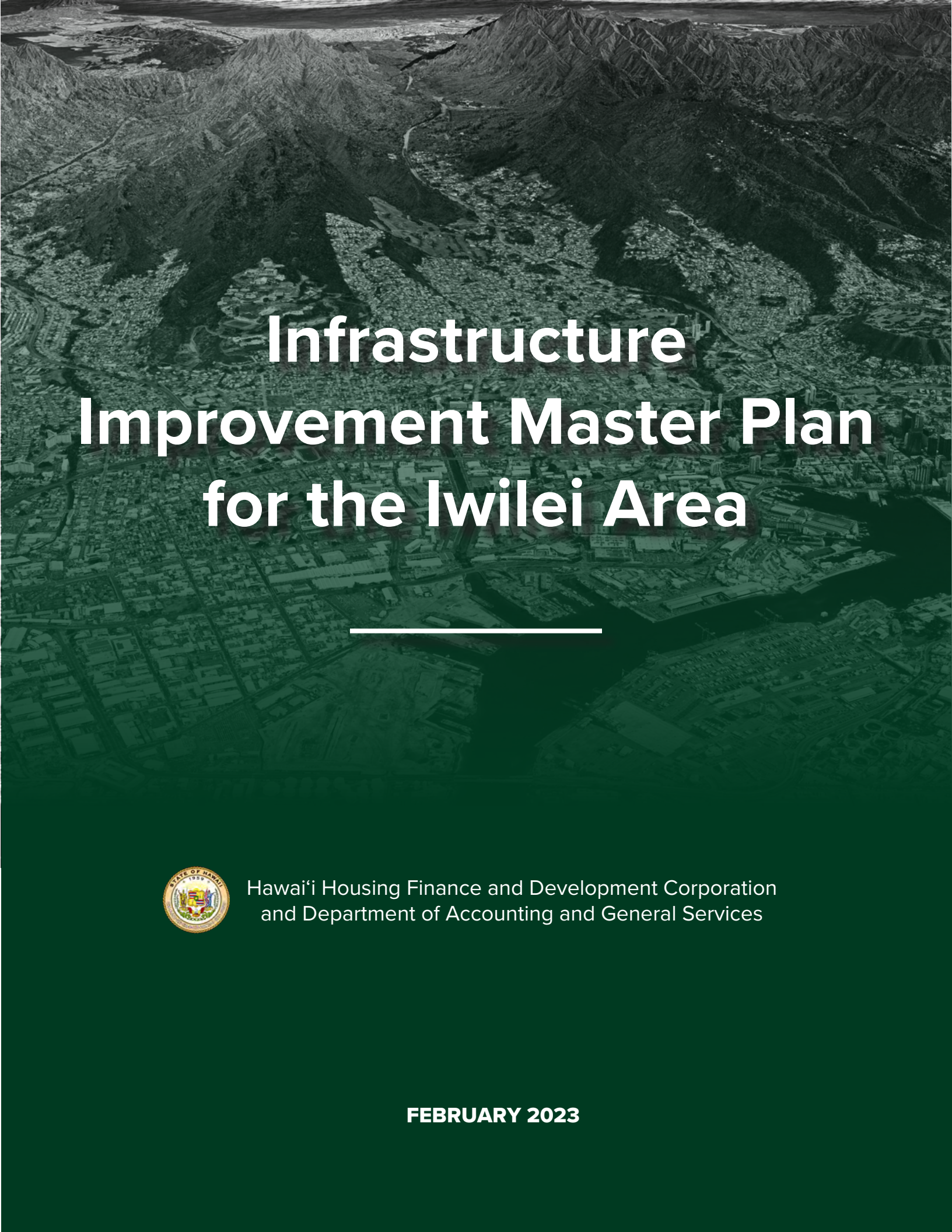


Infrastructure Improvement Master Plan for the Iwilei Area

Hawai‘i Housing Finance and Development Corporation
and Department of Accounting and General Services

FEBRUARY 2023

Infrastructure Improvement Master Plan for the Iwilei Area

Prepared for:

Hawai‘i Housing Finance and Development Corporation

and Department of Accounting and General Services

Prepared by:

PBR HAWAII & ASSOCIATES, INC.

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FEHR PEERS

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ARUP

February 2023

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List of Abbreviations and Acronyms

ACS	American Community Survey
ADD	Average Daily Demand
ATTC	Advanced Technology & Training Center
AWSC	All-Way Stop Controlled
BFE	Base Flood Elevation
BLE	Base Level Engineering
BMP	Best Management Practices
BWS	City and County of Honolulu, Board of Water Supply
CBD	Central Business District
CCUR	City Center Utility Relocation
CDP	Census Designated Place
City	City and County of Honolulu
CIP	Capital Improvement Program
CIPP	Cured in Place Pipe
DAGS	State of Hawai‘i Department of Accounting and General Services
DFM	City and County of Honolulu, Department of Facilities Maintenance
DHHL	State of Hawai‘i, Department of Hawaiian Home Lands
DOE	State of Hawai‘i, Department of Education
DOH	State of Hawai‘i, Department of Health
DOT	State of Hawai‘i, Department of Transportation
DOT Airports	State of Hawai‘i, Department of Transportation, Airports Division
DOT Highways	State of Hawai‘i, Department of Transportation, Highway Division
DOT Harbors	State of Hawai‘i, Department of Transportation, Harbors Division
DPP	City and County of Honolulu, Department of Planning and Permitting
DTS	City and County of Honolulu, Department of Transportation Services
ENV	City and County of Honolulu Department of Environmental Services
ESA	Environmental Site Assessment
ESDU	Equivalent Singe Family Dwelling Unit
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FFE	Finished Floor Elevation
FIRM	Flood Insurance Rate Map
FTTP	Fiber-to-the Premises
GPD	Gallons Per Day
GWI	Ground Water Infiltration
HART	City and County of Honolulu, Honolulu Authority for Rapid Transportation
HCC	University of Hawai‘i, Honolulu Community College
HECO	Hawaiian Electric Company, Inc.
HHFDC	State of Hawai‘i, Hawai‘i Housing Finance and Development Corporation
HPHA	State of Hawai‘i, Hawai‘i Public Housing Authority
HRS	Hawai‘i Revised Statutes
HT	Hawaiian Telcom
IGA	Intergovernmental Agreement
I/I	Infiltration and Inflow
IIIMP	Iwilei Infrastructure Improvement Master Plan
IKTODINA	City and County of Honolulu Iwilei/Kapālama Transit-Oriented Development Infrastructure Needs Assessment 2018

KS	Kamehameha Schools
kV	Kilovolt
LID	Low-Impact Development
Liliha CC	Liliha Civic Center
LOS	Level of Service
LPIs	Leading Pedestrian Indications
LRDP	Long Range Development Plan
MG	Million Gallons
MGD	Millions of Gallons per Day
MDD	Maximum Daily Demand
MWH	Mayor Wright Homes
NOAA	United States, National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OCCC	Oʻahu Community Correctional Center
OHA	Office of Hawaiian Affairs
OPSD	Office of Planning and Sustainable Development, State of Hawaiʻi
PacIOOS	Pacific Islands Ocean Observing System
PHB	Pedestrian Hybrid Beacons
POV	Personally Owned Vehicles
PSD	Public Safety Department
PUC	Public Utilities Commission
PUC-DP	Primary Urban Center Development Plan
ROH	Revised Ordinances of Honolulu
ROW	Right-of-Way
RRFB	Rectangular Rapid Flashing Beacon
SF	Square Footage / Square Feet
SLR	Sea Level Rise
SLR-XA	Sea Level Rise Exposure Area
Spectrum	Spectrum Oceanic
State	State of Hawaiʻi
SW-BMP	Storm Water Best Management Practice
SWMPP	Storm Water Management Program Plan
TMK	Tax Map Key
TOD	Transit-Oriented Development
TWSC	Two-Way Stop Controlled
UH	University of Hawaiʻi
WWPS	Wastewater Pump Station
WWTP	Wastewater Treatment Plant

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Executive Summary

This master plan identifies infrastructure improvements needed to support Transit-Oriented Development (TOD), including housing, in the Iwilei Infrastructure Improvement Master Plan Area (Iwilei Master Plan Area). The Iwilei Master Plan Area includes many large landholdings managed by State agencies, the City, or owned by private landowners that will benefit from infrastructure improvements for major planned projects. The State and City executed an Intergovernmental Agreement (IGA) for Master Planning and Construction of Infrastructure Improvements for State and City Owned Land Parcels in the Iwilei Neighborhood, committing to work together on this master plan and associated financing strategy.

The focus is on horizontal, hard infrastructure facilities that serve regional or area-wide needs to best capture economies of scale and ensure that public resources are invested in a cost-effective manner in the State of Hawai‘i (State) and City and County of Honolulu (City) efforts to realize the broader public benefits of TOD. For the purposes of this master plan, infrastructure is broadly defined to include sewer; water; storm water and drainage systems; roadways and highways; including multimodal and transit facilities; and electrical and telecommunications, including broadband. The anticipated development and associated resident population will also require additional public service infrastructure such as green/open space, public school facilities, and emergency services. Future studies and consultation will need to be undertaken to determine the additional parks and open space and State Department of Education (DOE) facilities necessary to support redevelopment.

Development Plans and Key Issues

Within the next 30 years, the Iwilei Master Plan Area is expected to include nearly 27,500 new housing units, with a change in uses for nearly 2 million square feet of existing commercial/institutional/mixed-use space. According to analysis of anticipated development assumptions with landowner input, updated between the summer of 2021 and spring 2022, the overall number of housing units is anticipated to increase, while the total amount of commercial/institutional and industrial space is expected to remain constant or decrease as existing land uses transition to residential or mixed-use.

To accommodate the anticipated growth in the Iwilei neighborhood, the Iwilei Master Plan Area will require major upgrades and improvements for sewer, water, electrical, telecommunications, drainage, and transportation systems. In addition, the Iwilei Master Plan will support broader TOD goals for the State and City and facilitate the vision for redeveloping the Iwilei neighborhood into a more walkable community with affordable housing and access to services and employment centers.

Improving infrastructure capacity of the sewer, water, drainage, transportation, and electrical systems will be critical in achieving TOD potential in the Iwilei Master Plan Area. There are significant barriers and concerns related to the timing and concurrency of needed infrastructure improvements for TOD development in this area, particularly related to sewer and electrical facility improvements needed to support initial development. Section 4 of this report and the following table summarizes the infrastructure improvements by type and identifies cost, phasing, and major owners that may benefit from each improvement for Phases 1 and 2.

CIP Project Name	Appr.	2023 Budget	Estimated Future	Sub Project Budget*	Phase	Major Owners Served
Sewer System						
Awa Street WWPS Impr./ Rehab. (appr. CIP # 2019046)		$1,501,000	$13,203,000		1 or 2	Area Wide
Hart Street WWPS Force Main Impr. Phase 3 (appr. CIP # 2017054)	$953,000	$4,801,000			1 or 2	Area Wide
Hart Street / Waiakamilo Rd. Rep. Sewer (appr. CIP # 2019065)	$3,602,000				1	Serving KS & DHHL
Iwilei, King Street, Kōkea Street Area Sewer Impr. (appr. CIP # 2019067)	$1,802,000		$7,802,000		1 or 2	
Relief on Kōkea Street*				$3,691,250	1 or 2	Mauka serving HCC, KS, Kaiʻulani Elem School, and improves MWH, Liliha Square, Kukui Gardens, Douglas Emmett, Kauluwela #2, Liliha CC, Castle & Cooke, Costco, Iwilei Business Center, Salvation Army and OHA. Kōkea Street 12" Upgrade Makai HCC Makai,
Relief on Liliha Street*				$1,840,000	1 or 2	Serving MWH, Liliha Square, Kukui Gardens, Douglas Emmett, Kauluwela #2, LCC
Relief on King Street*				$1,815,000	1 or 2	Serves MWH and can serve LCC
Nuʻuanu Stream Relief*				$1,890,000	1 or 2	Serves MWH and can serve LCC
Iwilei Road Relief *				$750,000	1 or 2	Serves MWH, Liliha Square, Kukui Gardens, Douglas Emmett, Kauluwela #2, LCC, Castle & Cooke, Costco, Iwilei Business Center, Salvation Army, OHA.
Kalihi/Nuʻuanu Area Sewer Rehab. / Impr. (appr. CIP # 2005075)	$301,000	$1,500,000	$33,905,000		1 or 2	Area Wide to mitigate increased I/I due to SLR by reducing upstream I/I

CIP Project Name	Appr.	2023 Budget	Estimated Future	Sub Project Budget*	Phase	Major Owners Served
Water System						
North Nimitz Highway 16-Inch Main, Waiakamilo Road to Sumner Street (BWS CIP)			$8,900,000		1 or 2	Area Wide
ʻAʻala Street and N Vineyard Blvd. Water System Improvements (BWS CIP)			$6,920,000		1 or 2	Serving MWH, Liliha Square, Kukui Gardens, Douglas Emmett, Kauluwela #1 & #2 and Elem, Salvation Army
Dillingham Blvd at Kohou Street Water System Improvements (BWS CIP)			$3,932,000		1	Serving KS
Kalani Street				$207,000	1 or 2	Serving KS and DHHL
Kaʻaahi Street				$180,000	1	Serving LCC and Weinberg
Drainage System						
Kapālama Canal Revitalization Project Dredging (adopted Master Plan)	$300,000		$35,000,000		1 or 2	Area Wide, land disposal vs ocean disposal
King Street Drain 1			$1,788,790		1 or 2	Serving Liliha CC and ʻAʻala Park
King Street Drain 2			$2,443,060		1 or 2	Serving KS
Moonui Street Drain (Houghtailing to Canal)			$9,300,000		1	Serving KS
Kaumualiʻi Street Drain			$2,365,090		1	Serving KS
Dillingham Boulevard Drain 1			$23,396,650		1	Serving KS
Dillingham Boulevard Drain 2			$5,356,200		1	Serving KS
Kalani Street Drain			$3,080,880		1	Serving KS & DHHL
Vineyard Boulevard Drain			$3,419,380		1	
Pua Lane Drain (incl. Kukui Gardens)			$26,458,950		1 or 2	Serving Mayor Wright Homes, Liliha Square, Kukui Gardens, Douglas Emmett, Kauluwela #1 & #2, Salvation Army

CIP Project Name	Appr.	2023 Budget	Estimated Future	Sub Project Budget*	Phase	Major Owners Served
Transportation - Walkways						
Kanoa Street from Pālama Street to Pua Lane Walkway			$171,600		1 or 2	MWH and Regional Connectivity
Pālama Street from Vineyard to King Street Walkway			$241,824		1 or 2	MWH and Regional Connectivity
Kohou Street from H1 to Nimitz Path			$5,820,857		1 or 2	KS, DHHL, HCC and Regional Connectivity
Kōkea Street from H1 to Nimitz Path			$5,622,939		1 or 2	KS, DHHL, HCC and Regional Connectivity
Kaʻaahi Street from Dillingham to Iwilei Road Path			$1,920,100		1	Liliha CC and Regional Connectivity
King Street from Dillingham to Liliha Walkway Upgrade			$191,100		1	MWH, Kukui Gardens, and Regional Connectivity
Transportation - Bike Facilities						
Kohou Street from H1 to Nimitz Shared Use Path			$1,040,424		1 or 2	KS, DHHL, HCC and Regional Connectivity
Kōkea Street from H1 to Nimitz Shared Use Path			$1,005,048		1 or 2	KS, DHHL, HCC and Regional Connectivity
Kaʻaahi Street from Dillingham to Iwilei Road Shared Use Path			$343,200		1	Liliha CC and Regional Connectivity
Between Kaʻaahi Street and King Street Shared Use Path			$144,672		1 or 2	Liliha CC and Regional Connectivity
Nimitz south of Sumner Street Shared Use Path			$66,528		1 or 2	Regional Connectivity
Transportation - Roadways						
New Segment between Kaumualiʻi Street and Mookaula Street (parallel to Moowaa and Kohou Streets)			$8,445,984		1	KS and Regional Connectivity
Extension of Moonui Street between Moowaa and Kohou Streets			$4,752,680		1	KS and Regional Connectivity

CIP Project Name	Appr.	2023 Budget	Estimated Future	Sub Project Budget*	Phase	Major Owners Served
Extension of Ka‘aahi Street			$4,192,749		1	Liliha CC and Regional Connectivity
Extension of Pacific Street between Alakawa and Iwilei Road			$8,221,048		1	City Mill, Castle and Cooke, OHA, and Regional Connectivity
Mayor Wright Homes New Roadway Network			$18,001,404		1	MWH
Electrical System						
25-kV Underground Distribution Network						
North King Street 25-kV			$7,000,000 - $11,500,000		1	Local Benefit, Mauka of Liliha CC, Honolulu Community College, KS properties; and makai of MWH
Liliha Street 25-kV			$2,300,000		1	Local Benefit, adjacent to MWH and Kukui Gardens
Iwilei Road North 25-kV			$1,230,000 - $1,850,000		1	Local Benefit, immediately adjacent to Liliha CC on the Diamond Head edge of the property
Pine Street 25-kV			$1,250,000 - $1,600,000		1	Local Benefit, adjacent to Iwilei Center
Sumner Street 25-kV			$1,720,000 - $2,300,000		1	Local Benefit

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1 Master Plan Overview

1.1 Background

This master plan builds on a number of plans and prior studies prepared by the City Department of Planning and Permitting (DPP) and the State of Hawai'i Office of Planning and Sustainable Development (OPSD). As identified in these prior studies, a major barrier to Transit-Oriented Development Implementation along the 20-mile-long Honolulu Rail Transit Project corridor is the lack of adequate infrastructure in areas designated for TOD, as well as the cost and timely delivery of shared infrastructure and improvements that are needed to proceed with individual TOD projects. This includes the significant cost of improving, upgrading, or constructing shared public infrastructure systems such as sewer, water, drainage, transportation and electrical accommodate the planned higher densities and to address existing system inadequacies or substandard conditions (OPSD/HHFDC, 2018).

Improvements to these shared systems are critical to support affordable housing goals, economic development opportunities, and provide improved access to jobs and services for residents. This master plan identifies infrastructure improvements needed to support anticipated TOD development, in addition to existing gaps that may limit implementation of goals.

1.2 Purpose and Need

The purpose of the Iwilei Infrastructure Improvement Master Plan is to identify infrastructure improvements that will advance landowner goals in the Iwilei Master Plan Area. The Iwilei Infrastructure Master Plan will support broader TOD goals for the State and City and facilitate the vision for redeveloping the Iwilei neighborhood into a more walkable community with affordable housing and access to services and employment centers.

The Iwilei Infrastructure Master Plan is based on land uses proposed in the City Kalihi and Downtown Neighborhood TOD Plans. Anticipated development for the area includes a shift to higher density housing and mixed-use development over the next 30 to 50 years or longer. This proposed growth would result in an overall increase in housing, while the total amount of commercial/institutional and industrial space is expected to remain constant or decrease as the existing uses transition to residential or mixed-use.

For the purposes of this master plan, infrastructure is broadly defined to include sewer; water; storm water and drainage systems; roadways and highways; including multimodal and transit facilities; and electrical and telecommunications, including broadband. The utility providers responsible for these various infrastructure systems are the City Department of Environmental Services (ENV) for sewer, the City Board of Water Supply (BWS) for water service, the City Department of Facilities Maintenance (DFM) for drainage, the City Department of Transportation Services (DTS) and the State Department of Transportation, Highways Division (DOT Highways) for transportation, Hawaiian Electric Company, Inc. (HECO) for electricity, and Spectrum Oceanic (Spectrum), Hawaiian Telcom (HT), and AT&T for communication services.

The anticipated development and associated resident population will also require additional public service infrastructure such as green/open space and public school facilities. Future studies and consultation will need to be undertaken to determine the additional parks and open space and DOE facilities necessary to support redevelopment.

1.3 Project Team and Roles

PBR HAWAII & Associates, Inc. (PBR HAWAII) was selected by the State as the consultant for the planning effort. PBR HAWAII assembled a multi-disciplinary team of consultants to provide professional expertise and assistance in completing this master plan, including civil engineering (R.M. Towill Corporation), transportation planning (Fehr & Peers), electrical engineering (Ronald N.S. Ho & Associates), and green infrastructure and sustainable systems design (Arup).

PBR HAWAII and their consultant team (Planning Team) worked closely with representatives from the Hawai‘i Housing Finance and Development Corporation (HHFDC) and the Department of Accounting and General Services (DAGS) to seek guidance and direction in completing the master plan.

2 Iwilei Infrastructure Improvement Master Plan Area

The Iwilei Infrastructure Improvement Master Plan Area (Iwilei Master Plan Area) was defined based on an evaluation of the existing conditions in the Iwilei Infrastructure Improvement Assessment (April 2022). The boundaries, as illustrated in Figure 2-1, were defined based on maps from the City TOD Plans, prior area studies, and input from departments, agencies, and landowners. Additionally, the identified boundaries consider the larger, regional infrastructure systems to which localized infrastructure improvements are connected and which function interdependently. This broader regional approach was intended to avoid incremental infrastructure planning, design, and construction, and to support efficient funding and delivery of infrastructure through coordinated multi-agency State and City planning efforts.

2.1 Project Location

The Iwilei Master Plan Area is on the island of Oʻahu, within the ahupuaʻa of Honolulu and Kapālama, in the Iwilei neighborhood Figure 2-1. It is located in central Honolulu and bound by Waiakamilo Road and the H-1 Freeway to the north; the H-1 Freeway and Nuʻuanu Canal to the east; Nuʻuanu Canal and North Nimitz Highway to the south; and North Nimitz Highway and Waiakamilo Road to the west. The Iwilei Master Plan Area includes two planned rail stations, Kūwili (Iwilei) and Niuhelewai (Kapālama).

2.2 Project Properties

The Iwilei Master Plan Area is comprised of over 700 properties, covering approximately 555 acres.

Various State agencies are responsible for properties within the Iwilei Master Plan Area comprising office, open space, educational, and residential uses, including large landholdings considered for redevelopment such as:

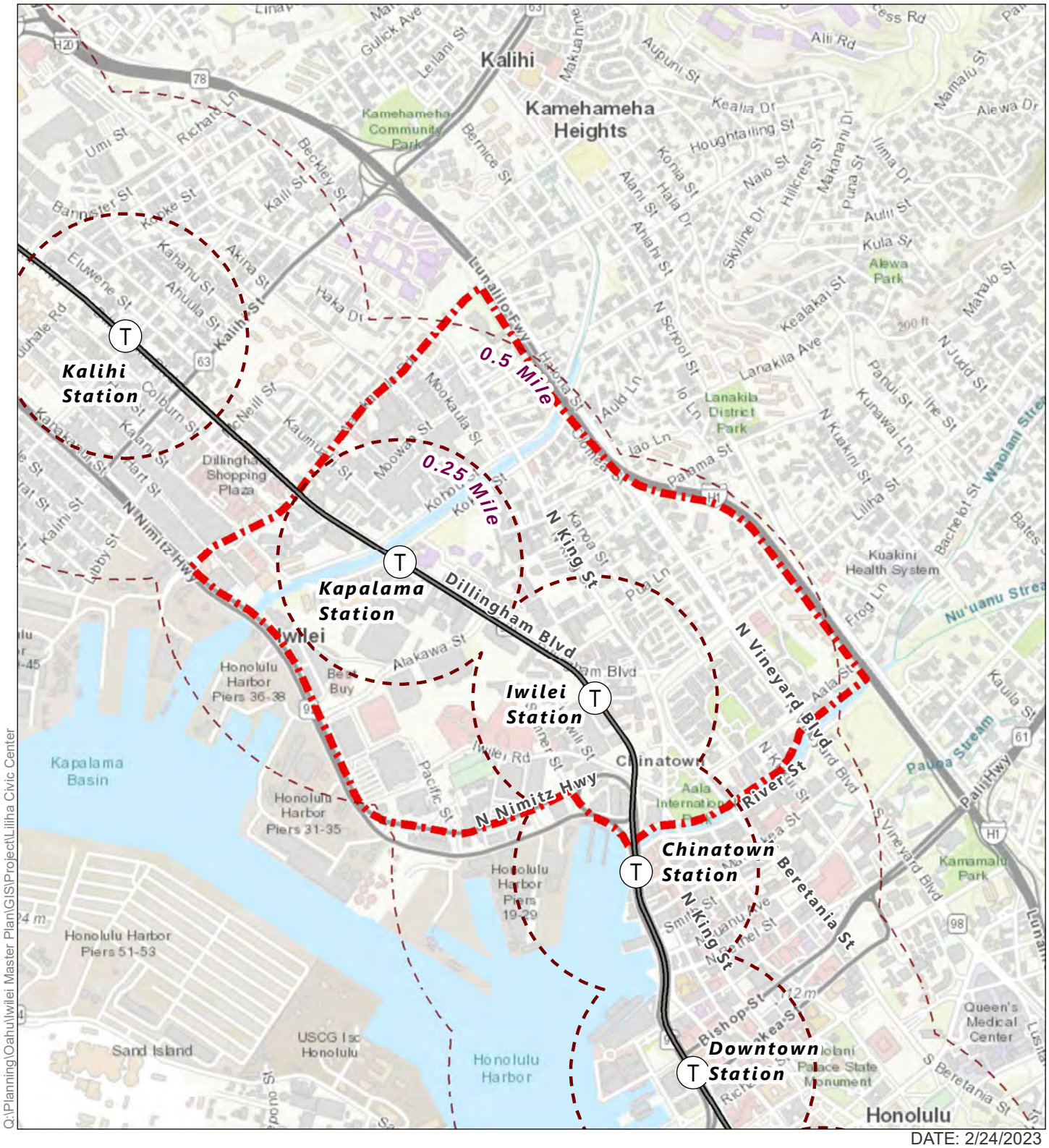
- Liliha Civic Center (Liliha CC) (Department of Accounting and General Services, DAGS);
- Mayor Wright Homes (MWH) and Kalanihuia Homes (Hawaiʻi Public Housing Authority, HPHA);
- City Square Shopping Center, portion (Department of Hawaiian Home Lands, DHHL);
- Honolulu Community College (HCC) (University of Hawaiʻi, UH); and
- Nā Lama Kukui Business Center (Office of Hawaiian Affairs, OHA—a semi-autonomous State agency).

The City also owns several smaller parcels near the Kūwili (Iwilei) Transit Station, and is in the process of acquiring the Iwilei Center property for near term use in current state, and long-term TOD redevelopment.

Private landowners with large properties in the Iwilei Master Plan Area include, but are not limited to:

- B P Bishop Trust Estate (Kamehameha Schools, KS);
- Castle & Cooke Commercial, Inc. (Castle and Cooke);
- City Mill Co. Ltd. (City Mill);
- Costco Wholesale Corp. (Costco),
- Douglas Emmett (Waena Apartments);
- The Salvation Army;
- Liliha Square (Liliha Square Shopping Center); and
- H & J Weinberg Foundation, Inc.

Figure 2-2 illustrates the major landowners and large development properties within the Iwilei Master Plan Area and Appendix A includes a complete list of landowners by tax map key (TMK).



Q:\Planning\Oahu\Iwilei Master Plan\GIS\Project\Liliha Civic Center

DATE: 2/24/2023

LEGEND

- Iwilei Master Plan Area
- Future Rail Stations
- Future Rail Line
- 0.25-Mile & 0.5-Mile TOD Walk Radius



Figure 2-1
Infrastructure Improvement Master Plan Area

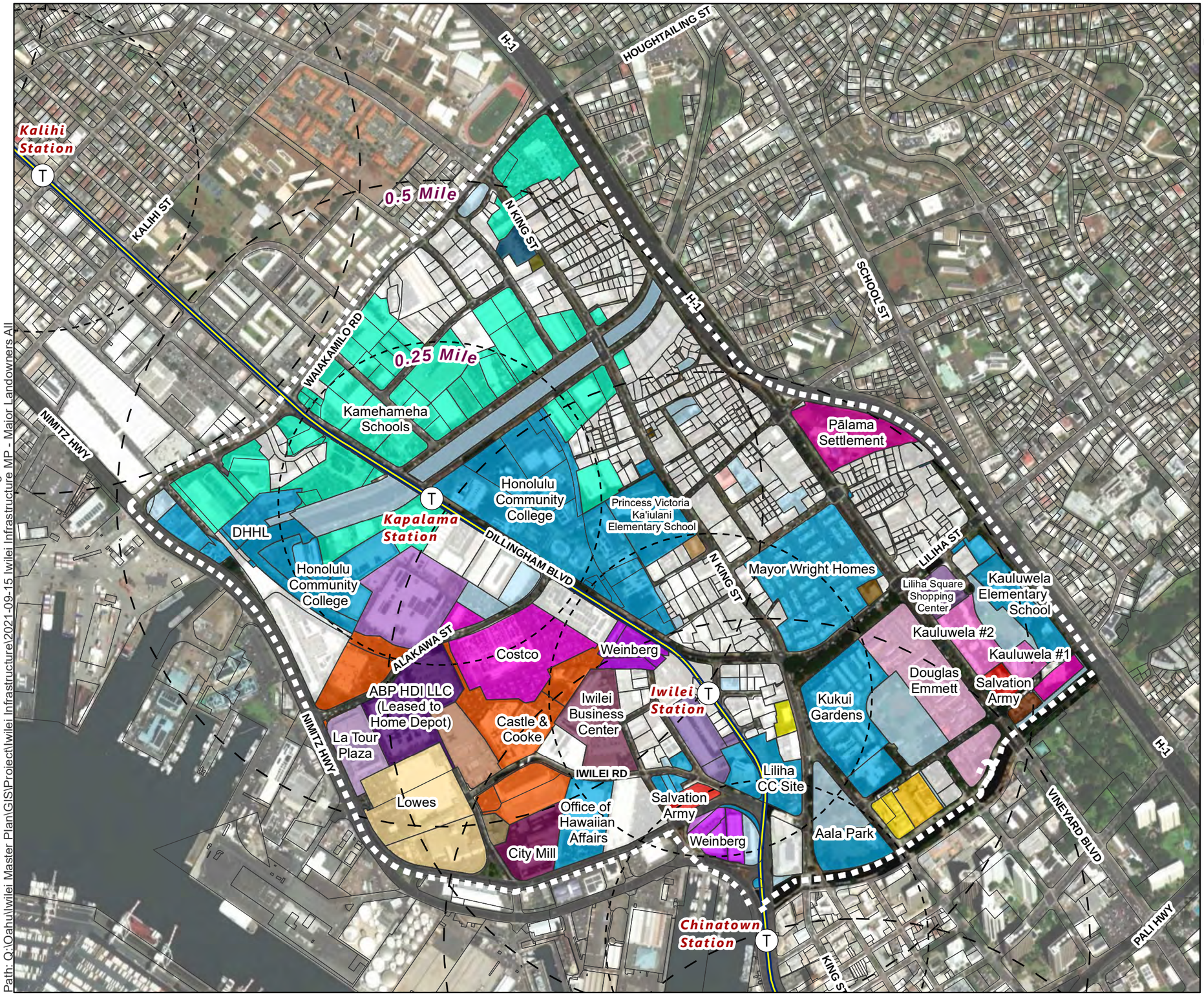
Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

North — Linear Scale (feet) 0 750 1,500

Source: City & County of Honolulu, 2020. ESRI Online Basemap.

Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.



Legend

- Iwilei Master Plan Area
- HART Transit Line
- HART Transit Station
- 0.25-Mile & 0.5-Mile TOD Walk Radius

Major Landowners

- Other Landowners
- ABP HDI LLC (Leased to Home Depot)
- Aloha United Way
- American Savings Bank
- Cannery Row Condo Master
- Castle & Cooke
- City Mill
- Costco
- DHX
- Douglas Emmett
- First Hawaiian Bank
- Govt. County Honolulu
- Govt. Federal
- Govt. State
- HART
- Hawai'i USA Federal Credit Union
- Iwilei Business Center
- Iwilei Center LLC
- Kamehameha Schools
- Kauluwela #1
- Kauluwela #2
- Keola Ho'onanea
- Kobayashi Hotel
- La Tour Plaza
- Liliha Square Shopping Center
- Lowes
- Methodist Episcopal Church
- Olu Hale Kanoa Condo Master
- O'ahu Stations LLC
- Pacific Auto Service
- Pālama Settlement
- Private - Hung/Hong
- Salvation Army
- Tensho Kotai Jingu Kyo Hawai'i
- Various
- Weinberg
- Weinberg (via Govt. State)

Figure 2-2
Major Landowners in the Iwilei Master Plan Area

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS
North
Island of O'ahu

Linear Scale (feet)
0 400 800 1,600

PBR HAWAII & ASSOCIATES, INC.

DATE: 2/24/2023

Source: City & County of Honolulu, 2018. ESRI Online Basemap.
Disclaimer: This Graphic has been prepared for general Planning purposes only and should not be used for boundary Interpretations or other spatial analysis.

PDF - Q:\Oahu\Iwilei Master Plan\PDF\Iwilei Infrastructure\Iwilei Infrastructure Master Plan Diagrams 2021-09-15
Path: Q:\Oahu\Iwilei Master Plan\GIS\Project\Iwilei Infrastructure\2021-09-15 Iwilei Infrastructure MP - Major Landowners All

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2.3 Existing Uses

The Iwilei Master Plan Area generally consists of an urbanized mix of industrial, commercial, educational, and residential uses. See **Error! Not a valid bookmark self-reference.** for an existing zoning map. Industrial and commercial uses range from small businesses to warehouse facilities. Educational uses include the Honolulu Community College, Kauluwela Elementary School, and Princess Victoria Ka‘iulani Elementary School. Residential uses include single family homes and multi-family buildings of varying heights and densities.

According to the American Community Survey (United States Census Bureau, 2021), the population within a one-mile radius of the Iwilei Master Plan Area is 91,433 people; within a three-mile radius the population is 229,329 people.

2.4 Anticipated Development Model

The Iwilei Infrastructure Master Plan incorporates the anticipated zoning identified in the City Kalihi and Downtown Neighborhood TOD Plans, adopted in 2017 and 2020, respectively (Figure 2-4). The City neighborhood TOD Plans, based on long-term community outreach and engagement efforts, identify the vision, needs of the community, and opportunities to generate higher density, mixed-use development along the future rail transit corridor.

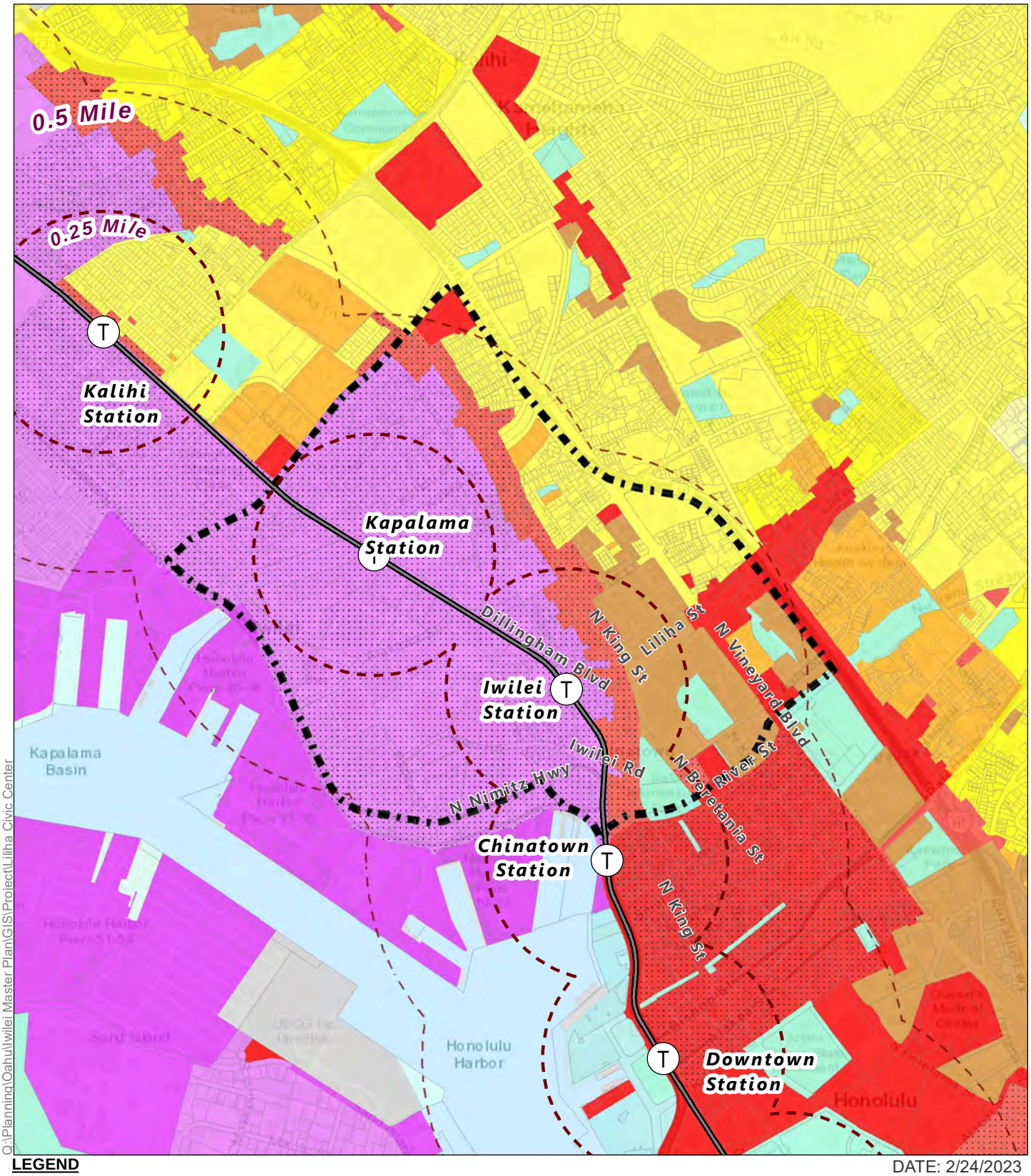
This master plan also utilized the City Iwilei/Kapālama Transit-Oriented Development Infrastructure Needs Assessment (IKTODINA, 2018) and the 2020 (State TOD Planning and Implementation Project for the Island of Oahu) to identify some initial development numbers, which were then refined and verified with interested landowners. It represents the most plausible land use pattern and density for projects in the TOD priority area based on current assumptions and provides a reasonable baseline for identifying infrastructure improvements for anticipated buildout and phasing. Details on development assumptions and specific infrastructure projects necessary to support development will continue to change as public and private development is planned and projects are closer to market readiness.

