to working with any format; these are part of the Toolbox Setup 3 file found on iChannel;
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- When copying from old reports (source), be sure to paste using *Paste Special | Unformatted Text* and then apply any style changes as needed within the target document. If you follow these instructions, you may use the Document Completion Tools (Add-Ins tab) for final color changes, et cetera;
-

MARKET STUDY, ECONOMIC IMPACT ANALYSIS, AND PUBLIC FISCAL ASSESSMENT OF THE PROPOSED PULELEHUA 900-UNIT APARTMENT 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
2525 McKinney Avenue, Suite B
Dallas, Texas 75201

www.cbre.com/valuation

CBRE

VALUATION & ADVISORY SERVICES

CBRE

1003 Bishop Street, Suite 1800
Honolulu, HI 96813

T 808-521-1200
F 808-541-5155

www.cbre.com

May 23, 2018

Paul Cheng
Maui Oceanview LP
2525 McKinney Avenue, Suite B
Dallas, Texas 75201

RE: Market Study, Economic Impact Analysis, and Public Cost Benefit Assessment of the Proposed Pulelehua 1,200-Unit Apartment 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 898-unit apartment component of the proposed Pulelehua mater plan which encompasses some 304 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 618 "market-priced" and 280 "workforce" rental apartments, along with 70,000 square feet neighborhood-serving commercial/retail space. The apartments will be used for long-term, full-time residential use only (no transient rentals or non-resident tenancy) and the workforce units will be priced according to Maui County affordable rental guidelines. All basic entitlements are in place for 898 of the units with minor County approvals needed. The project is within a larger master planned holding which may (or may not) support future development; specifically, there are 300 potentially approved "Ohana" units which are not addressed in our study.

In addition to the 898 apartment units which are the focus of this study, there are 2 single family homes proposed within the project, bringing the total unit count to the 900 thus far approved. We have not assessed the marketability or price of the two homes, but assume they will be easily sold if priced appropriately in the high-demand West Maui residential market. Their nominal impacts are included in the economic impact and fiscal assessment portion of the assignment.

The apartments, sited on some 60 acres, will be developed in a series of communities in the southwesterly portion of the larger holding together with retail (17.5 acres), parks (10.0 acres), school (13.1 acres) and open space/common areas (123.2 acres). The project will contain pathways, greenbelts, buffer spaces, and have a low-profile and low-density appearance.

Our studies analyzed the regional market for long-term residential rental apartments and the economic and fiscal impacts associated with its development in support of its revised-entitlement

processes acknowledging eventual inclusion of this summary reporting document into supplementary Environmental Assessment/ Environmental Impact Statement 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 date of this report is May 23, 2018, as it contains revisions resulting from the review of our original November 14, 2017 document by State and County agencies. However, we have not updated any of the market data, time-frames or pertinent conclusions from the prior study; and would not expect meaningful change over the intervening five-months regardless.

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 the apartment sector serving 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, 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, 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 additional 300 Accessory Dwelling Units (ADUs), or "Ohana units" within the development, which may or may not be built and/or be added to the apartment 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 a 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 housing project. Please contact us if further discussion or detail is required.

Respectfully submitted,

CBRE - VALUATION & ADVISORY SERVICES

Tom Holliday, CRE, FRICS
Director

Phone: 808.541.5120
Email: Tom.Holliday@cbre.com

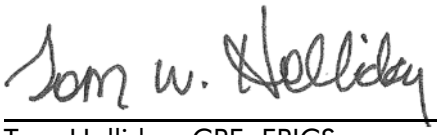
Jaelyn Odani
Appraiser
Hawaii Appraiser Trainee #R160315010

Phone: 808.541.5134
Email: Jaelyn.Odani@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. Jaelyn Odani and 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 Holliday, CRE, FRICS
Director

Jaelyn Odani
Appraiser
Hawaii Appraiser Trainee #R160315010

Table of Contents

EXECUTIVE SUMMARY

INTRODUCTION

The Pulelehua master planning area is comprised of approximately 304 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 (898 apartment units and 2 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 build-out design calls for:

- 898 long-term residential rental apartments.
- 618 of which will be rented at "market rate".
- 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.

- 70,000-square-feet of neighborhood-oriented commercial/retail floor area.
- 13.1-acre elementary school.
- 10-acres of park area.
- 123.2 acres of common areas/open space.
- 2 single family homes, bringing the total count for the project to 900 units.
- 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).

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 housing (particularly at workforce/affordable rents), 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 898 rental apartments 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 viewed by our firm on many occasions and specifically for this assignment on October 25, 2017.

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". 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

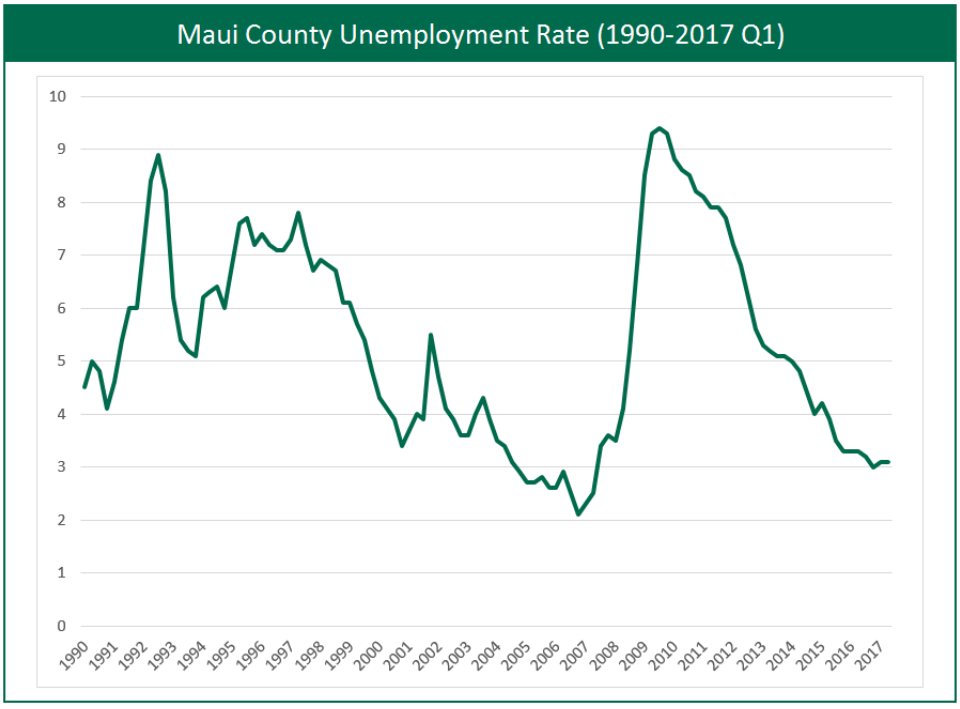
Based on our analysis of the subject property, its environs, and envisioned development we have reached the following conclusions as of the Third Quarter of 2017 regarding the probable market standing and economic impacts of the proposed Pulelehua Project.

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

Economic Indicators	2015	2016	2017	2018	2019	2020
	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 898 proposed apartments of Pulelehua will require about eight years to be fully absorbed following commencement of pre-leasing (tentatively anticipated for 2019), with full absorption by the 2026. 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 618 market-priced units would be quickly leased-up as they are completed.

- Cumulatively, this absorption estimate represents only about 16 percent of total regional residential demand during their offering period and 58 percent of the multifamily/apartment sector; which we consider to be 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 APARTMENT PROJECT

Year			Residential Component							
				Workforce Rentals		Market Rentals		Total Inventory	
Estimated Calendar	Project	Phase Being Constructed	Units Completed	Annually	Cumulative	Annually	Cumulative	Annually	Cumulative
2018-19	1 & 2	Phase I	Final approvals/entitlements achieved in 2018, initial grading/site work and infrastructure emplacement commences and is completed by early-2019. Phase I vertical construction begins in mid-2019 with unit reservations/lottery begining commensurately. First product completed and available for occupancy in 2020.						
2020	3	Phase I	123	40	40	90	90	130	130
2021	4	Phase I/II	150	40	80	88	178	128	258
2022	5	Phase II	125	40	120	88	266	128	386
2023	6	Phase II/III	125	40	160	88	354	128	514
2024	7	Phase III	125	40	200	88	442	128	642
2025	8	Phase III/IV	125	40	240	88	530	128	770
2026	9	Phase IV	125	40	**280**	88	**618**	128	**898**
		Total	**898**						

Commercial Component

Neighborhood or Phase	Gross Leaseable Area in Square Feet	Year Built	Years to Absorb
Kahanaiki/Phase I	50,000	2020	2
Central/Phase II	20,000	2022	1
Total	**70,000**		**3**

Note: The project will also include 2 single family homes. It is assumed they will be competitively designed and priced and be built and absorbed in the initial phases of Pulelehua. This will bring the total count to 900 units in the project.

Source: CBRE/Hallstrom Team

- We anticipate the two single family homes within the project will be built circa 2021-2022, with competitive design and pricing and will be sold (at maximum) within a year of completion; although it is highly likely they will be pre-sold during the construction process.

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 (2019), and initial apartment occupancy (2020).
2. 2021 to 2025, construction of apartments 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 four phases ranging from 218 units to 240 units, each with a mix of market and workforce/affordable.

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 $248 million of new, direct capital investment with significant unquantified indirect expenditures into the island's real estate market and generate $890 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 1,134 "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 $80.2 million in wages (averaging about $10 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 828 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 $33.4 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 2,296 residents at Pulelehua will have aggregate incomes of $333.8 million (2020-2026) and will stabilize at $91.4 million

annually thereafter. Discretionary expenditures into Maui businesses by the Pulelehua population will be some $166.9 million during build-out and average $45.7 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 1,148 persons will have cumulative household incomes of some $166.9 million during build-out and $45.7 million annually on a stabilized basis. Their discretionary income will total $83.4 million from 2020 through 2026, and stabilize at $22.8 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 $890 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 1,148 individuals and 449 households.

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.

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 $22.7 million during the 9-year building and initial residency projection period (2018-2026), and $4.7 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 $75.6 million during the 2018-2026 modeling period, and $10.2 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 $8.2 million during construction and absorption and $725,200 per year as stabilized.
- The net public benefit to the State of Hawaii from Pulelehua will be $40.5 million during construction and absorption and $565,246 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).
- 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

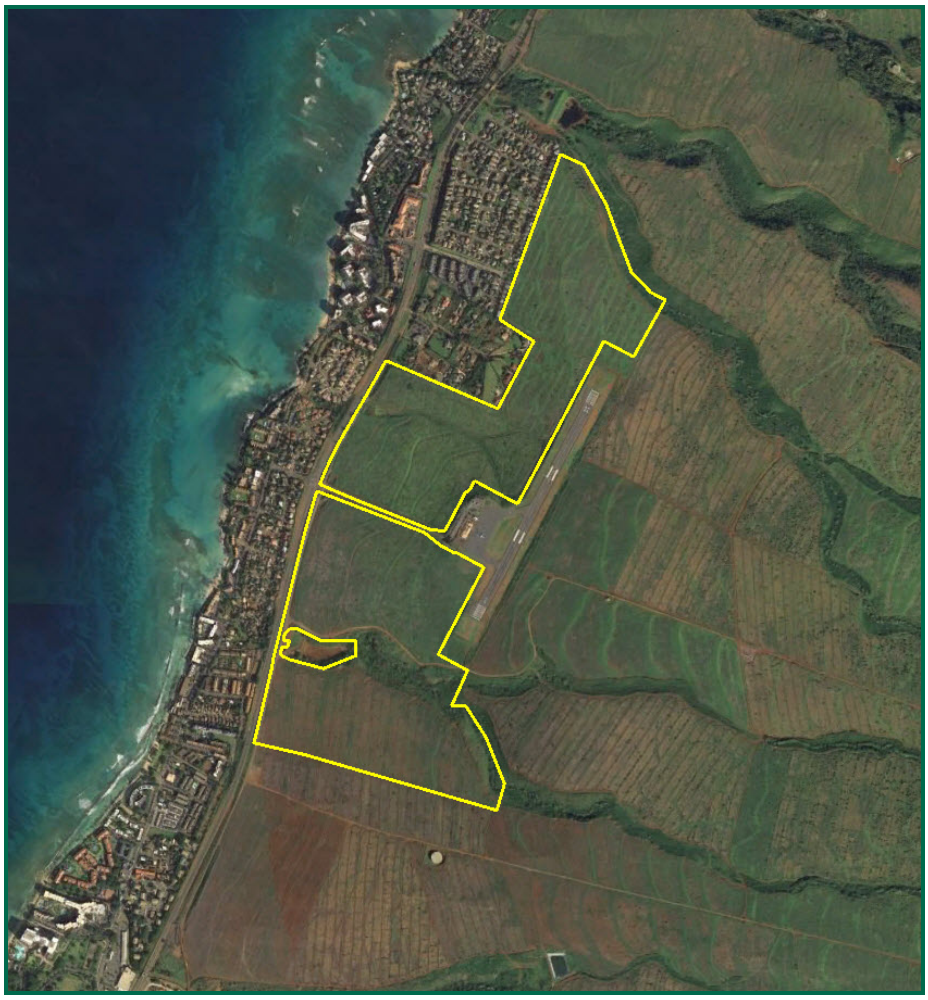
Model Item	Cumulative During Build-Out Period	Stabilized Annually Thereafter
Direct Capital Investment	$247,825,000	
Local Contractor's Profits	$24,782,500	
Local Supplier's Profits	$9,913,000	
Worker Years of Jobs	2,775	304
Employee Wages	$149,287,695	$11,930,880
Total Resident Population		2,296
New Inmigrating Maui Residents		1,148
Resident Household Income	$333,799,386	$91,418,277
New Maui Resident Household Income	$166,899,693	$45,709,138
Resident Discretionary Expenditures	$166,899,693	$45,709,138
New Maui Resident Discretionary Income	$83,449,847	$22,854,569
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	$889,936,000	$74,760,000
INCLUDES ONLY THOSE TAXES WHICH ARE "NEW" TO MAUI		
County of Maui Gross New Tax Receipts	$22,734,524	$4,720,264
State of Hawaii Gross New Tax Receipts	$75,553,891	$10,163,439
County of Maui New Expenditures	$14,581,778	$3,995,072
State of Hawaii New Expenditures	$35,032,843	$9,598,194
County of Maui Net New Profits/(Expenses)	$8,152,746	$725,192
State of Hawaii Net New Profits/(Expenses)	$40,521,047	$565,246

Source: CBRE/Hallstrom Team

The Subject Property and Proposed Project

LOCATION AND MASTER PLAN

The irregular shaped 304-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 898 apartment units and two single family homes, for a total of 900 units, is shown below

The project is summarized as follows; however, via agreements with the County there will be 280 workforce housing units, this is equivalent to 31.2% of the total unit count and 34% of the market unit count; far exceeding the 25% of market unit threshold in County ordinance. There will be 618 market-priced apartment units and t718 market-priced units.