Anticipated development identified in these plans includes a shift to higher density housing and mixed-use development over the next 30 to 50 years or longer (see Table 2-1). Within the next 30 years, the Iwilei Master Plan Area is expected to include nearly 27,500 new housing units, with a change in uses for nearly 2 million square feet of existing commercial/institutional/mixed-use space. This proposed growth would result in an overall increase in housing, while the total amount of commercial/institutional and industrial space is expected to remain constant or decrease as the existing uses transition to residential or mixed-use.

Table 2-1: Summary of Anticipated Development and Phasing

Land Use Type	Existing	New					Total
		Phase 1 (Up to 2030)	Phase 2 (2031-2040)	Phase 3 (2041-2050)	Phase 4 2051+/TBD	Combined	Cumulative (new + existing)
Residential[1] (Units)	4,200	±8,300	±9,700	±2,500	±6,900	**±27,400**	**31,600**
Commercial/ Institutional (SF)	8,025,600	(±34,600)	(±493,300)	(±150,500)	(±1,214,500)	**(±1,892,900)**	**±6,958,300**
Industrial (SF)	825,600						

[1] Anticipated number of units based on an average assumption of 1,000-1,500 SF per unit. Assumptions do not identify unit mix (bedrooms) or occupancy (number of actual residents).



Q:\Planning\Oahu\Iwilei Master Plan\GIS\Project\Liliha Civic Center

LEGEND

- Iwilei Master Plan Area
- Future Rail Stations
- Future Rail Line
- 0.25-Mile TOD Walk Radius
- 0.5-Mile TOD Walk Radius

Zoning

- P-1
- P-2
- F-1
- R-10
- R-5
- R-3.5
- A-1
- A-2
- B-1
- B-2
- BMX-3
- BMX-4
- I-2
- I-3
- IMX-1
- ALOHA TOWER PROJ.
- KAKAAKO COMM. DEV. DISTRICT

DATE: 2/24/2023

Figure 2-3
Existing Zoning

Infrastructure Improvement Master Plan for the Iwilei Area

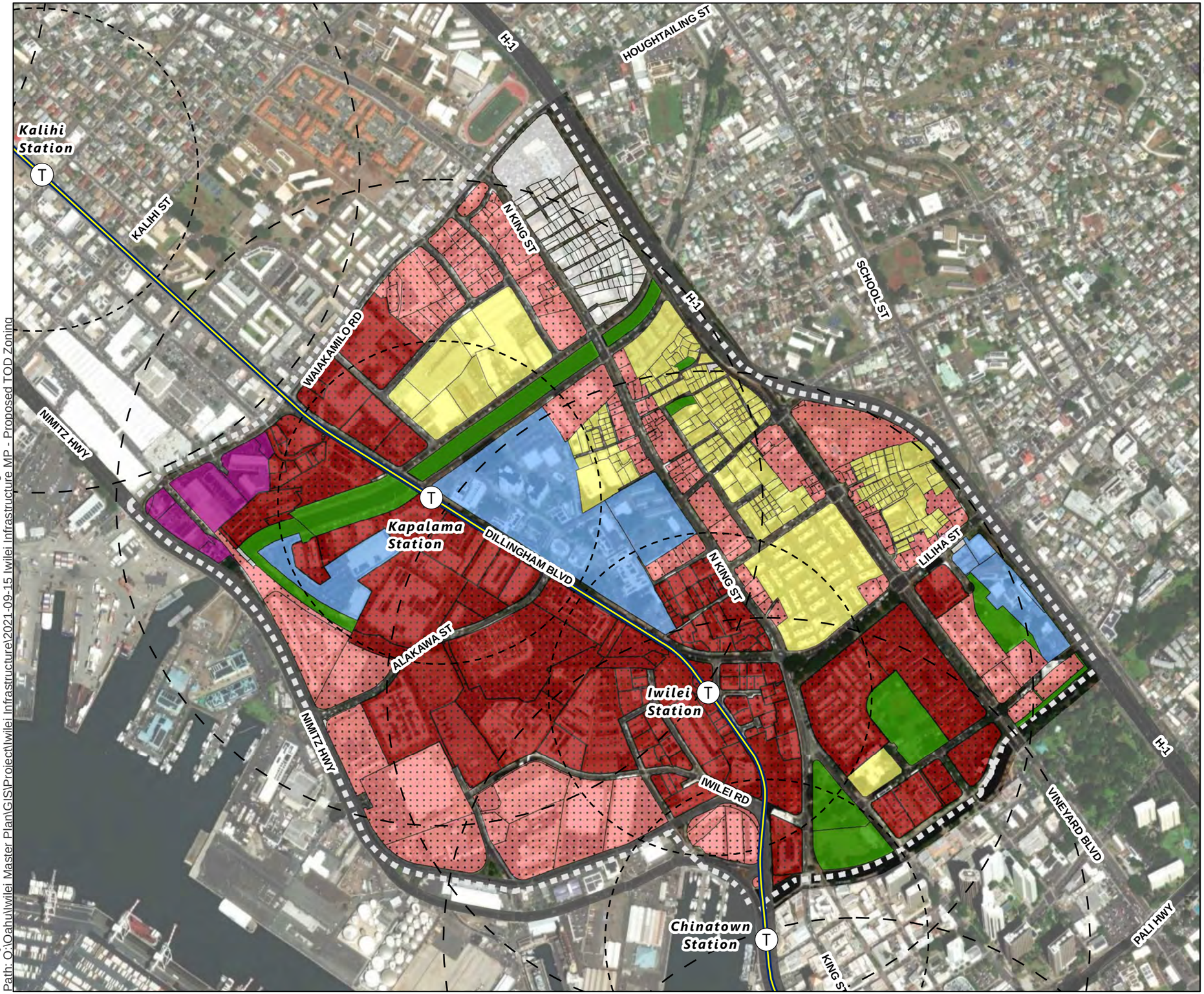
HHFDC/DAGS — Island of O'ahu

North

Linear Scale (feet)
0 750 1500

Source: City & County of Honolulu, 2020. ESRI Online Basemap.

Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.



Legend

- Iwilei Master Plan Area
- HART Transit Line
- HART Transit Station
- 0.25-Mile and 0.5-Mile TOD Walk Radius

Proposed TOD Land Uses

- Residential
- Urban Mixed Use-Medium
- Urban Mixed Use-High
- School/Public Space
- Industrial Mixed Use
- Open Space
- Not Identified
- ROW/Remnant

Figure 2-4
Proposed TOD Land Uses

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

North

Linear Scale (feet)

0 400 800 1,600

PBR HAWAII & ASSOCIATES, INC.

DATE: 2/24/2023

Source: City & County of Honolulu, 2018. ESRI Online Basemap.

Disclaimer: This Graphic has been prepared for general Planning purposes only and should not be used for boundary Interpretations or other spatial analysis.

PDF - Q:\Oahu\Iwilei Master Plan\PDF\Iwilei Infrastructure\Iwilei Infrastructure Master Plan Diagrams 2021-09-15
Path: Q:\Oahu\Iwilei Master Plan\GIS\Project\Iwilei Infrastructure\2021-09-15 Iwilei Infrastructure MP - Proposed TOD Zoning

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2.5 Model Methodology and Assumptions

Due to the existing urban conditions, development is anticipated to occur through urban infill implemented through a parcel-by-parcel approach. As noted in Section 2.2, the Iwilei Master Plan Area identifies several large landholdings considered for redevelopment that are either managed by State Agencies, the City, or owned by private landowners, in addition to many properties owned or managed by smaller entities which could also benefit from the proposed infrastructure improvements and help support TOD development in the area.

Potential private redevelopment is identified in this study using an anticipated development model based on current use and future TOD zoning potential of properties, as proposed in the City Kalihi and Downtown Neighborhood TOD Plans. Finally, single family residential areas are included in the Iwilei-Kapālama TOD priority area study boundary, however they are not included in the redevelopment analysis unless the lot is greater than five thousand square feet and has been identified for rezoning in the City Neighborhood TOD Plans.

Data sets included GIS parcels, transportation and streets, and facilities data from the City and County of Honolulu, Tax Categories and Rates data provided by the Department of Budget and Fiscal Services, and development assumptions originally generated by planning firm Dyett & Bhatia. All data sources utilized TMK as a category so, when necessary, this column was used to join data sets.

Opportunity sites were identified based on categories in the data sets including:

- Areas identified for TOD in the City Kalihi (adopted in 2017) and Downtown (adopted in 2020) Neighborhood TOD Plans,
- Vacant sites or sites currently occupied by surface parking lots,
- Properties where assessed value is less than land value, suggesting that the site is “underutilized,”
- Low intensity sites, where FAR values are below 0.75 or 0.50 and more intensive redevelopment may be appropriate (sites with low FAR values),
- Parcels smaller than 5,500 SF are not anticipated to be redeveloped,
- “Other Opportunity Sites” that have been identified as potential opportunities by stakeholders, landowners, City staff or consultants,
- But excluding open space, schools, and residential uses (except those identified as “Other Opportunity Sites”).

Then the initial development numbers generated from the model were refined and verified with large landowners and interested landowners in the master plan area. The anticipated project phasing is also determined by landowners’ input and serves as the basis for evaluating cumulative future development potential and impacts and for sequencing of infrastructure projects. Details on development assumptions and specific infrastructure projects necessary to support development will continue to change as public and private development is planned and projects are closer to market readiness.

The anticipated phasing does not necessarily mean that a certain project will happened in that specific timeline nor does it bind any agency or landowner to that timeline; and depiction of the site as an “opportunity” does not necessarily mean that the site will undergo change over the next 20-30 years.

It is possible that a site identified with redevelopment potential may not undergo change while other sites that are not considered to have potential may undergo change. However, the purpose behind this exercise is to help evaluate likely future development potential and impacts.

	Data Sources
General Assumptions and Considerations	TOD Zoning and FAR are based on the City Downtown (2020) Neighborhood TOD Plan and Kalihi (2017) Neighborhood TOD Plan . DPP generates population projections for the Island of O'ahu and for each of the City Development Plans. Iwilei-Kapālama is within the Primary Urban Center Development Plan. Long-term infrastructure planning is based on the DP's population projections; therefore, development areas have particular infrastructure allocations or are planned for a certain capacity, which if exceeded could increase infrastructure requirements. Development along TOD areas could modify and shift the concentration of the population within a DP Area. The analysis assumes that the estimated populations of these areas are not expected to increase. The anticipated project phasing provided by landowners serves as the basis for sequencing of infrastructure projects. Scenarios are generally defined by use types (residential – dwelling units; and industrial, commercial, mixed use – Square Feet (SF)). New technologies that increase infrastructure efficiencies were not incorporated into the analysis.
DHHL	Anticipated development numbers are based on 2019 TOD Analysis confirmed in 2021.
Liliha CC **DAGS / HHFDC**	Anticipated development numbers were developed by DAGS and HHFDC in early 2022.
HPHA	Anticipated development numbers are based on HPHA Strategic Redevelopment Initiatives report and confirmed in 2021.
KS	Estimated development numbers reviewed and refined in 2021.
UH – HCC	Anticipated development numbers are based on the 2011 Long Range Development Plan (LRDP) and confirmed in 2021.
O'ahu Community Correctional Center (OCCC)	Anticipated development data was obtained from the Final Environmental Impact Statement (FEIS) for the Replacement of O'ahu Community Correctional Center (2018).
Kapālama Canal Catalytic Project	The City and County of Honolulu provided specific project information. Data was also obtained from the Kapālama Canal Catalytic Project – FEIS (2021) and the Resilient Master Plan (2022).
OHA	Estimated development numbers reviewed and refined in 2021.
Salvation Army	Estimated development numbers reviewed and refined in 2021.
Castle and Cooke	Estimated development numbers reviewed and refined in 2021.
City Mill	Estimated development numbers reviewed and refined in 2021.
Costco	Estimated development numbers reviewed and refined in 2021.
Douglas Emmett	Estimated development numbers reviewed and refined in 2021.

	Data Sources
Liliha Square Shopping Center	Estimated development numbers reviewed and refined in 2021.
Pālama Settlement	Estimated development numbers reviewed and refined in 2021.
City and County of Honolulu	The City and County of Honolulu provided overall project information, review, and feedback. The City also owns several smaller parcels near the Kūwili (Iwilei) Transit Station and is in the process of acquiring the Iwilei Center property for near term use in current state, and long-term TOD redevelopment. Estimated development numbers are based on the proposed zoning identified in the adopted Neighborhood TOD plan.

Table 2-2 below summarizes landowner input for residential units and identifies the anticipated phase of development, as available. Most of the anticipated residential development estimates come from landowner input directly, with the remainder being accounted for in the development model as outlined above.

Table 2-2: Landowner Input – Residential Development and Phasing[2]

Developments	Tax Map Key (TMK)	Existing Units	Phases	New Units	Total Units
Kalanihuia (HPHA)	1-7-026: 006	150	2	350	500
Kapālama Mixed-Use Master Plan (DHHL)	1-5-020: 006 & 14, 1-5-033: 009	0	1	500	500
Kukui Gardens (HHFDC – Leased by EAH)	1-7-026: 053	390	TBD	600	990
Liliha Civic Center TOD (DAGS/HHFDC)	1-5-007: 001	0	1 and 3	600	600
Mayor Wright Homes (HPHA)	1-7-029: 003	364	1,2	2,136	2,500
Office of Hawaiian Affairs (OHA)[3]	1-5-010: 015	0	TBD	900	900
Large Private Landowners	Various Properties • Castle and Cooke • City Mill • Douglas Emmett • Kamehameha Schools • Liliha Square Shopping Center • Salvation Army	600	1= 6,400 2=8,050 3=1,320	15,800	16,400
Estimated Total from Landowner Input		**1,504**		**20,886**	**22,390**

[2] Development estimates based on 2021 consultation; subject to change.

[3] Numbers TBD based on detailed studies, this number was suggested as a potential placeholder for infrastructure analysis.

2.5.1 Potential Limitations to TOD Potential

Hazardous Materials. Given the industrial history of the Iwilei-Kapālama area, hazardous materials, such as lead and petroleum, may be present on many parcels due to past or present activities. The presence of hazardous materials can pose air and water quality and fire threats, add time and cost to redevelopment and infrastructure projects, and limit siting of residential uses or school facilities.

Landowners should undertake a Phase I Environmental Site Assessment (ESA) to identify potential or existing contamination liabilities for properties that may have had industrial uses in the TOD priority area. Depending on the results of the Phase I ESA, a Phase II ESA may be required to test the chemical makeup and possible contamination of soil, groundwater, and vapor on-site.

Airport Airspace Limitations. Another limitation in the Iwilei-Kapālama TOD priority area is height restrictions imposed by Department of Transportation, Airports Division (DOT Airports) in accordance with Federal Aviation Administration guidelines for protection of airport air space of the Daniel K. Inouye International Airport. These height restrictions vary throughout the Iwilei-Kapālama TOD priority area due to horizontal and conical approach surfaces.

2.6 Population Trends

Subsequent to above model development, water aquifer conditions were severely impacted by the 2021 Red Hill Storage Tank leaks. As a result, additional analysis has been and continues to be conducted to assess within the Iwilei area in general can be expected to spur population growth on Oʻahu, rather than representing the potential relocation of persons already residing on the island into this planning area.

This section provides a quick review of this question based on recent trends in Urban Honolulu Census Designated Place (CDP) population in context of residential development; and established policies for potential state subsidized residential uses.

Details on development assumptions and specific infrastructure projects necessary to support development will continue to change as public and private development is planned and projects are closer to market readiness. Additionally, the efforts to better understand the water resources are ongoing and may impact development opportunities including in the Iwilei Master Plan Area.

2.6.1 Urban Honolulu CDP Trends

The Urban Honolulu CDP spans from Kahala in the east to Salt Lake in the west (see Figure 2-5) and includes the Iwilei Master Plan Area, central business district (CBD), Waikīkī, Daniel K. Inouye International Airport, and Honolulu Harbor.

American Community Survey (ACS) estimates for the Urban Honolulu CDP from 2010 to 2020 show that resident population peaked in 2016, followed by decreases every subsequent year (see Figure 2-6). From 2010 to 2016, the Urban Honolulu CDP population grew by 3.8%, averaging an annual growth rate of 0.95%. The following four years, from 2017 to 2020, the population fell by 2.6%. Overall, the area is estimated to have lost 7,000 residents, or 2% of its 2010 population base, over the decade.

Conversely, while population declined, residential densification has increased in the Urban Honolulu CDP. The 2021 Liliha Civic Center Residential Market Overview prepared for HHFDC showed that just a portion of the Urban Honolulu CDP, its primary urban core including Kakaʻako, Ala Moana, and Kapiʻolani corridor, saw over 1,000 rental housing units and over 4,400 for-sale condominium units constructed between 2015 and 2020 (PBR HAWAII, 2021). The 801 South Street Buildings A and B alone represented over 1,000 new residential units.

Thus, although there was a large influx of residential units in the study area, it did not lead to population growth nor even stem population losses throughout the area.

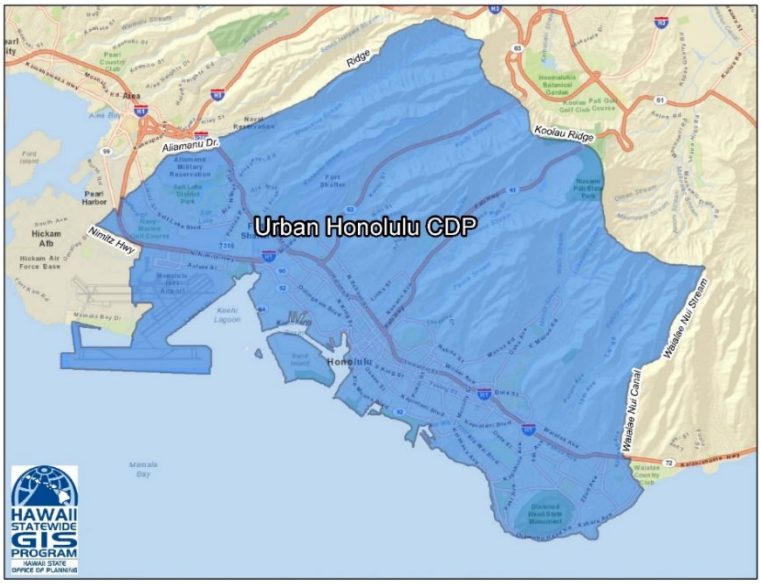
2.6.2 Housing Need and Policy

Proposed residential developments in the Iwilei Master Plan Area include high-rise senior living, medium-low rise affordable housing, and market rate housing. With the projected completion of rail service, the Iwilei Master Plan is anticipated to provide nearly 27,500 housing units over the next 30-50 years, in partial fulfillment of an estimated 21,392-unit deficit in primary resident housing units island-wide expected to materialize over just 10 years (2020-2030) (Department of Business, Economic Development, and Tourism, 2019). In short, the substantial new developments planned are an important part of what is expected to be needed island-wide in coming years.

Additionally, occupancy of major planned residential developments, including those developed with State agencies or subsidies such as HHFDC and HPHA, are expected to be restricted to households with established prior residency in the State. Therefore, the densification within the Iwilei Master Plan Area may spur population movements within the county or state, but is not expected to be a direct factor in driving new population growth[4].

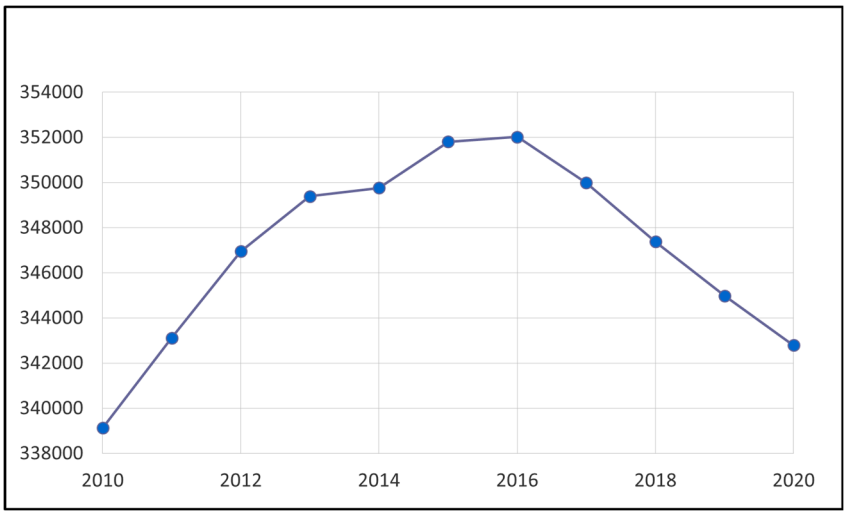
[4] Note: the BWS Master Plan is currently assuming minimal growth in the primary urban core. Spurring population movements within the county or state to the Honolulu primary urban core will affect the BWS infrastructure requirements. More water source and storage, above what is presently planned, will be required to support this movement which would impact the proposed water infrastructure improvements. The ENV sewer facilities and recommended improvements would also be impacted by larger population movements into the Honolulu primary urban core.

Figure 2-5: Urban Honolulu CDP



Source: (Hawai'i State Office of Planning, n.d.).

Figure 2-6: Urban Honolulu CDP Population Change



Source: (ACS, 2020)

3 Iwilei Infrastructure Improvement Master Plan

This master plan focuses on regional-serving, hard infrastructure systems such as sewer, water, drainage, storm quality, roadways and circulation, and electrical and telecommunications, to support the anticipated land use development assumptions.

The regional infrastructure improvement recommendations identify specific hard infrastructure projects to support TOD redevelopment in the Iwilei-Kapālama area, and as available identifies costs to upgrade or replace undersized facilities and/or rehabilitate or replace facilities at the end of their useful life. TOD projects will also have costs related to on-site improvements and lateral connections to off-site systems. These lateral connections and on-site improvements have not been included in the list of projects or cost estimates since the focus of this study is on regional infrastructure improvements.

The anticipated development and associated resident population will also require additional public service infrastructure such as green/open space, public school facilities, and emergency services. However, this study focused on hard infrastructure so future studies and consultation will need to be undertaken to determine the additional parks and open space and Department of Education (DOE) facilities necessary to support redevelopment.

The proposed regional infrastructure improvements for the Iwilei Master Plan Area are summarized in the following sections.

3.1 Sewer System

Existing Conditions. The Department of Environmental Services (ENV) services the Iwilei Master Plan Area with the Sand Island Wastewater Treatment Plant (WWTP) facilities. ENV is in the process of improving the area sewer capacity to address existing capacity restrictions and in anticipation of future development. ENV will check the anticipated development projects on a case-by-case basis to determine potential sewer issues due to these developments.

To address existing capacity restrictions and in anticipation of future development, ENV improved the sewer capacity with the Iwilei Master Plan Area by completing the Waiakamilo Road Trunk Sewer Project portion of the Awa Street Wastewater Pump Station (WWPS) Force Main and Sewer System Improvements in 2022. The Waiakamilo Road Trunk Sewer Project was a major project for the Iwilei-Kapālama area that relieves the Awa Street WWPS by connecting a large portion of the tributary area west of Waiakamilo Road up to North School Street directly to the 54-inch Trunk Sewer on North Nimitz Highway. With the completion of the Waiakamilo Road Trunk Sewer Project, the existing trunk sewer system along Dillingham Boulevard has increased capacity to serve new TOD development[5]. Figure 3-1 presents the existing surcharged[6] sewer lines prior to the completion of the Waiakamilo Road Trunk Sewer Project.

Infrastructure Improvements. ENV is in the process of improving the area sewer capacity. Most of the projects currently being implemented by ENV focus on relieving the known sewer issues in the system. ENV models anticipated development projects on a case-by-case basis to determine potential sewer issues due to these developments within the sewer system by flow in gallons per day (GPD) and Equivalent Single Family Dwelling Unit (ESDU). Table 3-1 and Table 3-2 illustrate the existing and projected sewer system demands for residential, commercial, and industrial uses in the Iwilei Master Plan Area based on anticipated shifts in land use from planned TOD for the area. (See Appendix C, Section 1 describes the engineering methodology for improvements.)

[5] The upgrade design is ongoing and ENV will include TOD and other DPP plans in the upgrade analysis. Until then the existing ‘Awa Street WWPS has some additional capacity for TOD.

[6] “Surcharged Sewer Lines” refer to pipes in which the load to be carried is greater than the capacity of the system.

Table 3-1: Summary of Existing Sewer Demand

Existing				
Residential Units	**Total Units**	**Capita**	**Flow GPD**	**ESDU**
Single Family	413	1,652	115,640	413
Multi Family (Low)	3,824	10,707	749,540	2,677
Subtotal			865,180	3,090
Commercial	**Total SF**	**Capita**	**GPD**	**ESDU**
Commercial	9,696,269	64,642	4,524,926	16,160
Industrial	825,617	5,504	385,288	1,376
Subtotal			4,910,214	17,536
		Total GPD	**5,775,394**	
			Total Existing ESDU	**20,626**

Table 3-2: Summary of Projected Sewer Demand

Proposed				
Residential Units	**Total Units**	**Capita**	**Flow GPD**	**ESDU**
Single Family	3,316	1,324	92,680	331
Multi Family	31,718	88,810	6,216,728	22,203
Subtotal			6,309,408	22,534
Commercial	**Total SF**	**Capita**	**GPD**	**ESDU**
Commercial	5,815,649	38,771	2,713,969	9,693
Industrial	1,025,704	6,838	478,662	1,710
Subtotal			3,192,631	11,403
		Total GDP	**9,502,039**	
			Total Proposed ESDU	**33,937**

Phases 1 through 4 of the anticipated land use development assumptions for the full development of Iwilei-Kapālama TOD area projects are presented in Table 3-3, which illustrates the increase in ESDU for the Iwilei-Kapālama TOD, by phase. Based on the anticipated TOD development, sewer improvements are needed to implement projects such as the Mayor Wright Homes, Liliha CC, and Kalanihuia Homes.

Table 3-3: Sewer Demand (ESDU) Calculations[7] by Phase

Phase	Existing ESDU Flow	Proposed ESDU	Increase in ESDU
1: present to 2030	2,785	9,894	7,109
2: 2031 to 2040	3,266	9,018	5,752
3: 2041 to 2050	1,359	2,479	1,120
4: 2051+ / TBD	924	1,694	770

Figure 3-1 also presents the major sewers upstream of the Awa Street WWPS that have been improved or will be improved within the next five (5) years. New connections to these lines are to be granted on a first-come, first-served basis.

[7] Calculations were determined using ENV standards for estimating wastewater flow for residential units and commercial/industrial square footages or gallons per acre in millions of gallons per day, and then calculated to Equivalent Single-Family Dwelling Unit (ESDU).

Tributary Area Diverted by the Waiakamilo Road Trunk Sewer from Sewer Main Asset No. 270442

Tributary Area Diverted by the Waiakamilo Road Trunk Sewer from Sewer Main Asset No. 4065456

Tributary Area Diverted by the Waiakamilo Road Trunk Sewer from Sewer Main Asset No. 4100168

Waiakamilo Road Trunk Sewer

Sewer Lines Affected by Waiakamilo Road Trunk Sewer

Hart Street / Waiakamilo Road Replacement Sewer CIP Project No. 2019065

Middle Street Station

Kalihi Station

Kapālama Station

Iwilei Station

Chinatown Station

N Nimitz Hwy

Kamehameha Hwy

Laumaka St

Puuhale Rd

Mokauea St

Kalihi St

Hart St

Kohou St

Kokea St

Lanakila Ave

N School St

Lunalilo Fwy

N King St

Pua Ln

Liliha St

N Vineyard Blvd

N Beretania St

State Highway Access Rd

LEGEND

- Existing Sewer Force Main
- Existing Sewer Line
- Iwilei Master Plan Area
- Future Rail Stations
- Future Rail Line
- Waiakamilo Road Trunk Sewer
- Sewer Lines Affected by Waiakamilo Road Trunk Sewer
- Hart Street / Waiakamilo Road Replacement Sewer CIP Project No. 2019065
- Tributary Area Diverted by the Waiakamilo Road Trunk Sewer from Sewer Main (270442)
- Tributary Area Diverted by the Waiakamilo Road Trunk Sewer from Sewer Main (4065456)
- Tributary Area Diverted by the Waiakamilo Road Trunk Sewer from Sewer Main (4100168)

Iwilei-Kapalama Completed and Ongoing Sewer Construction Projects, Existing Flow Calculations by Phase

Phase	Average Daily Flow *(gpd)*	ESDU
1	779,921	2,785
2	914,522	3,266
3	380,418	1,359
4	258,653	924

Figure 3-1

Completed and Ongoing Sewer Construction Projects

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

North

Linear Scale (feet) 0 200 400 800 1,200

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Projects Currently Identified or Underway. Projects described in Table 3-4 are being implemented to solve known existing sewer capacity issues, but local sewer collection improvements may be required, based on the site-specific development plans that may be proposed by individual landowners in the Iwilei-Kapālama Master Plan Area.

Table 3-4: CIP Budgets for Planned Sewer Improvement Projects (Phase 1)

2023 CIP Proj. No.	Name	Budget	Type[8]
2019046	Awa Street WWPS Improvements/Rehabilitation (appr.)	$1,501,000	P,D
	Estimate for 2025	$12,601,000	C,I
	Estimate for 2026	$602,000	C,I
2017054	Hart Street WWPS Force Main Improvements Phase 3 (appr.)	$953,000	P,D,C
	2023 Budget	$4,801,000	D,C,I
2019065	Hart Street/Waiakamilo Rd. Replacement Sewer (appr.)	$3,602,000	C,I
2019067	Iwilei, King Street, Kōkea Street Area Sewer Improvements (appr.)	$1,802,000	P,D
	Estimate for 2025	$7,802,000	P,D,C,I
2005075	Kalihi/Nu‘uanu Area Sewer Rehabilitation/Improvements	$301,000	P,D
	2023 Budget	$1,500,000	P,D
	Estimate for 2024	$1,001,000	P,D
	Estimate beyond 2024	$32,904,000	D,C,I
	2023 Budget	**$6,301,000**	
	Beyond 2023	**$63,069,000**	

The Hart Street/Waiakamilo Road Replacement Sewer project, currently in design/construction phase, which will complete the connection of existing sewer lines on Waiakamilo Road to the new trunk sewer. Other rehabilitation and improvement projects include the Awa Street WWPS Improvements/Rehabilitation which will address needed condition and reliability improvements – currently in the planning phase; and the Hart Street WWPS Force Main Improvements, BWS Phase III projects.

The Iwilei, King Street, Kōkea Street Area Sewer Improvements and the Kalihi, Nu‘uanu Area Sewer Rehabilitation/Improvements projects will improve the remaining existing capacity restrictions in the Iwilei-Kapālama Sewer System as described below. But, additional improvements may need to be completed to address localized capacity restrictions in the smaller 6-inch and 8-inch lines depending on the proposed development that connects to these lines.

Iwilei, King Street, Kōkea Street Area Sewer Improvements. The planning for the Iwilei, King Street, Kōkea Street Sewer Improvement project is currently underway and will modify the preliminary recommendations. ENV describes this project in their Budget: “*Construct new connecting sewer at Iwilei Road and Kūwili Street. Replace existing sewers through and fronting ‘A‘ala Park in King Street. Remove old unused laterals on the sewer main through ‘A‘ala Park. Construct new sewers along and in the vicinity of Olomea Street, Kōkea Street and King Street. Abandon old sewers and reconnect laterals to new sewers.*”

Kalihi/Nu‘uanu Area Sewer Rehabilitation/Improvements. The Kalihi/Nu‘uanu Area Sewer Rehabilitation/Improvements project is currently underway and will modify the preliminary recommendations. ENV describes this project in their Budget: “The project will include structural and/or hydraulic rehabilitation of existing gravity sewers in the collection basin areas of Lower Kalihi, Pacific Heights, Punchbowl, and Liliha. These project areas are identified as SCIP 12, 15, 19, and 13 respectively.

[8] **L** = Land; **P** = Planning; **D** = Design; **C** = Construction; **I** = Inspection

With FY21 funds, the project also includes Consent Decree required segments allowed to be done "after 2020", 18.g. SI-CS-04 Auiki St, and 18.f. SI-CS-39 Kalani St, and segments in the vicinity needing upgrade to provide capacity. The construction phase of the work is being done under multiple construction contracts, and portions of the work are phased."

Figure 3-2 presents the proposed sewer projects for Phase 1 and Figure 3-3 presents the proposed sewer projects for Phases 2 and 3. Table 3-5 describes the proposed sewer improvements and costs for the Iwilei Master Plan Area. The relief sewers presented below are potential solutions that may result from the Iwilei, King Street, Kōkea Street Area Sewer Improvements Project.

Table 3-5: Sewer Infrastructure Improvements and Cost Estimates

Improvement	Phase 1: Present to 2030	Phase 2: 2031 to 2040	Phase 3: 2041 to 2050	Phase 4: 2051+/TBD
Relief on Kōkea Street	$3,691,250			
Relief on Liliha Street[9] (2)	$1,840,000			
Relief on King Street [9]	$1,815,000			
Nu'uanu Stream Relief [9] (2)	$1,890,000			
Iwilei Road Relief [9] (2)	$750,000			
'Awa Street WWPS Improvements [9]	$13,203,000			
I/I and SLR Improvements				$152,303,920
Total:	**$175,493,170**			

Projects Requiring Additional Coordination with ENV. Consultation has been ongoing with ENV and the strategies to accommodate some of the anticipated redevelopment projects has not been finalized. The following proposed developments will require ongoing coordinating with ENV to determine how to address the adjustment of existing sewers and/or connections to existing sewer facilities. As a starting point for conversations with ENV, the following outlines possible approaches and adjustment of existing sewers to support anticipated development.

Relocation/Upgrading of Existing Sewer Lines. According to the anticipated development model, as TMKs 1-5-012:017 and 1-5-012:015, along with consolidated TMK grouping 1-5-015:001, :003, :004 & :005 are redeveloped, existing sewer lines will have to be relocated and upgraded to accommodate the proposed development plans.

North Nimitz Highway Connection. According to the anticipated development model, TMK 1-5-020:006 and consolidated TMK grouping 1-5-013:010, :012, :023 & :007 will require coordination with ENV on possible sewer connection to North Nimitz Highway.

Waiakamilo Road Connection. According to the anticipated development model, consolidated TMK groupings 1-5-021:002 & :015; 1-5-021:004, :022 & :023; 1-5-021:041, :043, :045, :046 & :051; 1-5-023:002 - :009; and 1-6-003:034, :042, :043 & :064 will require coordination with ENV on possible sewer connection to Waiakamilo Road.

Kohou Street Private Internal Sewers. According to the anticipated development model, TMKs 1-5-019:001 - :004 will require coordination with ENV to adjust private internal sewers for connect to Kohou Street.

[9] Being studied by ENV

[10] I/I and SLR Improvements CIPP is a budgetary estimate of a potential "worst case" project to limit the effect of SLR in the Iwilei Area.

Tributary Area Diverted by the Waiakamilo Road Trunk Sewer from Sewer Main Asset No. 270442

Waiakamilo Road Trunk Sewer

Phase 1 Proposed Sewer Improvement CIP Project No. 2019067

Phase 1 Sewer Lines Affected by CIP Project No. 2019067

Middle Street Station

Kalihi Station

Kapālama Station

Iwilei Station

Chinatown Station

LEGEND

- Existing Sewer Force Main
- Existing Sewer Line
- Iwilei Master Plan Area
- Future Rail Stations
- Future Rail Line
- Phase 1 Proposed Sewer Improvement CIP Project No. 2019067
- Phase 1 Sewer Lines Affected by CIP Project No. 2019067
- Waiakamilo Road Trunk Sewer
- Sewer Lines Affected by Waiakamilo Road Trunk Sewer
- Hart Street / Waiakamilo Road Replacement Sewer CIP Project No. 2019065
- Tributary Area Diverted by the Waiakamilo Road Trunk Sewer from Sewer Main (270442)
- Tributary Area Diverted by the Waiakamilo Road Trunk Sewer from Sewer Main (4065456)
- Tributary Area Diverted by the Waiakamilo Road Trunk Sewer from Sewer Main (4100168)

Iwilei-Kapalama Preliminary Sewer Improvement Recommendations Projected Flow Calculations by Phase

Phase	Average Daily Flow *(gpd)*	ESDU
1	2,770,199	9,894
2	2,524,973	9,018
3	694,186	2,479
4	474,346	1,694

Figure 3-2

Phase 1 Proposed Sewer Planning/Design Projects

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

North

Linear Scale (feet) 0 200 400 800 1,200

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Waiakamilo Road Trunk Sewer

Phase 2 - 3 Area Being Studied for Proposed Sewer Improvements CIP Project No. 2019067

Middle Street Station

Kalihi Station

Kapālama Station

Iwilei Station

Chinatown Station

LEGEND

- Existing Sewer Force Main
- Existing Sewer Line
- Iwilei Master Plan Area
- Future Rail Stations
- Future Rail Line
- Phase 2 -3 Area Being Studied for Proposed Sewer Improvements CIP Project No. 2019067
- Waiakamilo Road Trunk Sewer
- Sewer Lines Affected by Waiakamilo Road Trunk Sewer
- Hart Street / Waiakamilo Road Replacement Sewer CIP Project No. 2019065
- Tributary Area Diverted by the Waiakamilo Road Trunk Sewer from Sewer Main (270442)
- Tributary Area Diverted by the Waiakamilo Road Trunk Sewer from Sewer Main (4065456)
- Tributary Area Diverted by the Waiakamilo Road Trunk Sewer from Sewer Main (4100168)

Iwilei-Kapalama Preliminary Sewer Improvement Recommendations Projected Flow Calculations by Phase

Phase	Average Daily Flow (gpd)	ESDU
1	2,770,199	9,894
2	2,524,973	9,018
3	694,186	2,479
4	474,346	1,694

Figure 3-3

Phase 2 - 3 Proposed Sewer Planning Projects

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

North

Linear Scale (feet) 0 200 400 800 1,200

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College Walk Operational Improvements. According to the anticipated development model, TMKs 1-7-023:038 and 1-7-026:013 will require coordination with ENV on possible operational sewer improvements along College Walk.

Climate Change and Sea Level Rise. ENV is also evaluating the Iwilei Master Plan Area to determine the potential impacts from increased infiltration and inflow (I/I) due to climate change (increases in groundwater elevation from sea level rise and storm surge) under the Sand Island WWTP and Sewer Basin Facilities project. Figure 3-4 presents the areas of the sewer system that may be impacted by sea level rise. The identified sewer lines will also be affected due to the increase in groundwater elevation.

ENV describes this project in their Budget: "Project includes sewer relief and sewer rehabilitation projects identified by the Wet Weather I/I Assessment Update work, facility planning and condition assessments, in accordance with the requirements of the 2010 Consent Decree. This project covers the sewer collection basin that is tributary to the Hart Street Wastewater Pump Station, which roughly covers from the downtown area and westward to the Red Hill area. Project includes work in accordance with the Wet Weather I/I Assessment Update Report, December 2013, the Final Deferred Projects Report, May 2014, and the 18.f Report of Evaluation and Recommendations, December 2014, including project SI-CS-44, ʻĀlewa Heights Relief Sewer."

A worse case solution being studied is to develop a cured in place pipe (CIPP) lining and rehabilitation project for all the impacted sewers in the area to cut off the increase in I/I. This would be a costly and long-term solution, which would be difficult to implement. ENV is also studying other alternatives. All proposed relief sewers may need to be increased to accommodate additional flows generated by climate change-induced I/I, if the CIPP lining/rehabilitation alternative in this area is not selected under the Sand Island WWTP and Sewer Basin Facilities Plan project.

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Waiakamilo Road Trunk Sewer Project

No. 2013064 Kalihi/Nuuanu Area Sewer Rehabilitation/ Improvements – CIPP of all affected sewers is a worse case scenario

Area with Pipes with Increased Groundwater Infiltration from 3.2 ft Sea Level Rise

Awa Street WWPS

Middle Street Station

Kalihi Station

Kapālama Station

Iwilei Station

Chinatown Station

N Nimitz Hwy

Kamehameha Hwy

Laumaka St

Puuiale Rd

Mokauea St

Kalihi St

Sand Island Access Rd

Waiakamilo Rd

Kohou St

Kokea St

Kaiani St

Hart St

N King St

Pua St

Lanakila Ave

N School St

Lunalilo Fwy

Liliha St

N Vineyard Blvd

N Beretania St

LEGEND (prior to completion of Waiakamilo Road Trunk Sewer Project)

- Existing Sewer Force Main
- Existing Sewer Line
- Iwilei Master Plan Area
- Future Rail Stations
- Future Rail Line
- Surcharge = just under 1.00000
- Surcharge = 1.00000
- Surcharge = 2.00000
- Proposed Waiakamilo Road Trunk Sewer Project
- No. 2013064 Kalihi/Nuuanu Area Sewer Rehabilitation/Improvements

Figure 3-4

Sewer System Impacted by Climate Change (GWI with 3.2 SLR)

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

North

Linear Scale (feet) 0 200 400 800 1,200

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3.2 Water System

Existing Conditions. The BWS owns and operates the water system in the Iwilei Master Plan Area. The backbone water infrastructure is relatively strong in the Iwilei area; however, upgrading aging infrastructure is an ongoing challenge. Water system improvements are presently needed based on the existing water line sizes and the required fire flow for the proposed land uses for industrial and mixed-use development. The BWS will check the system when the applicants prepare their environmental documents for individual projects (as necessary) or come in for land use or building permits. The BWS has multiple projects in its capital improvements program (CIP) that will address current deficiencies and increase local and regional capacity. The BWS will require water conservation measures for proposed residential developments Figure 3-5 presents the existing water system with an overlay of the proposed TOD Phases.

Red Hill Water Contamination. In the short-term, water availability is a concern for new development until the Red Hill water contamination issue is resolved. The BWS shut down three water sources in the Hālawa/ʻAiea area and is presently providing supplemental water from Waipahu and increasing the pumping of the remaining wells in Honolulu to make up the difference. Water conservation is strongly urged to avoid building moratoriums for proposed projects.

In May 2022 at the Honolulu City Council Housing and Economy Committee meeting, the BWS announced that construction projects are not anticipated to be delayed by the Red Hill Storage Tank water contamination issue and may move ahead as planned. The BWS Stated:

> *"The Board of Water Supply remains steadfast in our commitment to providing safe, dependable, and affordable water for Oahu's needs today and in the future. This includes taking a strong stance when protecting our groundwater aquifers. And, the Red Hill Bulk Fuel Storage Facility – whose 20 underground fuel tanks are located above Oahu's sole source aquifer – continues to be a cause of concern.*
>
> *The underground storage tanks (USTs) at Red Hill were built by the military in the 1940s and have a history of fuel leaks. The aquifer helps to provide water for nearly 25 percent of Oahu residents, from Moanalua to Hawaii Kai, as well as those living on base housing connected to the Navy's water system. Since the U.S. Navy reported a leak of 27,000 gallons of jet fuel from Tank #5 at the Red Hill in January 2014, BWS has continued to stand firm in its recommendations that the underground tanks either be double-lined or be relocated away from the aquifer."*

The final decision on availability of water will be confirmed when the building permit application is submitted for approval, pending evaluation of the water system conditions at that time on a first-come, first-served basis. The BWS continues to request a 10% voluntary water conservation of all customers until new sources are completed and require water conservation measures in all new developments.

2016 BWS Water Master Plan. The 2016 BWS Water Master Plan studied the entire water system serving the greater City and County of Honolulu. The 2016 BWS Water Master Plan provided water demand projections, which included average day demand (ADD) estimates used in the system analysis. The BWS Water Master Plan delineated water demand by land use district defined in the City and County of Honolulu General Plan based on watershed areas across Oʻahu, however, the hydraulic model system boundaries are different from the defined land use district boundaries. Model systems are divided at locations where the water distribution system was either hydraulically disconnected or connected by a pump station or control valve.

The Iwilei Master Plan Area is within the Primary Urban Center Development Plan (PUC-DP) and is served by the Metro Low system. Metro Low is the largest model system by demand and system complexity. It encompasses the bulk of the makai portion of urban Honolulu, extending from Salt Lake to Hawaiʻi Kai, and represents about 38 percent of the total island-wide demand. Metro Low includes Metro 180 West, Metro 180 East, Metro 170,

and upper ridge pressure zones, and other segments that pump out of the Metro 180 West, Metro 180 East, and Metro 170. The Iwilei TOD Area is in the Metro 180 Low East system.

This system has the largest length of pipelines and highest demand of the 10 model systems. The average day demand in 2012 for the Metro Low system was 55.6 millions of gallons per day (mgd). The largest pressure zone in this model system is Metro 180 West, which had an average day demand of 42.9 mgd or 77 percent of the Metro Low system demand in 2012. About 70 percent of Metro Low supply originates from aquifers on the west side of Metro 180 West or near the Pearl Harbor area. There are three major sources of supply in Honolulu that have historically contributed up to 20 percent of total Metro Low supplies: Kalihi; Beretania; and Kaimukī Wells. These have also been essential in meeting peak hour demands.

In total, the Metro Low system maintains capacity for approximately 38 million gallons (MG) of water storage, with most of the storage facilities located in the upper zones. However, Metro 180 West, the largest zone in the Metro Low model system, has a relatively small volume of storage compared to the water demand for the zone, maintaining approximately 13 MG of storage capacity. This has been adequate because of reliance on wells in the area to supply peak demands.

According to the BWS Water Master Plan, the 2012 Actual Demand for the PUC-DP is 67.4 mgd, and the projected water demand for the Primary Urban Center for 2025 is 67.0 mgd and 68.7 mgd for 2040. For all of Oʻahu, the increase in total demand is just over 8 mgd, an approximately 5 percent increase from 2012 to 2040. Total demand is flat between 2012 and 2025, with a decrease of less than 1 mgd. There is a wide variation in land use district water demand growth from 2012 to 2025 (-16 to 19 percent) and from 2012 to 2040 (-17 to 43 percent). ʻEwa has the largest increase in demand from 2012 to 2040 at approximately 8.0 mgd (43 percent). Central Oʻahu has the second largest increase in demand, 2.6 mgd for 2012 to 2040. Waiʻanae, Koʻolaupoko, and East Honolulu are projected have negative growth in demand (-8, -17, and -3 percent, respectively) through the planning period under the most probable demand projection.

The BWS Water Master Plan also estimated the most probable demand projected by ADD based on their hydraulic model analysis water systems. The ADD demand for 2012 is 55.6 mgd and the most probable ADD demand for the Metro Low system is 56.2 mgd for 2025 and 58 mgd for 2040.

Infrastructure Improvements. For the Iwilei Master Plan Area, additional water demand is projected due to the increase in residential units and commercial-industrial square footage anticipated by the City in conjunction with projects by both public and private landowners. The calculated increase in commercial-industrial activity will result in an increase in water demand. Table 3-6 summarizes the estimated increase in ADD for the Iwilei-Kapālama TOD area and the most probable demand projections from the BWS Water Master Plan for the PUC-DP area and the Metro Low water system. (Appendix C, Section 2 describes the engineering methodology for improvements.)

Table 3-6: Iwilei-Kapālama TOD Additional Requirements in Average Daily Demand (ADD)

Phases	TOD Master Plan Estimated Increase in Demand (in mgd)	2016 BWS Water Master Plan for PUC-DP Area (2025) (in mgd)	2016 BWS Water Master Plan for Metro Low (2040) (in mgd)
Present (2012)	N.A.	67.4	55.6
1: Present to 2030	2.84	67	56.2
2: 2031 to 2040	2.88	68.7	58
3: 2041 to 2050	0.64	N.A.	N.A.
4 2051+ / (TBD)	0.49	N.A.	N.A.

This increase in demand would require additional water source, storage, distribution, and transmission system requirements as described in Table 3-7. The increase in demand can guide water distribution needs and storage requirements. This will be worked out on a case-by-case basis with the BWS as the TOD and BWS CIP projects progress. Honolulu TOD proponents can assist the BWS with environmental clearances and water use permits to facilitate or accelerate new water source and storage developments projects that may benefit TOD.

Figure 3-5

Existing Water System and Proposed TOD Phases

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

LEGEND

Phasing from Model
- Phase 1: Up to 2030
- Phase 2: 2031 - 2040
- Phase 3: 2041 - 2050
- Phase 4: 2051 and beyond
- Estimated based on Consolidated Parcels
- Iwilei Master Plan Area
- Future Rail Stations
- Future Rail Line

Existing Water Mainlines
- 4 - 6
- 8 - 12
- 16 - 20
- 24 - 30
- 36 - 42

NOT TO SCALE

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The BWS continuously monitors water usage in the Primary Urban Center. Should the water usage increase above the anticipated water demand of the Water Master Plan, the BWS will re-evaluate if there is any impact from the development of TOD projects on the increase in water demand, and work with other City and State Agencies involved in TOD on the need for additional water source and storage projects. Section 2.6 states that the proposed projects should not increase the population of the Iwilei area.

Table 3-7: Iwilei-Kapālama TOD Additional Requirements for Water Source and Storage

Phases	TOD Master Plan Estimated Increase in Demand (in mgd)	Water Source – Pump capacity (in mgd)	Storage (in mgd)
1: Present to 2030	2.84	6.40	5
2: 2031 to 2040	2.88	6.48	5
3: 2041 to 2050	0.64	1.43	1
4: 2051+ / (TBD)	0.49	1.11	0.75

Capacity Expansion Projects. Within the PUC-DP area, the present water source situation is complicated by the recent issues with the Red Hill[11] underground fuel storage facility water contamination which has caused the BWS to shut down the Hālawa Shaft, Hālawa Well, and ʻAiea Well close to the Red Hill Facility. The Hālawa Shaft, which provides 20 percent of the Metro Low and High systems water supply is presently turned off along with two other sources that serve the PUC-DP area. The BWS has embarked on a program to drill exploratory wells for development into production wells. The increase in water demand due to TOD in the Iwilei Master Plan Area and potential requirement for new water sources will have to be negotiated with the BWS. The Navy is now pumping the Red Hill well and flushing the aquifer which may allow the BWS to turn on the sources near the Red Hill Fuel Storage Facility. Until that time, conversations should be ongoing with BWS to confirm up to date water source information.

The BWS Water Master Plan also identified capacity expansion recommendations for the 2.0 MG Kalāwahine 180 Reservoir and the Kalāwahine Well with a maximum daily demand (MDD) capacity of 2 mgd near the Kalāwahine 180 Reservoir. Other recommendations and planned projects for the PUC-DP area were identified with transmission pipelines for capacity expansion, including the 2.5 miles of 36-inch pipeline planned to connect the 36 inch Moanalua Road pipeline to the Hālawa 42 inch pipelines and redundancy with 4 miles of 42 inch pipeline from Liliha Street to Isenberg Street along Beretania Street, Richards Street, King Street, and Victoria Street. Other projects include 0.1 MG of additional storage in Pālolo 605 zone, 14.6 mgd of additional pumping in various zones and 0.1 mile of 8-to-20-inch pipe to meet peak hour needs.

1.5 MDD/ADD Factor. According to the BWS Water Master Plan, planned development of new supplies to meet the more conservative MDD and ADD (MDD/ADD) factor requirement of 1.5, to provide additional flexibility, redundancy, and capacity for future growth in the system beyond 2040. New water supplies proposed in the ʻEwa-Waipahu model system can offset the Metro Low supply need by about 7 mgd. Depending on the actual demand increase and observed MDD/ADD factors in the future, some of the identified projects may be accelerated or deferred beyond the 30-year CIP planning period. It is recommended that BWS continue to evaluate the actual MDD/ADD factors to accurately reflect the system needs now and into the future.

While the BWS has water source capacity for ADD, it does not have source capacity to meet the 1.5 MDD factor as required by the City Water Standards. The BWS Water Master Plan, identified supply needs estimated for the Metro Low Model System with a water source requirement in 2012 of 20 mgd and 26 mgd in 2040. The BWS will expand supply over time to meet the 2040 need.

Storage Projects. The existing Metro Low system needs approximately 50 MG of additional storage as identified by the City Water Standards. By 2040, this increases to just over 60 MG. Finding appropriate and large sites in the Metro Low system service area to meet the storage need will be difficult. It is preferred to locate as much of the

[11] The BWS currently has a 6-year and 30-year CIP project list, both are undergoing major revisions due to the shift in priorities based on the Red Hill Fuel Tank spill. Many of the projects identified may get shifted around, especially in terms of design or construction year.

storage in the service area as possible; however, it is possible to locate storage further away and provide peak-hour pumping. An analysis of alternatives is needed to determine the most feasible options to address this deficiency.

The BWS Water Master Plan identified new storage requirements for the Metro Low system. The 10 million-gallon Waiawa 228 Reservoir expansion project has been identified to support the new Metro-Low storage requirements, which includes the Iwilei-Kapālama TOD projects. This is part of the West Side Supply Project that will include the 10 mgd variable speed booster pump station and control valve that draws from the new 10-million-gallon Waiawa 228 Reservoir into Metro 180 West for capacity expansion. The BWS will expand storage capacity over time to meet the 2040 need.

Pumping Capacity Projects. The pumping capacity needs identified in BWS Water Master Plan include well pumps, booster pumps operating between pressure zones, and in-line booster pumps. A substantial portion of the pumping capacity required in the ʻEwa-Waipahu System will be able to deliver MDD over a 16-hour period as per the City Water Standards. As with the supply requirements, the 1.5 ratio of MDD to ADD specified in the City Water Standards drives the pumping capacity needs for Metro Low. The BWS is looking to meet the pumping needs over time as it expands pumping capacity to meet the Standards for 2040 demands. Over the next several years, the BWS will review those factors and their impact on costs and rates to determine the correct balance for the system. The BWS Water Master Plan identified pumping capacity needs for the Metro Low System Model with a 2012 requirement of 24 mgd and a 2040 requirement of 29 mgd.

Transmission Projects. Several water transmission improvements have been identified to improve water service in the Iwilei Master Plan Area. Recommendations for the Iwilei Master Plan Area include improvements to areas with insufficient water systems to provide fire flow for mixed-use TOD development projects. This primarily includes areas served by 6-inch pipes and areas with dead-end 8-inch pipes.

The BWS intends to improve the local and regional water system with the projects described below.

North Nimitz Highway 16-inch Main

This 16-inch main is located along North Nimitz Highway from Waiakamilo Road to Sumner Street and along Waiakamilo Road from North Nimitz Highway to Hart Street.

This project will replace/complete the 16-inch main on North Nimitz Highway, which will strengthen the water system ability to provide fire flow for industrial land uses. The project is in the design phase and could be undertaken with development projects depending on the timing of construction.

Honolulu District 42-inch Mains

This 42-inch main runs from Liliha to Mōʻiliʻili, along Beretania Street from Liliha Street to Richards Street, along Richards Street from Beretania Street to King Street, along King Street to Victoria Street, and along Victoria Street to Kīnaʻu Street. The project is part of larger system improvements that will enhance reliability of the existing regional water system and is not specific to the TOD projects in this area. The project is currently in the planning phase.

Additional projects planned to serve the Metro 180 Water System in the Iwilei Master Plan Area include the following:

ʻAʻala Street and North Vineyard Boulevard Water System Improvements

The water lines – located along North Vineyard Boulevard, ʻAʻala Street, ʻAʻala Place, and North Kukui Street – involve construction within the Kapālama TOD Area. This project will study the upgrade/replacement of the existing lines to strengthen the water system ability to provide fire flow for business mixed use land uses. The project is in the planning and design phase and could be undertaken with development projects depending on the timing of construction.

Kōkea Street and Auld Lane Water System Improvements

The water lines are located along Kōkea Street, North King Street, Auld Lane, and ʻĪao Lane. Involves construction within the Kapālama TOD Area. This project will study the upgrade/replacement of the existing lines to strengthen the water system ability to provide fire flow for business mixed use land uses. The project is in the design phase and could be undertaken with development projects depending on the timing of construction.

Dillingham Boulevard at Kohou Street Water System Improvements

The water lines are located along Kohou Street, Kōkea Street, Dillingham Boulevard, Sumner Street, Moowaa Street, Kaumualiʻi Street, Pine Street, and Kūwili Street. Involves construction within the Iwilei-Kapālama TOD Area. This project will study the upgrade/replacement of the existing lines to strengthen the water system ability to provide fire flow for business mixed use land uses. The project is in the design phase and could be undertaken with development projects depending on the timing of construction.

Figure 3-6 illustrates the water improvements for the Iwilei Master Plan Area and parcels identified by phase. Table 3-8 describes the proposed water distribution improvements and costs for the Iwilei Master Plan Area. Available BWS CIP estimated costs are provided for CIP projects.

Table 3-8: Water Infrastructure Improvements and Cost Estimates

Improvement	Phase 1: Present to 2030	Phase 2: 2031 to 2040	Phase 3: 2041 to 2050	Phase 4: 2051+/TBD
BWS CIP				
North Nimitz Highway 16” Main	$8,900,000			
Honolulu District 42" Main - Liliha to Mōʻiliʻili	$400,000			
ʻAʻala Street and North Vineyard Boulevard	$6,920,000			
Kōkea Street and Auld Lane		$2,850,000		
Dillingham Boulevard at Kohou Street				$6,050,000
Sub-Total BWS CIP	***$25,120,000***			
Other Waterlines				
Iwilei Road 16”	$3,932,000			
Off-Iwilei Road 8”			$76,000	
Kohou Street 12”		$270,000		
Hone Lane 8”			$62,500	
Pālama and Kama Lane 8”			$17,500	
Long Lane 8”			$32,500	
Maʻo Lane 8”			$45,000	
Olomea Street 8”			$30,000	
Morris Lane 8”			$40,000	
Hoapili Lane 8”			$38,750	
Peterson Lane 8”			$458,750	
Kanoa Street 8”			$315,000	
Banyan Street 8”			$85,000	
Robello Lane 8”			$190,000	
Akepo Lane 8”			$100,000	
Auld Lane 8”			$37,500	
Kalani Street 12”	$207,000			
Kaaahi Street 12”	$180,000			
Moonui Street 12” (Phase 2)		$195,000		
Mookaula Street 12”		$300,000		
Sub-Total Other Waterlines	***$6,612,500***			
Total CIP and Other Waterlines	**$31,732,500**			

Sea Level Rise, Private Property, and Substandard Roads and Drainage Systems. Sea level rise is a concern for the BWS. With a sea level rise of 3.2 feet and a mean high water of 0.64 feet there could be standing water at areas below 4-foot elevation. At 6-foot ground elevation, all BWS lines are likely below sea level and a properly working drainage system is important for the maintenance of main breaks. Figure 3-7 shows approximate inundation area and low-lying areas in Iwilei-Kapālama as shown on the NOAA Sea level Rise Viewer for 4 feet. For streets in sea level rise exposure areas, the BWS reserves comments on pipeline upgrades until development and resiliency plans are formalized and streets are elevated, and drainage systems are improved to mitigate flooding based on a stormwater master plan.

The BWS is hesitant to construct water system improvements within easements on private property, within private roads, or in areas with improperly functioning drainage systems. Figure 3-8 identifies areas within the Iwilei-Kapālama project area with private and substandard roads. Proposed water system improvements to be constructed on these roads may require roadway and drainage improvements as well. The BWS reserves comments on pipeline upgrade for substandard streets until development plans are formalized and streets are upgraded to meet City Standards.

All proposed water improvements will require working with the BWS on mitigative measures before undertaking any water system improvements within low-lying areas, without appropriate drainage, and/or insufficient roadway improvements.

The BWS may require developers to replace aging and undersized pipelines. All proposed pipelines should be relocated within City rights-of-way that are built to City Standards and maintained by the City and County of Honolulu in accordance with Chapter 14-32 of the Revised ordinances of Honolulu.

More information on drainage infrastructure and roadway/bike lane projects can be found in Sections 3.3 and 3.5 respectively. Additionally, Figure 4-1 in Section 4 identifies overlapping infrastructure projects.

Figure 3-6

Proposed Waterline Improvements and Phases

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

Dillingham Boulevard at Kohou Street Water System Improvements

Kokea Street and Auld Lane Water System Improvements

'A'ala Street and North Vineyard Boulevard Water System Improvements

Nimitz Highway 16-inch Main, Waiakamilo Road to Sumner Street

Honolulu District 42-inch Mains - Liliha to Mō'ili'ili

Kalihi Station

Kapālama Station

Iwilei Station

Chinatown Station

Lanakila District Park

LEGEND

Phasing from Model
- Phase 1: Up to 2030
- Phase 2: 2031 - 2040
- Phase 3: 2041 - 2050
- Phase 4: 2051 and beyond
- Estimated based on Consolidated Parcels
- Iwilei Master Plan Area
- Future Rail Stations
- Future Rail Line

Proposed Waterlines
- New 16" Line
- New 12" Line
- New 8" Line

Existing Water Mainlines
- 4 - 6
- 8 - 12
- 16 - 20
- 24 - 30
- 36 - 42

Proposed Waterline Improvements
- 'A'ala Street and North Vineyard Boulevard Water System Improvements
- Dillingham Boulevard at Kohou Street Water System Improvements
- Kokea Street and Auld Lane Water System Improvements
- Honolulu District 42-inch Mains - Liliha to Mō'ili'ili
- Nimitz Highway 16-inch Main, Waiakamilo Road to Summer Street

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Figure 3-7

Proposed Waterline Improvements and Sea Level Rise

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

Dillingham Boulevard at Kohou Street Water System Improvements

Kokea Street and Auld Lane Water System Improvements

'A'ala Street and North Vineyard Boulevard Water System Improvements

Nimitz Highway 16-inch Main, Waiakamilo Road to Sumner Street

Honolulu District 42-inch Mains - Liliha to Mō'ili'ili

Kalihi Station

Kapālama Station

Iwilei Station

Chinatown Station

Lanakila District Park

68.36 ft
121.88 ft
243.41 ft
129.36 ft
119.90 ft
180.18 ft
158.46 ft
152.76 ft
192.81 ft
146.79 ft
802.94 ft
835.11 ft
500.23 ft
1257.82 ft
37.58 ft
160.07 ft
390.60 ft
2831.08 ft
1812.46 ft
304.68 ft

LEGEND

NOAA Sea Level Rise Viewer 4 Feet
- Approximate Inundated Area (no depth)
- Low-lying Area

Iwilei Master Plan Area

Future Rail Stations

Future Rail Line

Proposed Waterlines
- New 16" Line
- New 12" Line
- New 8" Line

Existing Water Mainlines
- 4 - 6
- 8 - 12
- 16 - 20
- 24 - 30
- 36 - 42

Proposed Waterline Improvements
- 'A'ala Street and North Vineyard Boulevard Water System Improvements
- Dillingham Boulevard at Kohou Street Water System Improvements
- Kokea Street and Auld Lane Water System Improvements
- Honolulu District 42-inch Mains - Liliha to Mō'ili'ili
- Nimitz Highway 16-inch Main, Waiakamilo Road to Summer Street

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Figure 3-8

Proposed Waterline Improvements and Substandard Roads

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

Dillingham Boulevard at Kohou Street Water System Improvements

Kokea Street and Auld Lane Water System Improvements

'A'ala Street and North Vineyard Boulevard Water System Improvements

Nimitz Highway 16-inch Main, Waiakamilo Road to Sumner Street

Honolulu District 42-inch Mains - Liliha to Mō'ili'ili

Kalihi Station

Kapālama Station

Iwilei Station

Chinatown Station

Lanakila District Park

LEGEND

- Substandard Road
- Substandard / Private Road
- Iwilei Master Plan Area
- Future Rail Stations
- Future Rail Line

Proposed Waterlines
- New 16" Line
- New 12" Line
- New 8" Line

Existing Water Mainlines
- 4 - 6
- 8 - 12
- 16 - 20
- 24 - 30
- 36 - 42

Proposed Waterline Improvements
- 'A'ala Street and North Vineyard Boulevard Water System Improvements
- Dillingham Boulevard at Kohou Street Water System Improvements
- Kokea Street and Auld Lane Water System Improvements
- Honolulu District 42-inch Mains - Liliha to Mō'ili'ili
- Nimitz Highway 16-inch Main, Waiakamilo Road to Summer Street

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3.3 Drainage System

Existing Conditions. The Iwilei Master Plan Area is located within the southern and central portion of the Kapālama and Nu'uanu watersheds. The Kapālama Canal and Nu'uanu Stream are the two major drainageways that flow through the Iwilei Master Plan Area and empty into Honolulu Harbor. The existing backbone drainage systems consist of drain lines owned by the City, State, and private entities. The systems have various deficiencies and constraints due to the limited capacity of the major drainageways, a flat low-lying terrain, and a high water table. Other factors such as tidal effect, a plugged shallow drain, and a malfunctioning pump (only one of the two private pumps is operational) may contribute to existing flooding conditions.

The drainage system in the Iwilei Master Plan Area does not meet the City Storm Drainage Standards and will need to be upgraded.

Flood Zones. There are four distinct flood mechanisms threatening the Iwilei Master Plan Area: coastal flooding, storm water flooding, riverine flooding, and groundwater flooding. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) shown in Figure 3-9, the majority of the Iwilei Master Plan Area is located in Zone X[12], an area determined to be outside the 0.2% annual chance of flooding (or 500-year floodplain). Although most of the Iwilei Master Plan Area is designated as having 'low flood potential,' several areas, including the makai portions of Iwilei, suffer from severe flooding and ponding after heavy rainfall events due to storm water runoff and deficiencies in the storm water drainage system.

Figure 3-9 also shows the approximate 100-year flood plain for the Iwilei Master Plan Area. The FEMA Base Level Engineering (BLE[13]) shows that the approximate 100-year storm flowing in the Kapālama Canal will cause flooding with a Base Flood Elevation (BFE) of 7.40 feet at North Nimitz Highway to 8.04 feet immediately makai of Vineyard Boulevard, where the existing ground elevations are at approximately 6-feet or less. The City will require that the Finished Floor Elevations (FFE) be raised to the identified elevations until the new preliminary FIRM maps are submitted to the City, as soon as next summer or fall. Flood proofing is allowed for commercial structures and non-residential portions of a residential building.

The Kapālama Revitalization Project may resolve most of this flooding issue. A typical cross-section of the Kapālama Canal from Dillingham Boulevard to North Nimitz Highway as presented in the Kapālama Canal Catalytic Project – Resilient Master Plan (City and County of Honolulu, 2022) is shown in Figure 3-10.

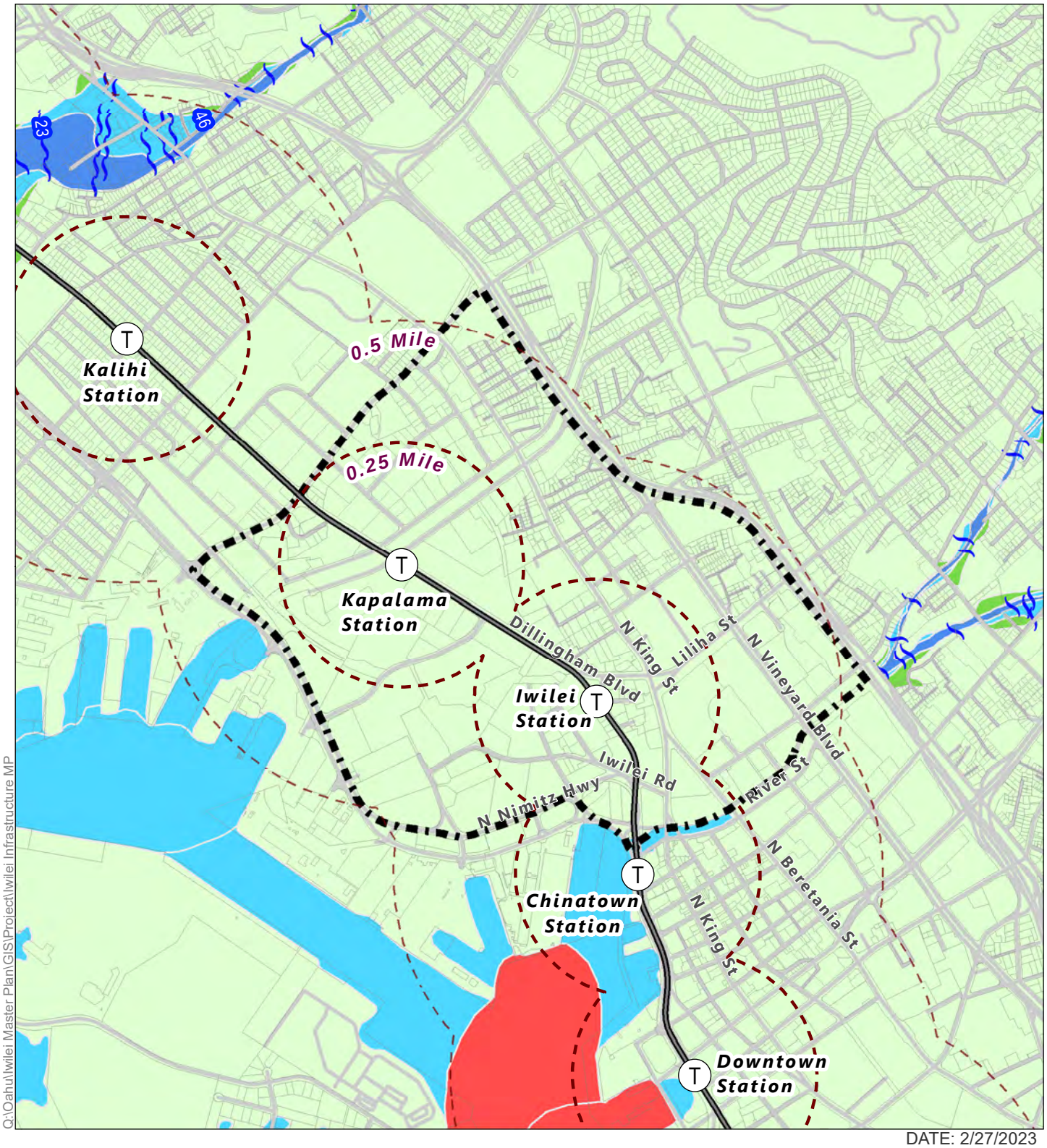
Additionally, the City has requested new detailed flood hazard area studies from FEMA for the Kapālama Stream and Nu'uanu Stream. These studies are currently being developed and preliminary maps are forthcoming. Until FEMA prepares the new Preliminary FIRM, the City will use the updated BLE data developed by FEMA to assist communities with Flood Plain Management. FEMA's BLE illustrates approximate flooding areas which show extensive flooding in the Iwilei Master Plan Area. The City is required to regulate the BLE until the new FEMA Preliminary Maps are submitted. The City is not planning to adopt the BLE for O'ahu, though it may be utilized to regulate areas of Zone A[14] and Zone X that are next to streams as part of the Flood Plain Management strategy. Upon completion, the City will adopt the new FIRM.

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[12] Zone X is an area determined to be outside of the 0.2% annual chance of flooding (or 500-year floodplain).

[13] According to the FEMA website, *"Base Level Engineering (BLE) generates watershed-wide flood hazard information built from foundation level hydrologic and hydraulic engineering models – providing floodplain boundaries, flood depth and water surface elevation grids. BLE is developed using high resolution ground elevation, using the latest modeling software to create modeling in agreement with FEMA's Standards for Flood Risk Projects. These results agree with a Zone A mapping designation. While this data does not immediately replace a community's Flood Insurance Rate Map (FIRM), the analysis provides information to support for local communities to determination Base Flood Elevations (BFEs) for Zone A and newly identified flood prone areas identified by the BLE analysis.*" (FEMA Region 6, 2021).