Land Use Acreage Summary	
Akahele Drive Right of Way Dedication	1.5
Local and Collector Rights of Way	22.8
Water Reclamation Plant	0.8
School	13.1
Retail	17.5
Apartment House Lots	44.3
Future Residential	71.0
Parks	10.0
Common Areas / Open Spaces	123.2
Gross Acreage	**304.3**

Residential Unit Summary	
Market Rate Apartment Units	720
Workforce Apartment Units	178
Single Family Units	2
Total	**900**

Retail Floor Area	± 70,000 sf

There is the potential for another 300-accessory dwelling/Ohana units (likely to be constructed as apartments) 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

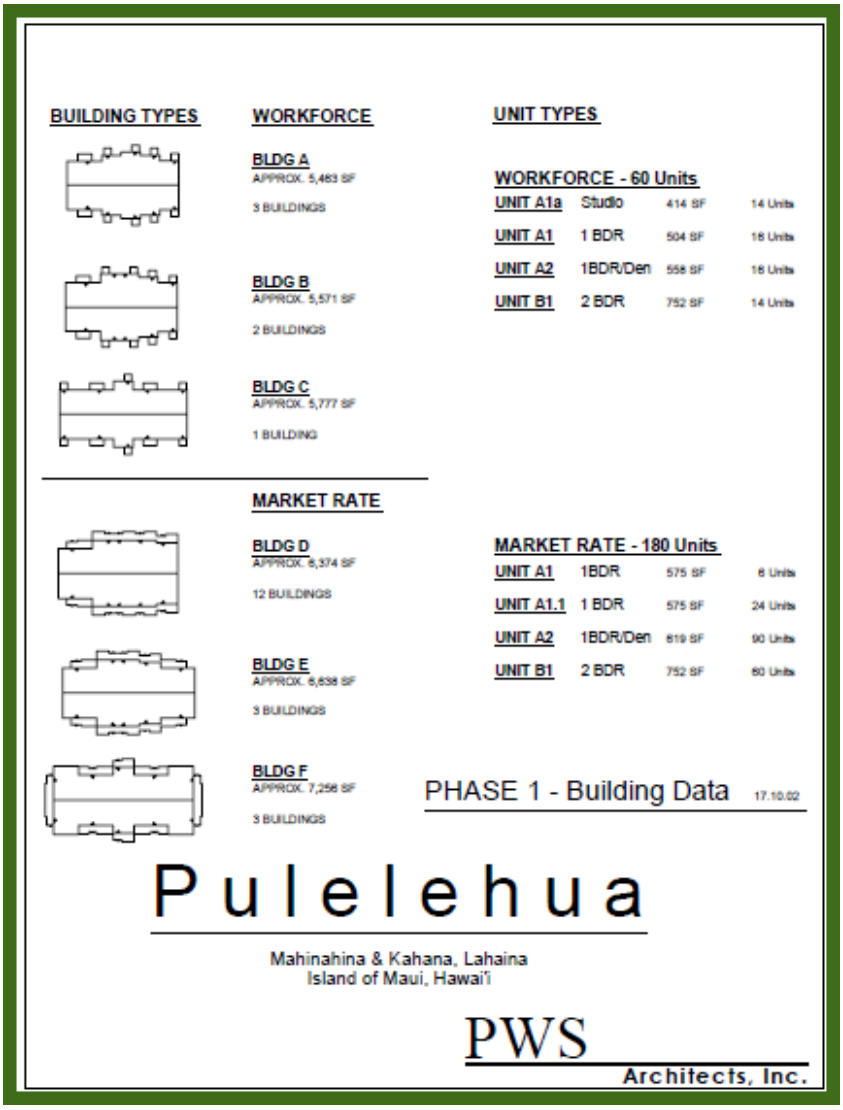
The buildings will be of multi-plex design, single-story wooden structures with gabled roofs, and exterior patio elements, as shown on the renderings below.

The unit-mix in the 240-units of Phase I were originally proposed as shown below. The most recent versions have 70 wrokforce housing units and 170 market-priced units.

PROPOSED 240 APARTMENT UNITS IN PULELEHUA PHASE I

Tenancy	Unit Type	Average Living Area Size in Square Feet	Number of Units in Phase
Workforce	Studio	414	14
	1 Bedroom	504	16
	1 Bedroom + Den	558	16
	2 Bedroom	752	14
		Total	**60**
Market-Priced	1 Bedroom	575	30
	1 Bedroom + Den	619	90
	2 Bedroom	752	60
		Total	**180**

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 898 Pulelehua rental apartment development is 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 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					
		Projected West Maui Resident Population			Additional Units Required by 2030
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**	
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 Demand 2017-2030
	2017 to 2020	2021 to 2025	2026 to 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	Low Income			Below Moderate		Moderate		Above Moderate		Gap Income	
		50% & Below	(51% to 80%)			(81% to 100%)		(101% to 120%)		(121% to 140%)		(141% to 160%)	
Prevailing Int. Rate	No. of Bedroom	50%	60%	70%	80%	90%	100%	110%	120%	130%	140%	150%	160%
		$37,050	$44,460	$51,870	$59,280	$66,690	$74,100	$81,510	$88,920	$96,330	$103,740	$111,150	$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%*

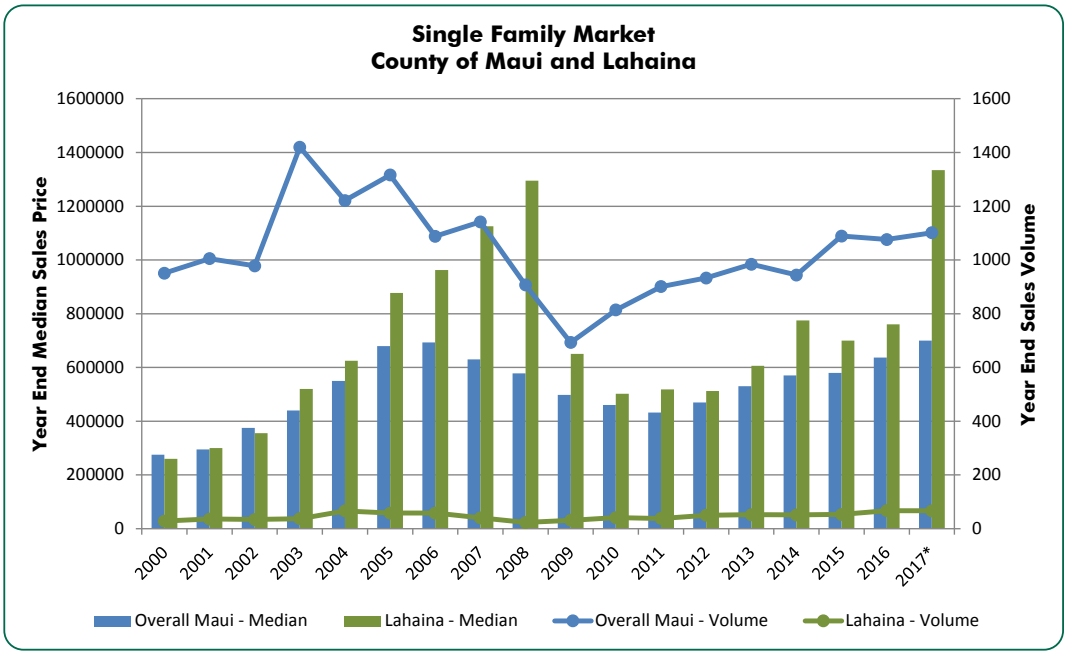
Source: Maui Multiple Listing Service and CBRE/Hallstrom Team.

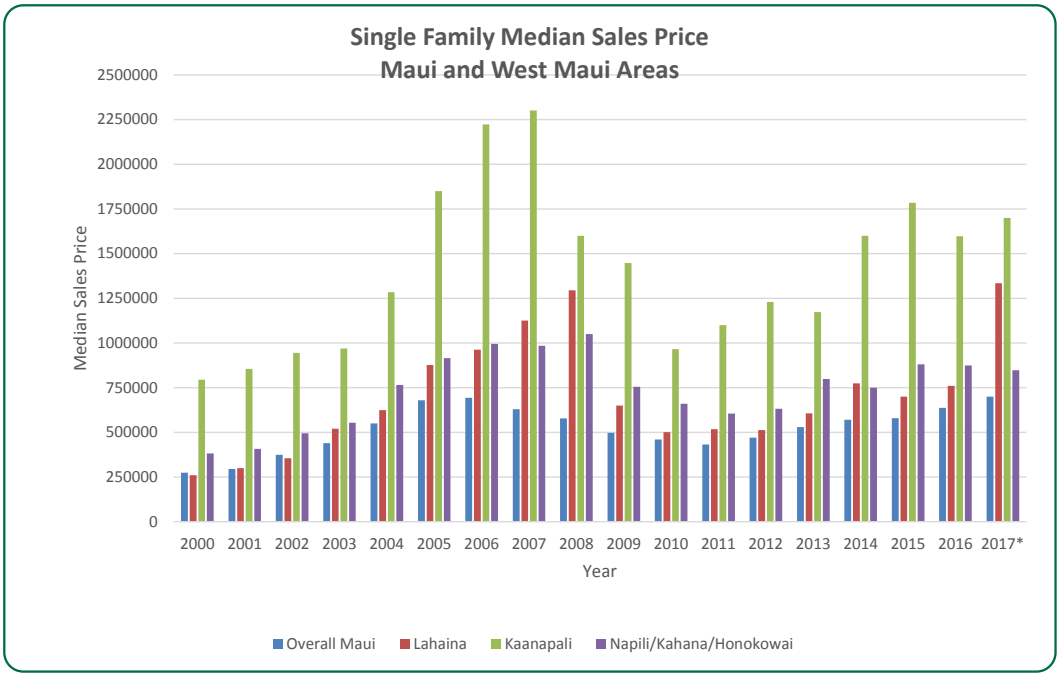
YEAR-END NUMBER OF SALES FOR MAUI AND SELECT WEST MAUI AREAS FROM MULTIPLE LISTING SERVICE DATABASE 2010 THROUGH ANNUALIZED 2017

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.

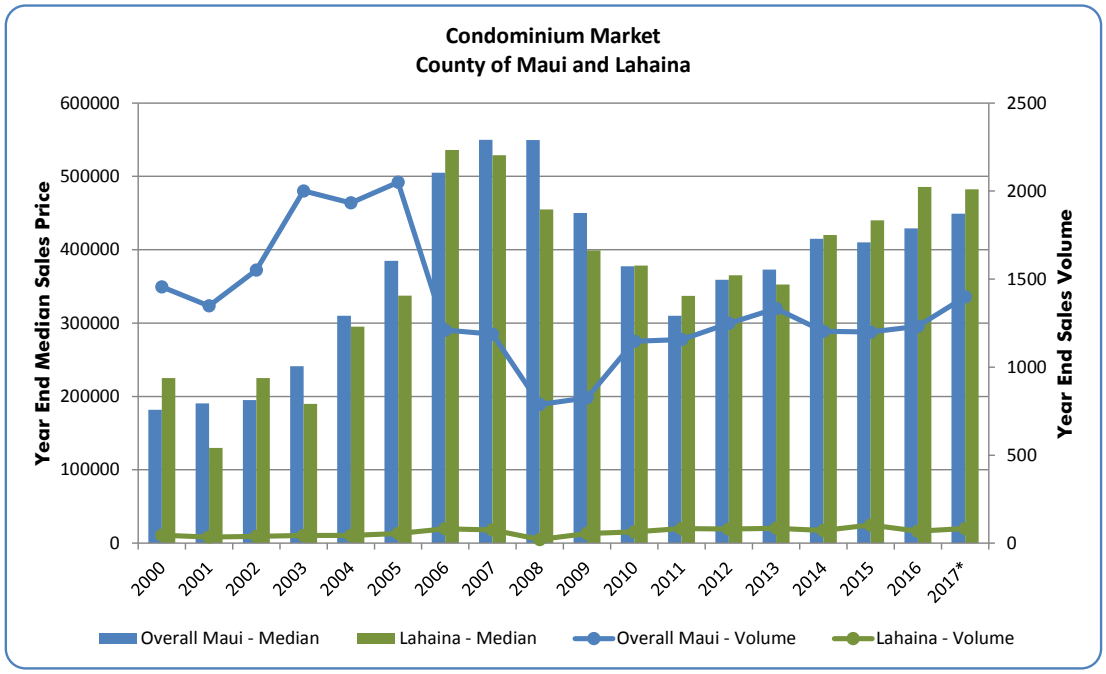
GRAPHS OF MAUI MULTIPLE LISTING SERVICE SINGLE FAMILY SALES FOR MAUI AND SELECTED WEST MAUI AREAS

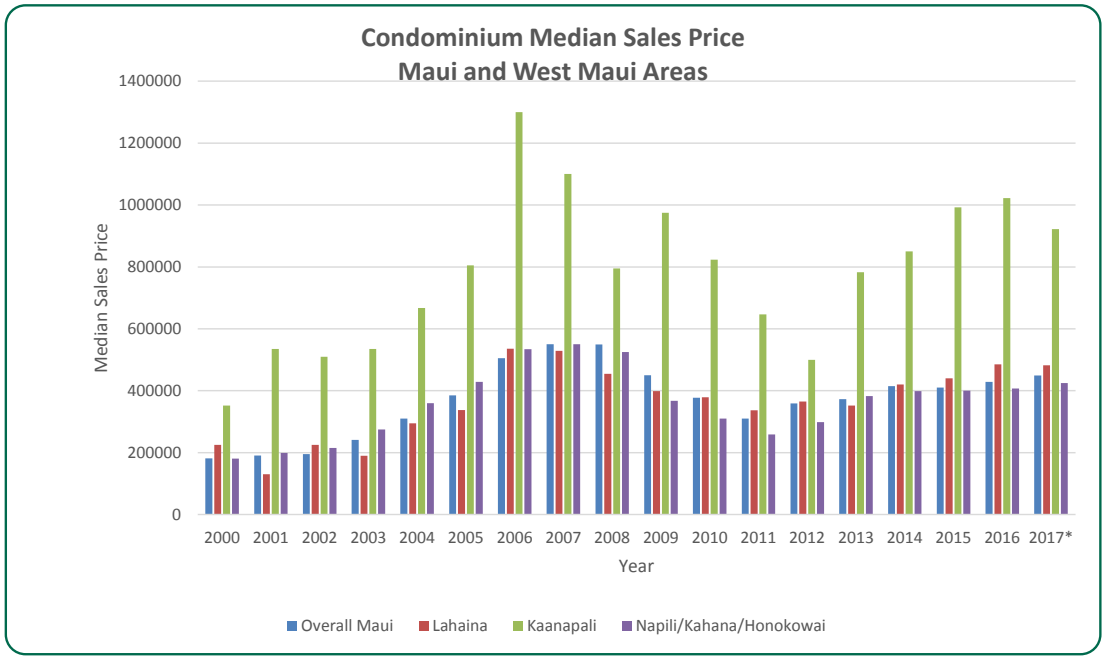




Source: Maui Multiple Listing Service and CBRE/Hallstrom Team.

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
Destination 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 Honoapiilani 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 Honawai 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, Lahaina, 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	2	2		$2,300		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 Rd,Lahaina, 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

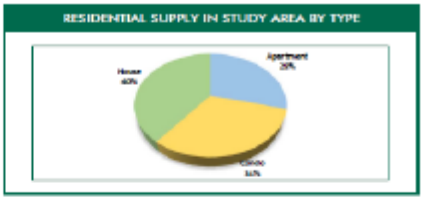
Virtually all units listed for rents were successfully leased in the month of their offering, particularly those priced at $3,000 per month or less, and according to apartment complex managers and rental agents demand for residential rentals in West Maui is very high (and increasing) and far outstrips 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.

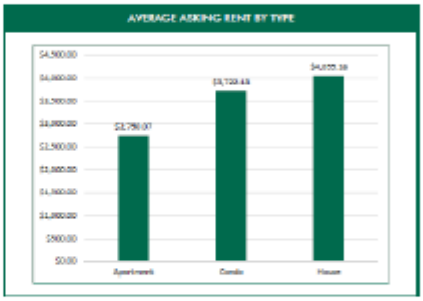
GRAPHS OF WEST MAUI LONG-TERM RESIDENTAL RENTAL UNIT SURVEY

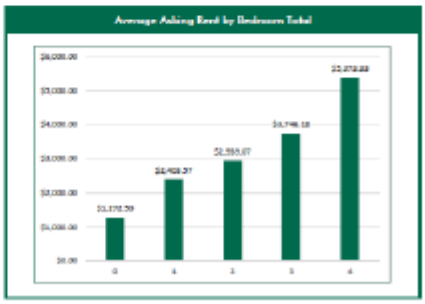
Unit Type	Number of Units
Apartment	14
Condo	15
House	19
Grand Total	48

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	$3,291.09







Source: As Cited andCBRE/Hallstrom Team

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.

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

	Number of Units			Unit Size in Sq. Ft.		Sales Prices		
Project Name	Multi Family	Single Family	Total	Multifamily	Single Family	Multifamily	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 (898 apartments and 2 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 buildings 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.

Our focus is on the absorption of the 898 apartment units. We assume the two single family homes will be appropriately-designed and competitively-priced and will sell at worst within a year of completion; likely in much less time (probably during construction).

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.

The Gross Demand method also supports there being excess unmet demand for the 898 Pulelehua units solely from a multifamily unit perspective. Analysis indicates there will be a need

for between 2,086 units and 3,274 units in West Maui by 2030, and the entitled and partially-entitled proposed projects are only planning to make some 1,880 maximum units available. Again, this represents only from 67 percent to 90 percent of the total need for multifamily/apartment units.

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 100-plus units annually, **which would be sufficient to absorb all 898 proposed Pulelehua units in a 7 to 9-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 60 to 80 percent of the multifamily/apartment 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 multifamily 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 MULTIFAMILY UNITS IN THE WEST MAUI STUDY AREA

Segment	TOTAL UNITS	2017-2020	2021-2025	2026-2030
1. Minimum Demand				
Assumed Supply (60% of entitled and partially entitled market projects)	768	260	254	254
Regional Multifamily Demand	2,086	594	746	746
Shortage or (Excess) Supply	1,318	334	492	492
Potential Residual Subject Minimum Demand				
at 95% Capture Rate	1,253	317	467	468
at 90% Capture Rate	1,187	301	443	443
2. Maximum Demand				
Assumed Supply (80% of entitled and partially entitled market projects)	1,024	260	382	382
Regional Multifamily Demand	3,247	842	1,110	1,294
Shortage or (Excess) Supply	2,223	582	728	912
Potential Residual Subject Maximum Demand				
at 95% Capture Rate	2,111	553	692	867
at 90% Capture Rate	2,000	524	655	821

Indicated Number of Years Required to Absorb 898 Pulelehua Units Using Residual Method

Scenario	Percent of Residual Demand	Number of Years to Achieve Full Absorption
Minimum	68.1%	9.5
Maximum	40.4%	5.3
Mid-Point	54.3%	7.4
		= 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 898 Pulelehua units, which would be expected to capture up to 95 percent of the left-over, unmet demand.

Using the residual analysis the 898 units of Pulelehua would be fully-absorbed (leased-up) within 5.3 to 9.5 years, with a mid-point of 7.4 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 multifamily/apartment 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 50 percent to 65 percent of the total Lahaina District new residential multifamily unit market sector during its planned offering period. This is an appropriate fraction of the total regional demand for new multifamily product, which we consider readily achievable.

Application of this method is shown for the Pulelehua multifamily units 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 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	17.00%	25
Totals		1,640	54.73%	898
	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	35.50%	79
Totals		1,531	58.66%	898
	Indicated Absorption Period		6.5 Years	

ANALYSIS MID-POINT			
8.4 Years	1,586	56.63%	898

Source: CBRE/Hallstrom Team

A total absorption period for the subject multifamily units would be between 6.5-years and 10.3-years, with a mid-point at 8.4 years. This equates to an average regional market capture rate of

56.6 percent for this unit type during the exposure period with an average annual absorption of 107 units.

Correlation of the three absorption quantification techniques indicates the 898-proposed long-term residential rental apartment units of the Pulelehua project will achieve full absorption within approximately 5 to 10-years of initial pre-leasing offerings, or approximately 7.5 years in total.

This is anticipated to commence with pre-leasing 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 (898 apartment and 2 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.

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 (2018 through 2028), within a 13-year modeling/projection period (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 APARTMENT PROJECT

Year			Residential Component						
				Workforce Rentals		Market Rentals		Total Inventory	
Estimated Calendar	Project	Phase Being Constructed	Units Completed	Annually	Cumulative	Annually	Cumulative	Annually	Cumulative
2018-19	1 & 2	Phase I	Final approvals/entitlements achieved in 2018, initial grading/site work and infrastructure emplacement commences and is completed by early-2019. Phase I vertical construction begins in mid-2019 with unit reservations/lottery begining commensurately. First product completed and available for occupancy in 2020.						
2020	3	Phase I	123	40	40	90	90	130	130
2021	4	Phase I/II	150	40	80	88	178	128	258
2022	5	Phase II	125	40	120	88	266	128	386
2023	6	Phase II/III	125	40	160	88	354	128	514
2024	7	Phase III	125	40	200	88	442	128	642
2025	8	Phase III/IV	125	40	240	88	530	128	770
2026	9	Phase IV	125	40	**280**	88	**618**	128	**898**
		Total	**898**						

Commercial Component

Neighborhood or Phase	Gross Leaseable Area in Square Feet	Year Built	Years to Absorb
Kahanaiki/Phase I	50,000	2020	2
Central/Phase II	20,000	2022	1
Total	**70,000**		**3**

Note: The project will also include 2 single family homes. It is assumed they will be competitively designed and priced and be built and absorbed in the initial phases of Pulelehua. This will bring the total count to 900 units in the project.

Source: CBRE/Hallstrom Team

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 $247.8 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

Project Year	Development Period 2017 to 2020	2021 to 2025	2026	Totals During Build-Out
Project Phase	**Phase I**	**Phase II & III**	**Phase IV**	
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				
Rental Apartment Units (3)	$25,625,000	$135,533,333	$26,666,667	**$187,825,000**
TOTAL PERIODIC CONSTRUCTION COSTS	**$62,053,571**	**$156,604,762**	**$29,166,667**	**$247,825,000**
Contractor Profits	$6,205,357	$15,660,476	$2,916,667	**$24,782,500**
Supplier Profits	$2,482,143	$6,264,190	$1,166,667	**$9,913,000**

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 unit (includes interior improvements, site work, landscaping and amenities.

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 $217.8 million during the modeling period. This is based on construction costs averaging $208,333 per unit (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. The cost estimates are intended to be "all in".

Pulelehua development will infuse on average an anticipated $31 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 $3.1 million per year, with a cumulative profit of $24.8 million over the construction period. The total annual Supplier's Profit would be some $1.2 million equating to $9.9 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	2021 to 2025	2026	Totals During Build-Out	Stabilized Annually
Project Increment	Phase I	Phase II & III	Phase IV		
Infrastructure Emplacement (1)	38	31	6	75	
Commercial Construction (2)	86	34		120	
Residential Component					
Rental Apartments (2,3)	128	678	133	939	
Total Periodic Construction Jobs	251	743	140	1,134	
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)	84	499	76	659	
Total FTE Jobs in Place at End of Period		73	76		76
TOTAL PERIODIC WORKER YEARS	335	1,997	444	2,775	
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 898 apartment units and 2 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 1,134 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 659 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	
Project Increment	Phase I	Phase II & III	Phase IV		
Infrastructure Emplacement (1)	$2,964,000	$2,470,000	$494,000	**$5,928,000**	
Residential Construction					
Rental Apartments & 2 Homes (1)	$10,127,000	$53,562,773	$10,538,667	**$74,228,440**	
Total Periodic Construction Wages	**$13,091,000**	**$56,032,773**	**$11,032,667**	**$80,156,440**	
On-Going Business Wages					Stabilized Annually
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)	$4,530,810	$26,995,234	$4,110,080	$35,636,123	**$4,110,080**
TOTAL PERIODIC WAGES	**$17,621,810**	**$108,702,339**	**$22,963,547**	**$149,287,695**	**$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 $80.2 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 $35.6 million during build-out and be $4.1 million annually on a stabilized basis.

POPULATION, INCOME AND EXPENDITURES

The units of Pulelehua will all be primary residences, with the apartments being 100 percent occupied by existing-relocating or new/in-migrating Maui residents. These resident households will constitute the population of the project, whose income and discretionary expenditures will create major positive impacts on the Maui economy.

We estimate that one-half (50%) of the subject project residents/households will be "current" Maui residents who are merely relocating from elsewhere on the island to a Pulelehua unit.

The other half (50%) of the residents/households will be "new" Maui residents who in-migrated to the island prior to or during the projection period (2018-2026).

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
Project Increment	Phase I	Phase I, II & III	Phase IV	
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	90	440	88	
Cumulative Units Rented	90	530	618	
Percent of Total Units in Project	10%	59%	69%	
Average Household Size	2.55	2.55	2.55	
Total Residents End of Each Period	**230**	**1,352**	**1,576**	
Single Family Homes		2		
Average Household Size		3.00		
Total Residents End of Each Period		**6**	**6**	
Total Resident Population End of Period	332	1,970	2,296	
Average Number of Residents Each Project Year During Period	332	1,151	2,296	
NEW (INMIGRATING) MAUI RESIDENTS END OF PERIOD	166	985	1,148	
Average Number of NEW Residents Each Project Year During Period	166	575	1,148	
RESIDENT HOUSEHOLD INCOME (1)				
Annually (at end of period)	**$13,257,796**	**$78,391,530**	**$91,418,277**	**$91,418,277**
Periodic	**$13,257,796**	**$229,123,314**	**$91,418,277**	**$333,799,386**
NEW (INMIGRATING) MAUI RESIDENTS				
Annually (at end of period)	**$6,628,898**	**$39,195,765**	**$45,709,138**	**$45,709,138**
Periodic	**$6,628,898**	**$114,561,657**	**$45,709,138**	**$166,899,693**
TOTAL DISCRETIONARY EXPENDITURES (2)				
Annually (at end of period)	**$6,628,898**	**$39,195,765**	**$45,709,138**	**$45,709,138**
Periodic	**$6,628,898**	**$114,561,657**	**$45,709,138**	**$166,899,693**
NEW (INMIGRATING) MAUI RESIDENTS				
Annually (at end of period)	**$3,314,449**	**$19,597,883**	**$22,854,569**	**$22,854,569**
Periodic	**$3,314,449**	**$57,280,829**	**$22,854,569**	**$83,449,847**

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 2 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. The total resident population in the project at build-out and full absorption will be 2,296 persons. Half of whom (1,148 persons) are relocating existing Maui resident households and half being in-migrants to West Maui (1,148).

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 two 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 $333.8 million, and at $91.4 million annually thereafter.

We estimate the 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 $45.7 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 $166.9 million.

The "new" Maui resident's annual household incomes will total $45.7 million on a stabilized basis, and their discretionary spending $22.9 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
Project Increment	**Phase I**	**Phase I, II & III**	**Phase IV**		
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 $890 million.

CBRE

SUMMARY OF ECONOMIC IMPACTS ASSOCIATED WITH DEVELIOPMENT
All Amounts Expressed in Constant 2017 Dollars

Project Increment	2017 to 2020 Phase I	2021 to 2025 Phase I, II & III	2026 Phase IV	Totals During Build-Out	Stabilized Annually
Construction Activity					
Construction Wages	$13,091,000	$56,032,773	$11,032,667	**$80,156,440**	
Contractor Profits	$6,205,357	$15,660,476	$2,916,667	**$24,782,500**	
Supplier Profits	$2,482,143	$6,264,190	$1,166,667	**$9,913,000**	
Other Construction Costs	$40,275,071	$78,647,322	$14,050,667	**$132,973,060**	
Total Construction Impact	**$62,053,571**	**$156,604,762**	**$29,166,667**	**$247,825,000**	
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	**$84,486,071**	**$414,169,762**	**$391,280,167**	**$889,936,000**	**$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 $247.8 million in cumulative Pulelehua construction costs will generate a total State Economic Output of $498.1 million during build-out with subsequent economic activity averaging $123.7 million annually on a stabilized basis.
- Direct subject construction wage earnings of $80.2 million will yield $129.9 million in statewide wage earnings during build-out and on-going earnings activity will generate $112 million during the modeling period and $19.3 million each stabilized year.
- Indirect and induced State taxes during build-out will total $25.4 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 1,826 worker years of employment. The on-going business activity will generate 2,150 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	**$62,053,571**	**$156,604,762**	**$29,166,667**	**$247,827,026**
1. Economic Output Multiplier	2.01	2.01	2.01	2.01
Total State Economic Output	**$124,727,679**	**$314,775,571**	**$58,625,000**	**$498,132,322**
2. Earnings Multiplier	0.68	0.68	0.68	0.68
Total Increase in State Earnings	**$42,196,429**	**$106,491,238**	**$19,833,333**	**$168,522,378**
3. State Tax Multipliers	0.1024	0.1024	0.1024	0.1024
Total Increase in State Taxes	**$6,354,286**	**$16,036,328**	**$2,986,667**	**$25,377,487**
4. Total Job Multipliers	9.40	9.40	9.40	9.40
Total State Jobs Created	**583.3**	**1,472.1**	**274.2**	**2,329.6**
Construction Employment	**251**	**743**	**140**	**1,134**
5. Direct-Effect Job Multipliers	1.61	1.61	1.61	1.61
Total Direct Jobs Created	**404.7**	**1,196.6**	**224.7**	**1,825.9**
Construction Wages	**$13,091,000**	**$56,032,773**	**$11,032,667**	**$80,156,440**
6. Direct-Effect Earnings	1.62	1.62	1.62	1.62
Total Increase in Direct Earnings	**$21,207,420**	**$90,773,093**	**$17,872,920**	**$129,853,433**

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	**84**	**1,253**	**304**	**304**
5. Direct-Effect Job Multipliers	1.31	1.31	1.31	1.31
Total Direct Jobs Created	**109.8**	**1,642.1**	**398.2**	**398.2**
Operating Wages	**$4,530,810**	**$52,669,565**	**$11,930,880**	**$11,930,880**
6. Direct-Effect Earnings	1.62	1.62	1.62	1.62
Total Increase in Direct Earnings	**$7,339,911**	**$85,324,696**	**$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.

The exception is for County real property taxes, as all the 898 apartment units, two 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 20 percent for the land and infrastructure components.

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 Period	Development, Leasing & Stabilization 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
Rental Apartment Project and Two Single Family Homes (at Construction Cost plus 20% for land)		$193,390,000	$225,390,000		$225,390,000
Total Assessed Value	**$12,390,300**	**$229,390,000**	**$261,390,000**		**$261,390,000**
Real Property Taxes					
Vacant Site	$68,642				
Commercial		$237,600	$237,600		$237,600
Rental Apartment Project & Two Single Family Homes		$1,222,225	$1,424,465		$1,424,465
Total Annual Property Taxes (End of Period)	**$68,642**	**$1,459,825**	**$1,662,065**		**$1,662,065**
Total Real Property Taxes During Period	**$343,211**	**$3,887,162**	**$1,662,065**	**$5,892,438**	

We estimate the County will receive some $5.9 million in real property tax receipts during the entire projection period from the 2017 study date through 2026, and annual collections of $1.7 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 collection from the subject of $22.7 million during the initial projection period to 2026, and $4.7 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 $18 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 $3.4 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)	$24,250,707	$147,898,104	$68,672,685	$240,821,496	**$57,640,018**
Taxable Corporate Profits	$12,052,375	$60,559,417	$58,400,358	$131,012,150	**$11,214,000**
Personal Taxes Paid	$1,236,786	$7,542,803	$3,502,307	$12,281,896	**$2,939,641**
Corporate Taxes Paid	$530,305	$2,664,614	$2,569,616	$5,764,535	**$493,416**
TOTAL STATE INCOME TAXES	**$1,767,091**	**$10,207,418**	**$6,071,923**	**$18,046,431**	**$3,433,057**

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 $15.9 million and a stabilized amount of $1.3 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	$62,053,571	$156,604,762	$29,166,667	$247,825,000	
Disposable Income Purchases (% of Worker Wages and New Household Income)	$13,887,535	$84,819,286	$36,632,697	$135,339,517	$30,013,097
Total Taxable Transactions	**$75,941,106**	**$241,424,048**	**$65,799,364**	**$383,164,517**	**$30,013,097**
TOTAL STATE EXCISE TAX	**$3,164,238**	**$10,059,416**	**$2,741,662**	**$15,965,316**	**$1,250,556**

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 $73.8 million during the initial forecasting period through 2026, and $10.2 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 Period	Development, Leasing & Stabilization Period			Totals During Build-Out Period	Stabilized Annually After Build-out
	2017 to 2020	2021 to 2025	2026		
INCLUDES ONLY THOSE REVENUES AND COSTS WHICH ARE "NEW" TO MAUI					
TOTAL GROSS PUBLIC REVENUES					
To County of Maui (Item #1)	$343,211	$3,887,162	$1,662,065	$5,892,438	$1,662,065
Adjustment for Other Proportional Taxes (1)	2.84	2.84	2.84	2.84	2.84
Adjusted Maui County Revenues	$974,720	$11,039,540	$4,720,264	$16,734,524	$4,720,264
Plus Impact Fees (2)	$6,000,000	$0	$0	$6,000,000	
Total County of Maui Receipts	$6,974,720	$11,039,540	$4,720,264	$22,734,524	$4,720,264
To State (Items #2 & #3)	$4,931,329	$20,266,833	$8,813,585	$34,011,747	$4,683,613
Adjustment for Other Proportional Taxes (3)	2.17	2.17	2.17	2.17	2.17
Adjusted State Revenues	$10,700,983	$43,979,028	$19,125,479	$73,805,491	$10,163,439
Plus Impact Fees (4)	$1,748,400	$0	$0	$1,748,400	
Total State of Hawaii Receipts	$12,449,383	$43,979,028	$19,125,479	$75,553,891	$10,163,439
AGGREGATE TAX REVENUES	$13,424,103	$55,018,569	$23,845,743	$92,288,415	$14,883,704

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 Period	Development, Leasing & Stabilization Period			Totals During Build-Out Period	Stabilized Annually After Build-out
	2017 to 2020	2021 to 2025	2026		
INCLUDES ONLY THOSE REVENUES AND COSTS WHICH ARE "NEW" TO MAUI					
PUBLIC COSTS (Expenses)					
By County of Maui	$576,840	$10,009,866	$3,995,072	$14,581,778	$3,995,072
By State of Hawaii	$1,385,862	$24,048,787	$9,598,194	$35,032,843	$9,598,194
TOTAL PUBLIC COSTS	$1,962,702	$34,058,653	$13,593,266	$49,614,621	$13,593,266

The total added operating and capital costs to the County of Maui will amount to $14.6 million during the build-out period and stabilize at $4 million annually. The total added per capita costs to the State of Hawaii budget will be $35 million during the build-out period and $9.6 million per year thereafter.