[14] Zone A is an area subject to inundation by the 1-percent annual chance flood event using approximate methodologies. No BFE or flood depths are shown because detailed hydraulic analyses have not been completed. Flood insurance is required and floodplain management standards apply.



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DATE: 2/27/2023

LEGEND

- Iwilei Master Plan Area
- Future Rail Stations
- Future Rail Line
- 0.25-Mile & 0.5-Mile TOD Walk Radius
- Base Flood Elevation (BFE) Line

Flood Zone

- AE: 1% annual chance flood, with BFE
- AO: 1% annual chance flood, flood depths of 1-3ft, average depths determined
- VE: 1% annual chance coastal flood, with BFE
- Floodway areas in AE
- XS: 0.2% annual chance flood
- X: Minimal flood areas

Source: FEMA, 2019. City & County of Honolulu, 2020. ESRI Online Basemap.

Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.

Figure 3-9

Flood Insurance Rate Map (FIRM)

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

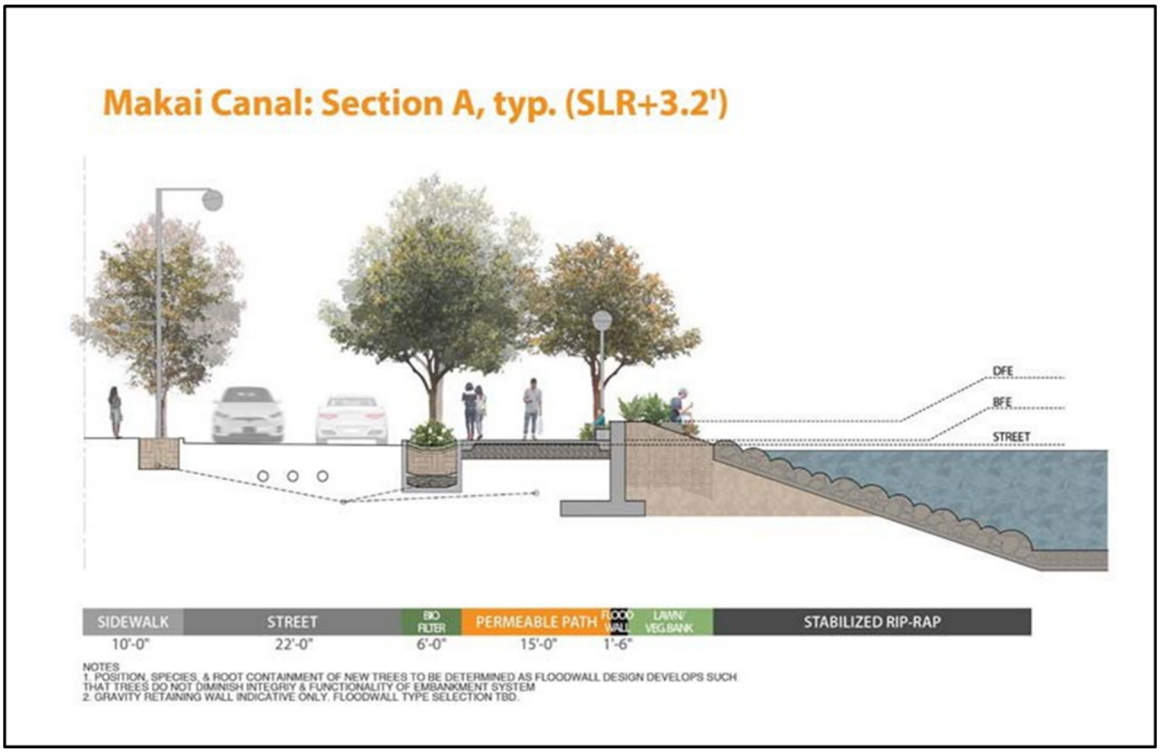
North

Linear Scale (feet)

0 750 1500

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Figure 3-10: Typical Cross-Section of the Kapālama Canal from Dillingham Boulevard to Nimitz Highway



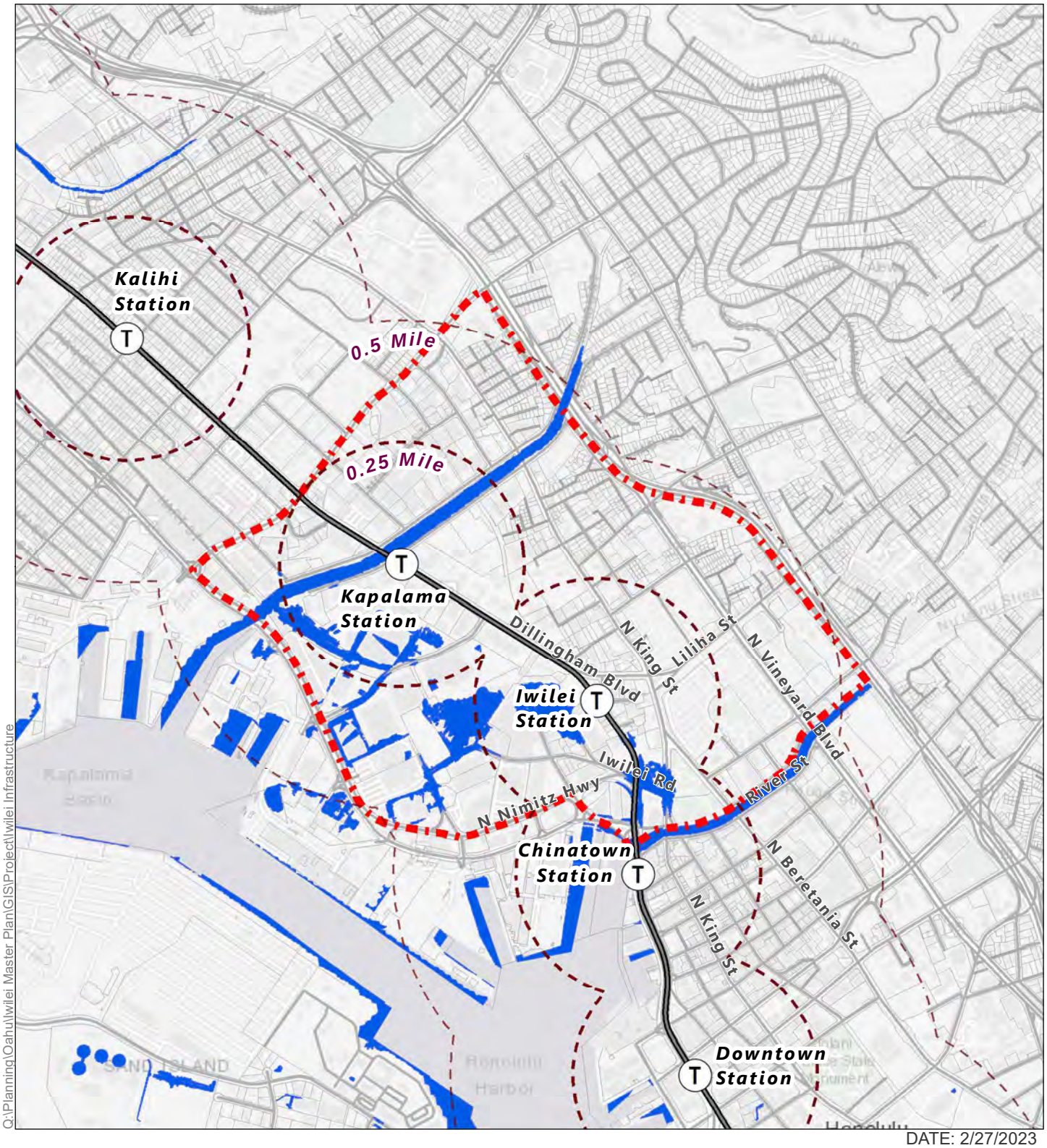
Source: City and County of Honolulu, Kapālama Canal Catalytic Project – Resilient Master Plan

Sea Level Rise (SLR). The four distinct flood mechanisms threatening the Iwilei Master Plan Area (coastal flooding, storm water flooding, riverine flooding, and groundwater flooding) are expected to be impacted by climate change through both SLR and variabilities in storm frequency and intensity.

Although detailed flood modeling has not been completed for the entire Iwilei Master Plan Area, recommendations to mitigate impacts from Sea Level Rise will be required to address flooding within the Iwilei Master Plan Area that could result in overwhelmed infrastructure systems, such as water pumping, or complete failure of certain systems, such as underground electrical facilities and backup generators that may become filled with water if they are not properly protected.

According to the *Sea Level Rise Guidanc*e document adopted on June 5, 2018, the City Climate Change Commission identified a planning benchmark up to 3.2 feet of SLR for critical infrastructure with long lifespans and low-risk tolerance (Climate Change Commission, 2018). The 3.2-foot SLR scenario modeled in the Pacific Islands Ocean Observing System (PacIOOS) Hawai'i Sea Level Rise Viewer (Viewer), included as Figure 3-11, identifies a substantial portion of the Iwilei Master Plan Area within the SLR Exposure Areas (SLR-XA) (2021). The SLR-XA for the 3.2-foot scenario includes the area between Dillingham Boulevard and North Nimitz Highway and along the areas bordering Kapālama Canal and Nu'uanu Stream.

In January 2022, the City completed the *Kapālama Canal Catalytic Project – The Resilient Master Plan* (see Appendix B for their final report) which studied flooding and SLR along the Kapālama Canal and proposed specific solutions through extensive planning, hydrology studies, and technical analysis (2022).



DATE: 2/27/2023

LEGEND

- Iwilei Master Plan Area
- TMK Boundaries
- Future Rail Stations
- Future Rail Line
- 0.25-Mile & 0.5-Mile TOD Walk Radius
- Roads
- Sea Level Rise Exposure Area (3.2 ft Scenario)

Figure 3-11

PacIOOS Sea Level Rise Viewer

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

North — Linear Scale (feet) 0 750 1500

Source: FEMA, 2019. City & County of Honolulu, 2020. ESRI Online Basemap. PacIOOS, Tetra Tech, Inc. and University of Hawai'i Coastal Geology Group, 2017.

Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.

Infrastructure Improvements. The drainage system in the Iwilei Master Plan Area does not comply with the City Drainage Standards. Improving the capacity of the drainage system in the Iwilei Master Plan Area will require fulfillment of various projects planned for the area based on recommendations in previous studies and analyses.

To address analysis of the drainage system, the City has requested new detailed flood hazard area studies from FEMA for the Kapālama Stream and Nu‘uanu Stream. These studies are currently being developed and are forthcoming. There are no plans to improve Nu‘uanu Stream at this time, but a Nu‘uanu Stream improvement Study will be refined after the FEMA study is completed.

The drainage master plans for the portion of the Iwilei Master Plan Area that drains into the Kapālama Canal will incorporate the findings from the Kapālama Canal Catalytic Project (City and County of Honolulu, 2022). The Kapālama Canal Revitalization Project recommendations and improvements will include canal dredging to mitigate flooding and convey drainage under a 100-year flood scenario and the development of flood walls to prevent flooding on the overbanks along Kapālama Stream.

Along with the Kapālama Canal Revitalization Project, canal dredging upgrades and new diversion drains will contribute improvements to comply with the City Drainage Standards. The non-standard recommendation includes upgrades to the existing private drainage pump station owned and operated by Castle & Cooke Properties. In order to reduce the dependence on the private drainage pump station and the size the upgraded Costco Drain, runoff from Pua Lane should be diverted to the Kukui Gardens Drain and Nu‘uanu Stream.

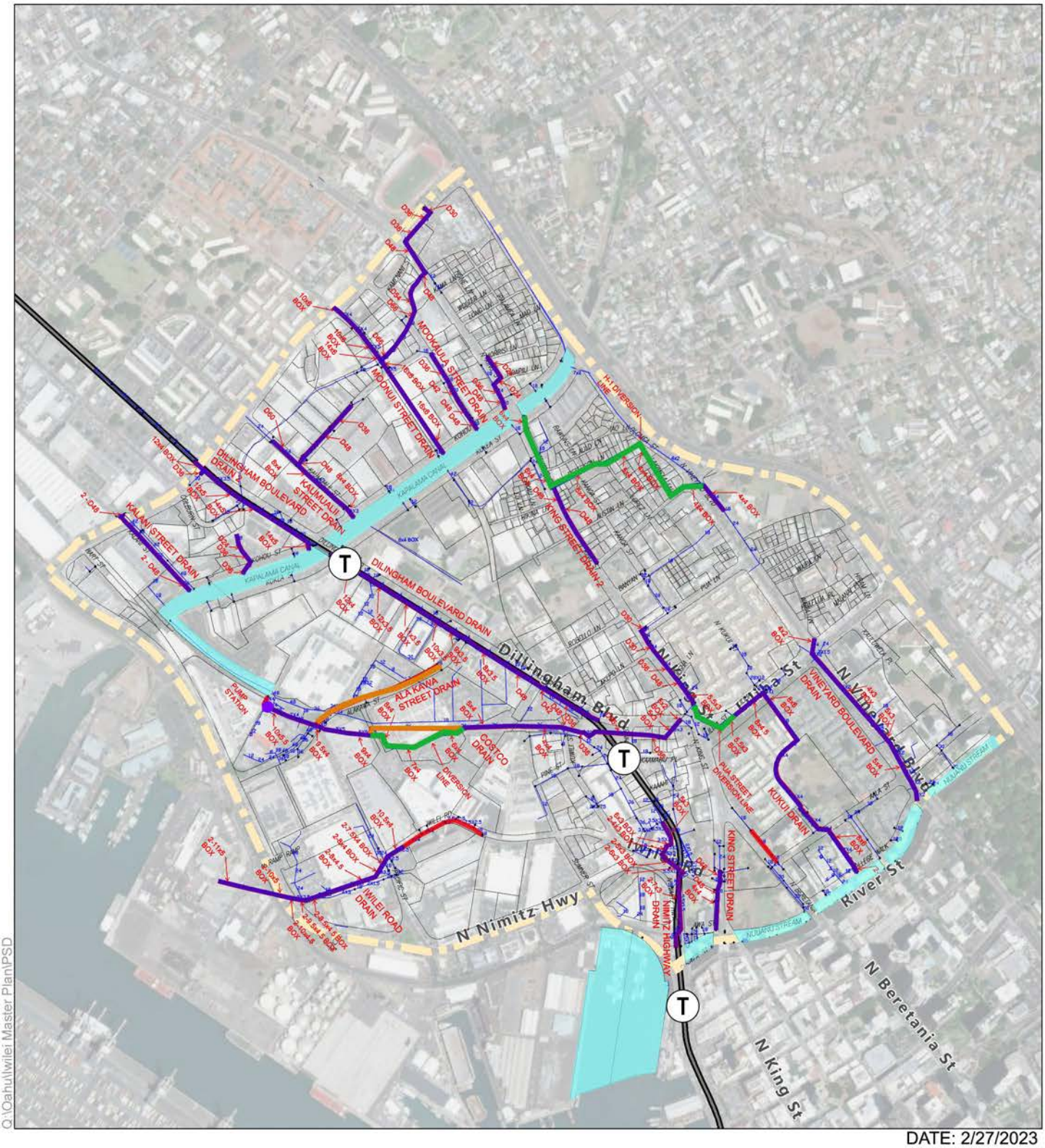
Figure 3-12 illustrates the proposed projects and drains that could be improved to meet the City Drainage Standards in the Iwilei Master Plan Area. Cost estimates are based on the Kapālama Catalytic Project, Iwilei Drainage Master Plan, and the Infrastructure Improvement Assessment. The cost estimate for the Costco Drain assumes that the drainage pump station remains privately owned and operated by Castle & Cooke Properties. The Nu‘uanu Stream Improvements are very preliminary as no studies have been done and more of the parameters will be determined after FEMA completes the detailed study for Nu‘uanu Stream requested by the City. Table 3-9 identifies the drainage improvements, costs, and phasing. (Appendix C, Section 3 describes the engineering methodology for improvements.)

Additionally, the limited right-of-way (ROW) space along Dillingham Boulevard, where the Honolulu Authority for Rapid Transportation (HART) transit guideway is also proposed, will limit what can be done to improve the drainage system. This may require all developers to retain their increase in runoff on site, and the system may have to utilize mechanical means such as drainage pumping to reduce the drain box culvert sizes Initiated.

More detailed analysis, design, engineering, and cost projections will be needed for key sub areas and larger development parcels to identify drainage improvements, and future SLR impacts, particularly for projects that serve multiple parcels. As individual redevelopment projects are undertaken, each project will be required to submit a drainage report that demonstrates that the development will not cause adverse impacts to the adjacent properties due to runoff. Detention basins or underground chambers will be needed to retain the increased runoff volumes.

Table 3-9: Drainage Improvements – Phasing and Cost Estimates

Improvement Project	Phase 1: Present to 2030	Phase 2: 2031 to 2040	Phase 3: 2041 to 2050	Phase 4: 2051+ / TBD	Total
Kapālama Canal Revitalization Project Dredging (adopted Master Plan)	$143,432,000 - $160,845,000	TBD	TBD	TBD	$226,509,320 - $258,188,180
Nu'uanu Stream Improvements				$40,000,000	
Houghtailing Street to Moonui Drain		$6,189,671			
King Street Drain 1	$1,788,790				
King Street Drain 2		$2,443,060			
King Street Drain 3			$7,803,650 (incl. H-1 Diversion)		
Mookaula Street Drain		$2,438,936			
Moonui Street Drain (Houghtailing to Canal)	$9,300,000				
Kaumuali'i Street Drain	$2,365,090				
Dillingham Boulevard Drain 1	$23,396,650				
Dillingham Boulevard Drain 2	$5,356,200				
Kohou Street Drain		$1,893,880			
Kalani Street Drain	$3,080,380				
H-1 Diversion Line				(See King Street Drain 3)	
Vineyard Boulevard Drain				$3,419,380	
Pua Lane Drain	$26,458,950 (incl. Kukui Gardens)				
Pua Lane Diversion Line	(See Pua Lane)				
Kukui Gardens Drain	(See Pua Lane)				
Costco Drain			$18,004,290 (incl. Diversion)		
Costco Diversion Line				(See Costco)	
North Nimitz Highway Drain		$9,003,840			
Iwilei Road Drain				$24,918,760	
Total:	**$414,370,847 to $446,049,707**				



DATE: 2/27/2023

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LEGEND

- Iwilei Master Plan Area
- Future Rail Stations
- Future Rail Line
- Surcharged Line
- New Drain Line
- Diversion Drain Line
- Relieved by the Diversion line
- D36 Proposed Drain Line Diameter
- 4x5 BOX Proposed Box Drain Size

Figure 3-12
Proposed Drainage Improvements

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

North — Linear Scale (feet) 0 525 1050

Source: City & County of Honolulu, 2020. ESRI Online Basemap. Department of Environmental Services. R.M. Towill.
Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.

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3.4 Storm Water Quality

Existing Conditions. The Oʻahu storm drain system is regulated under a National Pollutant Discharge Elimination (NPDES) permit. NPDES permits contain limits on what can be discharged into waters of the United States. They also create monitoring and permitting requirements to ensure that discharge does not impact water quality or health and safety. Discharge or pollutants include sewage, garbage, agricultural waste, industrial waste, and construction materials. The most current permit, NPDES Permit No. HI S000002, was issued on August 7, 2020, by the State of Hawaiʻi Department of Health (DOH) to the City. The effective date is September 1, 2020, until midnight, August 31, 2025.

Because the Oʻahu storm drain system is regulated under an NPDES permit, the City is required to implement a Storm Water Management Program Plan (SWMPP), updated in September 2021, to outline the steps the City will enact to reduce the discharge of storm water pollutants into State waters.

In addition to the SWMPP, the City has adopted guidelines for Storm Water Best Management Practices (SW-BMP) for new and redevelopment, which have been in effect since August 16, 2017. The SW-BMP guidelines apply to all development and land disturbing activities within the City and establish minimum requirements for Best Management Practices (BMPs). The 2017 guidelines for post-construction treatment control BMPs may include retention measures, biofiltration, and BMPs for alternative compliance.

For retention BMPs, detention basins or underground chambers can be used for both flood control and storm water quality purposes, provided that the soil infiltration rate meets the minimum requirement of 0.5 inches an hour and the ground water table is below the detention basin and the underground chamber invert. Due to space limitations, underground chambers may be the preferred option. As applicable, low-impact development (LID) solutions, such as capturing runoff from rooftops or impervious surfaces and conveying them to rain gardens, catchment basins, and other green infrastructure solutions should be implemented.

The location and method of the post-construction treatment control BMPs will be determined during the design phase of each individual redevelopment project in the Iwilei Master Plan Area. (Appendix C, Section 4 describes the engineering methodology for improvements.)

3.5 Transportation – Roadways and Multi-Modal Facilities

Existing Conditions. The Iwilei Master Plan Area has a strong network of roadway facilities that provides local and regional access via freeways, highways, and major arterials. The State H-1 Freeway and North Nimitz Highway are the main east-west corridors in the project vicinity. There are also on- and off-ramps to the H-1 at several points mauka of King Street (City) within the Kalihi neighborhood. Kamehameha Highway (State)/Dillingham Boulevard (City) and North King Street (City) are high-volume, east-west roadways. Mauka-makai access is provided by Liliha Street (State jurisdiction between King Street and School Street, City jurisdiction mauka of School Street), and Waiakamilo Road (City).

Multi-Modal Access and Circulation. TheBus is the main public bus transportation service that provides local and regional transit service in the Iwilei Master Plan Area, with transit stops located within walking distance (i.e., less than a quarter mile). The Iwilei Master Plan Area is supported by three types of bus services: Frequent Urban Routes, Major Suburban Routes, and Local Routes. Frequent Urban Routes provide bus service with headways between 6 to 40 minutes. Major Suburban Routes and Local Routes provide less frequent bus service with headways between 10 to 60 minutes. Overall, the Iwilei neighborhood has reasonably good access to The Bus transit network with several stops along the major corridors in the study area. The streets with the greatest bus frequency include Dillingham Boulevard and N. King Street. From Iwilei, bus passengers are directly connected as far as Mākaha, Haleʻiwa, and Hawaiʻi Kai.

Currently, a bus only lane is striped on N. King Street from Dillingham Boulevard-Liliha Street to River Street within the study areas, but the lane does extend to Punchbowl Street Diamond Head of Downtown Honolulu. This lane helps to expedite bus flow and minimize delays from general vehicle traffic, but does permit right turns to be made by any vehicle at all street intersections and driveways.

Presently, the Iwilei Master Plan Area lacks a safe connected network, particularly for bicycling and walking, and safe connections to major activity and employment centers in the surrounding region. The area has significant industrial and commercial activity with intermittent gaps in the bicycle and pedestrian networks. Waiakamilo Road, North Nimitz Highway, Iwilei Road, and parts of Pacific Street south of Iwilei Road are a few corridors in the study area that include bike lanes. On nearly all other facilities, bicyclists must share the lane with vehicle traffic, and in most cases with limited available travel lane width. In terms of overall connectivity, the Iwilei area provides good connectivity across the neighborhood through sidewalks along most streets with some gaps in the network. One issue within the overall area is the presence of exceptionally large blocks where street connectivity is limited. This is especially true of the area makai of Dillingham Boulevard and Diamond Head of Alakawa Street. This results in an automotive dominated circulation network. Several plans have been completed that made recommendations to improve multi-modal access and circulation, including roadway improvements within the area in accordance with the City 2012 Complete Streets ordinance.

The City rail project is currently under construction and projected to be fully operational by 2035. The 20-mile rail system will include twenty-one stations[15] and will be fully integrated with the City bus system (Honolulu Authority for Rapid Transportation, 2019). The future Honolulu rail line will run through the Iwilei Master Plan Area along Dillingham Boulevard, Kaʻaahi Street, and North Nimitz Highway. The Iwilei Master Plan Area includes two rail stations: the Kūwili (Iwilei) Station (#16) and the Niuhelewai (Kapālama) Station (#15).

The Kūwili (Iwilei) Station will be located along Kaʻaahi Street near the intersection with Dillingham Boulevard with a station plaza located at the intersection. The station improvements will include new walkways, bike paths, a shared use path, a transit-only right of way (bus lane), and landscaped buffers. A new driveway, drop-off, and parking area is located across from the existing Kaʻahumanu Place, while the HandiVan loading area is located along the existing Kaʻaahi Street. Once operational, travel times from the Kūwili (Iwilei) Station are anticipated to be 36 minutes to the Kualakaʻi (East Kapolei) Station, 15 minutes to the Hālawa (Aloha Stadium) Station, 2 minutes to the Downtown Station, and 6 minutes to the Ala Moana Station[15].

The Niuhelewai (Kapālama) Station will be located along Dillingham Boulevard near the intersection of Kōkea Street along the Kapālama Canal. The station improvements will include new walkways, connection to the future protected bike lane on Dillingham Boulevard and landscaped buffers. Once operational, travel times from the Niuhelewai (Kapālama) Station are anticipated to be 34 minutes to the Kualakaʻi (East Kapolei) Station, 13 minutes to the Hālawa (Aloha Stadium) Station, 4 minutes to the Downtown Station, and 8 minutes to the Ala Moana Station[15].

Evaluation of Anticipated Transportation Infrastructure. The Iwilei Infrastructure Improvement Master Plan (IIIMP) Transportation Assessment (2022) (see Appendix D for the complete study), was developed to evaluate the Iwilei Master Plan Area. The assessment builds on recommendations and anticipated improvements from previous plans and studies developed by the City and County of Honolulu listed below:

- *Oʻahu Pedestrian Plan* (2022)
- *Iwilei-Kapālama Transportation Network Assessment* (2021)
- *State TOD Planning and Implementation Project for the Island of Oʻahu* (OPSD, 2020)
- *Downtown Neighborhood Transit-Oriented Development Plan* (2020)
- *Kalihi Neighborhood Transit-Oriented Development Plan* (2017)
- *Iwilei/Kapālama Transit-Oriented Development Infrastructure Needs Assessment* (2018)
- *Oʻahu Bike Plan 2019 Update* (2019).

The following description summarizes the findings, anticipated future conditions, and recommendations for proposed improvements.

[15] As of March 31, 2022, HART is planning to submit revised plans for federal funding to shorten the rail line by one mile, and two stations. Under this revised plan the final rail station would be the Civic Center Station near the intersection of South Street and Halekauwila Street. The ultimate goal is eventually to still complete the segment to Ala Moana.

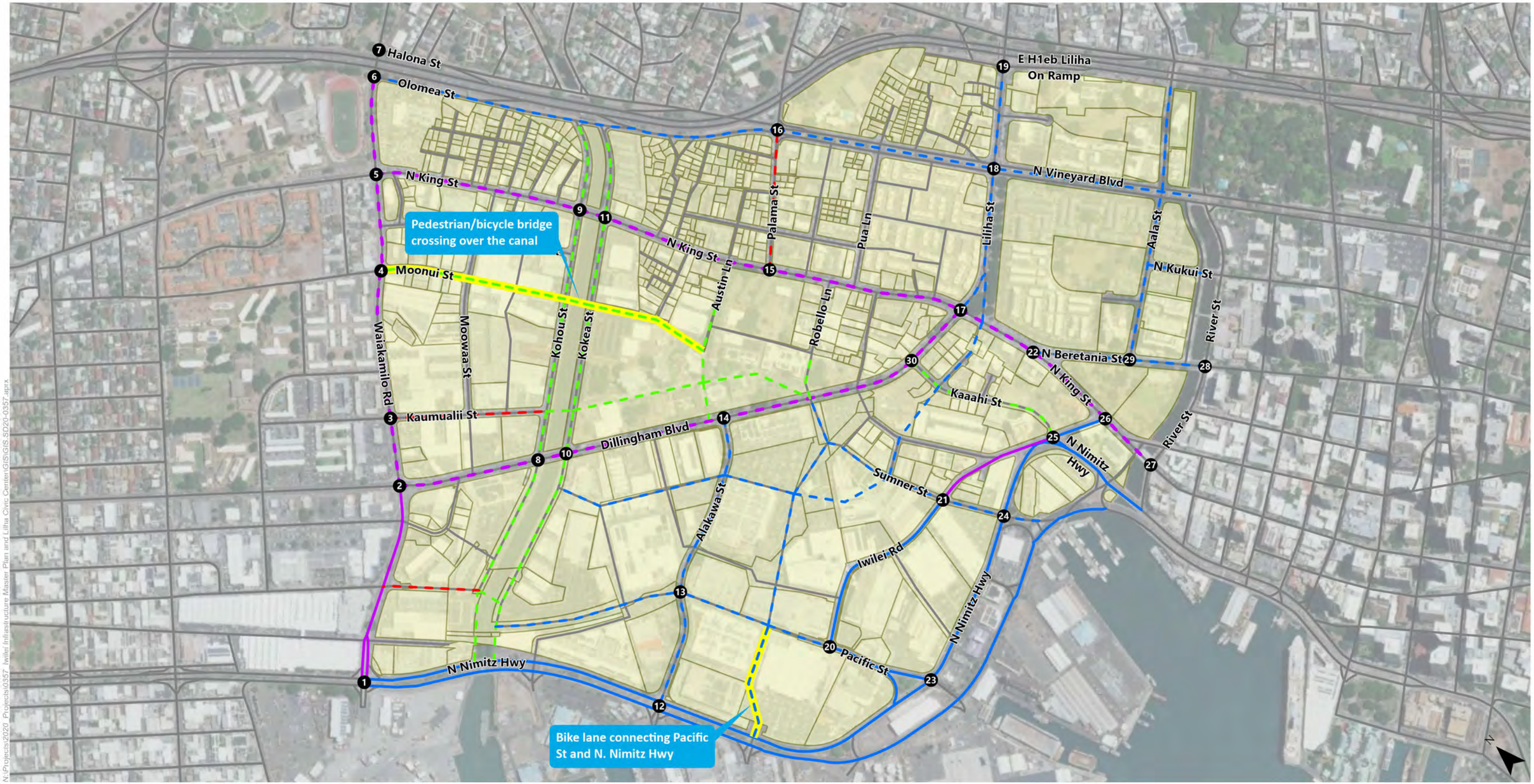
The net increase in traffic with the proposed redevelopment of the Iwilei Master Plan Area is expected to be substantial with approximately 64,000 net new daily trips and just over 5,000 net trips in each of the AM and PM peak hours. These trips were added to Year 2035 baseline traffic volumes that were grown from existing volumes at 0.5% per year. The year 2035 plus redevelopment peak hour volumes were then used to analyze operations at a total of 30 key intersections within the Master Plan area. Table 3-12 provides a list of all study intersections and their traffic operations under the study scenarios. The Year 2035 street network is assumed to include the new street segments and intersection modifications identified in the Iwilei-Kapālama Transportation Network Assessment (Department of Planning and Permitting and SSFM, 2021). These new roadways will help to distribute traffic within the study area and enhance overall mobility network connectivity.

Considering that the study area is an already urbanized environment with extensive existing development and most roadways are built to capacity, major improvements such as widening roadway segments are not considered feasible. In general, peak hour traffic operations will degrade, which is a common occurrence in urban core areas and their immediate environs, and the study area will essentially be an extension of the Downtown Honolulu core with planned intensification. However, some focused improvements can be implemented to reduce delays and minimize impacts on peak hours and off-peak operations. Recommended improvements at select locations include new traffic signals, signal timing optimization, realignment or reconfiguration of intersection approaches, the addition of a right-turn overlap phase, and the addition of a new street segment.

Infrastructure Improvements. Since the Iwilei Infrastructure Master Plan is a long-term development and will be constructed over a period of several years, one of the primary transportation objectives of this infrastructure master plan is to recommend improvements that improve pedestrian and bicyclist safety, improve mobility, encourage the use of non-automobile modes, integrate new development into the community context, complement the surrounding land uses, enhance accessibility, and support the downtown neighborhood transit-oriented development plan objectives. The feasibility of the recommended improvements at each location requires the preparation of conceptual plans during the planning phase of each project.

Additionally, pedestrian, bicycle, and transit improvements are recommended to encourage non-auto modes of transportation and improve the quality of walking, biking, and using transit in the area. New pedestrian and bicycle connections are also recommended to improve network connectivity to adjacent neighborhoods. It is critical that off-street parking supplies serving proposed redevelopment projects be limited to the lowest possible ratios consistent with TOD principles to encourage Traffic operations with the proposed improvements (and a description of each) are included in the last three columns of Table 3-12

Figure 3-13 illustrates the proposed bike network based on the 2019 O‘ahu Bike Plan Update and recommended bike connections that improves the network connectivity. Figure 3-14 illustrates the study locations and recommended circulation improvements that improve network connectivity.

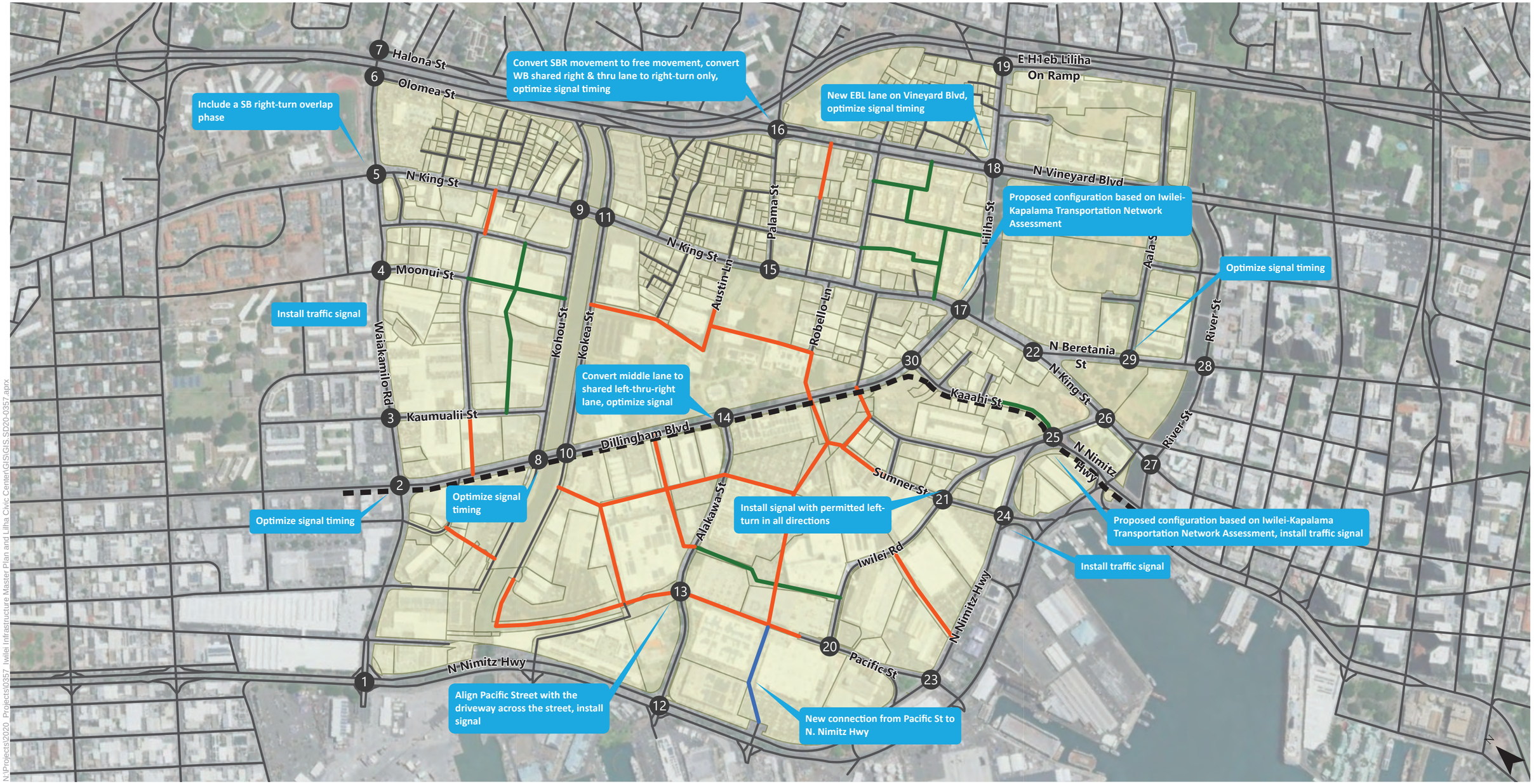


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Resource Mapping Hawaii, Maxar

Figure 3-13:
Recommended Pedestrian & Bike Network Improvements

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- Existing
- 0-10 Years (Iwilei-Kapalama Transportation Network Assessment)
- 11-40+ Years (Iwilei-Kapalama Transportation Network Assessment)
- Recommended Connection
- Study Intersections
- Future Rail Transit Route

Resource Mapping Hawaii, Maxar

Figure 3-14:
Recommended Roadways and Circulation Improvements

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The following is a list of recommended active transportation and transit improvement:

Pedestrian improvements.