CORRELATION OF NEW STATE AND COUNTY TAX REVENUES AND NEW SPENDING OBLIGATIONS

As shown below, both the County and the State will be provided with a net positive benefit (or "profit") from Pulelehua in each development period and on an annual stabilized basis.

PUBLIC COST AND BENEFITS ASSESSMENT ASSOCIATED WITH THE PROPOSED PULELEHUA COMMUNITY

All Amounts Expressed in Constant 2017 Dollars

Development Period	Development, Leasing & Stabilization Period			Totals During Build-Out Period	Stabilized Annually After Build-out
	2017 to 2020	2021 to 2025	2026		
INCLUDES ONLY THOSE REVENUES AND COSTS WHICH ARE "NEW" TO MAUI					
TOTAL NET PUBLIC BENEFITS					
County of Maui	$6,397,880	$1,029,674	$725,192	$8,152,746	$725,192
State of Hawaii	$11,063,521	$19,930,241	$9,527,285	$40,521,047	$565,246
AGGREGATE NET BENEFITS	$17,461,401	$20,959,915	$10,252,477	$48,673,794	$1,290,438

(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

The net benefit to the County of Maui will total $8.2 million during build-out and stabilize at $725,000 million per year (rounded). The State of Hawaii will have net fiscal benefits of $40.5 million during construction and $565,000 per year thereafter.

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-1

PROJECTED BUILD-OUT AND ABSORPTION OF PULELEHUA APARTMENT PROJECT

Year			Residential Component						
				Workforce Rentals		Market Rentals		Total Inventory	
Estimated Calendar	Project	Phase Being Constructed	Units Completed	Annually	Cumulative	Annually	Cumulative	Annually	Cumulative
2018-19	1 & 2	Phase I	Final approvals/entitlements achieved in 2018, initial grading/site work and infrastructure emplacement commences and is completed by early-2019. Phase I vertical construction begins in mid-2019 with unit reservations/lottery begining commensurately. First product completed and available for occupancy in 2020.						
2020	3	Phase I	123	40	40	90	90	130	130
2021	4	Phase I/II	150	40	80	88	178	128	258
2022	5	Phase II	125	40	120	88	266	128	386
2023	6	Phase II/III	125	40	160	88	354	128	514
2024	7	Phase III	125	40	200	88	442	128	642
2025	8	Phase III/IV	125	40	240	88	530	128	770
2026	9	Phase IV	125	40	**280**	88	**618**	128	**898**
		Total	**898**						

Commercial Component			
Neighborhood or Phase	Gross Leaseable Area in Square Feet	Year Built	Years to Absorb
Kahanaiki/Phase I	50,000	2020	2
Central/Phase II	20,000	2022	1
Total	**70,000**		**3**

Note: The project will also include 2 single family homes. It is assumed they will be competitively designed and priced and be built and absorbed in the initial phases of Pulelehua. This will bring the total count to 900 units in the project.

Source: CBRE/Hallstrom Team

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**

	Latent Demand	CONCLUDED HOUSING UNIT DEMAND RANGE 2016-2020	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 Demand 2017-2030
	2017 to 2020	2021 to 2025	2026 to 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	Projection Period 2021 to 2025	Projection Period 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 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

TABLE A-8

YEAR-END MEDIAN SALES PRICE FOR MAUI AND SELECT WEST MAUI AREAS FROM MULTIPLE LISTING SERVICE DATABASE 2000 THROUGH ANNUALIZED 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

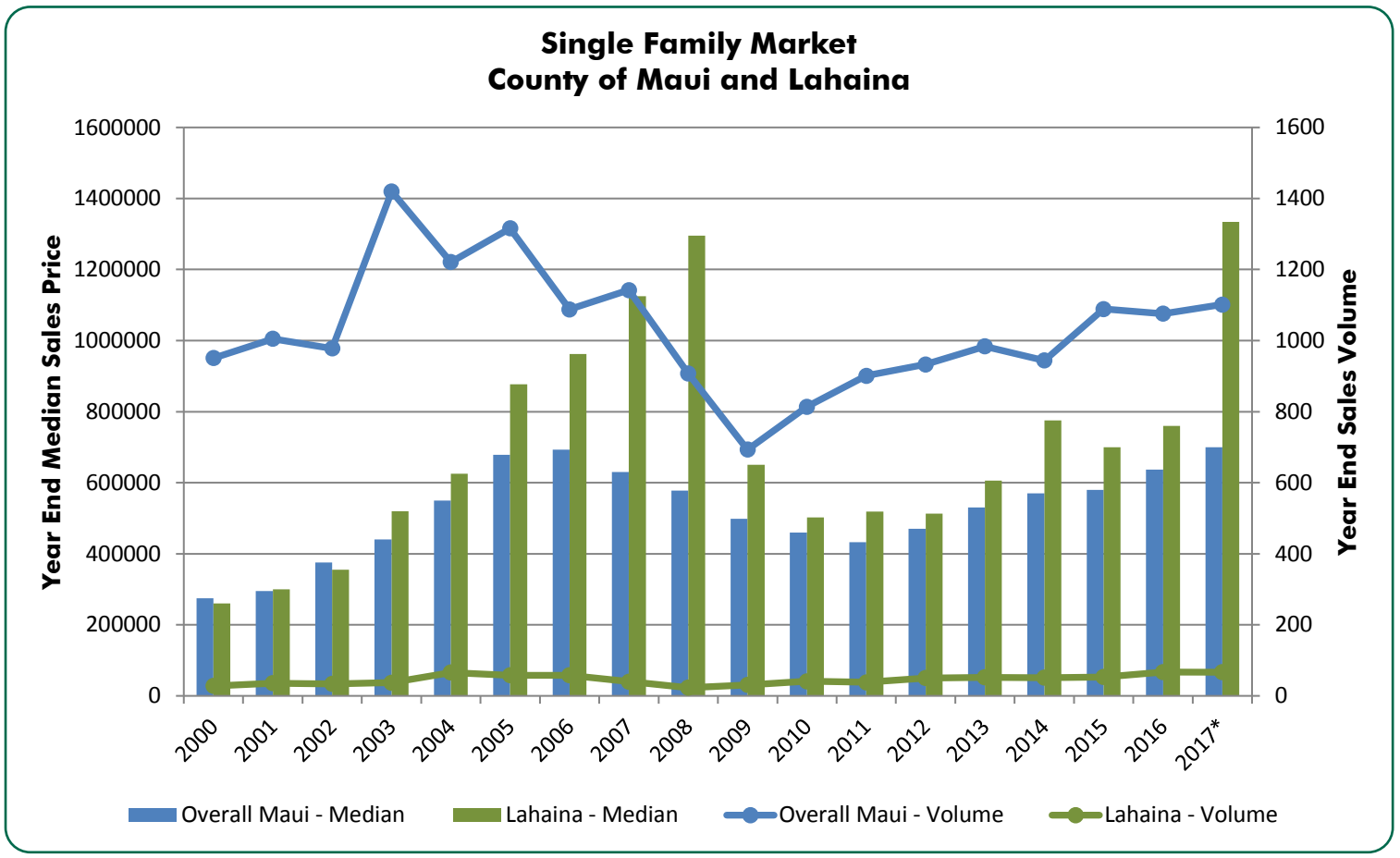
YEAR-END NUMBER OF SALES FOR MAUI AND SELECT WEST MAUI AREAS FROM MULTIPLE LISTING SERVICE DATABASE 2000 THROUGH ANNUALIZED 2017

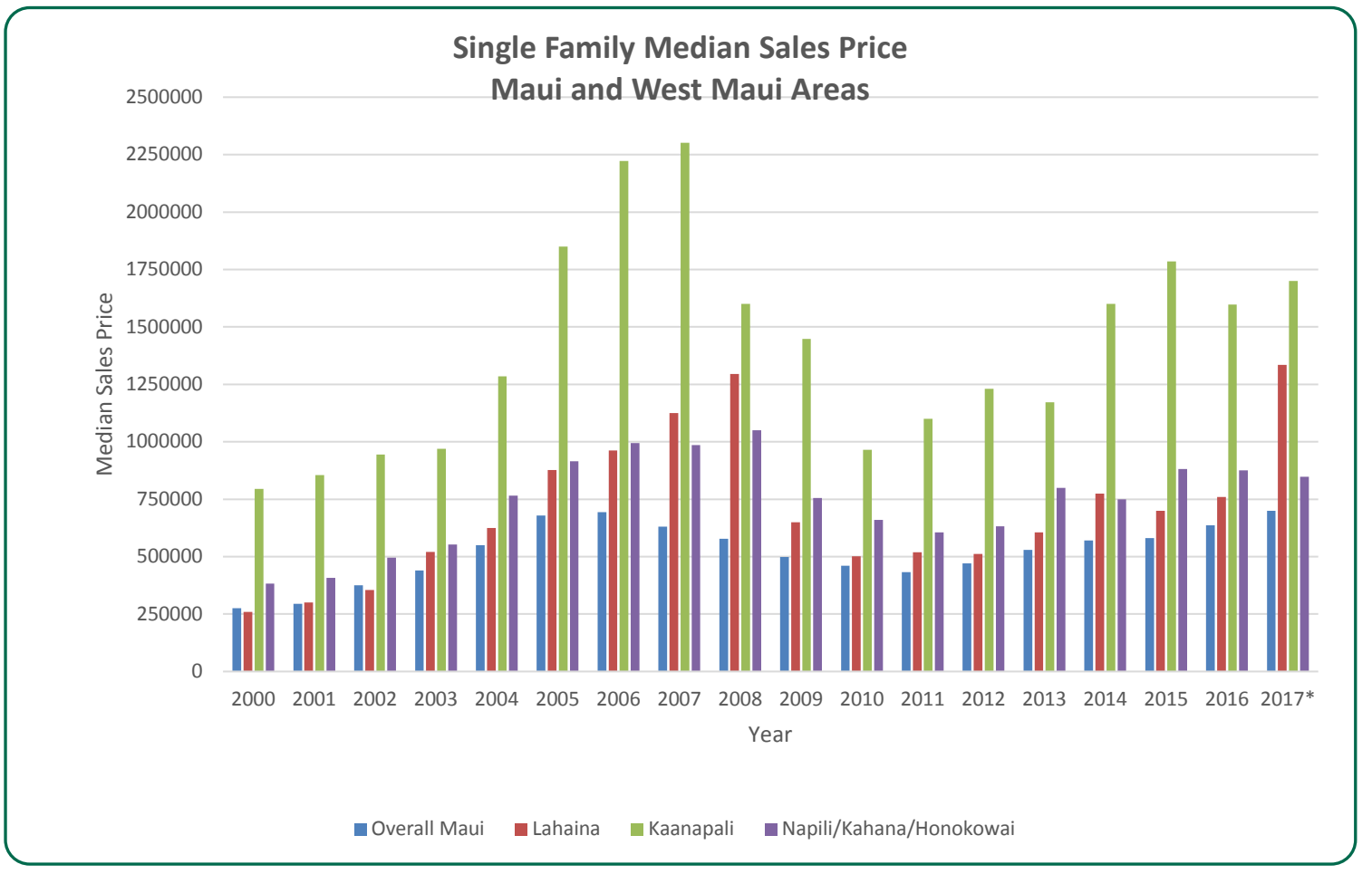
Property Type	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Annualized September 2017
Overall Maui																		
Single Family	951	1,005	978	1,420	1,221	1,316	1,088	1,142	907	693	814	901	933	984	944	1,089	1,076	1,101
% Change		*5.68%*	*-2.69%*	*45.19%*	*-14.01%*	*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