- Provide adequate walkways along both sides of all streets to improve accessibility. Sidewalks or paths should be context appropriate and account for furniture zones and other encroachments per the City and County of Honolulu Complete Streets Design Manual (September 2016).
- Provide pedestrian crossings of all legs of an intersection to reduce the need for a pedestrian to cross multiple legs to access their desired destination and encourage walking within and to/from the IIIMP area.
- Provide pedestrian refuge islands, tighten curb radius, and/or widen the sidewalk at intersections or mid-block crossings to shorten the pedestrian crossing distance, make pedestrians more visible to vehicles, and reduce the speed of turning vehicles. The measure applies to both controlled and uncontrolled crossings
- Design project driveways to provide adequate sight distance for drivers and pedestrians. This includes the placement of monument signage, fencing, and other potential impediments to visibility. Install audible and visual warning features where sight distance is limited.
- Consider pedestrian scramble or all-pedestrian phase at locations with high pedestrian activity,
- Provide protected left or right-turn phasing where feasible and appropriate to reduce or eliminate conflicts between pedestrians and turning vehicles
- Prohibit right-turn on red at locations where the parallel crossing carries a high volume of pedestrians, or at locations with sight distance issues (e.g., skewed intersections)
- Eliminate channelized right-turns to eliminate conflicts with pedestrians
- Implement leading pedestrian indications (LPIs)
- Provide “pedestrian recall” and shorten signal cycles, and/or provide additional crossing time to maximize walking opportunities for pedestrians during the pedestrian phase
- Improve street lighting to increase driver’s ability to identify pedestrian
- Install Pedestrian Hybrid Beacons (PHB) or Rectangular Rapid Flashing Beacon (RRFB) on higher speed and/or multi-lane roadways, or where additional treatments are needed based on industry best practices.
- Minimize the length between crossing locations and limit the distance to no more than 500 feet where feasible
- Improve pedestrian signage at crossing locations to notify drivers of the presence of a pedestrian.
- Restrict parking near crosswalk approaches to improve drivers' and pedestrians' visibility of one another
- Provide advanced stop bars ahead of crosswalks at stop signs and signals to reduce the number of vehicles encroaching on the crosswalk
- Provide raised crosswalks or raised intersections, speed humps, and/or narrow lanes to reduce approaching vehicles’ speed
- Focus pedestrian improvement projects on the priority network streets identified in the OPP before improving other roadway segments.

In addition to the pedestrian improvements identified above, new walkway segments, as identified in Table 3-10, are recommended to improve overall circulation in the Iwilei-Kapālama Area.

Table 3-10: Walkway Segment Improvements[16]

Improvement	Phase 1: Present to 2030	Phase 2: 2031 to 2040	Phase 3: 2041 to 2050	Phase 4: 2051+ / TBD
Kanoa Street from Pālama Street to Pua Lane Walkway	$171,600			
Pālama Street from Vineyard to King Street Walkway	$241,824			
Kohou Street from H1 to Nimitz Path	$5,820,857			
Kōkea Street from H1 to Nimitz Path	$5,622,939			
Kaʻaahi Street from Dillingham to Iwilei Road Path	$1,920,100			
1 or 2 Pedestrian Bridge Crossings of Kapālama Canal		$92,925		
King Street from Dillingham to Liliha Walkway Upgrade	$191,100			
Total:	**$14,061,345**			

Bicycle Improvements.

- Provide adequate bikeways along both sides of the street to improve accessibility in all directions
- Provide buffered or protected bike lanes where feasible to eliminate conflict between vehicles and bicycles
- Design project driveways so that the path crossing locations of each driveway provide adequate sight distance for drivers and bicyclists
- Ensure that all new development provides bicycle parking consistent with the requirements in the Land Use Ordinance to encourage the use of non-automobile travel and minimize vehicle trips
- Provide adequate wayfinding signs and/or markings to route people riding bicycles to key destinations
- Provide bike signals for bike lanes that cross high-speed or high-volumes streets. Leading Bicycle Intervals (LPIs) are a complimentary feature to bike signals
- Provide median refuges wide enough for a bicyclist to pass-through
- Provide a two-stage turn box at intersections where bicyclists are on the right side of protected bike lanes and need to make a left turn
- Provide colored pavement treatments where appropriate to highlight conflict areas between bike lanes and turn lanes
- Provide secure bicycle parking at key destinations
- Focus bicycle improvement projects on the facilities identified in the Oʻahu Bike Plan before improving other segments or path connections.

Figure 3-13 illustrates the planned bike facilities from the Oʻahu Bike Plan as well as additional recommended bikeway connections, as identified in Table 3-11, to improve overall network connectivity and break up super blocks. Note that the Oʻahu Bike Plan calls for two new bridge connections over Kapālama Canal (one at Kaumualiʻi Street and one at Kalani Street). A connection at Moonui Street is suggested to be considered in lieu of or in

[16] Estimated phasing based on location of segments – phasing subject to change upon review and approval of projects.

addition to the Kaumualiʻi Street crossing given its more central location between King Street and Dillingham Boulevard.

Table 3-11: Bikeway Segment Improvements[17]

Improvement	Phase 1: Present to 2030	Phase 2: 2031 to 2040	Phase 3: 2041 to 2050	Phase 4: 2051+/TBD
Kohou Street from H1 to Nimitz Shared Use Path	$1,040,424			
Kōkea Street from H1 to Nimitz Shared Use Path	$1,005,048			
Kaʻaahi Street from Dillingham to Iwilei Road Shared Use Path	$343,200			
Between Kaʻaahi Street and King Street Shared Use Path	$144,672			
Extension of Robello Lane through HCC Campus Shared Use Path				$59,928
Extension of Austin Lane through HCC Shared Use Path				$290,928
Extension of Kaumualiʻi Street across Kapālama Canal through HCC Campus Shared Use Path				$771,144
Extension along River Street between King Street and Nimitz Shared Use Path		$77,352		
Nimitz south of Sumner Street Shared Use Path	$66,528			
Dillingham Boulevard (full extent) Protected Bike Lane		$1,134,672		
King Street (full extent) Protected Bike Lane		$1,578,720		
Alakawa Street from Nimitz to Dillingham Bike Lane		$124,608		
Sumner Street from Dillingham to Nimitz Bike Lane		$82,541		
Extension of Pacific Street from Iwilei Road to Kōkea Street Bike Lane		$133,635		
New Segment from Kaʻaahi Street to Kōkea Parallel to Dillingham Bike Lane			$194,169	

[17] Estimated phasing based on location of segments – phasing subject to change upon review and approval of projects.

Improvement	Phase 1: Present to 2030	Phase 2: 2031 to 2040	Phase 3: 2041 to 2050	Phase 4: 2051+/TBD
New Segment parallel to Alakawa Street from Pacific Street to Dillingham Bike Lane			$99,592	
Liliha Street from H1 to King Street/Dillingham Bike Lane		$106,908		
Extension from Liliha Street to Dillingham (segment parallel to Ka‘aahi Street) Bike Lane			$21,358	
Vineyard Boulevard Bike Lane				$175,997
‘A‘ala Street ma uka of Beretania Bike Lane			$117,115	
Beretania Street south and east of King Street Intersection (parallel to ‘A‘ala Park) Bike Lane			$73,573	
Kaumuali‘i Street (northwest of Kohou Street) Shared Roadway		$5,383,908		
Kalani Street (northwest of Kohou Street) Shared Roadway		$3,161,754		
Pālama Street from King Street to Vineyard Shared Roadway		$4,716,792		
Total:	**$20,904,566**			

Transit Improvements

- Convert routes that connect to transit stations to walk- and bike-friendly routes
- Improve the pedestrian and bike users' experience with wayfinding signage that directs the user to transit stations and major bus stops
- Place transit stops near intersections with sufficient access for pedestrians and bicyclists to improve connectivity
- Eliminate parking near transit stops to provide clear bus access to curb stops or adjacent properties
- Provide shelters at bus stops based on their characteristics (see Honolulu Complete Streets Design Manual for more information on types of bus shelters)
- Upgrade current bus shelters with amenities that improve users’ experience (lighting, seating, trash receptacles, real-time informational displays, wayfinding signs/maps, etc.)
- Reroute bus transit with limited personally owned vehicle (POV) access for local traffic circulation only through Ka‘aahi Street for improved access to the future Kūwili (Iwilei) Station.
- Provide potential electric capacity for electric bus charging stations near the future Kūwili (Iwilei) Station.

Roadway Improvements. For signalized study intersections, recommendations are proposed for conditions where the overall intersection LOS is calculated to operate at LOS E or lower. For unsignalized study intersections, recommendations are proposed for conditions where a critical movement or approach is calculated to operate at LOS E or lower. These recommendations were identified to illustrate the scope of improvements needed to

eliminate or reduce impacts to vehicle operations. When evaluating the need for these improvements at any location, potential secondary impacts to pedestrians, bicyclists, and transit in terms of operations and safety should be considered.

Figure 3-14 summarizes the recommended roadway network improvements, including recommended new connections to break up super blocks. Table 3-12 shows intersection operation levels with and without proposed improvements, with the proposed improvements described in the last column. Operating levels are reported only for locations where improvements are proposed, but both peak hour operating levels with improvement are presented since they would enhance operations at all times of day.

It is expected that the City would take responsibility for obtaining funding for and implementing any or all these improvements. This could take the form of a Pro Rata Share District but would likely require coordination with the State given that some of the improvements involve DOT-maintained facilities.

Table 3-12: Intersection Level of Service with Improvements

Intersection	Traffic Control[18]	Peak Hour	Baseline 2035+Project		With Potential Improvements		Description of Improvements Needed to Mitigate Project Impact
			Delay (sec)	LOS	Delay (sec)	LOS	
1. Waiakamilo Rd / N Nimitz Hwy	Traffic Signal	AM	27.9	C	-	-	
		PM	38.4	D	-	-	
2. Waiakamilo Rd / Dillingham Blvd	Traffic Signal	AM	**153.5**	**F**	**97.0**	**F**	Optimize signal timing
		PM	**123.8**	**F**	**87.6**	**F**	
3. Waiakamilo Rd / Kaumualiʻi St	Traffic Signal	AM	7.9	A	-	-	
		PM	7.7	A	-	-	
4. Waiakamilo Rd / Alokele St & Moonui St	TWSC	AM	24.5	C	5.9	A	Install traffic signal (DTS plans to implement road diet in lieu of signal)
		PM	**42.3**	**E**	5.4	A	
5. Waiakamilo Rd / N King St	Traffic Signal	AM	**66.8**	**E**	**64.0**	**E**	Add right turn overlap phase on SBR, optimize signal timing
		PM	**62.8**	**E**	**62.6**	**E**	
6. Olomea St / Houghtailing St	Uncon-trolled	AM	-	-	-	-	
		PM	-	-	-	-	
7. Hālona St / Houghtailing St	Traffic Signal	AM	20.7	C	-	-	
		PM	19.4	B	-	-	
8. Kohou St / Dillingham Blvd	Traffic Signal	AM	**92.8**	**F**	32.9	C	Optimize signal timing
		PM	46.7	D	23.0	C	
9. Kohou St / N King St	Traffic Signal	AM	11.8	B	-	-	
		PM	23.8	C	-	-	
10. Kōkea St / Dillingham Blvd	Traffic Signal	AM	51.2	D	-	-	
		PM	48.6	D	-	-	
11. Kōkea St / N King St	Traffic Signal	AM	13.9	B	-	-	
		PM	18.7	B	-	-	
12. Alakawa St / N Nimitz Hwy	Traffic Signal	AM	28.8	C	-	-	
		PM	45.9	D	-	-	
13. Pacific St / Alakawa St	TWSC	AM	**>180**	**F**	9.7	A	Align Pacific Street with the driveway across the street, install signal
		PM	**>180**	**F**	7.5	A	

[18] *TWSC = Two-Way Stop Controlled; AWSC = All-Way Stop Controlled*

Intersection	Traffic Control[18]	Peak Hour	Baseline 2035+Project		With Potential Improvements		Description of Improvements Needed to Mitigate Project Impact
			Delay (sec)	LOS	Delay (sec)	LOS	
14. Alakawa St / Dillingham Blvd	Traffic Signal	AM	40.9	D	36.8	D	Convert center lane to shared left-thru-right movement, install signal
		PM	**55.5**	**E**	32.5	C	
15. N King St / Pālama St	Traffic Signal	AM	10.0	B	-	-	
		PM	25.8	C	-	-	
16. Vineyard Blvd / Hālona St / Olomea St / Pālama St	Traffic Signal	AM	**66.8**	**E**	40.4	D	Convert SB right-turn movement to Free movement, convert WB Shared right-thru lane to Right-Turn Only, optimize signal timing
		PM	**>180**	**F**	47.3	D	
17. Dillingham Blvd / Liliha St / N King St	Traffic Signal	AM	**63.5**	**E**	-	-	No feasible improvements beyond proposed improvements from Iwilei-Kapālama Transportation Network Assessment
		PM	**63.4**	**E**	-	-	
18. Vineyard Blvd / Liliha St	Traffic Signal	AM	**165.6**	**F**	**95.5**	**F**	Add 2nd EB left-turn lane using existing median width, optimize signal
		PM	**109.6**	**F**	**90.2**	**F**	
19. H-1 On Ramp / Kī‘apu Pl / Liliha St	Traffic Signal	AM	21.5	C	-	-	
		PM	24.5	C	-	-	
20. Iwilei Rd / Pacific St	AWSC	AM	11.6	B	-	-	
		PM	13.2	B	-	-	
21. Iwilei Rd / Sumner St	AWSC	AM	**58.9**	**F**	8.9	A	Install signal with permitted left-turn on all directions
		PM	**>180**	**F**	32.2	C	
22. N King St / Beretania St	Traffic Signal	AM	13.1	B	-	-	
		PM	15.3	B	-	-	
23. Pacific St / N Nimitz Hwy WB	Traffic Signal	AM	15.3	B	-	-	
		PM	12.8	B	-	-	
24. Sumner St / N Nimitz Hwy WB	TWSC	AM	**42.0**	**E**	10.1	B	Install traffic signal
		PM	**>180**	**F**	33.7	C	
25. Iwilei Rd / Ka‘aahi St	Signal	AM	31.8	D	-	-	No other improvements deemed feasible
		PM	**58.9**	**E**	-	-	
26. Iwilei Rd / N King St	Traffic Signal	AM	21.1	C	-	-	
		PM	22.6	C	-	-	
27. N King St / River St	Traffic Signal	AM	10.2	B	-	-	
		PM	11.7	B	-	-	
28. N Beretania St / River St	Traffic Signal	AM	6.0	A	-	-	
		PM	13.9	B	-	-	
29. N Beretania St / ‘A‘ala St	Traffic Signal	AM	**111.4**	**F**	27.5	C	Optimize signal timing
		PM	**59.1**	**E**	28.1	C	
30. Dillingham Blvd / Ka‘aahi St	Traffic Signal	AM	7.7	A	-	-	
		PM	32.4	C	-	-	

In addition to the intersection improvements, new roadway segments, as identified in Table 3-13, are recommended to improve overall circulation in the Iwilei-Kapālama Area.

Table 3-13: Roadway Segment Improvements and Estimated Costs[19]

Improvement	Phase 1: Present to 2030	Phase 2: 2031 to 2040	Phase 3: 2041 to 2050	Phase 4: 2051+/TBD
New Segment between Kaumualiʻi Street and Mookaula Street (parallel to Moowaa and Kohou Streets)	$8,445,984			
Extension of Moonui Street between Moowaa and Kohou Streets	$4,752,680			
Extension of Kaʻaahi Street	$4,192,749			
Extension of Pacific Street between Alakawa and Iwilei Road	$8,221,048			
Mayor Wright Homes New Roadway Network	$18,001,404			
Extension of Moowaa Street between Kaumualiʻi Street and Dillingham Boulevard		$2,982,216		
Extension of Moowaa Street between Mookaula Street and King Street		$2,126,008		
New Segment from Austin Lane to Robello Lane (in HCC campus)		$3,503,988		
New Segment from Kōkea Street to Austin Lane (in HCC campus)		$5,984,865		
Extension of Robello Lane to Dillingham Boulevard (in HCC campus)		$1,517,949		
New Segment connecting Banyan Street from Kanoa Street to Vineyard Boulevard		$2,621,304		
Extension of ʻAʻala Street through ʻAʻala park between King Street and Beretania			$3,025,752	
New Segment connecting Dillingham to Kūwili Street, extension of Sumner Street, and New Segment J		$4,360,856		
Extension of Sumner Street		$2,742,768		

[19] Estimated phasing based on location of segments – phasing subject to change upon review and approval of projects.

Improvement	Phase 1: Present to 2030	Phase 2: 2031 to 2040	Phase 3: 2041 to 2050	Phase 4: 2051+/TBD
New Segment parallel to Alakawa connecting New Segment at Intersection with to Dillingham (through existing parking lots)		$10,296,264		
New Segment connecting New Segment to Alakawa Street		$3,591,720		
New Segment parallel to Alakawa connecting Pacific Street Extension (through existing parking lots)		$1,951,864		
Extension of Pacific Street, to connect to Alakawa		$6,827,896		
New Segment running ma uka/ma kai connecting Dillingham to Alakawa		$6,174,856		
New Segment running parallel to Dillingham between Kōkea Street and Alakawa Street		$9,040,976		
New Segment running ma uka/ma kai parallel to Kōkea Street and Alakawa Street		$5,383,952		
Extension of Kōkea Street to Alakawa Street (parallel to Nimitz and Dillingham)		$11,892,584		
Extension of Colburn Street between Waiakamilo and Kohou Street (parallel to Dillingham)		$2,612,160		
New Segment adjacent to OHA between Iwilei Road and North Nimitz Highway		$5,579,864		
Total:	**$135,831,707**			

3.6 Electrical

Existing Conditions. HECO is the main supplier of electricity on O‘ahu and is regulated by the State Public Utilities Commission (PUC). Most of the power on O‘ahu is generated by fossil fuel burning plants located on the west side of the island and delivered eastward through two primary transmission corridors. These regional facilities interconnect HECO substations interspersed throughout the island of O‘ahu. The distribution system generally consists of a blend of underground electric utility lines and overhead utility lines supported by wood joint poles. The system also includes regional transmission and sub-transmission power lines with some regional power lines supported by metal poles. Existing overhead facilities installed prior to the adoption of the TOD Special District designation may remain overhead and may be repaired and, if necessary, supplemented if such actions do not alter the character of such lines (i.e., HECO may replace or “up conductor” their lines, but the voltage of these distribution lines must remain the same).

There are some existing underground electric and communications duct systems within Iwilei, especially in areas that have been recently redeveloped, such as along Alakawa Street, or that were installed by the respective utility companies to serve as regional infrastructure. These latter underground facilities do not generally provide service to individual customers. In the future, however, the current draft TOD legislation will mandate that all new electric and telecommunications facilities be placed underground in TOD Special Districts.

HECO presently serves its residential, commercial, and governmental customers in the Iwilei Master Plan Area from its 12-kilo volt (kV) distribution system. The power sources for the 12-kV system are the existing HECO Iwilei, Waiakamilo, and Kapālama Substations[20]. The Iwilei Transmission Substation, located within the Iwilei Master Plan Area, converts the HECO 138-kV transmission voltage to 46-kV sub-transmission voltage and to 25-kV distribution voltage. Another substation, the existing 4-kV Kalihi distribution substation along Gulick Avenue, serves a more limited area. Finally, in 2020, a fourth distribution substation, the Auiki Substation, received approval from the PUC. The Auiki Substation is to be located adjacent to Auiki Street near DOT Harbors' new Kapālama Container Facility.

Due to the size of the electrical lines in the Dillingham corridor, currently there is only capacity for roughly 200 to 600 new residential units; although based on the information from area landowners, 1,300 to 1,800 new units are expected to be built in the next 10 years in that corridor. The City Center Utility Relocation (CCUR) Project, which proposes to relocate some of the existing overhead utility lines along Dillingham Boulevard into underground duct systems may ease some of these capacity issues. In August of 2022 HART selected Nan Incl to undertake the utility relocation project, which includes water and sewer lines in addition to the electrical facilities. This project includes a ma uka shift of the rail guideway - from a center-running alignment to a new ma uka alignment primarily on KS and HCC properties. The ma uka shift helps to avoid relocation of high voltage power lines and should provide slightly more space for underground cable from Waiakamilo to Kōkea Street to serve Kapālama Canal area development sooner than the proposed King Street alignment.

HECO has indicated during the prior TOD studies conducted by the City and the State, that it plans to serve large redevelopment projects. This includes projects consolidating multiple small parcels into a larger parcel, and block type developments, such as existing large parcels where density and loads will be increased significantly from existing levels based on the HECO 25-kV distribution system. Redevelopment or rebuilding on existing small land parcels will continue to be served by HECO from their 12-kV distribution system. The needed electrical improvements identified by this analysis include increasing the capacity of the existing 12-kV distribution lines (reconductor or "up conductor"), where applicable; extending 25-kV distribution infrastructure and circuits throughout the Iwilei Master Plan Area; providing an additional 46-kV transmission line; and providing additional transmission station and distribution substation capacity. It should also be noted that HECO has standards for construction of both aerial and underground 12-kV distribution systems. However, HECO does not have standards for construction of aerial 25-kV distribution systems.

Regional work and joint landowner discussions should continue to extend 25-kV circuits from their Iwilei transmission substation to support the larger redevelopment projects within the Iwilei Master Plan Area. Conversations for coordinated improvements should be continued to ensure adequate and timely implementation.

It is also likely that an additional 46-kV transmission alignment will be needed to provide redundancy for the existing Waiakamilo substation in order to mitigate the possibility of the substation going offline due to an outage on one of the 46-kV lines feeding the substation. Additionally, capacity at the existing Waiakamilo Substation could also be increased by adding substation transformers.

[20] The Iwilei, Kalihi, and Kapālama substations appear to be operating near design capacity. Pending submission of service requests triggered by TOD redevelopment, a request has been made to HECO for verification of the remaining capacity in these substations.

Standard Development Scenario and Utility Relocation. It is anticipated that in the future, TOD legislation will mandate that all new electric and telecommunications facilities be placed underground in TOD Special Districts (Revised Ordinance of Honolulu [ROH], Chapter 22). Existing overhead facilities installed prior to the adoption of the TOD Special District designation may remain overhead and may be repaired or supplemented if such actions do not alter the character of such lines (i.e., HECO may replace or "up conductor" their lines but the voltage of these distribution lines must remain the same).

For new developments requiring underground electrical facilities the developer is expected to pay for and construct the support structures. For underground electric service, the developer is required to fund the cost of the HECO underground cable installation. These funds consist of refundable advance portion and a non-refundable contribution reflecting the cost difference between an overhead system and an underground system. Over a 10-year period after construction of such projects, HECO reimburses, on a year-by-year basis, the project developers, a sum equivalent to the electricity usage charges paid by the energized development, during that year, for the "advance" portion only.

In the most common scenario for new electric services, the cost of new overhead electrical facilities that are triggered by specific development projects, while nominally the responsibility of HECO, based on their tariff, are usually paid for with funds provided by the developers of the projects requesting service. These funds, paid to HECO by the developer for electric service, consist of a refundable advance covering the cost of the overhead system.

The funding mechanisms and responsibilities for local electrical improvements initiated by the City, State, or HECO vary, depending on what the project entails and what type of electrical facility is being improved. In general, new developments and re-developments such as the Liliha CC Re-development, Mayor Wright Homes, KS Kapālama, and the various HPHA Housing re-developments are required to fund and construct the underground infrastructure associated with their respective developments.

For relocation work, project developers are assessed 100% of the cost for the relocation work by all utility companies with the exception of City and State projects where relocation cost sharing is mandated by State Statute, City Ordinance and/or Legislation. Examples of such cost sharing are Hawai'i Revised Statutes (HRS) 264-33 and Improvement District legislation. In the latter, costs for the relocation are prorated between the developers/property owners, the governmental agency, and the utility companies through a negotiated formula. It is understood that another process, Community Funded Development, is being contemplated, but the cost sharing formula and funding mechanisms are still being developed.

Infrastructure Improvements. Through consultation with HECO, recommendations for electrical improvements within the Iwilei Master Plan Area were identified. The necessary electrical improvements identified by the infrastructure assessment are to:

1) Increase the capacity of the existing 12-kV distribution lines (reconductor or "up conductor");
2) Re-distribute existing loads through switching and other modifications to HECO's existing overhead system to create additional capacity once additional 12-kV circuits become available from the new Auiki Substation or addition of a new substation transformer to the Waiakamilo Substation;
3) Extend 25-kV distribution circuits throughout Iwilei to service loads identified through master plan coordination with HECO;
4) Provide an additional 46-kV transmission line to Waiakamilo Substation;
5) Provide additional transmission station and distribution substation capacity; and
6) Provide capacity required for electric bus (and POV) charging.

HECO has already implemented proposed improvement 5 by obtaining PUC approval for construction of the new Auiki Substation in the Kalihi Kai area. Although the primary purpose of this new substation is to support the State's new Kapālama Container Terminal, electrical capacity in the Iwilei area could also be increased as described in Item 2 above.

25-kV Distribution Network. New underground infrastructure[21] must be built to allow for the extension of 25-kV circuits throughout the Iwilei Master Plan Area. The 25-kV distribution voltage presently serves the Downtown area and portions of the Kaka'ako area via an underground duct line located within North Nimitz Highway and Ala Moana Boulevard but does not serve the Iwilei Area.

Except for the existing 25-kV duct system and circuiting that extends from the Iwilei Transmission Substation eastwards along North Nimitz Highway (serving Downtown and parts of Kaka'ako), there are currently no 25-kV distribution lines serving the Iwilei area. New underground infrastructure must be built to allow for the extension of 25-kV circuits throughout the district. It is also recommended that any project to install underground electric duct systems may also consider including duct system for telecommunications utilities as well. A list of streets proposed to serve as the backbone 25-kV duct system is presented in Table 3-14. Areas anticipating near-term development may need these improvements immediately. It should be noted that HECO has indicated that they currently have no standards for construction of aerial 25-kV distribution lines and, therefore, ROM costs for equivalent aerial system have not been developed.

Creating this 25-kV underground network would entail constructing underground duct lines along several streets serving the Iwilei area. Initially, these duct lines could be energized at 12-kV, since that distribution voltage currently exists within this TOD area, but would be convertible to use with 25-kV circuits in the future by HECO installing 25-kV rated cables.

This assessment estimated costs for the 25-kV network improvements[22], since these improvements will either be triggered by specific projects and will have to be covered by developers, or an assessment district will be set up to share costs among landowners, HECO, and the City. For the purpose of cost estimating, the major thoroughfares are North Nimitz Highway, Kalihi Street, Waiakamilo Road, North King Street, Liliha Street, Iwilei Road, and Dillingham Boulevard. Also targeted for installation of new duct infrastructure are Kūwili Street, Pine Street, and Sumner Street since these roadways provide access to the other roadways for extension of 25-kV circuits from HECO's Iwilei Transmission Substation.

The 25-kV upgrades can be installed in stages, as noted in the phasing section below, based on the needs of development in the area. The total estimated cost for the 25-kV improvements ranges from $64.27 to $71.2 million for improvements along the following streets:

Table 3-14: 25-kV Underground Distribution Network

Improvement (Roadway Reference)	Phase 1: Present to 2030	Phase 2: 2031 to 2040	Phase 3: 2041 to 2050	Phase 4: 2051+ / TBD
North Nimitz Highway		$31,000,000		
Kalihi Street		$5,200,000 - $5,750,000		
Waiakamilo Road		$5,750,000		
North King Street	$7,000,000 - $11,500,000			
Liliha Street	$2,300,000			
Vineyard Boulevard		$2,100,000		
Iwilei Road South		$1,800,000		
Iwilei Road North	$1,230,000 - $1,850,000			
Pine Street	$1,250,000 - $1,600,000			

[21] HECO has indicated that they currently have no standards for construction of aerial 25 kV distribution lines.

[22] The cost models also include budgets for: prorations for appropriately sized utility handholes and manholes, trenching and backfilling, pavement saw cutting and repair work, patching, shoring, dewatering, and traffic control; and HECO cabling and equipment.

Improvement (Roadway Reference)	Phase 1: Present to 2030	Phase 2: 2031 to 2040	Phase 3: 2041 to 2050	Phase 4: 2051+ / TBD
Dillingham Boulevard		$920,000 - $1,050,000		
Kūwili Street		$4,000,000 - $4,200,000		
Sumner Street	$1,720,000 - $2,300,000			
Total	**$64,270,000 - $71,200,000**			

46-kV Transmission Upgrades. In the mid- to long-term an additional 46-kV[23] transmission alignment would likely be needed to serve the Iwilei Master Plan Area. Three alternate underground routings were analyzed for the 46-kV duct: Dillingham Boulevard, North King Street, or North Nimitz Highway. The alternatives vary on costs, constraints, and relevant stakeholders. The rationale for the additional 46-kV sub-transmission line is to provide redundancy for the Waiakamilo Substation and mitigate the possibility that an outage occurring on one of the 46-kV lines feeding that substation could cause that substation and all the customers connected to that substation to go off-line. Additionally, capacity at the existing Waiakamilo Substation could also be increased by adding substation transformers.

The cost for installation of the HECO 46-kV infrastructure and circuits is considered to be a "system" cost, which is typically borne by HECO, and depends on which alternative is deemed to be the most viable and cost efficient. The Dillingham Corridor alternative is the most inexpensive at $18.4 million. However, the Dillingham corridor is already very congested such that in order to avoid relocating high voltage power lines, the Dillingham utility relocation "mauka shift" was awarded to Nan Inc, in early Fall 2022 for $500 million. Nan Inc. is now responsible for relocating underground and overhead systems including sewer, water, and electric along the Dillingham Corridor. The Nimitz alternative is the most expensive at approximately $52.2 million since the alignment route is very long.

If the TOD special district legislation requires installation of the 46-kV facilities underground, it has yet to be determined if HECO will agree that construction of the 46-kV duct system and cabling would all be considered a "system" cost or whether HECO would only agree to bear the cost for an "equivalent overhead" 46-kV line leaving the bulk of the cost to be funded by some other means.

Table 3-15: 46-kV Transmission Upgrade Alternatives

Underground Roadway Infrastructure	New 46-kV Infrastructure Alignment Alternatives		
	North Nimitz Highway	North King Street	Dillingham Boulevard
North Nimitz Highway	$38,000,000	-	-
Kalihi Street	$7,500,000	$3,500,000	$1,730,000
North King Street	-	$13,800,000	-
Iwilei Road North	$1,850,000	$1,050,000	-
Pine Street	$1,850,000	-	$1,050,000
Dillingham Boulevard	-	$1,300,000	-
Kūwili Street	$2,900,000	$2,800,000	$2,900,000
Sumner Street	-	-	$12,700,000
Total Estimated Cost	**$52,100,000**	**$22,450,000**	**$18,380,000**

[23] The HECO 46-kV underground infrastructure cost model is based on 4-5" HECO conduits which would accommodate one 46-kV circuit. For each 46-kV infrastructure alternative alignment paralleling a 25-kV infrastructure routes consideration is given to synergistic cost sharing.

Phasing of Improvements.

Near Term: In the near-term, the following steps could be taken to increase electrical capacity in this area:

1) Reconductor or "up conductor" existing 12-kV distribution lines to increase their capacity;
2) Modify the existing 12-kV overhead distribution system and
3) Extend 25-kV distribution circuits from the Iwilei Transmission Substation toward the Kapālama direction.

The following streets should be upgraded with underground 25-kV distribution lines in Phase 1: North King Street, Liliha Street, Iwilei Road, Pine Street and Sumner Street. Near-term steps 1) and 2) would likely be system improvements implemented and funded by HECO. Step 3) may be done in increments and funded by an individual redevelopment project, or large landowners undertaking redevelopment of a number of their parcels, or the City may organize a regional improvement project to benefit all area landowners where funding could be determined through a cost-sharing agreement, such as an Improvement District.

Mid Term: For medium-term electrical capacity improvements, further expansion of the 25-kV Iwilei circuits should be prioritized to continue to expand capacity to serve the parcels anticipated for redevelopment. Additional mid-term steps are to provide additional substation transformers at the Waiakamilo substation and add a 46-kV sub-transmission circuit to this substation.

An alternative mid-term improvement that may be considered by one or more of the larger landowners in conjunction with HECO would be to identify a parcel within the Iwilei and/or Kapālama area that could be developed by HECO into a new distribution substation. The major consideration for this alternative would be:

1) Proximity to existing 46-kV sub-transmission alignments to minimize the cost and impact of extending these lines to the substation site;
2) Proximity to larger re-development targeted parcels to minimize the cost of TOD mandate underground infrastructure construction; and
3) Separation from existing HECO substations to mitigate Consumer Advocate and PUC concerns about HECO rate-base expenditures on "system" improvements.

Long Term: In the long term, HECO may need to consider developing a new transmission station, similar to the existing Iwilei Transmission Substation along Kūwili Street, near the corner of Dillingham and Ka'aahi Street. A 2-acre or more parcel on the western edge of the Kapālama area would need to be secured for this purpose. This facility would provide additional capacity required to support TOD, not only in the Iwilei-Kapālama area, but in other surrounding TOD areas as well. A new transmission station would provide additional capacity for the 25-kV distribution system and also provide additional capacity for the 46-kV sub-transmission circuits, which feed the 12-kV substations.

3.7 Telecommunication Systems

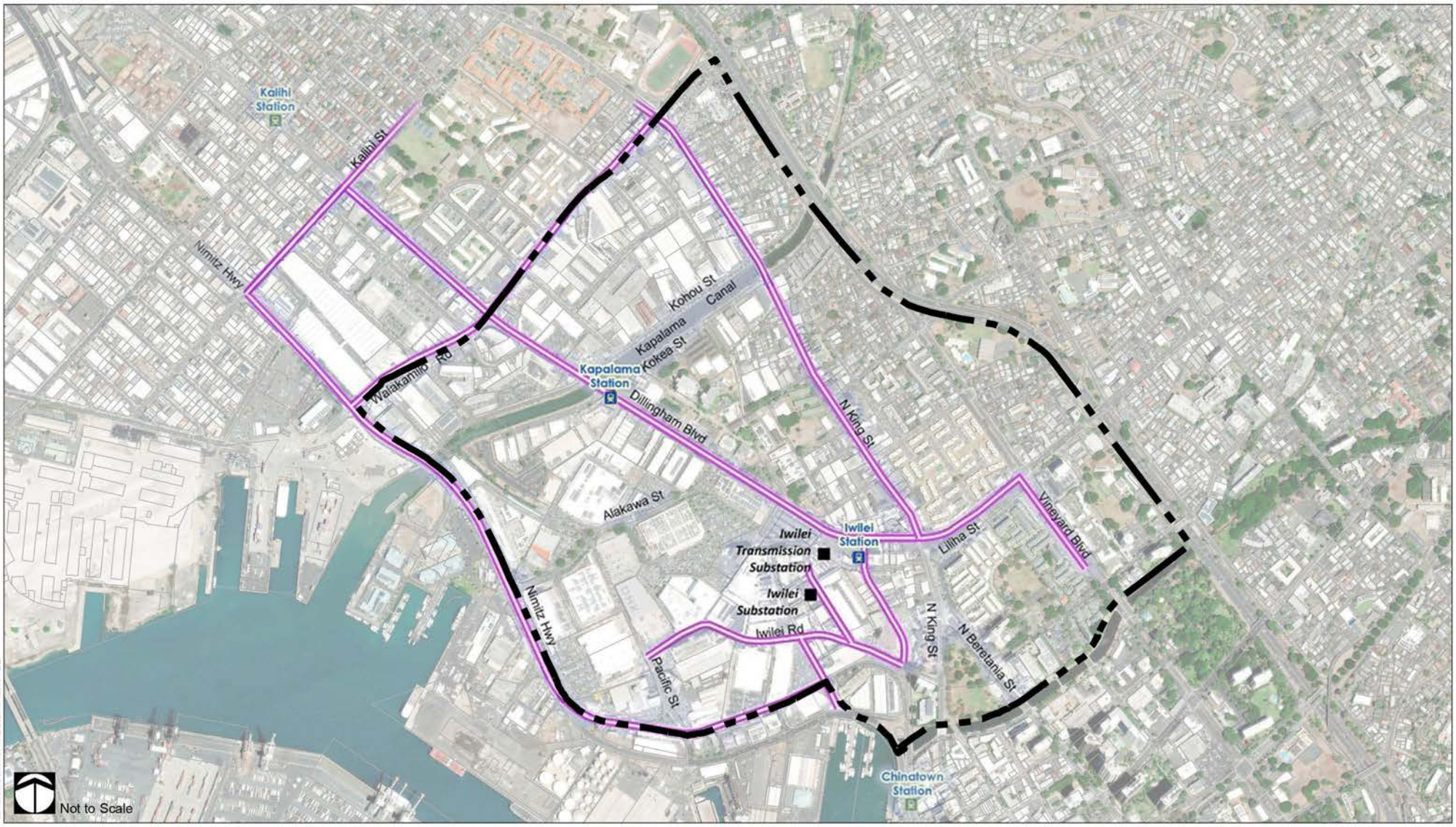
Existing Conditions. Similar to HECO, Hawaiian Telcom (HT), and Spectrum provide telecommunication services via their overhead lines mounted onto the same wood poles that support the HECO 12-kV and 4-kV distribution systems. The older, existing HT and Spectrum facilities consist mainly of a combination of twisted, copper pair and coaxial cables along with fiber optic trunking (high bandwidth transmission lines). However, in recent years both HT and Spectrum have committed to a "fiber-to-the premises" (FTTP) approach to their facility development strategy and are using fiber optic cables for area and local distribution and as service drops to customers.

There are some existing underground duct systems for telecommunications that were built by the respective utility companies for trunking cables to serve higher capacity regional distribution. In the late 1980's, AT&T Corporation built an underground duct system that traverses the Iwilei Master Plan Area within Dillingham Boulevard. This duct line contains fiber optic cables owned by AT&T Corp. and AT&T Government Solutions. AT&T facilities do not provide service to retail customers but serve large corporations and governments. By agreement with the City and the State, any work required to relocate the existing AT&T facilities is paid for by AT&T.

Infrastructure Improvements. For new development projects, HT and Spectrum typically require developers to provide underground telecommunications duct system infrastructure (also known as support structures) but will provide the cabling at their cost. These utility companies can also replace the existing overhead and underground legacy trunking facilities with fiber optic cables and supplement existing fiber optic cable facilities with additional structures where they are deemed necessary. Conversations with communication providers will need to be continued to develop a long-term district approach to develop the backbone communications network and/or identify ow to incorporate emerging wireless technologies.

3.8 Public Services – Open Space / Parks and Public Schools / Emergency Services

The anticipated development and associated resident population will also require additional public service infrastructure such as green/open space, public school facilities, and police/EMT/fire services. However, this study focused on hard infrastructure so future studies and consultation will need to be undertaken to determine the additional parks and open space and DOE facilities necessary to support redevelopment.



Q:\Oahu\Iwilei Master Plan\PSD

DATE: 2/27/2023

LEGEND

- Iwilei Master Plan Area
- Rail Station
- Proposed Underground Electrical/ Communications Improvements
- HECO Substation

Source: City & County of Honolulu, 2020. ESRI Online Basemap. Ronald N.S. Ho & Associates, Inc.
Disclaimer: This Graphic has been prepared for general planning purposes only and should not be used for boundary Interpretations or other spatial analysis.

Figure 3-15

Proposed Electrical Improvements

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

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4 Iwilei Infrastructure Improvement Master Plan Summary

Improving infrastructure capacity of the sewer, water, drainage, transportation, and electrical systems will be critical in achieving TOD potential in the Iwilei Master Plan Area. There are significant barriers and concerns related to the timing and concurrency of needed infrastructure improvements for TOD development in this area, particularly related to sewer and electrical facility improvements needed to support initial development.

Details on development assumptions and specific infrastructure projects necessary to support development will continue to change as public and private development is planned and projects are closer to market readiness.

The following sub-sections summarize infrastructure improvements by type and identify cost, phasing, and major owners that may benefit from each improvement.

Sewer. ENV has been working with developers in the area on a "case by case" basis and the existing sewer system in Iwilei has limited capacity to serve new TOD development until the ʻAwa Street WWPS is relieved and upgraded. The ENV Waiakamilo Road Trunk Sewer Project will partially relieve the ʻAwa Street WWPS by connecting a substantial portion of the tributary area west of Waiakamilo Road up to North School Street directly to the 54-inch Trunk Sewer on North Nimitz Highway. The Awa Street WWPS will still need to be upgraded to increase its capacity. The portion of the Waiakamilo Road Trunk Sewer that diverts flow from the existing gravity lines west of the intersection of Dillingham Boulevard and Waiakamilo Road is already in use.

Based on the anticipated TOD development, new and upsized sewer lines will be needed to implement Mayor Wright Homes, Liliha CC, and Kalanihuia Homes. ENV is studying the area under the Iwilei, King Street, Kōkea Street Area Sewer Improvements Project. A potential solution that may result from this project is the sewer improvements on King Street to Nuʻuanu Street to serve these projects.

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Table 4-1: Cost of Each Project and which Anticipated TOD Development Project Will Benefit

CIP Proj. No.	CIP Project Name	Sub-project or Addt'l Sewer Project	Appr.	2023 Budget	Estimated Future	Sub Project Budget*	Phase	Major Owners	Which Projects Benefit	Total
2019046	Awa Street WWPS Impr. / Rehab. (appr.)			$1,501,000	$13,203,000		1 & 2	Area Wide		
		ʻAwa Street WWPS Impr.*				$13,203,000				
2017054	Hart Street WWPS Force Main Impr. Phase 3 (appr.)		$953,000	$4,801,000			1&2	Area Wide		
2019065	Hart Street / Waiakamilo Rd. Rep. Sewer (appr.)		$3,602,000				1	Serving KS & DHHL		
2019067	Iwilei, King Street, Kōkea Street Area Sewer Impr. (appr.)		$1,802,000		$7,802,000		1 & 2			
		Relief on Kōkea Street*				$3,691,250		Mauka serving HCC, KS, Kaʻiulani Elem School, and improves MWH, Liliha Square, Kukui Gardens, Douglas Emmett, Kauluwela #2, LCC, Castle & Cooke, Costco, Iwilei Business Center, Salvation Army and OHA. Kōkea Street 12" Upgrade Makai HCC Makai,		
		Relief on Liliha Street*				$1,840,000		Serving MWH, Liliha Square, Kukui Gardens, Douglas Emmett, Kauluwela #2, LCC		
		Relief on King Street*				$1,815,000		Serves MWH and can serve LCC		
		Nu'uanu Stream Relief*				$1,890,000		Serves MWH and can serve LCC		
		Iwilei Road Relief *				$750,000		Serves MWH, Liliha Square, Kukui Gardens, Douglas Emmett, Kauluwela #2, LCC, Castle & Cooke, Costco, Iwilei Business Center, Salvation Army, OHA.		
2005075	Kalihi/Nu'uanu Area Sewer Rehab. / Impr. (appr.)		$301,000	$1,500,000	$33,905,000			Area Wide to mitigate increased I/I due to SLR by reducing upstream I/I		
N.A.		I/I and SLR Improvements CIPP*			$152,303,920		2 & 3	Area Wide to mitigate increased I/I due to SLR		
	Total		**$6,658,000**	**$7,802,000**	**$207,213,920**	**$23,189,250**				

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Water. The backbone water infrastructure is relatively strong in the Iwilei Master Plan Area, however aging infrastructure is an ongoing challenge. In the short-term, water availability is a concern for new development until the Red Hill water contamination issue is resolved. Water system improvements are presently needed based on the existing water line sizes and the required fire flow for anticipated land uses. The BWS has multiple projects in its CIP projects that will address current deficiencies and increase local and regional capacity. Existing water lines for a majority of the TOD projects will have to be upsized to deliver the BWS required flow for fire potential and increase reliability. Water source and storage capacity will be assessed as the demand of the Primary Urban Center increases. To strengthen the distribution system and improve fire protection in the Iwilei Area a new water line on Iwilei Road is recommended.

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6-year CIP	6-year CIP Project Name	Sub-project of CIP Project or Additional Water Project	Appropriated	2023 1. Budget	Estimated Future	Potential Sub Project Budget*	Phase	Major Owners	Which Projects Benefit	Total
BWS Data	North Nimitz Highway 16-Inch Main, Waiakamilo Road to Sumner Street (BWS CIP) (design)				$8,900,000		1 & 2	Area Wide		
BWS Data	ʻAʻala Street and N Vineyard Blvd. Water System Improvements (BWS CIP) (design)				$6,920,000		1 & 2	Serving MWH, Liliha Square, Kukui Gardens, Douglas Emmett, Kauluwela #1 & #2 and Elem, Salvation Army		
BWS Data	Kōkea Street and Auld Lane Water System Improvements (BWS CIP) (design)				$6,050,000		2 or 3	Serving KS		
BWS Data	Dillingham Blvd at Kohou Street Water System Improvements) BWS CIP) (design)				$3,932,000		1	Serving KS		
BWS Data	Honolulu District 42-Inch Mains - Liliha to Mōʻiliʻili (BWS CIP) Planned				$350,000,000		3 or 4	Area Wide		
Other		Iwilei Road			$3,932,000		2	Serving Castle & Cooke, Iwilei Business Center, OHA, Salvation Army		
Other		Off-Iwilei Road			$76,000		3	Serving Salvation Army, Weinberg		
Other		Kohou Street			$270,000		2	Serving KS and DHHL		
Other		Hone Lane			$62,500		3	No Major Landowners		
Other		Pālama and Kama Lane			$54,000		3	No Major Landowners		
Other		Long Lane			$32,500		3	No Major Landowners		
Other		Maʻo Lane			$45,000		3	No Major Landowners		
Other		Olomea Street			$30,000		3	No Major Landowners		
Other		Morris Lane			$40,000		3	No Major Landowners		
Other		Hoapili Lane			$38,750		3	No Major Landowners		
Other		Peterson Lane			$458,750		3	No Major Landowners		
Other		Kanoa Street			$315,000		3	No Major Landowners		
Other		Banyan Street			$85,000		3	No Major Landowners		
Other		Robello Lane			$190,000		3	HCC		
Other		Akepo Lane			$100,000		3	HCC		
Other		Auld Lane			$37,500		3	No Major Landowners		
Other		Kalani Street			$207,000		1 or 2	Serving KS and DHHL		

6-year CIP	6-year CIP Project Name	Sub-project of CIP Project or Additional Water Project	Appropriated	2023 1. Budget	Estimated Future	Potential Sub Project Budget*	Phase	Major Owners	Which Projects Benefit	Total
Other		Ka‘aahi Street			$180,000		1	Serving LCC and Weinberg		
Other		Moonui Street			$195,000		2	Serving KS		
Other		Mookaula Street			$300,000		2	Serving KS		
	Total				**$382,451,000**					

Drainage. The drainage system does not meet the City Drainage Standards and will need to be upgraded. The existing backbone drainage systems consist of drain lines owned by the City, State, and private entities and have various deficiencies and constraints due to low-lying terrain and high-water table. Other factors such as tidal effect, plugged shallow drain, and malfunctioning pumps (only one of the two private pumps is operational) may contribute to flooding issues in the area. Each individual development must submit a drainage report to demonstrate that the development causes no impact on adjacent properties due to runoff. The City has requested additional flood studies from the Federal Emergency Management Agency (FEMA). Preliminary indications show increased 100-year hazard from the Kapālama Canal. The Kapālama Canal Revitalization Project is important to improve the flood protection and drainage systems in the Iwilei Master Plan Area. To complement the upgraded canal, new drainage pumping stations next to the canal should be planned unless the roads in the area are raised. The Pua Lane Drainage will relieve the existing drainage inadequacy at the Dillingham Boulevard, Liliha Street and King Street Intersection which impacts MWH and Liliha CC. (Latest CIP No. 2015102 shows $35,000,000 beyond 2028 and $850,000 Expended and $300,000 Encumbered).

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CIP	CIP Project Name or MP Name	Appropriated	2023 Budget	Estimated Future	Potential Sub Project Budget*	Phase	Major Owners/Note	Which Projects Benefit	Total
	Kapālama Canal Revitalization Project Dredging (adopted Master Plan)	$300,000		$35,000,000		1 or 2	Area Wide, land disposal vs ocean disposal		
	Kapālama Canal Dredging						Pre-soil test results		
	Temporary Flood Walls						Pre-soil test results		
	Nu‘uanu Stream Improvements			$40,000,000			Estimate		
	Houghtailing to Moonui St Drainage			$6,169,671		2	Serving KS		
	King Street Drain 1			$1,788,790			Serving Liliha CC and ‘A‘ala Park		
	King Street Drain 2			$2,443,457			Serving KS		
	King Street Drain 3 (Incl. H-1 Diversion)			$7,803,650		3	Serving KS & Pālama Settlement		
	H-1 Diversion Line (see King Street Drain 3)					3			
	Mookaula Street Drain			$2,438,936		2	Serving KS		
	Moonui Street Drain (Houghtailing to Canal)			$9,300,000		1	Serving KS		
	Kaumuali‘i Street Drain			$2,365,090		1	Serving KS		
	Dillingham Boulevard Drain 1			$23,396,650		1	Serving KS		
	Dillingham Boulevard Drain 2			$5,356,200		1	Serving KS		
	Kohou Street Drain			$1,893,880		2	Serving KS		
	Kalani Street Drain			$3,080,880		1	Serving KS & DHHL		
	Vineyard Boulevard Drain			$3,026,000		1			
	Pua Lane Drain (incl. Kukui Gardens)			$26,458,950		1 & 2	Serving MWH, Liliha Square, Kukui Gardens, Douglas Emmett, Kauluwela #1 & #2, Salvation Army		
	Pua Lane Diversion Line (See Pua Lane)					1 & 2	Serving MWH and relieving Costco Drain		
	Kukui Gardens Drain(See Pua Lane)					2	Serving MWH, Kukui Gardens and Douglas Emmett		
	Costco Drain (incl. diversion)			$18,004,290		2	Serving Weinberg, Iwilei Business Center, Castle & Cooke, Costco, ABP HDILLC, Cannery Row		
	Costco Diversion Line (See Costco)					2			
	North Nimitz Highway Drain			$9,003,840		2	Serving Castle & Cooke, Iwilei Business Center, OHA, Salvation Army, OHA, Lowes		
	Iwilei Road Drain			$24,918,760		2	Serving Castle & Cooke, Iwilei Business Center, OHA, Salvation Army, OHA, Lowes		
	TOTAL	**$300,000**		**$222,449,044**					

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Roadways and Circulation. Given the anticipated levels of redevelopment, including major expansion of residential uses throughout the area, circulation is a key infrastructure consideration. Roadways and circulation related improvements may include major intersections and roadways in the vicinity of each TOD project site that serve both regional and project related purposes. Multi-modal access and circulation improvements will be a critical component to providing access for all users, including pedestrians, bicyclists, and transit users, to promote safer and more active transportation choices and to promote ridership of the transit line.

Roadway and Circulation Type	Cost	Phase	Benefit and Location Notes
Walkways			
Kanoa Street from Pālama Street to Pua Lane Walkway	$171,600	1 & 2	MWH and Regional Connectivity
Pālama Street from Vineyard to King Street Walkway	$241,824	1 & 2	MWH and Regional Connectivity
Kohou Street from H1 to Nimitz Path	$5,820,857	1 & 2	KS, DHHL, HCC and Regional Connectivity
Kōkea Street from H1 to Nimitz Path	$5,622,939	1 & 2	KS, DHHL, HCC and Regional Connectivity
Kaʻaahi Street from Dillingham to Iwilei Road Path	$1,920,100	1	Liliha CC and Regional Connectivity
1 or 2 Pedestrian Bridge Crossings of Kapālama Canal	$92,925	2 & 3	KS, HCC, and Regional Connectivity
King Street from Dillingham to Liliha Walkway Upgrade	$191,100	1	MWH, Kukui Gardens, and Regional Connectivity
Subtotal:	**$14,061,345**		
Bikeways			
Kohou Street from H1 to Nimitz Shared Use Path	$1,040,424	1 & 2	KS, DHHL, HCC and Regional Connectivity
Kōkea Street from H1 to Nimitz Shared Use Path	$1,005,048	1 & 2	KS, DHHL, HCC and Regional Connectivity
Kaʻaahi Street from Dillingham to Iwilei Road Shared Use Path	$343,200	1	Liliha CC and Regional Connectivity
Between Kaʻaahi Street and King Street Shared Use Path	$144,672	1 & 2	Liliha CC and Regional Connectivity
Extension of Robello Lane through HCC Campus Shared Use Path	$59,928	4/TBD	HCC and Regional Connectivity
Extension of Austin Lane through HCC Shared Use Path	$290,928	4/TBD	HCC and Regional Connectivity
Extension of Kaumualiʻi Street across Kapālama Canal through HCC Campus Shared Use Path	$771,144	4/TBD	KS, HCC, and Regional Connectivity
Extension along River Street between King Street and Nimitz Shared Use Path	$77,352	2	Liliha CC and Regional Connectivity
Nimitz south of Sumner Street Shared Use Path	$66,528	1 & 2	Regional Connectivity
Dillingham Boulevard (full extent) Protected Bike Lane	$1,134,672	2 & 3	Regional Connectivity
King Street (full extent) Protected Bike Lane	$1,578,720	2 & 3	Regional Connectivity

Roadway and Circulation Type	Cost	Phase	Benefit and Location Notes
Alakawa Street from Nimitz to Dillingham Bike Lane	$124,608	2	Regional Connectivity
Sumner Street from Dillingham to Nimitz Bike Lane	$82,541	2	Regional Connectivity
Extension of Pacific Street from Iwilei Road to Kōkea Street Bike Lane	$133,635	2 & 3	Castle and Cooke, City Center, City Mill, HA, and Regional Activity,
New Segment from Kaʻaahi Street to Kōkea Parallel to Dillingham Bike Lane	$194,169	3 & 4	Castle and Cooke. Liliha CC, City Center, and Regional Connectivity
New Segment parallel to Alakawa Street from Pacific Street to Dillingham Bike Lane	$99,592	3 & 4	Castle and Cooke, HCC Ma kai, KS, and Regional Connectivity
Liliha Street from H1 to King Street/Dillingham Bike Lane	$106,908	2 & 3	MWH, Kukui Gardens, Regional Connectivity
Extension from Liliha Street to Dillingham (segment parallel to Kaʻaahi Street) Bike Lane	$21,358	3	HCC, Iwilei Center, Liliha CC, Regional Connectivity
Vineyard Boulevard Bike Lane	$175,997	4/TBD	MWH, Kukui Gardens, Liliha Square, Pālama Settlement, and Regional Connectivity
ʻAʻala Street ma uka of Beretania Bike Lane	$117,115	3 & 4	Kukui Gardens and Regional Connectivity
Beretania Street south and east of King Street Intersection (parallel to ʻAʻala Park) Bike Lane	$73,573	3 & 4	Kukui Gardens, MWH, and Regional Connectivity
Kaumualiʻi Street (northwest of Kohou Street) Shared Roadway	$5,383,908	2	KS, DHHL, and Regional Connectivity
Kalani Street (northwest of Kohou Street) Shared Roadway	$3,161,754	2	KS, DHHL, and Regional Connectivity
Pālama Street from King Street to Vineyard Shared Roadway	$4,716,792	2 & 3	HCC, Pālama Settlement, and Regional Connectivity
Subtotal:	**$20,904,566**		
Roadways			
New Segment between Kaumualiʻi Street and Mookaula Street (parallel to Moowaa and Kohou Streets)	$8,445,984	1	KS and Regional Connectivity
Extension of Moonui Street between Moowaa and Kohou Streets	$4,752,680	1	KS and Regional Connectivity
Extension of Kaʻaahi Street	$4,192,749	1	Liliha CC and Regional Connectivity
Extension of Pacific Street between Alakawa and Iwilei Road	$8,221,048	1	City Mill, Castle and Cooke, OHA, and Regional Connectivity
Mayor Wright Homes New Roadway Network	$18,001,404	1	MWH
Extension of Moowaa Street between Kaumualiʻi Street and Dillingham Boulevard	$2,982,216	2 & 3	KS and Regional Connectivity
Extension of Moowaa Street between Mookaula Street and King Street	$2,126,008	2 & 3	KS and Regional Connectivity
New Segment from Austin Lane to Robello Lane (in HCC campus)	$3,503,988	2 & 3	Honolulu CC and Regional Connectivity

Roadway and Circulation Type	Cost	Phase	Benefit and Location Notes
New Segment from Kōkea Street to Austin Lane (in HCC campus)	$5,984,865	2 & 3	Honolulu CC and Regional Connectivity
Extension of Robello Lane to Dillingham Boulevard (in HCC campus)	$1,517,949	2 & 3	Honolulu CC and Regional Connectivity
New Segment connecting Banyan Street from Kanoa Street to Vineyard Boulevard	$2,621,304	2 & 3	HCC, MWH, and Regional Connectivity
Extension of ʻAʻala Street through ʻAʻala Park between King Street and Beretania	$3,025,752	3 & 4	Regional Connectivity
New Segment connecting Dillingham to Kūwili Street, extension of Sumner Street, and New Segment J	$4,360,856	2 & 3	Regional Connectivity
Extension of Sumner Street to New Segment H	$2,742,768	2 & 3	Iwilei Center and Regional Connectivity
New Segment parallel to Alakawa connecting New Segment L at Intersection with New Segment K to Dillingham (through existing parking lots)	$10,296,264	2 & 3	Castle and Cooke, HCC, and Regional Connectivity
New Segment connecting New Segment J to Alakawa Street	$3,591,720	2 & 3	HCC Ma kai and Regional Connectivity
New Segment parallel to Alakawa connecting Pacific Street Extension to New Segment K (through existing parking lots)	$1,951,864	2 & 3	City Mill, Castle and Cooke, HCC, and Regional Connectivity
Extension of Pacific Street, to connect to Alakawa	$6,827,896	2 & 3	City Mill, Castle and Cooke, HCC Ma kai, and Regional Connectivity
New Segment running ma uka/ma kai connecting Dillingham to Alakawa	$6,174,856	2 & 3	Regional Connectivity
New Segment running parallel to Dillingham between Kōkea Street and Alakawa Street	$9,040,976	2 & 3	HCC Ma kai and Regional Connectivity
New Segment running ma uka/ma kai parallel to Kōkea Street and Alakawa Street	$5,383,952	2 & 3	HCC Ma kai and Regional Connectivity
Extension of Kōkea Street to Alakawa Street (parallel to Nimitz and Dillingham)	$11,892,584	2 & 3	HCC Ma kai and Regional Connectivity
Extension of Colburn Street between Waiakamilo and Kohou Street (parallel to Dillingham)	$2,612,160	2 & 3	KS, DHHL, and Regional Connectivity
New Segment adjacent to OHA between Iwilei Road and North Nimitz Highway	$5,579,864	2 & 3	OHA, Castle and Cooke, City Mill, and Regional Connectivity
Subtotal	**$135,831,707**		
Total	**$170,797,618**		

Electrical and Telecommunications. Although the existing electrical system in the Iwilei Master Plan Area has sufficient capacity for present day needs and can support limited growth, HECO has indicated according to their April 2020 letter and during the prior TOD studies conducted by the City and the State, that it plans to serve large redevelopment projects. This includes projects consolidating multiple small parcels into a larger parcel, and block type developments, such as existing large parcels where density and loads will be increased significantly from existing levels based on the HECO 25-kV distribution system. Redevelopment or rebuilding on existing small land parcels will continue to be served by HECO from their 12-kV distribution system. The needed electrical

improvements identified by this analysis include increasing the capacity of the existing 12-kV distribution lines (reconductor or "up conductor"), where applicable; extending 25-kV distribution infrastructure and circuits throughout the Iwilei Master Plan Area; providing an additional 46-kV transmission line; and providing additional transmission station and distribution substation capacity. It should also be noted that HECO has standards for construction of both aerial and underground 12-kV distribution systems. However, HECO does not have standards for construction of aerial 25-kV distribution systems.

Regional work and joint landowner discussions should continue to extend 25-kV circuits from their Iwilei transmission substation to support the larger redevelopment projects within the Iwilei Master Plan Area. Conversations for coordinated improvements should be continued to ensure adequate and timely implementation.

Electrical	Cost	Phase	Benefit and Location Notes
25-kV Underground Distribution Network			
North Nimitz Highway	$31,000,000	2	Regional benefits
Kalihi Street	$5,200,000 - $5,750,000	2	Regional benefits
Kaʻaahi Street	$1,400,000	2	Local Benefit, immediately adjacent to Liliha CC on the makai edge
Waiakamilo Road	$5,750,000	2	Regional benefits
North King Street	$7,000,000 - $11,500,000	1	Local Benefit, Mauka of Liliha CC, Honolulu CC, KS properties; and makai of MWH
Liliha Street	$2,300,000	1	Local Benefit, adjacent to MWH and Kukui Gardens
Vineyard Boulevard	$2,100,000	2	Local Benefit, adjacent to Kukui Gardens and Liliha Square Shopping Center
Iwilei Road South	$1,800,000	2	Local Benefit, adjacent to OHA, Castle and Cooke, and Iwilei Center
Iwilei Road North	$1,230,000 - $1,850,000	1	Local Benefit, immediately adjacent to Liliha CC on the Diamond Head edge of the property
Pine Street	$1,250,000 - $1,600,000	1	Local Benefit, adjacent to Iwilei Center
Dillingham Boulevard	$920,000 - $1,050,000	2	Local Benefit, makai of MWH and adjacent to Honolulu Community College, would also benefit KS properties
Kūwili Street	$4,000,000 - $4,200,000	2	Local Benefit
Sumner Street	$1,720,000 - $2,300,000	1	Local Benefit
46-kV Transmission Upgrade Alternatives		2	Regional Benefits
North Nimitz Highway	$52,100,000		
North King Street	$22,450,000		
Dillingham Boulevard	$18,380,000		
Subtotal:	**$158,60,000 - $165,530,000**		

Other considerations.

Hazardous Materials. Landowners should undertake a Phase I ESA to identify potential or existing contamination liabilities for properties that may have had industrial uses in the area. Depending on the results of the Phase I ESA, a Phase II ESA may be required to evaluate the chemical makeup and possible contamination of soil, groundwater, and vapor on-site.

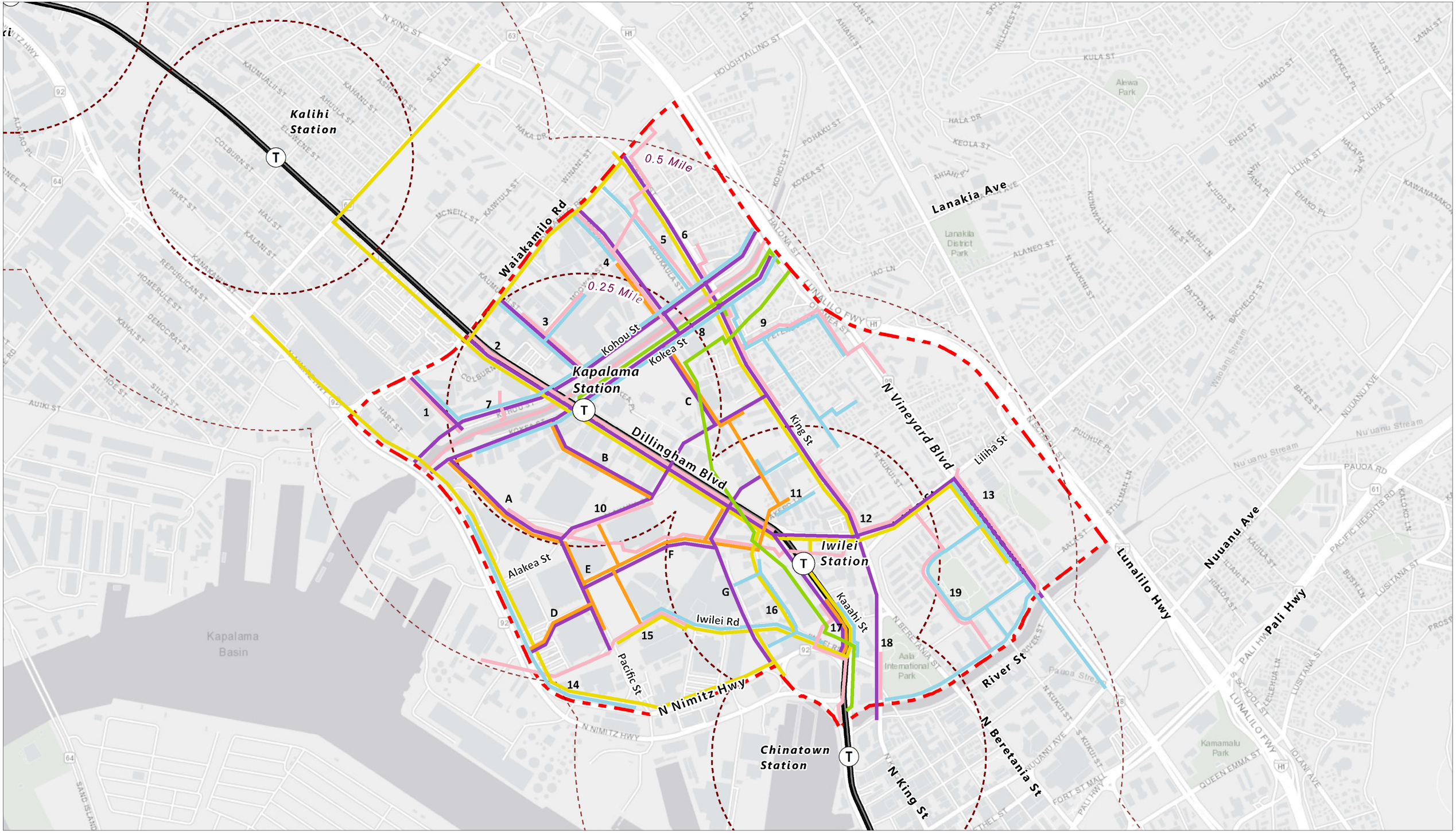
Department of Transportation, Airports Division (DOT Airports). Landowners should consult with DOT Airports as soon as feasible in the redevelopment project planning process to provide an opportunity for review of the airspace constraints and single-engine out policies for individual aircraft operating at Daniel K. Inouye International Airport.

4.1 Opportunities for Coordinated Project Efforts

Figure 4-1 and Table 4-2 on the following pages identifies segments and locations that have been identified for more than one project improvement in the aforementioned sections. These segments could benefit from coordinated improvements to limit segment disruptions and potentially facilitate and/or expedite their completion.

While City departments have not yet had extensive inter-departmental discussions about each of these potential groupings, this template can be used for budget discussions and potential funding options to leverage coordinated improvements.

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LEGEND

- Iwilei Master Plan Area
- Future Rail Stations
- Future Rail Line
- SEWER
- WATER
- DRAINAGE
- BIKE
- ROAD
- ELECTRICAL

Source: City and County of Honolulu 2017 & 2020.

Disclaimer: This graphic has been prepared for planning purposes only and should not be used for boundary interpretations or other spatial analysis.

Figure 4-1
Opportunities for Coordination

Infrastructure Improvement Master Plan for the Iwilei Area

HHFDC/DAGS — Island of O'ahu

North — Linear Scale (feet) 0 400 800

PBR HAWAII & ASSOCIATES, INC.