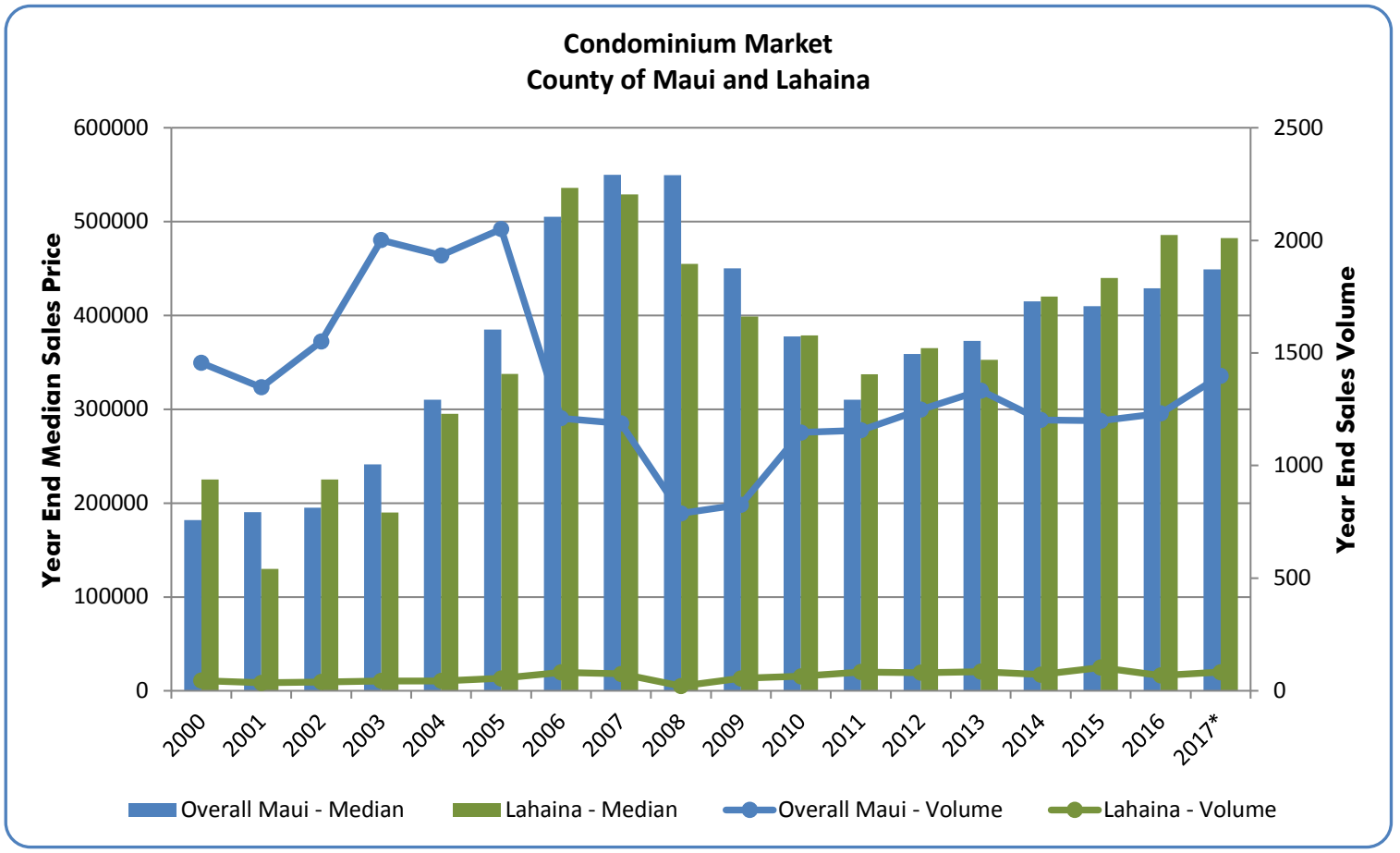


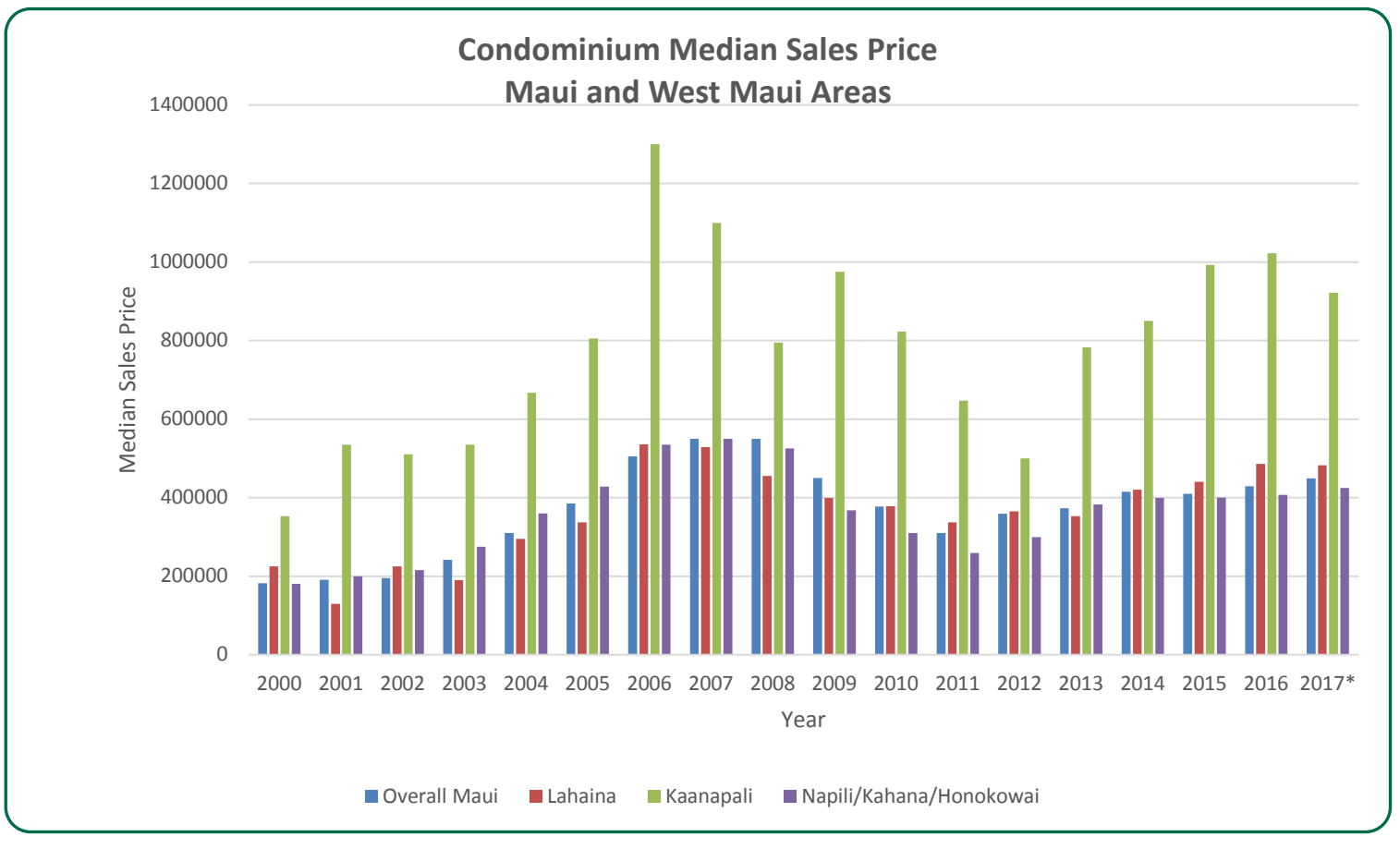


Source: Maui Multiple Listing Service and CBRE/Hallstrom Team.

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

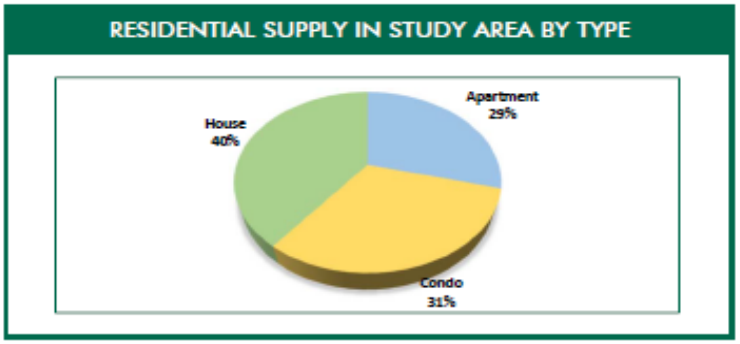
TABLE A-13

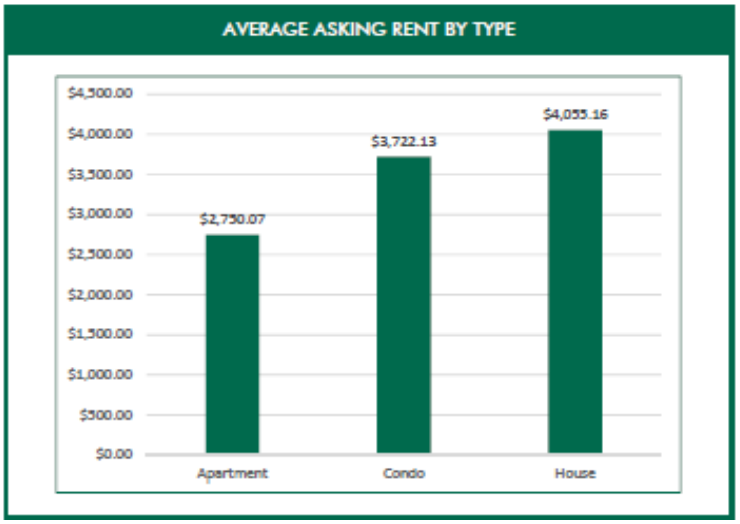
GRAPHS OF WEST MAUI LONG-TERM RESIDENTAL RENTAL UNIT SURVEY

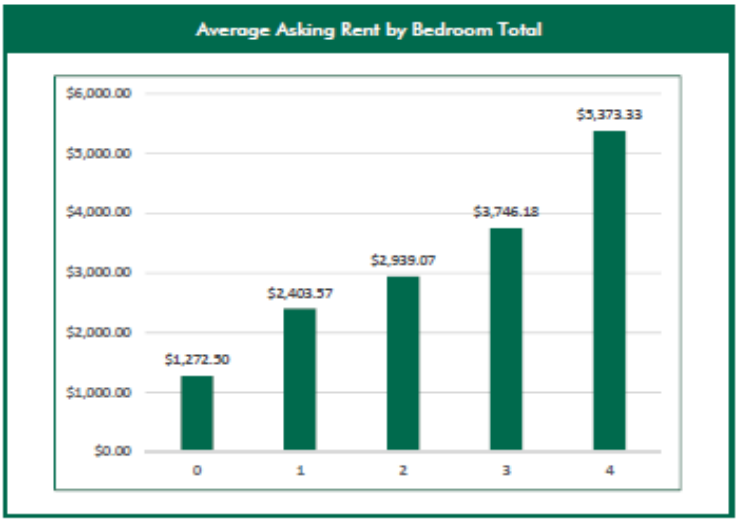
Unit Type	Number of Units
Apartment	14
Condo	15
House	19
Grand Total	48

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







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

1Pauahi1350
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 MULTIFAMILY UNITS IN THE WEST MAUI STUDY AREA

Segment	TOTAL UNITS	2017-2020	2021-2025	2026-2030
1. Minimum Demand				
Assumed Supply (60% of entitled and partially entitled market projects)	768	260	254	254
Regional Multifamily Demand	2,086	594	746	746
Shortage or (Excess) Supply	1,318	334	492	492
Potential Residual Subject Minimum Demand				
at 95% Capture Rate	1,253	317	467	468
at 90% Capture Rate	1,187	301	443	443
2. Maximum Demand				
Assumed Supply (80% of entitled and partially entitled market projects)	1,024	260	382	382
Regional Multifamily Demand	3,247	842	1,110	1,294
Shortage or (Excess) Supply	2,223	582	728	912
Potential Residual Subject Maximum Demand				
at 95% Capture Rate	2,111	553	692	867
at 90% Capture Rate	2,000	524	655	821

Indicated Number of Years Required to Absorb 898 Pulelehua Units Using Residual Method			
Scenario	Percent of Residual Demand		Number of Years to Achieve Full Absorption
Minimum	68.1%		9.5
Maximum	40.4%		5.3
Mid-Point	54.3%		7.4
		=	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	17.00%	25
Totals		1,640	54.73%	898
		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	35.50%	79
Totals		1,531	58.66%	898
		Indicated Absorption Period	6.5 Years	

ANALYSIS MID-POINT			
8.4 Years	1,586	56.63%	898

Source: CBRE/Hallstrom Team

TABLE B-3

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

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	$247,825,000	
Local Contractor's Profits	$24,782,500	
Local Supplier's Profits	$9,913,000	
Worker Years of Jobs	2,775	304
Employee Wages	$149,287,695	$11,930,880
Total Resident Population		2,296
New Inmigrating Maui Residents		1,148
Resident Household Income	$333,799,386	$91,418,277
New Maui Resident Household Income	$166,899,693	$45,709,138
Resident Discretionary Expenditures	$166,899,693	$45,709,138
New Maui Resident Discretionary Income	$83,449,847	$22,854,569
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	$889,936,000	$74,760,000
INCLUDES ONLY THOSE TAXES WHICH ARE "NEW" TO MAUI		
County of Maui Gross New Tax Receipts	$22,734,524	$4,720,264
State of Hawaii Gross New Tax Receipts	$75,553,891	$10,163,439
County of Maui New Expenditures	$14,581,778	$3,995,072
State of Hawaii New Expenditures	$35,032,843	$9,598,194
County of Maui Net New Profits/(Expenses)	$8,152,746	$725,192
State of Hawaii Net New Profits/(Expenses)	$40,521,047	$565,246

Source: CBRE/Hallstrom Team

TABLE C-2

PROPOSED DEVELOPMENT SCHEDULE AND ESTIMATED CONSTRUCTION COSTS

All Amounts Expressed in Constant 2017 Dollars

Project Year	Development Period			Totals During Build-Out
	2017 to 2020	2021 to 2025	2026	
Project Phase	Phase I	Phase II & III	Phase IV	
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				
Rental Apartment Units (3)	$25,625,000	$135,533,333	$26,666,667	**$187,825,000**
TOTAL PERIODIC CONSTRUCTION COSTS	**$62,053,571**	**$156,604,762**	**$29,166,667**	**$247,825,000**
Contractor Profits	$6,205,357	$15,660,476	$2,916,667	**$24,782,500**
Supplier Profits	$2,482,143	$6,264,190	$1,166,667	**$9,913,000**

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 unit (includes interior improvements, site work, landscaping and amenities.

Source: CBRE/Hallstrom Team

TABLE C-3

ESTIMATED YEARLY FULL-TIME EQUIVALENT EMPLOYMENT POSITIONS CREATED BY DEVELOPMENT

Project Year	Development Period 2017 to 2020	2021 to 2025	2026	Totals During Build-Out	Stabilized Annually
Project Increment	Phase I	Phase II & III	Phase IV		
Infrastructure Emplacement (1)	38	31	6	75	
Commercial Construction (2)	86	34		120	
Residential Component					
Rental Apartments (2,3)	128	678	133	939	
Total Periodic Construction Jobs	251	743	140	1,134	
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)	84	499	76	659	
Total FTE Jobs in Place at End of Period		73	76		76
TOTAL PERIODIC WORKER YEARS	335	1,997	444	2,775	
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 898 apartment units and 2 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
Project Increment	Phase I	Phase II & III	Phase IV		
Infrastructure Emplacement (1)	$2,964,000	$2,470,000	$494,000	**$5,928,000**	
Residential Construction					
Rental Apartments & 2 Homes (1)	$10,127,000	$53,562,773	$10,538,667	**$74,228,440**	
Total Periodic Construction Wages	**$13,091,000**	**$56,032,773**	**$11,032,667**	**$80,156,440**	
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)	$4,530,810	$26,995,234	$4,110,080	$35,636,123	**$4,110,080**
TOTAL PERIODIC WAGES	**$17,621,810**	**$108,702,339**	**$22,963,547**	**$149,287,695**	**$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
Project Increment	Phase I	Phase I, II & III	Phase IV	
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	90	440	88	
Cumulative Units Rented	90	530	618	
Percent of Total Units in Project	10%	59%	69%	
Average Household Size	2.55	2.55	2.55	
Total Residents End of Each Period	230	1,352	1,576	
Single Family Homes		2		
Average Household Size		3.00		
Total Residents End of Each Period		6	6	
Total Resident Population End of Period	332	1,970	2,296	
Average Number of Residents Each Project Year During Period	332	1,151	2,296	
NEW (INMIGRATING) MAUI RESIDENTS END OF PERIOD	166	985	1,148	
Average Number of NEW Residents Each Project Year During Period	166	575	1,148	
RESIDENT HOUSEHOLD INCOME (1)				
Annually (at end of period)	$13,257,796	$78,391,530	$91,418,277	$91,418,277
Periodic	$13,257,796	$229,123,314	$91,418,277	$333,799,386
NEW (INMIGRATING) MAUI RESIDENTS				
Annually (at end of period)	$6,628,898	$39,195,765	$45,709,138	$45,709,138
Periodic	$6,628,898	$114,561,657	$45,709,138	$166,899,693
TOTAL DISCRETIONARY EXPENDITURES (2)				
Annually (at end of period)	$6,628,898	$39,195,765	$45,709,138	$45,709,138
Periodic	$6,628,898	$114,561,657	$45,709,138	$166,899,693
NEW (INMIGRATING) MAUI RESIDENTS				
Annually (at end of period)	$3,314,449	$19,597,883	$22,854,569	$22,854,569
Periodic	$3,314,449	$57,280,829	$22,854,569	$83,449,847

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 2 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

Project Increment	2017 to 2020 Phase I	2021 to 2025 Phase I, II & III	2026 Phase IV	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
Project Increment	Phase I	Phase I, II & III	Phase IV		
Construction Activity					
Construction Wages	$13,091,000	$56,032,773	$11,032,667	**$80,156,440**	
Contractor Profits	$6,205,357	$15,660,476	$2,916,667	**$24,782,500**	
Supplier Profits	$2,482,143	$6,264,190	$1,166,667	**$9,913,000**	
Other Construction Costs	$40,275,071	$78,647,322	$14,050,667	**$132,973,060**	
Total Construction Impact	**$62,053,571**	**$156,604,762**	**$29,166,667**	$247,825,000	
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	**$84,486,071**	**$414,169,762**	**$391,280,167**	$889,936,000	$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

Year	Development, Leasing & Stabilization Period			Totals During Build-Out
	2017 to 2020	2021 to 2025	2026	
Construction Costs	$62,053,571	$156,604,762	$29,166,667	$247,827,026
1. Economic Output Multiplier	2.01	2.01	2.01	2.01
Total State Economic Output	$124,727,679	$314,775,571	$58,625,000	$498,132,322
2. Earnings Multiplier	0.68	0.68	0.68	0.68
Total Increase in State Earnings	$42,196,429	$106,491,238	$19,833,333	$168,522,378
3. State Tax Multipliers	0.1024	0.1024	0.1024	0.1024
Total Increase in State Taxes	$6,354,286	$16,036,328	$2,986,667	$25,377,487
4. Total Job Multipliers	9.40	9.40	9.40	9.40
Total State Jobs Created	583.3	1,472.1	274.2	2,329.6
Construction Employment	251	743	140	1,134
5. Direct-Effect Job Multipliers	1.61	1.61	1.61	1.61
Total Direct Jobs Created	404.7	1,196.6	224.7	1,825.9
Construction Wages	$13,091,000	$56,032,773	$11,032,667	$80,156,440
6. Direct-Effect Earnings	1.62	1.62	1.62	1.62
Total Increase in Direct Earnings	$21,207,420	$90,773,093	$17,872,920	$129,853,433

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

Year	Development, Leasing & Stabilization Period			Stabilized Annually
	2017 to 2020	2021 to 2025	2026	
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	84	1,253	304	304
5. Direct-Effect Job Multipliers	1.31	1.31	1.31	1.31
Total Direct Jobs Created	109.8	1,642.1	398.2	398.2
Operating Wages	$4,530,810	$52,669,565	$11,930,880	$11,930,880
6. Direct-Effect Earnings	1.62	1.62	1.62	1.62
Total Increase in Direct Earnings	$7,339,911	$85,324,696	$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 Period	Development, Leasing & Stabilization 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
Rental Apartment Project and Two Single Family Homes (at Construction Cost plus 20% for land)		$193,390,000	$225,390,000		$225,390,000
Total Assessed Value	**$12,390,300**	**$229,390,000**	**$261,390,000**		**$261,390,000**
Real Property Taxes					
Vacant Site	$68,642				
Commercial		$237,600	$237,600		$237,600
Rental Apartment Project & Two Single Family Homes		$1,222,225	$1,424,465		$1,424,465
Total Annual Property Taxes (End of Period)	**$68,642**	**$1,459,825**	**$1,662,065**		**$1,662,065**
Total Real Property Taxes During Period	**$343,211**	**$3,887,162**	**$1,662,065**	**$5,892,438**	
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)	$24,250,707	$147,898,104	$68,672,685	$240,821,496	**$57,640,018**
Taxable Corporate Profits	$12,052,375	$60,559,417	$58,400,358	$131,012,150	**$11,214,000**
Personal Taxes Paid	$1,236,786	$7,542,803	$3,502,307	$12,281,896	**$2,939,641**
Corporate Taxes Paid	$530,305	$2,664,614	$2,569,616	$5,764,535	**$493,416**
TOTAL STATE INCOME TAXES	$1,767,091	$10,207,418	$6,071,923	$18,046,431	$3,433,057
3. STATE GROSS EXCISE TAX					
Taxable Transactions					
Construction Contracts	$62,053,571	$156,604,762	$29,166,667	$247,825,000	
Disposable Income Purchases (% of Worker Wages and New Household Income)	$13,887,535	$84,819,286	$36,632,697	$135,339,517	$30,013,097
Total Taxable Transactions	**$75,941,106**	**$241,424,048**	**$65,799,364**	**$383,164,517**	**$30,013,097**
TOTAL STATE EXCISE TAX	$3,164,238	$10,059,416	$2,741,662	$15,965,316	$1,250,556
INCLUDES ONLY THOSE REVENUES AND COSTS WHICH ARE "NEW" TO MAUI					
TOTAL GROSS PUBLIC REVENUES					
To County of Maui (Item #1)	$343,211	$3,887,162	$1,662,065	$5,892,438	$1,662,065
Adjustment for Other Proportional Taxes (1)	2.84	2.84	2.84	2.84	2.84
Adjusted Maui County Revenues	$974,720	$11,039,540	$4,720,264	$16,734,524	$4,720,264
Plus Impact Fees (2)	$6,000,000	$0	$0	$6,000,000	
Total County of Maui Receipts	$6,974,720	$11,039,540	$4,720,264	$22,734,524	$4,720,264
To State (Items #2 & #3)	$4,931,329	$20,266,833	$8,813,585	$34,011,747	$4,683,613
Adjustment for Other Proportional Taxes (3)	2.17	2.17	2.17	2.17	2.17
Adjusted State Revenues	$10,700,983	$43,979,028	$19,125,479	$73,805,491	$10,163,439
Plus Impact Fees (4)	$1,748,400	$0	$0	$1,748,400	
Total State of Hawaii Receipts	$12,449,383	$43,979,028	$19,125,479	$75,553,891	$10,163,439
AGGREGATE TAX REVENUES	$13,424,103	$55,018,569	$23,845,743	$92,288,415	$14,883,704
PUBLIC COSTS (Expenses)					
By County of Maui	$576,840	$10,009,866	$3,995,072	$14,581,778	$3,995,072
By State of Hawaii	$1,385,862	$24,048,787	$9,598,194	$35,032,843	$9,598,194
TOTAL PUBLIC COSTS	$1,962,702	$34,058,653	$13,593,266	$49,614,621	$13,593,266
TOTAL NET PUBLIC BENEFITS					
County of Maui	$6,397,880	$1,029,674	$725,192	$8,152,746	$725,192
State of Hawaii	$11,063,521	$19,930,241	$9,527,285	$40,521,047	$565,246
AGGREGATE NET BENEFITS	$17,461,401	$20,959,915	$10,252,477	$48,673,794	$1,290,438

(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 Period	Development, Leasing & Stabilization Period			Totals During Build-Out Period	Stabilized Annually After Build-out
	2017 to 2020	2021 to 2025	2026		
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
Rental Apartment Project and Two Single Family Homes (at Construction Cost plus 20% for land)		$193,390,000	$225,390,000		$225,390,000
Total Assessed Value	**$12,390,300**	**$229,390,000**	**$261,390,000**		**$261,390,000**
Real Property Taxes					
Vacant Site	$68,642				
Commercial		$237,600	$237,600		$237,600
Rental Apartment Project & Two Single Family Homes		$1,222,225	$1,424,465		$1,424,465
Total Annual Property Taxes (End of Period)	**$68,642**	**$1,459,825**	**$1,662,065**		**$1,662,065**
Total Real Property Taxes During Period	$343,211	$3,887,162	$1,662,065	$5,892,438	

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			Totals During Build-Out Period	Stabilized Annually After Build-out
	2017 to 2020	2021 to 2025	2026		
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)	$24,250,707	$147,898,104	$68,672,685	$240,821,496	**$57,640,018**
Taxable Corporate Profits	$12,052,375	$60,559,417	$58,400,358	$131,012,150	**$11,214,000**
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Corporate Taxes Paid	$530,305	$2,664,614	$2,569,616	$5,764,535	**$493,416**
TOTAL STATE INCOME TAXES	$1,767,091	$10,207,418	$6,071,923	$18,046,431	$3,433,057
3. STATE GROSS EXCISE TAX					
Taxable Transactions					
Construction Contracts	$62,053,571	$156,604,762	$29,166,667	$247,825,000	
Disposable Income Purchases (% of Worker Wages and New Household Income)	$13,887,535	$84,819,286	$36,632,697	$135,339,517	$30,013,097
Total Taxable Transactions	$75,941,106	$241,424,048	$65,799,364	$383,164,517	$30,013,097
TOTAL STATE EXCISE TAX	$3,164,238	$10,059,416	$2,741,662	$15,965,316	$1,250,556

Source: CBRE/Hallstrom Team

TABLE D-1

PUBLIC COST AND BENEFITS ASSESSMENT ASSOCIATED WITH THE PROPOSED PULELEHUA COMMUNITY

All Amounts Expressed in Constant 2017 Dollars

Development Period	Development, Leasing & Stabilization Period			Totals During Build-Out Period	Stabilized Annually After Build-out
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TOTAL GROSS PUBLIC REVENUES					
To County of Maui (Item #1)	$343,211	$3,887,162	$1,662,065	$5,892,438	$1,662,065
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To State (Items #2 & #3)	$4,931,329	$20,266,833	$8,813,585	$34,011,747	$4,683,613
Adjustment for Other Proportional Taxes (3)	2.17	2.17	2.17	2.17	2.17
Adjusted State Revenues	$10,700,983	$43,979,028	$19,125,479	$73,805,491	$10,163,439
Plus Impact Fees (4)	$1,748,400	$0	$0	$1,748,400	
Total State of Hawaii Receipts	$12,449,383	$43,979,028	$19,125,479	$75,553,891	$10,163,439
AGGREGATE TAX REVENUES	$13,424,103	$55,018,569	$23,845,743	$92,288,415	$14,883,704
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AGGREGATE NET BENEFITS	$17,461,401	$20,959,915	$10,252,477	$48,673,794	$1,290,438

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(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

Addendum E

CLIENT CONTRACT INFORMATION

Addendum F

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

<u>Oahu</u>

-- 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

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

TAKITANI AGARAN & JORGENSEN,
LLLP

Anthony P. Takitani
Gilbert S.C. Keith-Agaran
David M. Jorgensen

Of Counsel:
Joseph L. Wildman
Eve S. Green

24 N. CHURCH ST. STE. 409
WAILUKU, MAUI, HAWAII 96793
T. (808) 242-4049
F. (808) 244-4021

June 14, 2017

Mr. Daniel E. Orodenker, Executive Officer
Land Use Commission
Department of Business, Economic Development & Tourism
State of Hawaii
P.O. Box 2359
Honolulu, Hawai'i 96804-2359

Re: **Notice of Change of Ownership Interests for LUC Docket No. A04-751**
Petition of Maui Land & Pineapple Company, Inc.
Petition Area TMKs (2) 4-3-001: 082 & 083 (previously (2) 4-3-001: 031 portion)
Property Pulelehua Subdivision

Dear Mr. Orodenker:

Our law firm represents Maui Oceanview LP. Submitted with this Notice of Change of Ownership Interest for LUC Docket No. A04-751 is the 2017 Annual Report for LUC Docket No. A04-751.

As required by Condition No. 28 of the Decision and Order (Notice of Change of Ownership Interests), Maui Oceanview LP hereby gives notice to the Land Use Commission of the State of Hawaii ("Commission") that Maui Land & Pineapple Co. Inc. sold and transfered its ownership interest of the Petition Area that is subject to the Commission's Findings of Fact, Conclusions of Law, and Decision and Order dated and entered on June 30, 2006 in Docket No. A04-751. The date of the sale was June 3, 2016.

New Owner of Petition Area: Maui Oceanview LP.

Address: 2525 McKinney Avenue, Suite B
Dallas, Texas 75201

Telephone: (214) 415-8868

Contact: Paul Cheng

Should you have any questions or requests for additional information, please contact me at (808) 242-4049. Your acceptance of this notice is appreciated.

Sincerely,

TAKITANI AGARAN & JORGENSEN, LLLP

By GILBERT S.C. KEITH-AGARAN
Attorneys for Maui Oceanview LP

cc: Paul Cheng/ Maui Oceanview LP
Jordan Hart/Chris Hart & Associates

June 14, 2017

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

Mr. William Spence, Director
Department of Planning County of Maui
One Main Plaza #315
2200 Main Street
Wailuku, HI 96793-2155

Re: **2017 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 Spence:

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. Submitted concurrently with this report is a notice of change of ownership interests from Maui Land & Pineapple, Inc. ("MLP") to Maui Oceanview LP as required by Condition No. 28.

General Project Progress:
The Land Use Commission of the State of Hawaii ("LUC") approved 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 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).

Conditions and Compliance:

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 is in the process of finalizing a Workforce Housing Agreement with the Maui County Department of Housing and Human Concerns which will have these terms.

1. Total number of workforce affordable housing required for Pulelehua will be equal to the current County of Maui workforce affordable housing requirements.
2. The workforce affordable housing units within Pulelehua can be "for rental" and/or for sale

Additionally, the County of Maui has requested that Maui Oceanview LP submit contemporaneously with the request above its site plan and request the LUC to confirm the plan is a conforming site plan. Maui Oceanview LP intends to submit a request to the LUC to specifically allow it the option of developing rental housing only.

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 with the Petitioner's predecessor, 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 has had numerous meetings with the DOE to finalize the 13-acre school site. DOE has conducted design charrettes in West Maui and completed its master plan in December 2015. Maui Oceanview,LP has met with the DOE and showed them our progress. DOE informed us that they had preliminary architectural plans for the development, and were made aware of the transfer of ownership and new

progress made on the site. DOE explained that their budget does not include any 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.

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 has been working with the County of Maui Department of Environmental Management, Wastewater Reclamation Division on connection to the LWWRF.

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.

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 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: No specific action taken to date.

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 ahport 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 Hmvai'ifrom and against all claims, liability, and losses resulting from aircraft and ailport operations, provided that the State of Hmvai 'ishall not be released from its negligence.*

Compliance: Maui Oceanview LP will notify all prospective buyers and lessors of potential adverse aviation impacts once sales 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. 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 and an updated TIAR is completed and accepted by DOT.

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 noisesensitive 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. 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 and an updated TIAR is completed and accepted by DOT.

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 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 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 is in ongoing discussions with the DWS regarding water resource allocation and will have a plan to provide such prior to Development.

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.

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.

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.

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. Notice of Change of Ownership Interests is submitted concurrently with the report.

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 2017 annual report submitted in compliance with this condition. MLP provided annual reports in compliance with this condition from 2007 through 2016. With this report Maui Oceanview LP would like to become current with reporting obligations and respectfully requests acceptance of this report in covering the reporting requirements for 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: 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.

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.

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.
It's General Partner

By Paul Cheng
It's President

TAKITANI AGARAN & JORGENSEN, LLLP
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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	)	DOCKET NO. A04-751
	)	
MAUI LAND & PINEAPPLE COMPANY, INC., a Hawaii corporation	)	PROPOSED AMENDED FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER
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.	)	

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

[1] At the time of its original Petition, **Petitioner's address and principal place of business is 120 Kane Street, Kahului, Hawai'i, 96732.**

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 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 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,[2] 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. 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

[2] 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)

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 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[3] (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,

[3] The Amended Petition, among other things, revised the acreage of the Petition Area from approximately 312 acres to approximately 310.440 acres.

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.

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 Novmeber 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.

21. OP responded to the motion on _____, 2018; the Planning Department responded to the motion on _____, 2018.

~~15.~~22. The Commission heard the motion on _____, 2018.

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) Series consists 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.[4] 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

[4] 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.

"E" in productivity rating.[5] 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) 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[6] 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

[5] 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.

[6] The figures under the ALISH classification system reflect the larger acreage of the Petition Area prior to being revised in the Amended Petition.

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.

~~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 reflects its plans to develop 900 primarily rental residential units at Pulelehua. Maui Oceanview LP will offer for rent 898 units in split-level apartment houses and will offer for sale two large estate edge lots 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 will enter into a housing agreement with the County of Maui Department of Housing and Human Concerns (DHHC). Maui Oceanview LP proposes to develop a total of 280 workforce housing units (including the 125 rental housing units associated with MLP's Kapalua Mauka project), 618 market rental units, and two Single-Family House Lots for sale.

59. Maui Oceanview LP's primarily rental project will offer 280 units, or 31% of the 898 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 a ten-year period as follows:

PULELEHUA PROPOSED PHASING				
PHASE	**ESTATE LOTS**	**WORKFORCE RENTAL HOUSING UNITS**	**MARKET RENTAL HOUSING UNITS**	**TOTAL UNITS**
PHASE 1		70	170	240
PHASE 2		70	150	220
PHASE 3		70	150	220
PHASE 4		70	148	220
PHASE 5	2			
TOTALS	**2**	**280**	**618**	**900**

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).** Since Maui Oceanview LP is not proposing to develop single family residences for sale (other than two Estate Edge Lots), it does not intend to construct any accessory/'ohana units as part of the Pulelehua Project. At some future date, Maui Oceanview LP may request that the County of Maui consider allowing and approving the use of the number of accessory/'ohana units as additional density for apartment units.

PETITIONER'S FINANCIAL CAPABILITY TO UNDERTAKE THE PROPOSED DEVELOPMENT

~~47.~~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.

~~48.~~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 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 Lavout)				
Unit Type	**Neighborhood**			**Total**
	Central	Kahanaiki	Mahinahina	
Main Street Apartment		0	0	
Live/Work		50	0	50
Apartment	340	290	218	898
Terrace House				
Sidevard/Cottage House				
Front Lana'i House				
Estate House	0	2	0	2
Residential Units	340	342	218	900

STATE AND COUNTY LAND USE PLANS AND PROGRAMS

~~49.~~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.

~~50.~~72. Project District No. 5 was approved as Ordinance No. 3888(2011) and codified as Maui County Code chapter 19.93.

~~51.~~73. The Petition Area is not within the County of Maui's special management area.

NEED FOR THE PROPOSED DEVELOPMENT

~~52.~~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.