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Table 4-2: Opportunities for Coordinated Project Efforts by Location and Project Type

Identifier	Segments/Location	Sewer	Water	Drainage	Road	Bike	Electrical	Proximity To:
1	Kalani Street from Waiakamilo to Kapālama Canal		New 12-inch Line	Kalani Street Diversion Drain		Future Shared Roadway		DHHL and KS
2	Dillingham Boulevard			Dillingham Boulevard Diversion Drain 2		Future Protected Bike Lane	25-kV duct Local Benefit, makai of MWH and adjacent to Honolulu Community College, would also benefit KS properties	DHHL, HCC, and KS
3	Kaumualiʻi Street Segment		Dillingham Boulevard at Kohou Street Water System Improvements	Kaumualiʻi Street Diversion Drain Line		Future Shared Roadway		HCC and KS
4	Moonui Street from Waiakamilo with extension to Kohou Street		New 12-inch Line	Moonui Street Diversion Drain Line	Future Roadway identified in IK Transportation Network Assessment	Recommended Shared Use Path		HCC and KS
5	Mookaula Street		New 12-inch Line	Mookaula Street Diversion Drain Line				HCC and KS
6 &12	King Street from Waiakamilo to Liliha Street		Small Segment	2 Segments Diversion Drain Line & New Drain Line Area wide drainage benefit, including MWH *Potential to coordinate also with Lakimela and Peterson Lane; and Liliha Street*	Intersection Improvement at Liliha Street and Dillingham Area wide circulation benefits at the makai-Diamond Head corner of MWH	Future Protected Bike Lane	25-kV duct Local Benefit, Mauka of Liliha CC, Honolulu Community College, KS properties; and makai of MWH	HCC, KS, MWH, Kukui Gardens/Waena Apartments, Pālama Settlement, Liliha Square Shopping Center, Liliha CC
7	Kohou Street between Dillingham and Kalani Street		Dillingham Boulevard at Kohou Street Water System Improvements New 12-inch Line	Portion: Kapālama Canal Dredging Area wide flood benefits to address floodplain issues, includes benefits to MWH and Liliha CC (affected by flooding from canal = reason to raise Liliha CC property), and KS properties		Future Shared Use Path		HCC Ma kai and KS

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Identifier	Segments/Location	Sewer	Water	Drainage	Road	Bike	Electrical	Proximity To:
8	Kōkea Street from Dillingham to King Street	Phase 1 Proposed Sewer Improvement CIP Project Number 2019067		Portion: Kapālama Canal Dredging Area wide flood benefits to address floodplain issues, includes benefits to MWH and Liliha CC (affected by flooding from canal = reason to raise Liliha CC property), and KS properties		Future Shared Use Path		HCC and KS
9	Lakimela Lane and Peterson Lane to King Street	Phase 1 Sewer Line Affected by CIP Project Number 2019067 Crosses nearby	Kōkea Street and Auld Lane Water System Improvements	H-1 Diversion Line - New Drain Line *Potential to coordinate also with King Street*				HCC and KS
10	Alakawa Street			Alakawa Street Drain – Relieved by the Diversion Line		Future Bike Lane		HCC Ma kai, KS, HCC, Castle and Cooke
11	Akepo Lane		New 8-inch Line		Future Roadway identified in IK Transportation Network Assessment			HCC and MWH
12	Liliha Street between King Street and Vineyard			Kukui Drain – Diversion Drain Line & Pua Street Diversion - New Drain Line *Potential to coordinate also with King Street*	Intersection Improvement at Liliha Street and Dillingham Area wide circulation benefits at the makai-Diamond Head corner of MWH	Future Bike Lane/ Future Protected Bike Lane	Proposed Underground Improvements *Potential to coordinate also with Dillingham*	HCC, MW, Kukui Gardens/Waena Apartments, Liliha CC
13	Vineyard from Nu'uanu Stream to Liliha Street		ʻAʻala Street and North Vineyard Boulevard Water System Improvements	Vineyard Boulevard Drain - Diversion Drain Line		Future Bike Lane	Proposed Underground Improvements – extends through intersection with Dillingham	Kukui Gardens/Waena Apartments, MHW, Liliha Square Shopping Center
14	Nimitz from Sumner Street to Waiakamilo		North Nimitz Highway 16-inch main, Waiakamilo Road to Sumner Street				Proposed Underground Improvements	OHA, Costco, Castle and Cooke, City Mill
15	Iwilei Road from King Street to Pacific Street with segment in easement to Nimitz		New 16-Inch Line	Surcharged Line and Iwilei Road Diversion Drain Line	(See #12)		25-kV duct Local Benefit, immediately adjacent to Liliha CC on the Diamond Head edge of the property	OHA, Costco, Castle and Cooke, Iwilei Center, City Mill

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Identifier	Segments/Location	Sewer	Water	Drainage	Road	Bike	Electrical	Proximity To:
16	Kūwili Street		Dillingham Boulevard to Kohou Street Water System Improvements				25-kV duct	Iwilei Center, Liliha CC
17	Kaʻaahi Street from Dillingham with segment of Nimitz off ramp to Awa Street	Sewer Line Affected by Waiakamilo Road Trunk Sewer	New 17-inch Line	North Nimitz Highway Diversion Drain Line	Future Roadway and Recommended Shared Use Path Area wide circulation benefits and benefits to immediately adjacent to Liliha CC on the makai edge		25-kV duct Local Benefit, immediately adjacent to Liliha CC on the makai edge	Iwilei Center, Liliha CC
18	King Street adjacent to ʻAʻala Park			King Street Drain - Diversion Drain Line		Future Protected Bike Lane		Liliha CC, Kukui Gardens/Waena Apartments
19	ʻAʻala Place		ʻAʻala Street and North Vineyard Boulevard Water System Improvements	Kukui Drain - Diversion Drain Line				Kukui Gardens/Waena Apartments
A	Kōkea Street Extension to Alakawa			Pump Station and Diversion Drain Line	Future Roadway identified in IK Transportation Network Assessment	Future Bike Lane		HCC Ma kai, KS
B C D E	Kōkea to Alakawa Honolulu CC Pacific Street to Nimitz Pacific Street Extension				Future Roadway identified in IK Transportation Network Assessment	Future Bike Lane Recommended Shared Use Path Future Bike Lane Future Bike Lane		HCC Ma kai, KS, Costco, Castle and Cooke, OHA, City Mill
F	New Segment through Parking Area(s)			Costco Drain - Diversion Drain Line & New Drain Line *Potential to coordinate with New segment from Kōkea Street to Alakawa Street adjacent to Kapālama Hale, across Alakawa to new segment through parking area*	Future Roadway identified in IK Transportation Network Assessment *Potential to coordinate with New segment from Kōkea Street to Alakawa Street adjacent to Kapālama Hale, across Alakawa to new segment through parking area*	Future Bike Lane *Potential to coordinate with New segment from Kōkea Street to Alakawa Street adjacent to Kapālama Hale, across Alakawa to new segment through parking area*		Costco, Castle and Cooke, OHA, City Mill, Liliha CC, Iwilei Center
G	Sumner Street					Future Bike Lane		Iwilei Center, Costco, Castle and Cooke, City Mill

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Appendix A

TMK parcels and Associated Landowners in the Iwilei Master Plan Area

Appendix A: Iwilei Master Plan Are TMK and Landowner List

Ref. #	TMK	Landowner as of 2-15-22	Additional Description as Applicable	Acreage
1	15008005	STATE OF HAWAII		0.2440
2	15008004	WEINBERG,H & J FNDTN INC		0.7652
3	15008014	WEINBERG,H & J FNDTN INC		1.2101
4	15008015	WEINBERG,H & J FNDTN INC		1.0222
5	15015001	WEINBERG,H & J FNDTN INC		1.3833
6	15015003	WEINBERG,H & J FNDTN INC		0.7614
7	15015004	WEINBERG,H & J FNDTN INC		0.2565
8	15005036	VARIOUS OWNERS		0.0732
9	16002134	VARIOUS OWNERS		0.0679
10	17031011	VARIOUS OWNERS		0.0275
11	17031020	VARIOUS OWNERS		0.0286
12	17031045	VARIOUS OWNERS		0.0406
13	17032086	VARIOUS OWNERS		0.0437
14	17032087	VARIOUS OWNERS		0.1143
15	16001101	HAWN DIV TENSHO-KOTAI JINGU		0.0379
16	16001102	HAWN DIV TENSHO-KOTAI JINGU		0.0369
17	15008006	SALVATION ARMY THE		1.3244
18	17023038	SALVATION ARMY THE		1.1215
19	17032073	HONG,C K		0.0283
20	15003010	PACIFIC AUTO SERVICE LLC		0.2100
21	17031050	OLU HALE KANOA		0.4274
22	15005040	OAHU STATIONS LLC		0.4608
23	17029002	METHODIST EPISCOPAL CHURCH		0.5188
24	15010016	LOWES HOME CENTERS LLC		0.0669
25	15010018	LOWES HOME CENTERS LLC		0.0047
26	15012019	LOWE'S HOME CENTERS LLC		0.0210
27	15013010	LOWES HOME CENTERS LLC		5.6491
28	15013012	LOWES HOME CENTERS LLC		3.5416
29	15013023	LOWE'S HIW, INC		4.8320
30	17023008	YEUNG,YIM LI LEE	LILIHA SQUARE SHOPPING CENTER	2.1490
31	15012018	MORI,RAYMOND S TR		3.9700
32	15010008	KOBAYASHI HOTEL INC		0.7631
33	17023036	KEOLA HOONANEA		1.3810
34	17023001	KAULUWELA 2		3.5255
35	17023039	KAULUWELA 1		1.5366
36	15003001	B P BISHOP TRUST ESTATE		1.0811
37	15003002	B P BISHOP TRUST ESTATE		0.5511
38	15003016	B P BISHOP TRUST ESTATE		0.8270
39	15004030	B P BISHOP TRUST ESTATE		0.5870
40	15004032	B P BISHOP TRUST ESTATE		1.3420
41	15004033	B P BISHOP TRUST ESTATE		0.7420
42	15004034	B P BISHOP TRUST ESTATE		0.8880
43	15005007	B P BISHOP TRUST ESTATE		2.1000
44	15019001	B P BISHOP TRUST ESTATE		1.5755

Ref. #	TMK	Landowner as of 2-15-22	Additional Description as Applicable	Acreage
45	15019002	B P BISHOP TRUST ESTATE		1.5720
46	15019003	TRS EST OF BERNICE PAUAHI BISHOP		0.3209
47	15019004	B P BISHOP TRUST ESTATE		1.2537
48	15019005	B P BISHOP TRUST ESTATE		1.1362
49	15019006	B P BISHOP TRUST ESTATE		0.9792
50	15019007	B P BISHOP TRUST ESTATE		0.9751
51	15019008	B P BISHOP TRUST ESTATE		0.4870
52	15019009	B P BISHOP TRUST ESTATE		0.4950
53	15019010	B P BISHOP TRUST ESTATE		0.5846
54	15019011	B P BISHOP TRUST ESTATE		0.5626
55	15019012	B P BISHOP TRUST ESTATE		3.2604
56	15019016	B P BISHOP TRUST ESTATE		0.9032
57	15019017	B P BISHOP TRUST ESTATE		0.9046
58	15020002	B P BISHOP TRUST ESTATE		0.3340
59	15020003	B P BISHOP TRUST ESTATE		5.0471
60	15020008	B P BISHOP TRUST ESTATE		0.0429
61	15020020	B P BISHOP TRUST ESTATE		0.2160
62	15020021	B P BISHOP TRUST ESTATE		3.5390
63	15020022	B P BISHOP TRUST ESTATE		0.0658
64	15021002	B P BISHOP TRUST ESTATE		3.3219
65	15021004	B P BISHOP TRUST ESTATE		0.7834
66	15021015	B P BISHOP TRUST ESTATE		0.4670
67	15021022	B P BISHOP TRUST ESTATE		0.3856
68	15021023	B P BISHOP TRUST ESTATE		1.5290
69	15021041	B P BISHOP TRUST ESTATE		0.0010
70	15021043	B P BISHOP TRUST ESTATE		0.6545
71	15021045	B P BISHOP TRUST ESTATE		0.6205
72	15021046	B P BISHOP TRUST ESTATE		0.1374
73	15021051	B P BISHOP TRUST ESTATE		0.0649
74	15022001	B P BISHOP TRUST ESTATE		1.7449
75	15022002	B P BISHOP TRUST ESTATE		2.3878
76	15022003	B P BISHOP TRUST ESTATE		1.1848
77	15022004	B P BISHOP TRUST ESTATE		0.1465
78	15022005	B P BISHOP TRUST ESTATE		0.0858
79	15022006	B P BISHOP TRUST ESTATE		0.1331
80	15022008	B P BISHOP TRUST ESTATE		0.2189
81	15022010	B P BISHOP TRUST ESTATE		1.2142
82	15022011	B P BISHOP TRUST ESTATE		0.7188
83	15023002	B P BISHOP TRUST ESTATE		0.6956
84	15023003	B P BISHOP TRUST ESTATE		0.6956
85	15023004	B P BISHOP TRUST ESTATE		0.6956
86	15023005	B P BISHOP TRUST ESTATE		0.5248
87	15023006	B P BISHOP TRUST ESTATE		0.5133
88	15023007	B P BISHOP TRUST ESTATE		0.7547

Ref. #	TMK	Landowner as of 2-15-22	Additional Description as Applicable	Acreage
89	15023008	B P BISHOP TRUST ESTATE		1.0221
90	15023009	B P BISHOP TRUST ESTATE		1.0751
91	16002103	B P BISHOP TRUST ESTATE		0.2607
92	16002104	B P BISHOP TRUST ESTATE		0.5803
93	16003034	B P BISHOP TRUST ESTATE		0.0806
94	16003042	B P BISHOP TRUST ESTATE		0.5745
95	16003043	B P BISHOP TRUST ESTATE		4.5290
96	16003064	B P BISHOP TRUST ESTATE		0.0583
97	15007009	IWILEI CENTER LLC		3.0123
98	15007029	IWILEI CENTER LLC		0.1932
99	15007030	IWILEI CENTER LLC		0.6291
100	15012001	FRIENDS OF THE LIBRARY OF HAWAII		6.7132
101	17026010	HAWAIIUSA FCU		1.9872
102	15007086	HONOLULU AUTHORITY FOR RAPID TRANSIT,	HART	0.0196
103	15015025	CITY & COUNTY OF HONOLULU	HART	0.0220
104	15015027	CITY & COUNTY OF HONOLULU	HART	0.0686
105	15005014	STATE OF HAWAII	Pālama Fire Station	0.2822
106	15005016	STATE OF HAWAII	Princess Victoria Kaʻiulani Elementary School	6.0160
107	15007001	STATE OF HAWAII	Liliha Civic Center	3.7910
108	15007002	SENIOR RESIDENCE AT IWILEI		1.8250
109	15008018	STATE OF HAWAII	ROW/Remnant - Nimitz Hwy	0.2420
110	15009001	STATE OF HAWAII	Leased to C&C Honolulu & Pu'uhonua Nonprofit Corp	0.3323
111	15009002	STATE OF HAWAII	Leased to C&C Honolulu	0.2053
112	15009003	STATE OF HAWAII	Leased to C&C Honolulu	0.2337
113	15009010	STATE OF HAWAII	Leased to C&C Honolulu - Health Services Branch	0.3770
114	15010015	OFFICE OF HAWAIIAN AFFAIRS		4.9819
115	15020004	STATE OF HAWAII	Drainage Way and Kapālama Canal	3.3120
116	15020006	HAWAIIAN HOME LANDS		2.7500
117	15020009	STATE OF HAWAII	HCC Kokea Street Campus	6.4460
118	15020014	HAWAIIAN HOME LANDS		0.1366
119	15020016	STATE OF HAWAII	Leased to C&C - Department of Facility Maintenance	1.3825
120	15020018	STATE OF HAWAII	Remnant	0.0430
121	15033009	HAWAIIAN HOME LANDS		1.5727
122	15033022	STATE OF HAWAII	Leased to 4 Wheels Auto	0.6124
123	15040003	S OF H DOT HARBORS DIV		0.1265
124	16002007	STATE OF HAWAII	ROW/Remnant - H1	0.0063
125	17023024	S OF H DOT HIGHWAYS DIV		0.1134
126	17023037	STATE OF HAWAII	ROW/Remnant - Vineyard Adjacent to Salvation Army	0.0677
127	17023041	STATE OF HAWAII	Kauluwela Elementary School	4.6570
128	17023043	STATE OF HAWAII	Liliha Library	0.6936
129	17026006	HAWAII PUBLIC HOUSING AUTHORITY	Kalanihuia Homes	1.8964
130	17026053	HAWAII HOUSING FINANCE AND DEV. CORP.	Leased to Kukui Gardens/EAH/DGI Associates	9.4350
131	17027001	STATE OF HAWAII	ʻAʻala Park	3.6360
132	17029003	HAWAII PUBLIC HOUSING AUTHORITY	Mayor Wright Homes	14.8451

Ref. #	TMK	Landowner as of 2-15-22	Additional Description as Applicable	Acreage
133	17032044	STATE OF HAWAII	ROW/Remnant - Vineyard and Pua	0.0020
134	17032046	STATE OF HAWAII	ROW/Remnant - Vineyard and Pua	0.0298
135	17033040	STATE OF HAWAII	ROW/Remnant - Kiapu Place/H1	0.0240
136	15003012	U S POSTAL SERVICE		1.1813
137	15000000	Kapālama Catalytic Canal		5.0884
138	15003020	BOARD OF WATER SUPPLY		0.6659
139	15006022	CITY AND COUNTY OF HONOLULU	Parking/ROW	0.1408
140	15006030	CITY AND COUNTY OF HONOLULU	Parking/ROW	0.1522
141	15007050	CITY AND COUNTY OF HONOLULU	Leased to Intitute for Human Services (IHS)	0.3399
142	15008009	CITY AND COUNTY OF HONOLULU	ROW/Remnant	0.1542
143	15008020	CITY AND COUNTY OF HONOLULU	Warehouse - Adjacent to Nimitz	0.9919
144	15009018	CITY AND COUNTY OF HONOLULU		0.1203
145	15015013	CITY AND COUNTY OF HONOLULU	ROW/Remnant	0.0962
146	15015016	CITY AND COUNTY OF HONOLULU	DMV Parking	1.2778
147	15015020	CITY & COUNTY OF HONOLULU	ROW/Remnant	0.0161
148	15015022	CITY AND COUNTY OF HONOLULU	Kapālama Hale	1.3083
149	15015023	CITY AND COUNTY OF HONOLULU	ROW/Remnant	0.0317
150	15020011	CITY AND COUNTY OF HONOLULU	Kapālama Catalytic Canal	4.7060
151	15020015	CITY AND COUNTY OF HONOLULU	ROW	0.3246
152	15021044	CITY AND COUNTY OF HONOLULU	ROW/Remnant	0.0047
153	15033014	UNITED STATES OF AMERICA	Kalihi Fire Station	0.6475
154	15033015	CITY AND COUNTY OF HONOLULU	Kalihi Fire Station	0.1001
155	16001031	CITY AND COUNTY OF HONOLULU	Kanoa Street Mini Park	0.3800
156	16001122	HONOLULU REDEVELOP AGENCY		0.4591
157	16002132	CITY AND COUNTY OF HONOLULU	Auld Lane Mini Park	0.1987
158	17023033	CITY AND COUNTY OF HONOLULU	Kauluwela Mall	0.4041
159	17023035	CITY AND COUNTY OF HONOLULU	Kauluwela Mall - Remnant	0.0091
160	17023040	CITY AND COUNTY OF HONOLULU	Kauluwela Community Park	2.1943
161	17023042	CITY AND COUNTY OF HONOLULU	ROW/Remnant	0.1771
162	17026008	CITY AND COUNTY OF HONOLULU	Beretania Community Park	5.3646
163	17026015	CITY AND COUNTY OF HONOLULU	Storage - Remnant	0.0288
164	17026017	CITY AND COUNTY OF HONOLULU	Kila Kalikimaka Mall	0.1551
165	17027002	CITY AND COUNTY OF HONOLULU	ʻAʻala Park	3.0547
166	17031003	CITY AND COUNTY OF HONOLULU	Leased to Pualani Manor Corp	0.6849
167	17031029	CITY AND COUNTY OF HONOLULU	Leased to Banyan Housing & HPHA	0.7611
168	15007043	FIRST HAWAIIAN BANK		0.7965
169	17026013	DOUGLAS EMMETT RESIDENTIAL 2014 LLC	Waena Apartments	2.4054
170	17026054	DOUGLAS EMMETT RESIDENTIAL 2014 LLC	Waena Apartments	9.4480
171	15012020	MASSDEC LLC	DHX-Dependable Hawaiian Express	3.9770
172	15012017	COSTCO WHOLESALE CORP		10.8262
173	15015002	COSTCO WHOLESALE CORP		0.9850
174	15010007	CITY MILL CO LTD		4.4396
175	15010010	CASTLE & COOKE COMMERCIAL INC		1.7695
176	15010017	CASTLE & COOKE COMMERCIAL INC		0.5893

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177	15010019	CASTLE & COOKE COMMERCIAL INC		2.2733
178	15012010	CASTLE & COOKE COMMERCIAL INC		6.7832
179	15012011	CASTLE & COOKE COMMERCIAL INC		0.0376
180	15012012	CASTLE & COOKE CANNERY PROPERTIES LLC		3.6720
181	15012014	CASTLE & COOKE CANNERY PROPERTIES LLC		1.1351
182	15012015	CASTLE & COOKE COMMERCIAL INC		2.1974
183	15015011	AHN,FAMILY JT TR	Cannery Row Condo Master	9.5840
184	17026004	AMERICAN SAVINGS BANK FSB		0.4559
185	17026016	AMERICAN SAVINGS BANK FSB		0.9811
186	17023034	ALOHA UNITED WAY INC		0.8770
187	15012007	ABP HDI LLC	Leased to Home Depot	9.0010
188	15003003	1125 KING LLC		0.4344
189	15003004	NATC LLC		1.0120
190	15003005	WU,EDWARD M TRUST		0.1192
191	15003006	1125 KING LLC		0.1556
192	15003007	NG,ANDY D		0.0619
193	15003008	YOU,BERYL MING YU		0.0468
194	15003017	FUJIMOTO,HISAO		0.0597
195	15003019	LA TORRE,SCOTT J TR		0.0908
196	15003022	1125 KING LLC		0.2267
197	15004003	GREAT SOUTH INVESTMENT LLC		0.1647
198	15004004	FONG,PATRICK B N		0.0487
199	15004005	SHOZUYA,THOMAS S TR		0.0474
200	15004006	905 EU LLC		0.0498
201	15004007	VAN DYKE,ERIC G B		0.0498
202	15004010	PASION,CAMILO L/CEFERINA V TRUST		0.0724
203	15004011	RECAIDO,ADOR		0.0386
204	15004012	EVANGELISTA,JOHN A		0.0430
205	15004013	LIN,LEO		0.0402
206	15004014	MERCADO,PEDRO V		0.0395
207	15004015	912 EU LLC		0.0388
208	15004016	LAC,SONNEY		0.0385
209	15004017	TATEMICHI,SARAH L TRUST		0.0401
210	15004019	MARK RENTALS 2017 LLC		0.2628
211	15004021	HE,MINGHUA		0.1087
212	15004025	912 EU LLC		0.0774
213	15004027	NAKANISHI,HATSUO TR		0.0380
214	15004028	VARIOUS OWNERS		0.0028
215	15004031	LI,DE XING		0.3289
216	15004035	TRAN,NEN CAM		0.0939
217	15004039	912 EU LLC		0.0405
218	15004040	SHIMAMOTO,RAYMOND K TRUST		0.0112
219	15005008	DELCREST INTERNATIONAL LP		0.2260
220	15005009	TANG,EDWARD S K/CHRISTINE L B TR		0.0923

Ref. #	TMK	Landowner as of 2-15-22	Additional Description as Applicable	Acreage
221	15005010	PAI'EA MILLWRIGHTS LLC		0.1557
222	15005011	FUJII FAMILY PARTNERSHIP		0.2230
223	15005012	MEW,GORDON K T RESIDUARY TR		0.1716
224	15005013	YOUNG KI LTD		0.3158
225	15005015	MAH,SANG CHUN		0.1769
226	15005034	D & W DEVELOPMENT LTD PTNSH		0.0866
227	15005035	CHAN,CHUN T TR		0.0868
228	15005037	TOKUMURA,ADELE K		0.1275
229	15005038	MAH,SANG CHUN		0.2296
230	15006001	KINGSGATE PLAZA CO		1.1766
231	15006004	SETO,FULTON L TRUST		0.2872
232	15006005	JNC INVESTMENTS LLC		0.1928
233	15006006	FUJII FAMILY PARTNERSHIP		0.3239
234	15006007	SHI,PETER		0.1659
235	15006008	ISLAND-WEST INVESTMENT CORP		0.4780
236	15006009	ALOHA TOFU FACTORY INC		0.4868
237	15006010	ISLAND-WEST INVESTMENT CORP		0.9384
238	15006015	MOLINA,TIMMY C TR		0.1422
239	15006016	TRAN,CUONG H		0.0801
240	15006017	UYENO,JEANNIE		0.2234
241	15006018	SUH,YONG BUM		0.2190
242	15006019	IZAWA INVESTMENT LLC		0.4406
243	15006020	FELCOR 2 LLC		0.1703
244	15006021	TOMITA,VIVIAN T TRUST		0.0379
245	15006023	FELCOR 1 LLC		0.0526
246	15006024	VINA,CRUZ J JR		0.0487
247	15006031	ALPAC CORP		0.3441
248	15006032	NAKAMURA,DAVID M TRUST		0.3571
249	15006033	DHARMA REALM BUDDHIST ASSN		0.5945
250	15006034	TOYAMA,IVAN K/FAY K TR		0.0603
251	15006036	SHI,PETER		0.7390
252	15006042	ST AKEPO LLC		0.1496
253	15006043	TRAN,CUONG HOANG TRUST		0.3310
254	15006044	TRAN,CUONG HOANG TRUST		0.1185
255	15007003	CUPBOARD LLC		0.7467
256	15007006	HIGGINS PROPERTIES LLC		0.4806
257	15007016	HAWAIIAN ELECTRIC CO INC		2.7415
258	15007019	NUUANU CHINESE BAPTIST CHURCH		0.2022
259	15007021	CITY AND COUNTY OF HONOLULU		0.2296
260	15007023	CITY AND COUNTY OF HONOLULU		0.3764
261	15007026	FOUR K PROPERTIES LLC		0.1471
262	15007028	YAMAUCHI,RODNEY S		0.1482
263	15007031	THOM,BUCK K FAMILY PRTNSP		0.1328
264	15007032	TSR PARTNERS		0.3117

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265	15007033	CITY AND COUNTY OF HONOLULU		0.4782
266	15007037	KAAAHI DEVELOPMENT		0.4984
267	15007041	G VON HAMM TEXTILES INC		0.2897
268	15007042	ALOHA FENDER WORKS INC		0.2101
269	15007046	NUUANU CHINESE BAPTIST CHURCH		0.3842
270	15007047	CHONG,ABRAHAM C K TRUST		0.1658
271	15007048	NAKAOKA INVESTMENTS INC		0.1286
272	15007049	SPAIN,MICHAEL G TR		0.1286
273	15007052	YI,DOLE K S		0.3399
274	15007054	ETERNAL LIGHT LLC		0.1286
275	15007055	OAK CAP VENTURES HONOLULU LLC		0.2683
276	15007085	BO WAH INVESTMENT INC		0.1275
277	15008019	DOWNTOWN AFFORDABLES LLC		0.0014
278	15009004	CITY AND COUNTY OF HONOLULU		0.4046
279	15009005	424 SUMNER STREET LLC		0.4741
280	15009006	ALLWER,MOHAMED ATA		0.4732
281	15009009	CITY AND COUNTY OF HONOLULU		0.3846
282	15009011	CITY AND COUNTY OF HONOLULU		0.1666
283	15009013	JTB HAWAII INC		0.6202
284	15009014	JTB HAWAII INC		0.5013
285	15009015	J T E INC		0.1955
286	15009016	KUWILI PARTNERS		0.1942
287	15009019	P & V INTERNATIONAL LLC		0.1712
288	15009021	HAWAIIAN ELECTRIC CO INC		0.6215
289	15009022	HAWAIIAN ELECTRIC CO INC		0.0038
290	15010001	SERITAGE KMT FINANCE LLC		3.9215
291	15013002	STATE OF HAWAII		0.0253
292	15013017	STATE OF HAWAII		0.0003
293	15015021	A.S.N. ENTERPRISES, HAWAII LTD PART		1.1431
294	15015026	BANK OF HAWAII		3.2640
295	15020012	STATE OF HAWAII		0.0880
296	15021028	WOND FAMILY KAPALAMA LLC		0.3444
297	15021029	WOND FAMILY KAPALAMA LLC		0.6196
298	15021031	WOND FAMILY KAPALAMA LLC		0.2687
299	15023011	CHONG,AMY L TR		0.2460
300	15023013	FAY INVESTMENT INC		0.3804
301	15023014	FAY INVESTMENTS INC		0.3862
302	15023015	FAY INVESTMENT ASSOCIATES		2.3186
303	15023016	OAHU STATIONS LLC		0.5511
304	15023018	TOKUNAGA,JOHN TRUST		0.2689
305	15023019	MURAKAMI,TRUST		0.1806
306	15023023	CITY AND COUNTY OF HONOLULU		0.0017
307	15023029	1341 MOOKAULA LLC		0.2322
308	15023030	MOOKAULA PROPERTIES LLC		0.9095

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309	15023033	MURAKAMI,TRUST		0.1150
310	15023034	MURAKAMI,TRUST		0.1161
311	15023035	850 MOOWAA LLP		0.2326
312	15023037	HAMANO INVESTMENTS LLC		0.3118
313	15023038	KAMADA,KAYLENE K S TRUST		0.2662
314	15023041	TORI RICHARD, LTD		0.4391
315	15023044	AWAI,JOEL P N		0.2624
316	15023045	TR MILL TOWN LLC		0.1295
317	15023046	TR MILL TOWN, LLC		0.3022
318	15023048	CHON HOLDING CORP		0.2627
319	15023050	KTJ INC		0.1362
320	15023051	KODAMA,GERALD TRUST		0.2352
321	15023052	OKADA TRUCKING COMPANY LTD		0.2396
322	15023053	OKADA TRUCKING COMPANY LTD		0.2727
323	15023054	RYAN'S GRAPHICS CORP		0.3128
324	15023055	DIAMOND BAKERY CO LTD		0.8443
325	16001001	TAMASHIRO,WALTER H TRUSTEE		0.2103
326	16001002	DINIEGA,ORLANDO V EXEMPTION TR		0.1019
327	16001003	R & D CONTRACTORS		0.1484
328	16001004	TRANG,GEORGE G N TR		0.1071
329	16001005	CHAN,KWAI TRUSTEE		0.0795
330	16001006	JAVIER,MARLON		0.0443
331	16001007	NAKASATO,DAN R		0.1222
332	16001008	CAO,XIU YING		0.1219
333	16001009	TRAN,HOANG T		0.1451
334	16001010	PASCUA,VILLAMOR S		0.1079
335	16001012	HAWN DIV TENSHO-KOTAI JINGU		1.0934
336	16001013	HAWN DIV TENSHO-KOTAI JINGU		0.0382
337	16001014	LAC,SONNEY		0.0582
338	16001015	HAWN DIV TENSHO-KOTAI-JINGU-KYO		0.0772
339	16001016	TENSHO-KOTAI-JINGU-KYO		0.0580
340	16001017	HAWN DIV TENSHO KOTAI JINGU		0.0703
341	16001019	KIM,YONG		0.0884
342	16001020	LAM,LAMBERT K Y TR		0.1263
343	16001021	LUM,EULALIA W M TR		0.2731
344	16001022	GANSIT,FERNANDO C TRUST		0.0692
345	16001023	FERNANDEZ,EVERLINA B		0.0580
346	16001024	SANCHEZ,JACINTO		0.0618
347	16001026	LI,DE XING		0.1389
348	16001027	TANG,DENNIS		0.0490
349	16001028	VIETNAMESE BUDDHIST ASSN		0.4897
350	16001029	CHOO,KIMIKO S		0.1212
351	16001030	MARIPOSA PROPERTIES LTD PTN		0.1212
352	16001032	CABICO,LYDIA TRUST		0.1488

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353	16001033	BAJA,JULIUS D		0.0918
354	16001034	VILLA,LORITA K TR		0.0980
355	16001035	FUJIHARA,DAVID K TR		0.0952
356	16001036	ANDAYA,ROGIE A TR		0.1476
357	16001037	ANDAYA,ROGIE TR		0.1309
358	16001038	MARIPOSA PROPERTIES LTD PTN		0.1467
359	16001039	PAGADUAN,HERMIE M		0.0413
360	16001040	LI,RUSHENG		0.0360
361	16001041	HUANG,AIMING		0.0484
362	16001042	ZHU,JIAZHENG		0.0370
363	16001043	PENG,JIN ZAN		0.0376
364	16001044	CABUSLAY,ADORACION TRUST		0.0418
365	16001045	DOLOR,FAUSTO A TRUST		0.0352
366	16001046	CHUN,TAI MOY TR		0.0346
367	16001047	CARILLO,DIONICIA T DECD		0.0417
368	16001048	POBRE,ORNELIO S JR		0.0426
369	16001049	CABUSLAY,CHERRYLIN		0.0352
370	16001050	FORONDA,LYNDON P		0.1422
371	16001051	CHOY,WALTER W F TR		0.1650
372	16001052	GAO,JI KANG		0.1827
373	16001053	BONILLA,ALIPIO D/EUSEBIA TR		0.1958
374	16001054	CHO,YOUNG KU		0.1648
375	16001055	VARIOUS OWNERS		0.0095
376	16001056	AVERA,EUGENIA B		0.2662
377	16001057	CABANSAGAN,MARY-ANNE A		0.1259
378	16001058	CABANSAGAN,PAZ		0.1322
379	16001059	ABAD,PAULINO A		0.1195
380	16001060	ARDIENTE,BERNARDITA R		0.2481
381	16001061	RCJ CORPORATION		0.0957
382	16001068	LEI,SAO IOK		0.0344
383	16001069	KALIHI-PALAMA HEALTH CENTER		0.1755
384	16001070	HAWN DIV TENSHO-KOTAI-JINGU-KYO		0.1569
385	16001071	GUO,HUAWEN		0.1488
386	16001072	LUM,WENDE		0.1146
387	16001073	PETERSON LANE CONDOMINIUM		0.1376
388	16001074	MAGOON,MARGARET A O TR		0.2199
389	16001075	VISAYA,LETICIA U		0.0749
390	16001076	CAMBIA,LEE D/MAXIMA J TR		0.0571
391	16001077	ISIMANG,VICTOR TR		0.0492
392	16001078	ABABA,RAYNARD		0.0615
393	16001080	VO,TINA		0.0382
394	16001081	BARTOLOME,VENANCIA C JR		0.0875
395	16001082	VILLANUEVA,FLORANTE		0.0501
396	16001083	BADUA,CARIDAD B		0.0684

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397	16001089	GANSIT,FERNANDO C TR		0.0333
398	16001090	KAYA,THOMAS T TRUST		0.1281
399	16001092	LUIS,ROBERT G		0.1315
400	16001096	LEE,DANNY W K		0.1421
401	16001098	STATE OF HAWAII		0.0003
402	16001099	CABANSAGAN,PAZ		0.0471
403	16001100	VARIOUS OWNERS		0.0525
404	16001103	HAWAII DIV/TENSHO-KOTAI-JINGU-KYO		0.0355
405	16001104	TENSHO-KOTAI-JINGU-KYO		0.0480
406	16001105	HAWN DIV TENSHO-KOTAI-JINGU-KYO		0.0551
407	16001106	HAWN DIV TENSHO-KOTAI-JINGU-KYO		0.0597
408	16001107	HAWN DIV TENSHO-KOTAI JINGU		0.0102
409	16001108	TONGPALAN,JERRY F P		0.1276
410	16001111	DOMINGO,MARCELINA B TRUST		0.0923
411	16001112	CASTRO,EDWIN M		0.0923
412	16001113	GUO,JIA QIANG		0.0918
413	16001114	WONG,JEANETTE L TR EST		0.1048
414	16001115	MARTIN,POLI B		0.0615
415	16001116	WHITING,SANYBOY S		0.0331
416	16001117	KAWANO,TYLER S T		0.0364
417	16001118	WALLACE,TO-NU LU		0.0368
418	16001119	LIN,KEN G/XIAOLIAN W TR		0.0427
419	16001121	CALDERON,ALFREDO B		0.0255
420	16001123	CABERTO,CATHY B TR		0.1488
421	16001124	QUANG,CAN DAI		0.0610
422	16001126	VILLARTA,ALBERTO V/ERLINDA T TR		0.0945
423	16001127	XI,ZHANG NIAN		0.1447
424	16002002	JONG,IN S TR		0.0844
425	16002003	RAWLINS LANE GARDENS LLC		0.0809
426	16002005	JUNASA,BIENVENIDO D		0.3682
427	16002006	XU,YI YAN		0.0918
428	16002008	ROMUALDO,FILOMENO L		0.0999
429	16002009	ZHANG,HONG XI		0.0871
430	16002011	BERNARDINO,OSCAR E TR		0.0686
431	16002012	LAC,SONNEY		0.0689
432	16002013	LOI,AGNES H P C		0.0982
433	16002014	LEE,ALEX Y		0.0612
434	16002015	JONG,IN SUN TR		0.1000
435	16002016	TIET,QUANG KE		0.0826
436	16002017	SHINSATO,CAROL C		0.1456
437	16002028	HAWAIIAN FINANCIAL FEDERAL CREDIT UNION		0.6332
438	16002029	SALEM RADIO PROPERTIES INC		0.2601
439	16002030	SHIRAISHI,LILLIAN Y TR		0.0628
440	16002031	MASCARDO,AMILIA O		0.0662

Ref. #	TMK	Landowner as of 2-15-22	Additional Description as Applicable	Acreage
441	16002032	YAMASHIRO,MYRON K TR		0.0696
442	16002033	HAWAIIAN FINANCIAL FEDERAL CREDIT UNION		0.0824
443	16002034	KALA,GEORGETTE P		0.0842
444	16002035	NINOMIYA,JOANNE M DECL TR		0.0988
445	16002036	I HARA LLC		0.1517
446	16002037	WONG,ADRIAN K K TR		0.0989
447	16002038	DONG,ZHEN-BI		0.1160
448	16002039	KIM,SUNG SUK		0.2459
449	16002041	PARUBRUB,ORLINO D		0.0692
450	16002042	BRESLIN,TAE HWA		0.0670
451	16002043	OKITA,SANFORD K		0.0663
452	16002044	VISAYA,MANUEL G TRUST		0.0658
453	16002045	ANCHETA,JOSEPH N		0.0655
454	16002046	RAMOS,RICHARD C		0.0642
455	16002047	TOMIYAMA,NISHIE		0.0635
456	16002048	OSHIRO,JAMES S		0.0629
457	16002049	CADIZ,ROGELIO Z		0.0834
458	16002054	PAGDILAO,ROLY G		0.0909
459	16002055	TOPINIO,FIDEL S/DOLORES B TR		0.0910
460	16002056	KAHAUOLOPUA,EBEN JR		0.2213
461	16002057	PILMOCA,RICHARD T		0.0643
462	16002058	SAYCON,ELPEDIO S		0.0643
463	16002059	NG,CAROLYN WAI LING TR		0.1184
464	16002060	KAJIKAWA,TAKESHI TR EST		0.0643
465	16002062	CHIKASUYE,KENNETH A		0.1359
466	16002063	FUKADA,YONEKO		0.2183
467	16002064	TOY,ELIZABETH Y S TR		0.0737
468	16002065	KAMAI,DAVID B		0.0742
469	16002066	AQUINO,MANUEL P		0.0751
470	16002067	CABADING,WARLITO Y TR		0.0423
471	16002068	FARINAS,RODOLFO C		0.0333
472	16002069	RUMBAWA,RUSSELL B		0.1529
473	16002071	YONEDA,SAMSON S TR		0.0723
474	16002072	KAWADA,BERTHA GEN TRAN TR		0.0702
475	16002073	VISAYA,MANUEL G TRUST		0.0705
476	16002074	VISAYA,MANUEL G TRUST		0.0748
477	16002075	ANCHETA,JASON L		0.0800
478	16002076	AFAGA,ROGER M		0.0826
479	16002077	FUKUMOTO,LEIGH K TR		0.0770
480	16002078	SHI,GUO R		0.0761
481	16002079	CHUN,STEPHEN W S TRUST		0.1702
482	16002080	BAUTISTA,LAWRENCE		0.0601
483	16002081	BUTAY,EDWIN V		0.0719
484	16002085	HE,NENG PING		0.0220