~~53.~~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.

~~54.~~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 along Akahele Street 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 62,000 square feet (70,000 sf maximum) of gross leasable area spread among six development pads totaling 10.6 acres on either side of Akehele Street (the airport access drive) at Honoapiilani Highway as well as north of the Regional Sports Park. Based on the pads' relative sizes Maui Oceanview estimated the pads north of Akahele Street will support some 29,000 square feet of floor area,

the pads south of Akahele Street will support about 24,000 square feet, and the southern-most pads will support approximately 9,000 square feet. The overall Floor Area Ratio will be approximately 0.134. 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.

~~55.~~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.

~~56.~~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 (898 apartment rental units and 2 single family homes) and 62,000 square feet (70,000 sf 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.[7]

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,

[7] 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

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 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 898 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.[8]

IMPACT ON RESOURCES OF THE AREA

Agricultural Resources

~~57.~~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").

~~58.~~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.

~~59.~~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.

~~60.~~105. Maui Pineapple has identified approximately 2,000 Net Pine

[8] 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.

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.

~~61.~~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.

~~62.~~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

~~63.~~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.

~~64.~~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

~~65.~~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

~~66.~~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.

~~67.~~118. Petitioner will prepare an archaeological monitoring plan for approval by the DLNR, SHPD, prior to the commencement of any construction activities.

~~68.~~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[9] prepared by Tanya Lee-Grieg of `Aina Archaeology makes similar findings:

[9] 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.

Uncle Felimon Sadang has stated that in regard to the specific lands of the proposed Pulelehua Community project, both personally and as the Kā‘anapali 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 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.[10]

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

~~69.~~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

~~70.~~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

[10] 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.

areas. Recreation areas will include two 5-acre neighborhood parks with ball fields, community gardens, passive recreational areas, and an extensive trail system. Gulch areas will provide an additional 33 acres of open space. Petitioner intends to develop all parks and dedicate larger neighborhood parks and ball fields to the County of Maui. Petitioner intends to have the homeowner association maintain the trail system and 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 Honoapiilani Highway, and will be accessed through the additional access requested from the Hawaii Department of Transportation.

~~71.~~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.

Scenic Resources

~~72.~~133. 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.

~~73.~~134. 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.

~~74.~~135. 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

~~75.~~136. 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.

137. Development of housing at Pulelehua would have a positive rather than a negative effect on nearshore ocean water quality. All drainage will be retained on 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.

138. 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.

~~76.~~139. 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 for MLP for its project needs).

ENVIRONMENTAL QUALITY

Noise

~~77.~~140. 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.

~~78.~~141. 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.

~~79.~~142. 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

~~80.~~143. 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

~~81.~~144. 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

~~82.~~145. 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.

~~83.~~146. 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.

~~84.~~147. 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.

~~85.~~148. 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.

~~86.~~149. 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.

~~87.~~150. 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.

~~88.~~151. 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.

~~89.~~152. 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.

~~90.~~153. 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.

154. 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.

155. Under Maui Oceanview LP's proposed development, the existing Akahele Street continues to be a primary entrance to Pulelehua. Two additional access points to Honoapiilani Highway have been proposed to the Hawaii Department of Transportation (DOT), the northernmost access point will be limited to right-in, right-out access only, whereas the southernmost access will be improved to provide access to the proposed 10-acre County Regional Park.

156. At the request of DOT-Highways, a Transportation Impact Assessment Report (TIAR) [Exhibit C] reanalyzes traffic impacts related to the Pulelehua development. The TIAR contemplates build out of Pulelehua as four scenarios.

~~91.~~157. In the intial scenario, two new Project roadways would bisect Akahele Street and provide direct access to the residential apartment buildings. In the following scenarios, primary access would be provided through Akahele Street. A rental area north of Akahele Street will also be served by a proposed right-in, right-out access on Honoapiilani Highway. The residential units and County Regional Park developed in the third scenario would be served by Akahele Street and a new Project roadway that intersects Honoapiilani Highway south of Mahinahina Gulch. TIAR [Exhibit C], Exec. Summary, p. 2.

Kapalua-West Maui Airport

~~92.~~158. 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.

~~93.~~159. 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.

~~94.~~160. 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

~~95.~~161. 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 Miihinahina 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.

162. 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.

~~96.~~163. 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

~~97.~~164. 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

~~98.~~165. 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.

~~99.~~166. Petitioner intends to construct a new sewage collection system within the Petition Area to transport wastewater to the LWWRF for processing and disposal.

167. 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.

168. 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.

169. 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, any treated water will be used for Pulelehua's irrigation needs (with any excess taken for 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

~~100.~~170. 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 P6haku-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.

~~101.~~171. 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.

~~102.~~172. 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.

173. 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.

174. Maui Oceanview, LP's consultant Kimley-Horn has prepared a preliminary draining report on the Pulelehua project as proposed for development. At full build-out the development is planned to construct approximately 898 affordable and market-rate, multi-family residential units (roughly 90 buildings with 8-10 units each), 2 single-family residential lots, a 10-acre community park, 3 retail centers totaling approximately 62,000 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.

175. 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.

176. 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 Honoapiilani Highway." Prelim. Drainage Rep. [Exhibit G], p. 5.

177. 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

~~103.~~178. 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.

~~104.~~179. Significant levels of solid waste are not currently being generated on the Petition Area.

~~105.~~180. 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.

~~106.~~181. 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

~~107.~~182. 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.

~~108.~~183. 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.

~~109.~~184. 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.

~~110.~~185. 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.

~~111.~~186. 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.

187. It is critical that construction of the public elementary school at the School Site be timed to coincide with occupancy of the housing.

~~112.~~188. Maui Oceanview LP's plans for Pulelehua include locating a future Hawaii DOE elementary school off Honoapiilani 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 Honoapiilani Highway for future dedication for storage and turning lanes that may be required when the school is constructed and operating.

Police and Fire Protection

~~113.~~189. 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.

~~114.~~190. 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.

~~115.~~191. The proposed street widths of Pulelehua are sufficient to accommodate fire equipment in an emergency.

~~116.~~192. The Napili Fire Station is adequate to provide the level of service that is needed for Pulelehua.

Emergency Medical Services

~~117.~~193. 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

~~118.~~194. 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

~~119.~~195. 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.

~~120.~~196. 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.

197. 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.

198. 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.

199. 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 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.

200. 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.

201. 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

~~121.~~202. 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 Kifanapali 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

~~122.~~203. 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 Kaanapali. 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 Rl 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 securihJ 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 insure 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

~~123.~~204. 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

~~124.~~205. 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 Oceaview 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 properh; 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

~~125.~~206. 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 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

Objective 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 60-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~~ 898 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 include provisions to maintain the rents of the 280 units as affordable within HUD guideline.

~~PROTECT PHASING~~

207. 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 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 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 either 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 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 accessible by the onsite trail network.

D. Edge neighborhood district
Analysis: The Edge neighborhood district is located on 48 acres of land on the Northern edge of the project site with adjacent open space. The applicant is proposing this district for one (1) single family residence.

E. Estate edge district
Analysis: The Estate edge district is located adjacent to the Edge neighborhood district on the Northern side 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 on the southern 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 898 multifamily units and 2 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 Honoapiilani 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 Honoapiilani 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 Honoapiilani 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 Honoapiilani 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 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.

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 Honoapiilani Highway and along the Honoapiilani Highway 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 Honoapiilani 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 898 rental apartment units and 2 single family lots, for a total of 900 residential units. The Apartments are designed as one story residential buildings containing 8-10 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 Honoapiilani Highway as well as near the southern boundary across from the County Regional Park. 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 Center Neighborhood district and public park space. The Open Space District with pedestrian pathway network will provide for connectivity, active park space, buffer areas, and separation of neighborhoods.

PROJECT PHASING

~~126.~~208. Permitting, development, buildout, and sale of Pulelehua are proposed to occur over a 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 and 79, 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~~ Maui Oceanview LP 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 MLP's Kapalua Mauka development in LUC Docket No. A03-741.

b. In addition, ~~Petitioner~~ Maui Oceanview LP shall develop and offer for ~~sale~~ rent not less than ~~325~~ 155 affordable housing 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 a Housing Agreement with Maui DHHC.

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 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 a Housing Agreement with Maui DHHC.

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.

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 ~~SO~~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 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 areage 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.

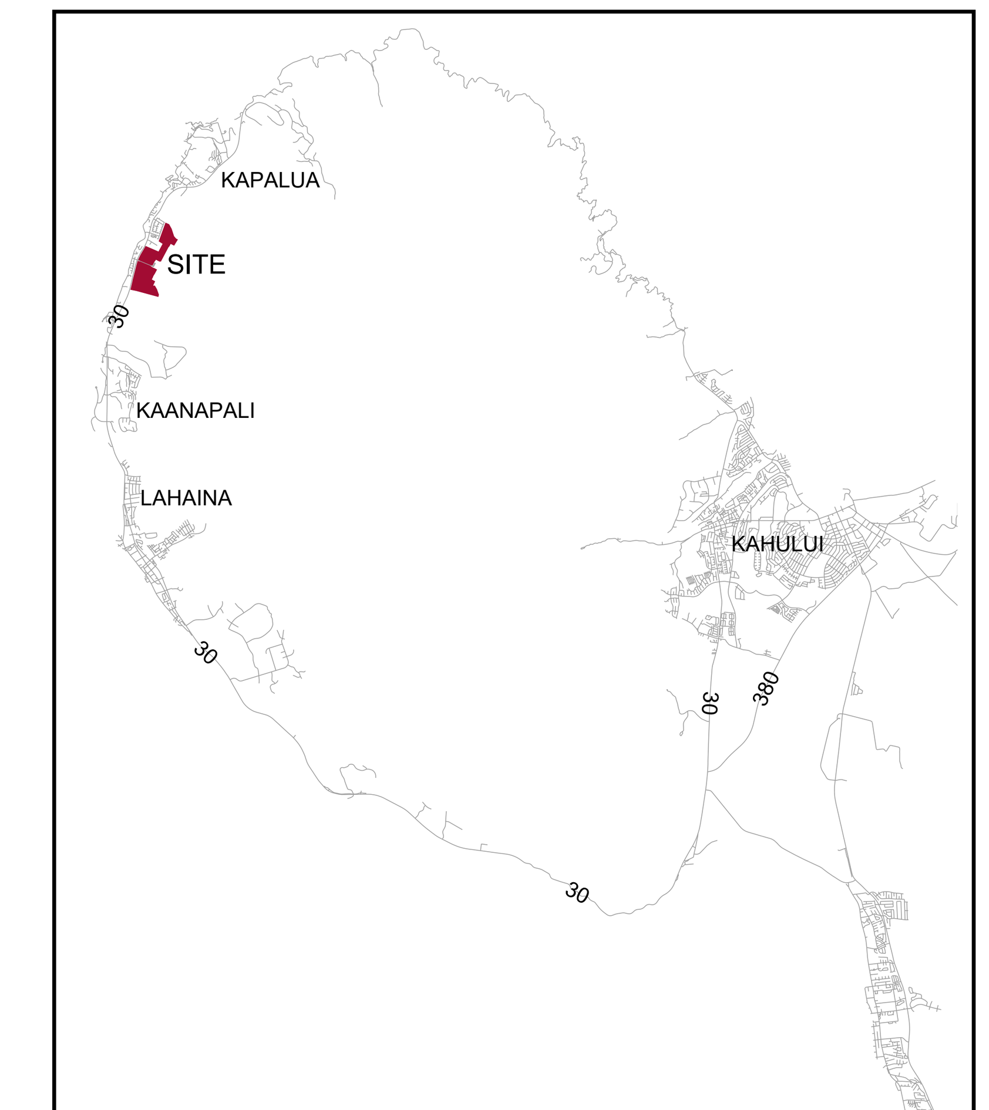
Done at Maui, Hawai'i, thi~~.~~s ~~22nd~~ _____ day of ~~June, 2006~~_____, 20___, per motion on ~~June 22, 2006~~_____, 20___

PULELEHUA

Maui Oceanview LP Response to Land Use Commission Staff Comments
8/24/2018

Volume 2

SHEET LIST



VICINITY MAP
SCALE: 1:20,000'

Pulelehua

WEST MAUI PROJECT DISTRICT 5

March 18, 2018

Mahinahina & Kahana, Lahaina
Island of Maui, Hawai'i

INFRASTRUCTURE INVESTMENTS USA

PRITCHARD ASSOCIATES

Kimley»Horn

PWS Architects, Inc.

bei 1 BASHARKHAH 2 ENGINEERING 3 INCORPORATED

T.H. PRITCHETT / Associates
Landscape Architects

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PROJECT RENDERINGS

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawai'i

March 18, 2018

INFRASTRUCTURE INVESTMENTS USA

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GRAPHIC SCALE IN FEET
0 150 300 600
1"=300' @ 22x34

LEGEND

- NEIGHBORHOOD RETAIL / SERVICES BUILDING
- LIVE / WORK BUILDING
- WORKFORCE BUILDING
- MARKET RATE BUILDING
- RECREATIONAL OPEN SPACE / DETENTION
- POCKET PARK
- BUS STOP-NORTH BOUND
- BUS STOP-SOUTH BOUND

CONCEPTUAL SITE PLAN

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawai'i
March 18, 2018

INFRASTRUCTURE INVESTMENTS

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GRAPHIC SCALE IN FEET
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1"=300' @ 22x34

LEGEND

- NEIGHBORHOOD RETAIL / SERVICES BUILDING
- LIVE / WORK BUILDING
- WORKFORCE BUILDING
- MARKET RATE BUILDING
- RECREATIONAL OPEN SPACE / DETENTION
- POCKET PARK
- 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, Hawai'i
March 18, 2018

INFRASTRUCTURE INVESTMENTS USA

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GRAPHIC SCALE IN FEET
0 150 300 600
1"=300' @ 22x34

District Areas

Core Neighborhood District	Acreage	Residential Units
CORE-1	4	0
CORE-2	3	0
Total	**7**	**0**

Center Neighborhood District		
CNTR-1	4	50
CNTR-2	2	0
CNTR-3	14	0
Total	**20**	**50**

General Neighborhood District		
GNRL-1	23	290
GNRL-2	43	340
GNRL-3	9	110
GNRL-4	8	108
Total	**83**	**848**

Edge Neighborhood District		
E	**48**	**1**

Estate Edge District		
EE	**23**	**1**

Workplace Edge District		
WE-1	**5**	**0**

Parks, Open Spaces & Buffers		
OS-1	48	0
OS-2	76	0
Total	**124**	**0**

Total	**310**	**900**

DISTRICT LAND USE ALLOCATION MAP

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawai'i
March 18, 2018

USA INFRASTRUCTURE INVESTMENTS
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GRAPHIC SCALE IN FEET
0 150 300 600
1"=300' @ 22x34

Residential Phasing Summary

Phase	Year	MR	WF	SF	Total
1	2019	170	70	0	240
2	2020	150	70	0	220
3	2021	150	70	0	220
4	2022	148	70	0	218
5	2023	0	0	2	2
Total		618	280	2	900

Commercial Phasing Summary

A	2021	±	29,000	sf
B	2021	±	24,000	sf
C	2022	±	9,000	sf
Total		±	62,000	sf

PRELIMINARY
PHASING PLAN

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawai'i
March 18, 2018

INFRASTRUCTURE INVESTMENTS
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GRAPHIC SCALE IN FEET
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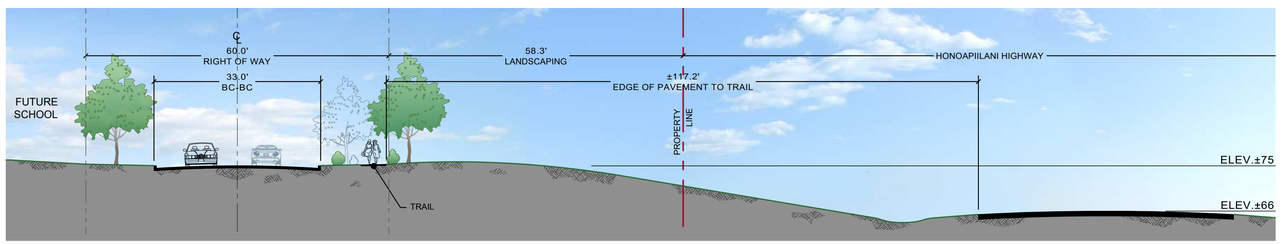
LEGEND

- 8' MULTI-USE TRAIL
- 6' TRAIL
- COMMERCIAL SIDEWALKS
- 5' SIDEWALK
- 4' LOCAL SIDEWALK/PATH (HARD AND SOFT SURFACE)
- NEIGHBORHOOD SERVICES (RETAIL, OFFICE, ETC.)
- 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 SCHOOL

TRAIL SYSTEM & CONNECTIVITY PLAN

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawai'i
March 18, 2018

INFRASTRUCTURE INVESTMENTS USA
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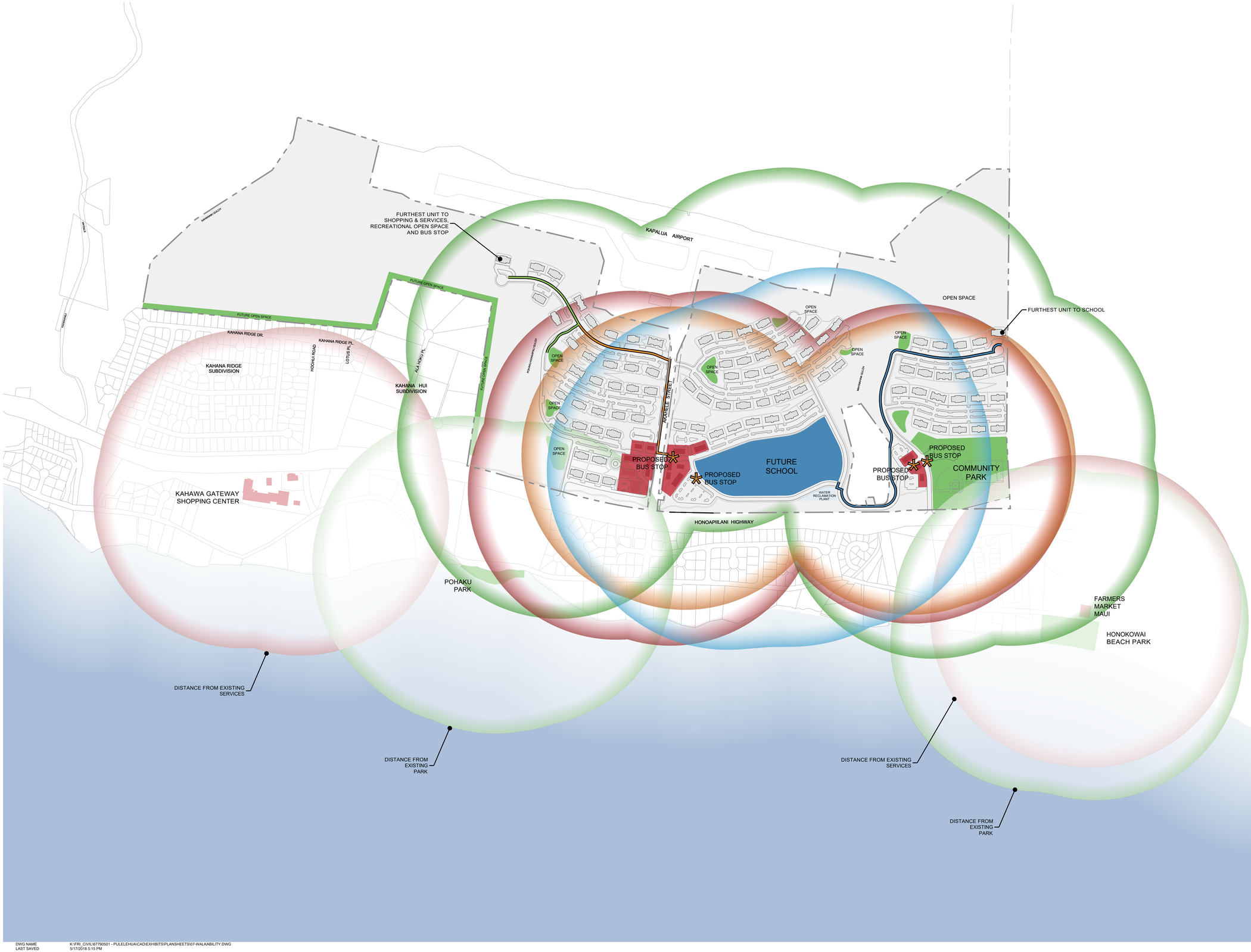

GRAPHIC SCALE IN FEET
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1"=400' @ 22x34

LEGEND

5-MINUTE WALK TO DESTINATION	PERCENTAGE OF UNITS WITHIN ZONE
SHOPPING & SERVICES	94%
RECREATION	100%
PUBLIC TRANSPORTATION	85%
SCHOOL	84%

LONGEST PATH DISTANCES TO:

SHOPPING & SERVICES:	±2,462 LF	±9.3 min.
RECREATIONAL OPEN SPACE:	±1,210 LF	±4.6 min.
BUS STOP:	±2,700 LF	±10.2 min.
SCHOOL:	±3,062 LF	±11.6 min.

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, Hawai'i
March 18, 2018

INFRASTRUCTURE INVESTMENTS USA

PRITCHARD ASSOCIATES

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PWS Architects, Inc.

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T.H. PRITCHETT / Associates
Landscape Architects

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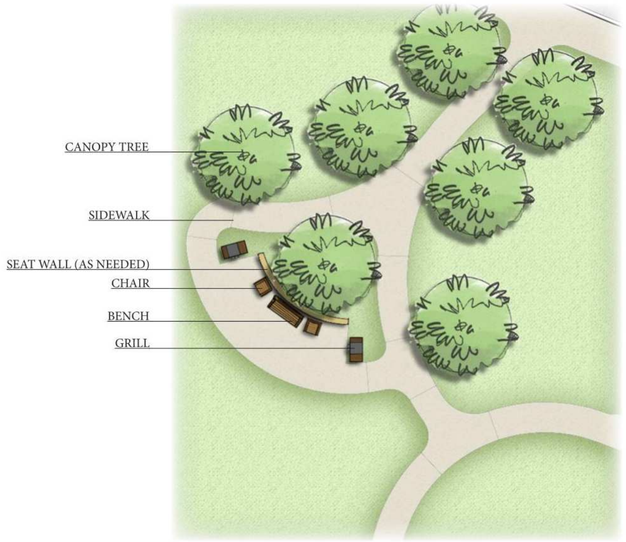
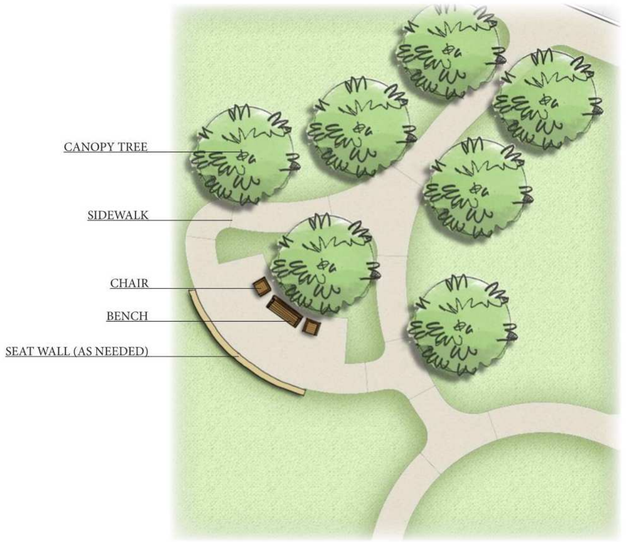
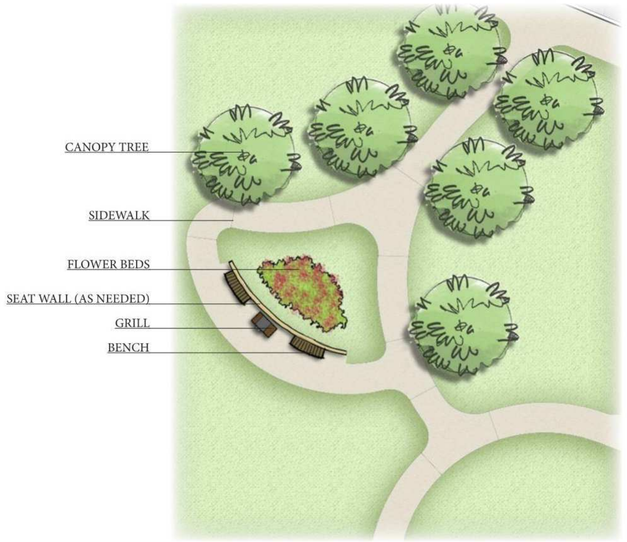


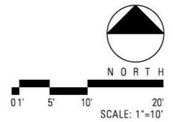
TYPICAL POCKET PARK
CONCEPT A



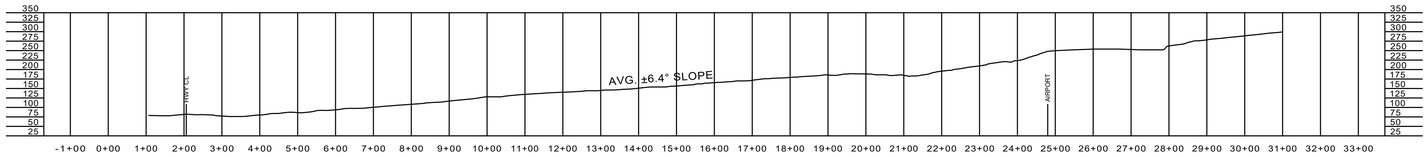
TYPICAL POCKET PARK
CONCEPT B



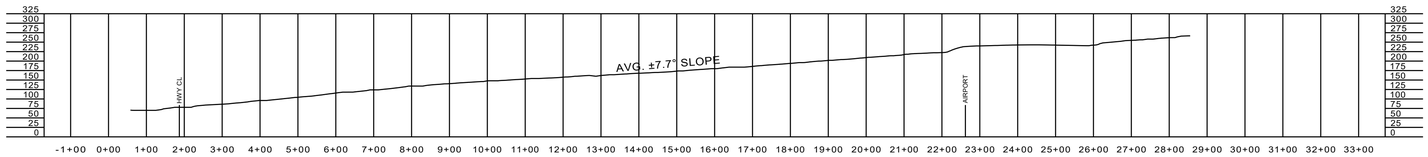
TYPICAL POCKET PARK
CONCEPT C



SECTION A



SECTION B



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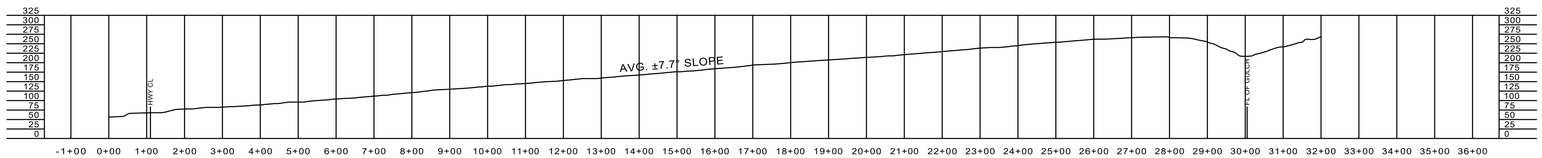

SECTIONS PROFILES
SCALE 1":200'

TYPICAL POCKET PARK & SECTIONS EXHIBITS

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawai'i
March 18, 2018

INFRASTRUCTURE INVESTMENTS USA

PRITCHARD ASSOCIATES

Kimley»Horn

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T.H. PRITCHETT / Associates
Landscape Architects

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GRAPHIC SCALE IN FEET
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1"=50' @ 22x34

Pp
Pp
BUS STOP
BUS STOP
HONOAPIILANI HIGHWAY

COMMUNITY PARK

Pulelehua

WEST MAUI PROJECT DISTRICT 5

Mahinahina & Kahana, Lahaina
Island of Maui, Hawai'i
March 18, 2018

INFRASTRUCTURE INVESTMENTS
PRITCHARD ASSOCIATES
Kimley»Horn
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bei I BASHAW/AHI II ENGINEERING III INCORPORATED

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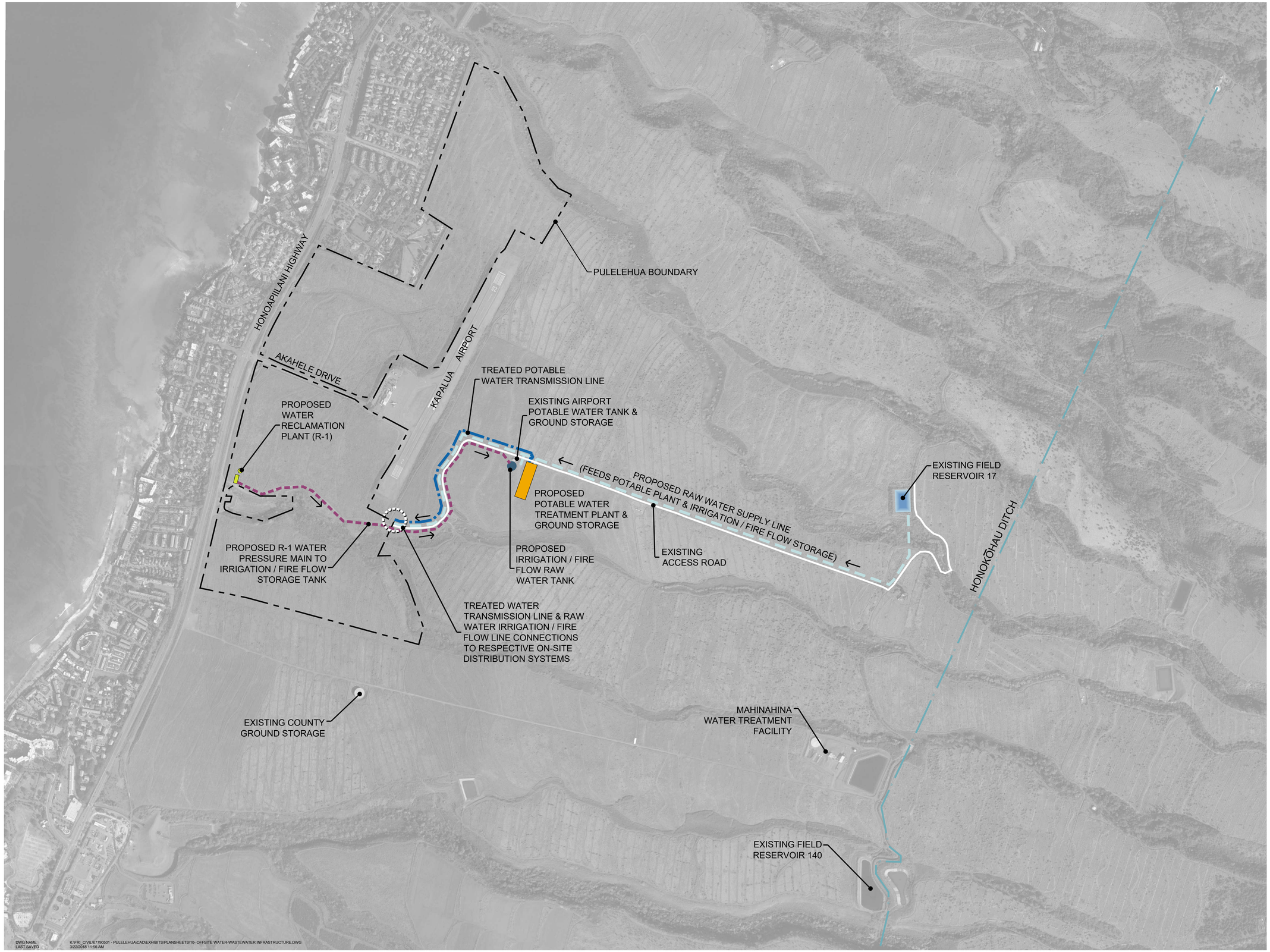

GRAPHIC SCALE IN FEET
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NOTE:

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
Island of Maui, Hawai'i
March 18, 2018

INFRASTRUCTURE INVESTMENTS USA

PRITCHARD ASSOCIATES
Kimley»Horn
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T.H. PRITCHETT / Associates
Landscape Architects

DWG NAME:
LAST SAVED

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