Ref. #	TMK	Landowner as of 2-15-22	Additional Description as Applicable	Acreage
485	16002086	HE,NENG PING		0.1228
486	16002087	MAEDA,STEVEN K/LILIANE L TR		0.0830
487	16002088	ORTIZ,RUBEN		0.0050
488	16002090	TRENT TRUST CO LTD		0.0181
489	16002093	PAGTULINGAN,PEPITO C		0.0689
490	16002096	RABACAL,ELAINE K TR		2.7693
491	16002099	H & K INC		0.3188
492	16002102	HAWAIIAN FINANCIAL FEDERAL CREDIT UNION		0.3270
493	16002108	PAESTE,LODRIGO M V		0.0892
494	16002109	HORTIZUELA,LARRY O		0.0747
495	16002111	LOO,STANLEY YUK TIM		0.1475
496	16002114	BUTAY,EDWIN V		0.0089
497	16002125	CHEN,SHOU PING		0.0920
498	16002126	CHRISTIANA TR		0.0921
499	16002127	YANG,YU MING		0.0921
500	16002128	CASTRO,FLORENTINO M		0.0894
501	16002129	RAMOS,JAY J C		0.0940
502	16002130	PAGBA,JOHN L		0.0918
503	16002131	BEGONIA,ROBERTO G		0.0766
504	16002133	CITY AND COUNTY OF HONOLULU		0.0105
505	16002136	DAGDAGAN,ALWIN B		0.0878
506	16002137	VARIOUS OWNERS		0.0312
507	16002138	MORRIS,MILLE		0.0058
508	16002139	TAKAMATSU,RODNEY Y TR		0.1905
509	16002140	YOON,STEVE S K		0.1180
510	16002141	BRINGAS,LEOPOLDO C JR/BRENDA K S TR		0.1414
511	16002142	PASION-FERMIN,ELEONITA		0.1278
512	16002143	ANDAYA,CARMEN A TR		0.1265
513	16003001	LA TORRE,SCOTT J TR		0.1085
514	16003002	KOMATSU,SANFORD S TRUST		0.1134
515	16003003	BUMANGLAG,AMOR B		0.0766
516	16003004	DAMO,MARIA C R L		0.0778
517	16003005	KAM,RAYMOND W C & AGNES C TR		0.0792
518	16003006	AQUINO,AMELITA A		0.0804
519	16003007	LAMBOT,ROBERTO C		0.0817
520	16003008	GANIRON,LILIA J		0.0357
521	16003009	SIAPNO,ELSA A		0.0384
522	16003010	KAY,GEORGIA K TR		0.3137
523	16003011	MARINO,DALE K		0.0789
524	16003012	GANO,RONEL R		0.0735
525	16003013	HAWAII KOTOHIRA JINSHA		0.4417
526	16003017	CAO,JUAN Q		0.1919
527	16003018	FELTRO,ALMEDA		0.1082
528	16003019	LUO,DA CHENG		0.0945

Ref. #	TMK	Landowner as of 2-15-22	Additional Description as Applicable	Acreage
529	16003020	SAKAI,YUKIE TR		0.1469
530	16003021	FUJIMOTO,FRANCIS M TRUST		0.3824
531	16003023	KAIZUKA,BERT T TRUST		0.0735
532	16003024	SOLIMA,JOVENCIO M TRUST		0.1469
533	16003025	CASTRO,HONORIO V JR		0.0734
534	16003026	IBARA,MYLES Y		0.0771
535	16003027	NACAPUY,HILARIO S TR		0.1469
536	16003028	BORCE,PEPITO V		0.0734
537	16003029	AGCANAS,LAURENTINA R TR		0.0733
538	16003030	SUGIMOTO-DANAO,SANDRA A TR		0.0737
539	16003031	TABIOS,DEXTER D B		0.0733
540	16003032	G & I WATUMULL LTD PARTNERSHIP		0.2872
541	16003033	SUPERB INC		0.1268
542	16003035	CAMPOS FAMILY TRUST		0.0734
543	16003036	JAMES,NORMA L		0.0961
544	16003037	SAKAI,CASEY S		0.0878
545	16003038	YOSHIOKA,HARUKO TRUST		0.1469
546	16003039	LACISTE,ROSENDO		0.0767
547	16003040	SAKAI,KUNIO TR		0.0595
548	16003041	UEHARA,SUMIKO		0.1992
549	16003065	YAMAMOTO,BERT Y TR		0.1343
550	16003070	NASCIMENTO,KAMUELA R TR		0.2034
551	16003075	DURAN,JUAN		0.0697
552	16003078	TAGALICUD,ROMELLYN A		0.0749
553	16003085	LARDIZABAL,ROLANDO U		0.0734
554	16003088	BROWN,CHARLES H JR TRUST		0.0737
555	16003090	HIGA,JANET T TR		0.0918
556	16003091	WANG,KAIHE		0.0734
557	17026011	KUKUI CHILDRENS FOUNDATION		0.8042
558	17026012	IZUMO TAISHAKYO MISS OF HAW		0.4167
559	17031001	HUYNH,PHU KIM		0.1522
560	17031005	MAEDA,TRUST		0.2640
561	17031006	LUI,YU WOON		0.7900
562	17031007	ARIOS,ROBERT R		0.0425
563	17031008	ALBANO,ROBERT K O		0.0425
564	17031009	SHEN,LIANNE		0.0425
565	17031010	CAMBIA,HONIE D		0.0425
566	17031012	GUEVARRA,ALFREDO B		0.0425
567	17031013	LEE,AH FEI		0.0425
568	17031014	FANG,CARDY J H C		0.0425
569	17031015	HEE,HENRY T K		0.0425
570	17031016	CHING,GONE MEAN		0.0425
571	17031017	LEE,YUE HUNG L		0.0425
572	17031018	NI,YINDI		0.0425

Ref. #	TMK	Landowner as of 2-15-22	Additional Description as Applicable	Acreage
573	17031019	GUO,YING		0.0428
574	17031021	BUTAY,JUANITO/PATRICIA TR		0.0443
575	17031022	YOUNG,CLIFFORD M G		0.0480
576	17031026	NG,LARRY/PAZ TR		0.2192
577	17031027	NGUYEN,SAMSON		0.1627
578	17031030	LOO,WILLIAM W M		0.1864
579	17031032	MARIPOSA PROPERTIES LTD PTN		0.0799
580	17031033	ABABA,RENATO A		0.0459
581	17031034	DEVICTORIA,CARLOTA P		0.0541
582	17031035	MARIPOSA PROPERTIES LTD PTN		0.0567
583	17031037	TOGUCHI CHIYOKO INC		0.1270
584	17031040	PALAMA SETTLEMENT		1.8688
585	17031042	JOW,YUNG KWAUN		0.0526
586	17031043	CHAR,STELLA O K		0.0462
587	17031044	CHUN,RICHARD N T TRUST		0.0692
588	17031046	LAM,TAT CHUEN/SERLIN P C TRUST		0.0549
589	17031048	ST ELIZABETHS EPISCOPAL CHURCH		1.1461
590	17031052	ST ELIZABETHS EPISCOPAL CHURCH		0.2849
591	17031053	SEDYANA,PADMA		0.0700
592	17031054	MATSUBARA,HERBERT H TRUST		0.0472
593	17031057	HAWN ASSN 7TH DAY ADVENTIST		0.5992
594	17031062	CHIYOKO TOGUCHI INC		0.7231
595	17031063	HAWN ASSN 7TH DAY ADVENTIST		0.0645
596	17031064	HAWAII CONFERENCE FOUNDATION		1.3827
597	17032004	QIN,WEI-JIAN		0.0959
598	17032005	LIANG,XU MING		0.0946
599	17032007	SUNRISE DRAGON LLC		0.0412
600	17032009	WONG,RANDAL S/YVONNE M TR		0.0840
601	17032010	PASCUA,CATALINO M		0.1183
602	17032011	LIN,LEO		0.0904
603	17032012	KWA,NATALIE A		0.0478
604	17032013	PANG,DESTRY R		0.0446
605	17032014	COLEMAN,MATTHEW-WYATT K TR		0.0446
606	17032015	XIAO,GUO Y		0.0871
607	17032016	LU,,XIAO JIE LIANG		0.0427
608	17032017	GS INDUSTRIES LLC		0.9686
609	17032018	LIANG,SIO C		0.6389
610	17032019	TAM,SHARON S		0.2951
611	17032020	KINGS VICTORY LLC		0.1212
612	17032021	SUNRISE DRAGON LLC		0.3921
613	17032022	LUNG KONG KUNG SHAW SOCIETY		0.1371
614	17032023	LEI,CHRISTY Z		0.2831
615	17032025	BUCK TOY CLUB		0.3160
616	17032026	WU,YAN CHANG TR		0.2984

Ref. #	TMK	Landowner as of 2-15-22	Additional Description as Applicable	Acreage
617	17032030	GUZMAN,DOLORES D		0.0846
618	17032031	PADAYAO,DIEGO R		0.0459
619	17032032	KAGEYAMA,SY S		0.0459
620	17032033	HUA,TU C		0.0459
621	17032034	CORPUZ,REMEDIOS S TR		0.0459
622	17032035	LI,RI R TR		0.0459
623	17032036	MA,NGAI		0.0459
624	17032037	TSURUDA,RICHARD M/TOKUKO GEN TRF TR		0.0456
625	17032038	LAU,PING HUNG		0.0436
626	17032039	LEE,ALAN K C/JANIE Y Y TR		0.0455
627	17032040	LIN,JIAN WEN		0.0676
628	17032041	FORONDA,FEDERICO T		0.0461
629	17032042	IWANAGA,CAROL ANN Y		0.0469
630	17032043	CADIENTE,CLEMENTE/ANASTACIA		0.0719
631	17032047	TUPPIL,MARCELINO P		0.0927
632	17032048	HO,KIM CHI THI		0.0380
633	17032049	CHUN,PRESCOTT D M TR		0.0435
634	17032050	VANZON,MICHELLE Q		0.0459
635	17032051	DE VERA,BENITA T TR		0.0492
636	17032052	HUANG,MIAO KUAN		0.0533
637	17032053	MADDELA,FLORENTINO G JR		0.0574
638	17032054	HEALING,EUGENE H		0.0646
639	17032055	BAUTISTA,NARCISO M		0.0671
640	17032057	LAM,TRAM TAN/NGUYEN,THUY LINH TR		0.1230
641	17032059	CANDELARIO,CHARLIE D TR		0.0359
642	17032060	1416 A PUA LANE LLC		0.0394
643	17032061	LUM,WING YEE LAU		0.0785
644	17032062	CHUNG,FRED W C/ELEANOR Y TR		0.0391
645	17032063	RILEY,LADONNA		0.0394
646	17032064	CHUNG FAMILY TR		0.0852
647	17032065	AOKI,ARTHUR E JR TR		0.1313
648	17032066	TRAN,MINH QUOC		0.0514
649	17032067	LAM,LAMBERT K Y		0.0563
650	17032068	LAM,LAMBERT K Y		0.0575
651	17032069	TAM,MICHAEL K W		0.2851
652	17032072	SEBASTIAN,FLORANTE S LLC		0.0710
653	17032074	FLORANTE S SEBASTIAN LLC		0.0711
654	17032075	SERENO,SILVERIO C JR		0.0711
655	17032076	BARNACHEA,DOMINADOR G		0.0703
656	17032078	LEE,RICHARD K W TR EST		0.1528
657	17032079	LEE,RICHARD K W TR		0.0640
658	17032080	VARIOUS OWNERS		0.0333
659	17032081	VIDAD,CEASAR R V		0.0751
660	17032082	ON TONG TUNG HEONG SOCIETY		0.0761

Ref. #	TMK	Landowner as of 2-15-22	Additional Description as Applicable	Acreage
661	17032083	BALBAS,IMELETA S		0.0663
662	17032084	WONG,PUI YING		0.0432
663	17032085	NIE,NELSON Y C		0.0966
664	17032088	TABIOS,AURORA T TRUST		0.0803
665	17032089	LLAMAS,REMY C		0.0635
666	17032090	SHIGAKI,ROBERT S TR EST		0.0298
667	17032091	VARIOUS OWNERS		0.0880
668	17032093	VALENZUELA,CELIA G TR		0.0891
669	17032094	ISHIHARA,KAREN C		0.2263
670	17032095	FLORANTE S SEBASTIAN LLC		0.0711
671	17032096	LANIO PROPERTIES CORP		0.1265
672	17032097	EBNER,BODEREK K K L		0.1010
673	17032098	ZHANG,HENRY Y		0.1010
674	17032099	HPL CO LLC		0.2061
675	17033001	LO,RENEE K		0.0485
676	17033002	TANADA,SHIGEO		0.0548
677	17033003	CHEUNG,WAI CHON		0.0619
678	17033004	YPL TRUST		0.1154
679	17033005	LILIHA PROFESSIONAL BUILDING LLC		1.2556
680	17033007	KOREAN CHRISTIAN CHURCH		0.8482
681	17033030	TONG,WING YIP		0.0142
682	17033041	DOMINGO,MIRIAM P TR		0.1869
683	17033044	CHUN,TONY Y F		0.0412
684	17033045	VASS LLC		0.0395
685	17033046	WU FAMILY PROPERTIES LLC		0.0835
686	17033047	WU FAMILY PROPERTIES LLC		0.0546
687	17033052	LIANG,JOE		0.1863
688	15003011	FUJINO FAMILY LTD PARTSHP		0.5267
689	15003015	MCDOUGALL FAMILY AGENCY		0.6318
690	15003018	J J RASMA, LLC		0.1372
691	15004001	SHIMAMOTO,RAYMOND K TR		0.2847
692	15004002	BABA,YOSHIMORI LIVING TRST		0.2665
693	15004008	NAKANISHI,HATSUO TR		0.1480
694	15004009	HONOLULU BROOM FACTORY INC		0.0758
695	15004024	NAKANISHI,HATSUO TR		0.0553
696	15004026	H B F INCORPORATED		0.1150
697	15005019	K SUMIYOSHI INC		0.2645
698	15005021	M & S PR0PERTIES LLC		0.4758
699	15005022	ALII FIRE PROTECTION		0.3053
700	15006025	BRANNER,JOHN M		0.0433
701	15006040	ROBELLO GROUP LLC		0.2145
702	15008001	CHANG,EUGENE Y G TR		2.1438
703	15012003	PAMCAH-UA LOCAL 675 PENSION FUND		1.7604
704	15015008	DTC INVESTMENTS LLC		2.9161

Ref. #	TMK	Landowner as of 2-15-22	Additional Description as Applicable	Acreage
705	15015024	CPY PARTNERS LLC		1.4900
706	15017006	UNIVERSITY OF HAWAII	HCC Main Campus	
707	15019015	ROSS,MARGARET E TR		1.3944
708	15020005	SOUSKE PROPERTIES LLC		1.7725
709	15020013	RONIN PROPERTIES LLC		5.2501
710	15021001	WOND FAMILY KAPALAMA LLC		0.4669
711	15021024	WOND FAMILY KAPALAMA LLC		0.3589
712	15021032	WOND FAMILY KAPALAMA LLC		0.1344
713	15021033	WOND FAMILY KAPALAMA LLC		0.2648
714	15021039	WOND FAMILY KAPALAMA LLC		0.1055
715	15021042	WOND FAMILY KAPALAMA LLC		0.2476
716	15022009	KAALAEA DEVELOPMENT INC		0.3795
717	15023028	1349 & 1349A MOOKAULA STREET		0.2109
718	16002010	BEGONIA,ROBERTO G		0.0446
719	16002115	SALVACION,LANIE L		0.1061
720	17023025	ALVAREZ,ELENITA V TR		0.6511
721	17029001	MAH,YONG CHUN		0.1891
722	17029006	FUJII FAMILY PARTNERSHIP		0.3746
723	17029011	FUJII FAMILY PARTNERSHIP		0.1709
724	17029012	FUJII FAMILY PARTNERSHIP		0.1781
725	17029013	LIU,WILSON		0.3147
726	17029014	682 NORTH KING LLC		0.3214
727	17031002	AU,ERIC Y P		0.1377
728	17031004	AU,KERWIN M T TRUST		0.2934
729	17031023	BOIRUM,EMILY J		0.0308
730	17031024	PEAPEALALO,CARSON A T		0.0351
731	17031025	SIRISUMPHANT,APIWAT		0.0456
732	17031028	PHAN,LONG KIM		0.3558
733	17032056	GROANING,WINONA MAE		0.1137
734	17033006	KIKUKAWA,DAVID A		0.5745
735	17033049	CHING,CHRISTOPHER K F		0.1097

Appendix B

Kapālama Canal Adopted Master Plan



KAPĀLAMA CANAL CATALYTIC PROJECT

THE RESILIENT MASTER PLAN

FINAL REPORT

JANUARY 2022

Prepared by:

WCITARCHITECTURE

with assistance from:

ARUP

R. M. TOWILL CORPORATION

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

walters kimura moloda
landscape architects

dtl

element environmental llc
environmental · engineering · water resources

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Appendix B: Surveys and Technical Reports
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B2 Project Advisory Committee (PAC) List
B3 Canal/Bathymetry Survey
B4 Preliminary Dredging Disposal Plan

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B8 Environmental Impact Statement Preparation Notice (EISPN)
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- B10-A: Hydraulic Modeling Report
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- B10-D: EPA Brownfields Community Wide Assessment
- B10-E: Review of Historic Preservation Documentation
- B10-F: Cultural Impact Assessment
- B10-G: Traffic Assessment
- B10-H: EISPN Letters and Responses
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B11 Final Floodwall Type Selection Report
B12 Final Sampling and Analysis Plan: Dredged Material Evaluation for Maintenance Dredging
B13 Final Sampling and Analysis Report: Dredged Material Evaluation for Maintenance Dredging
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C1 Project Kick-off Presentation (6.16.16)
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C7 PAC Meeting (12.12.16)
C8 Public Workshop #2 (2.8.17)
C9 City Workshop #3 (3.29.17)
C10 In-Canal Structures Presentation (7.19.17)
C11 City Master Plan Presentation (8.24.17)
C12 PAC Master Plan Presentation (11.29.17)
C13 Sea Level Rise (SLR) Kick-off & Technical Summary (7.26.19)
C14 SLR Resiliency Workshop (9.17.19)
C15 DPP SLR Meeting (11.8.19)
C16 PAC SLR Presentation (12.18.19)
C17 Final SLR Presentation (3.16.20)
C18 Master Plan Outreach YouTube Video (8.11.20)
C19 Floodwall Type Selection Kick-off (8.14.20)
C20 Initial Floodwall Type Selection Alternatives (9.11.20)
C21 Floodwall Type Selection Review (10.27.20)

Appendix D: Meeting & Workshop Summaries

D1 Kick-Off Meeting Minutes (6.16.16)
D2 City Internal Visioning Workshop Meeting Minutes (7.26.16)
D3 City Green Infrastructure Presentation Meeting Minutes (7.27.16)
D4 Thought Leader Interview Notes (11.16)
D5 Public Workshop #1 Summary (9.29.16)
D6 PAC Workshop Summary (10.5.16)
D7 City Workshop #2 Meeting Minutes (11.9.16)
D8 PAC Meeting #2 Meeting Minutes (12.12.16)
D9 Public Workshop #2 Summary (2.8.17)
D10 City Workshop #3 Meeting Minutes (3.29.17)
D11 City In-Canal Structures Meeting Minutes (7.19.17)
D12 City Master Plan Presentation Meeting Minutes (8.24.17)
D13 PAC Master Plan Meeting Minutes (11.29.17)
D14 SLR Resiliency Workshop Meeting Minutes (9.17.19)
D15 DPP SLR Meeting Minutes (11.8.19)
D16 PAC SLR Meeting Minutes (12.18.19)
D17 Floodwall Study Kick-off Meeting Minutes (8.14.20)
D18 Initial Floodwall Alternatives Meeting Minutes (9.11.20)

LIST OF ACRONYMS USED

The following is a list of acronyms and abbreviations used in this Final Report:

BFE:	Base Flood Elevation
CITY:	City and County of Honolulu
DEIS:	Draft Environmental Impact Statement
DFE:	Design Flood Elevation
DHHL:	Department of Hawaiian Homelands
DOH:	Department of Health
DPP:	Department of Planning and Permitting
ECR:	Existing Conditions Report
EIS:	Environmental Impact Statement
EISPN:	Environmental Impact Statement Preparation Notice
FEIS	Final Environmental Impact Statement
FEMA:	Federal Emergency Management Agency
GMSL:	Global Mean Sea Level
HAR:	Hawai'i Administrative Rules
HART:	Honolulu Authority for Rapid Transportation
HCC:	Honolulu Community College
HDOT:	Hawai'i Department of Transportation
HRS:	Hawai'i Revised Statutes
KCCP:	Kapālama Canal Catalytic Project
KS:	Kamehameha Schools
MLLW:	Mean Lower Low Water
NOAA:	National Oceanic and Atmospheric Administration
PAC:	Project Advisory Committee
ROM:	Rough Order of Magnitude
SLR:	Sea Level Rise
TOD:	Transit-Oriented Development
USEPA:	United States Environmental Protection Agency



Fig. 1-1 Conceptual Master Plan: Central Canal Rendering (2017)

1 EXECUTIVE SUMMARY

The Kapālama Canal Catalytic Project (KCCP) and the resulting Resilient Master Plan are based on various community plans supported by the City and County of Honolulu (City). These community plans include the Kalihi-Pālama Action Plan (2004) and the Kalihi Neighborhood Transit-Oriented Development (TOD) Plan (2017), which provide visions for a linear park along Kapālama Canal, a waterfront promenade, and complete street improvements along Kōkea and Kohou Streets from Nimitz Highway to the H-1 Freeway. In addition to supporting the community's visions, the KCCP addresses green infrastructure and water quality improvements, flood control, erosion control, bank stabilization, dredging, and sea level rise (SLR). The intent of the KCCP is to catalyze broader neighborhood improvements, address the need for recreation space, and new mixed-use development in the area around the Kapālama rail transit station. The KCCP embraces a landscape and architectural palette inspired by local culture, history, and environment as seen in its use of public art, interpretive signage, and outdoor furniture (*Fig. 1-1 and 1-3*).

The KCCP area is an approximately one-mile long waterway in the ahupua'a of Kapālama that roughly follows the original course of the former Niuhelewai Stream from Honolulu Harbor to just diamond head of Houghtailing Street. The Canal was built by the City in 1938 as a flood control project with financial assistance from the Federal Public Works Administration program. While the flood protection allowed for the industrial, commercial, and residential developments currently on the adjacent lands, it regarded water as a nuisance and the Canal was designed to prioritize water drainage, resulting in the degradation of water quality and stream bank erosion. The KCCP seeks to elevate the perception of water from that of being a threat to that of being a community resource.

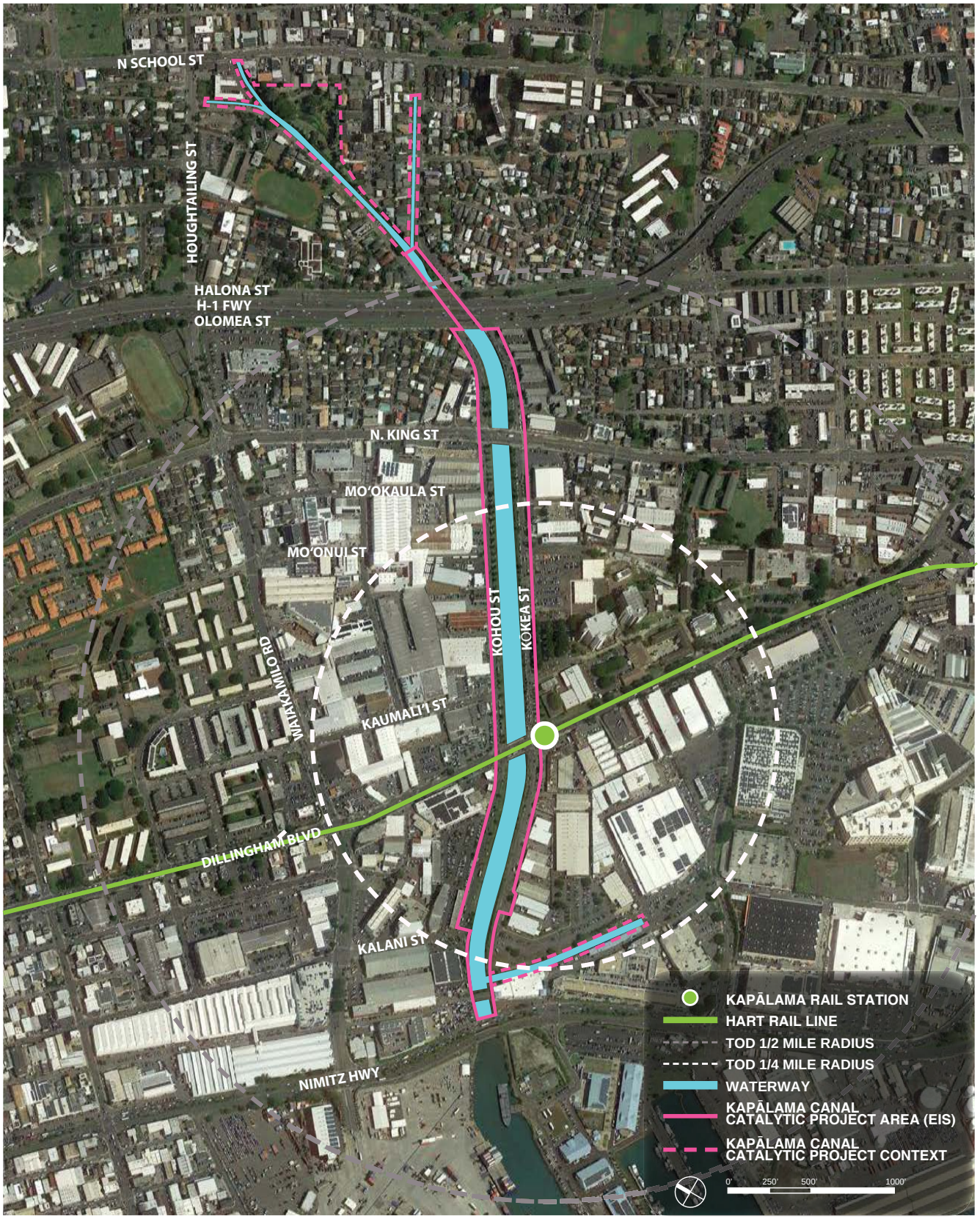


Fig. 1-2 Kapālama Canal Catalytic Project Area

For the purposes of the Project's Environmental Impact Statement (EIS), the study area is Kapālama Canal from Nimitz Highway to the first fork mauka of the H-1 Freeway. The study area of the Canal makai of Kalani Street is limited to the outside edge of the Canal bank; between Kalani Street and the H-1 Freeway, the study area is defined from property line to property line; and between the H-1 Freeway and the first fork, the study area is limited to the inside edges of the Canal (*Fig. 1-2*). Although outside of the KCCP area, the context as shown in the dashed line in Fig. 1-2 was studied during the master planning process to facilitate more comprehensive neighborhood planning.

The KCCP culminated in the submittal of a Final EIS (FEIS) that presented the Resilient Master Plan as the Proposed Action. The Resilient Master Plan was the outcome of five years of planning driven by transit and community-oriented urban design principles; various technical reports; extensive community outreach with State and City officials, community leaders and stakeholders, and the general community; and resiliency strategies to address SLR. A Conceptual Master Plan was completed in 2017 that proposed urban, architectural, and engineering interventions along the Canal—in response to neighborhood plans, analyses of existing conditions, and community input—that would provide the community with a vibrant linear park offering a range of amenities and experiences from mauka to makai. In 2020, the Conceptual Master Plan and its Phasing Plan were revised to address SLR per the 2018 Honolulu Mayor's Directive on Climate Change, resulting in the Resilient Master Plan. As the final master plan for the KCCP, the Resilient Master Plan retains many of the characteristics and goals set forth in the Conceptual Master Plan. However, certain design components were deemed no longer feasible and various details were revised, including modifications to the Canal's edge condition, in order to provide a safe and resilient linear park for the present community and generations to come.



Fig. 1-3 Conceptual Master Plan: Makai Canal Rendering (2017)

2 EXISTING CONDITIONS

The KCCP began with an observational analysis of existing site conditions, collection and summary of existing and available civil data, related planning studies developed by the City and adjacent landowners, and jurisdictional and regulatory parameters, all of which are compiled in the Existing Conditions Report (ECR) completed in 2016 (see Appendix B1). The ECR describes the following conditions in detail through narratives, photographs (*Fig. 2-1 to 2-6*), plans, and diagrams:

- Hydrologic and embankment conditions comprise an approximately 100-foot wide waterway the length of the KCCP area with vegetated banks below N. King Street, and a concrete rubble masonry wall above N. King Street. Water pollution was also observed in the form of murky waters and the presence of trash in the waterway.
- Existing vegetation include mainly grass, weeds, mangroves, and rainbow shower street trees, with intermittent irrigation that does not meet the Plumbing Code.
- A lack of continuous sidewalks, the absence of bike paths, and two-way drive lanes with abundant street parking on both Kohou and Kōkea Streets confirm a lack of multi-modal connectivity along the length of the Canal.
- Adjacent landowners include Honolulu Community College (HCC), Kamehameha Schools (KS), and Department of Hawaiian Homelands (DHHL). KS and HCC have development plans that present opportunities for collaborative planning.
- Architecturally significant structures along or near the Canal include the old Oʻahu Rail and Land Company bridge, Dillingham Bridge, and the Hawaiʻi Hochi building.
- Existing utilities include above ground electrical, underground sanitary sewers and water mains, and stormwater outfalls into the Canal.
- City planning studies, including the Primary Urban Center Development Plan (2004), Kalihi-Pālama Action Plan (2004), Kalihi Neighborhood TOD Plan (2017), and the Kapālama Canal Conceptual Plan Study for Flood Control, Landscaping, and Beautification (1980), describe plans to improve the Canal and the neighborhood.
- Chapter 343, Hawaiʻi Revised Statutes (HRS) EIS process.
- Regulatory approvals such as the Clean Water Act, Section 404 permit by the United States Army Corps of Engineers and Section 401 Water Quality Certification by the Hawaiʻi Department of Health (DOH).
- A list of community stakeholders, including elected officials, government agencies, religious groups, businesses, landowners/developers, educational institutions, and cultural groups.
- Cultural and Historic Brief describing yesterday's Kapālama as a productive ahupuaʻa that supported sandalwood forests in the mauka areas and fishponds and loʻi in the makai areas.
- Geotechnical Work Plan.



Fig. 2-1 Canal mauka of H-1 Freeway looking makai (ECR 2016)



Fig. 2-2 Canal makai of Dillingham Boulevard looking mauka (ECR 2016)



Fig. 2-3 HCC gathering space (ECR 2016)

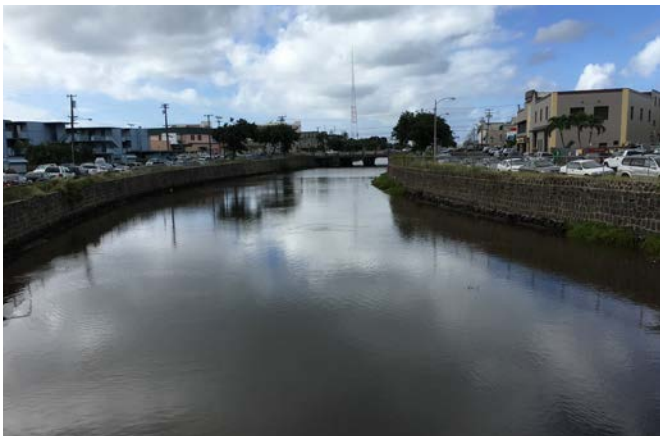


Fig. 2-4 Canal from Olomea Street Bridge looking makai (ECR 2016)



Fig. 2-5 Kohou Street looking makai (ECR 2016)



Fig. 2-6 Existing Rainbow shower trees (ECR 2016)

3 PLANNING PROCESS

The KCCP was driven and informed by a robust community engagement program, various technical studies and surveys, transit and community-oriented architectural and planning perspectives, and issues surrounding SLR. The planning process culminated in the preparation and submission of the FEIS pursuant to Chapter 343, HRS, and Title 11, Chapter 200.1, Hawai'i Administrative Rules (HAR), DOH, in which the Resilient Master Plan was presented as the Proposed Action.

3.1 Community Engagement

Input from workshops attended by various City agencies and project consultants, and feedback generated from community outreach, were a continuous and important part of the master planning process for the KCCP. The community engagement program included two public workshops (*Fig. 3-1 to 3-4*); the formation of a Project Advisory Committee (PAC) comprised of representatives of adjacent landowners, government agencies, cultural groups, and elected officials (see Appendix B2); interviews with Thought Leaders identified for their impact within the Kalihi-Pālama neighborhood (see Appendix D4); a Crowdbrite website; public input during the EIS process; and an outreach video published on YouTube in 2020 as a means to update the general public on the Resilient Master Plan, promote the publication of the EIS, and encourage comments (Appendix C18). Fig. 3-5 presents a timeline of the various community workshops, presentations, meetings, and interviews.



Fig. 3-1 Public Workshop #1 Presentation Photo



Fig. 3-2 Public Workshop #1 Interactive Activities Photo



Fig. 3-3 Public Workshop #2 Presentation Photo



Fig. 3-4 Public Workshop #2 Interactive Activities Photo

Date (mm.dd.yy)	Meeting Name
06.06.16	City Kick-Off Meeting
07.26.16	City Visioning Workshop
07.27.16	City Green Infrastructure Presentation
08.09.16	KS Presentation/Interview
08.18.16	Board of Water Supply Interview
08.31.16	Honolulu Authority for Rapid Transportation (HART) Interview
09.07.16	Kokua Kalihi Valley Interview
09.09.16	Pālama Settlement Interview
09.16.16	Kalihi-Pālama Hawaiian Civic Club Interview
09.29.16	Public Workshop #1
10.05.16	PAC Workshop
11.04.16	HCC Interview
11.04.16	Farrington High School Interview
11.09.16	City Workshop #2
11.09.16	City Green Infrastructure Workshop
12.12.16	PAC Meeting #1
01.08.17	Public Workshop #2
03.29.17	City Workshop #3
03.30.17	Farrington High School Hydraulic Presentation
04.11.17 - 05.17.17	EIS Preparation Notice (EISPN) Comment Period
04.17.17	Farrington High School Kapālama Canal Symposium
07.19.17	City In-Canal Sructures Presentation
08.24.17	City Master Plan Presentation
11.29.17	PAC Master Plan Presentation
07.26.19	SLR Kick-off & Technical Summary
09.16.19	SLR Resiliency Workshop
11.08.19	Department of Planning and Permitting (DPP) SLR Meeting
12.18.19	PAC SLR Presentation
03.16.20	Final SLR Presentation
08.08.20 - 09.22.20	EIS Comment Period
08.11.20	Master Plan Outreach Video publication on YouTube
08.14.20	Floodwall Study Kick-off
09.11.20	Floodwall Alternatives
10.27.20	Floodwall Review

City Meeting
PAC Meeting
Public Outreach
Thought Leader Interview

Fig. 3-5 Chronological Outline of City and Community Engagement

3.2 Technical Surveys and Reports

Over the course of the master planning process, various technical surveys and reports were conducted to support and inform the design, and provide supporting documents for the EIS (Appendix B). Additional reports such as the Final Floodwall Type Selection Report (Appendix B11), the Final Sampling and Analysis Plan (Appendix B12), and the Final Sampling and Analysis Report (Appendix B13) were also completed to support the future design and construction of the Resilient Master Plan.

3.3 Sea Level Rise and Climate Change

Consideration for future SLR has been essential to the master planning of the KCCP. SLR is an inevitable outcome of global warming that will likely continue through many centuries, even if human-generated global greenhouse gas emissions were stopped today (Hawai'i Sea Level Rise Vulnerability and Adaptation Report, 2017). The design and planning for the KCCP has taken into account the studies and guidance directive summarized below.

The State of Hawai'i Sea Level Rise Vulnerability and Adaptation Report, initially mandated by State Act in 2014 (Hawai'i Climate Change Adaptation Initiative) and expanded upon in 2017 (Hawai'i Climate Change Mitigation and Adaptation Initiative), provides the initial basis for addressing SLR and recommendations to mitigate exposure to it while increasing our capacity for adaptation. As the Report is considered a "living" output for current reference, it will be updated as new information becomes available. While the initial Report projects up to 3.2 feet of Global Mean Sea Level (GMSL) rise by the year 2100 with possible projections for early rise of this magnitude as soon as 2060, questions remain around the exact timing of that rise due largely to uncertainties around future global environmental conditions.

In June 2018, the City's Climate Change Commission adopted Sea Level Rise Guidance and an accompanying Climate Change Brief. The Guidance, Brief, and Report were incorporated into the Honolulu Mayor's Directive on Climate Change in July 2018, further establishing local governmental policies for compliance, coordination, and cooperation with these items. It was found reasonable to set as a planning benchmark up to 3.2 feet (~1 meter; +3.2' SLR) of GMSL rise by mid-century for areas affected by chronic high tide flooding. It was also found reasonable to set as a planning benchmark up to 6 feet (~1.8 meter; +6' SLR) of GMSL rise in the later decades of the century, especially for critical infrastructure with long expected lifespans and low risk tolerance. In response to the Mayor's Directive, the DPP initiated a SLR study for the KCCP.

Finally, online SLR viewers developed by the National Oceanic Atmospheric Administration (NOAA) were used as a digital atlas to provide maps that help designate and identify those land areas seen as specifically affected by projected levels of SLR and high-tide flooding, as shown in Fig. 3-6.

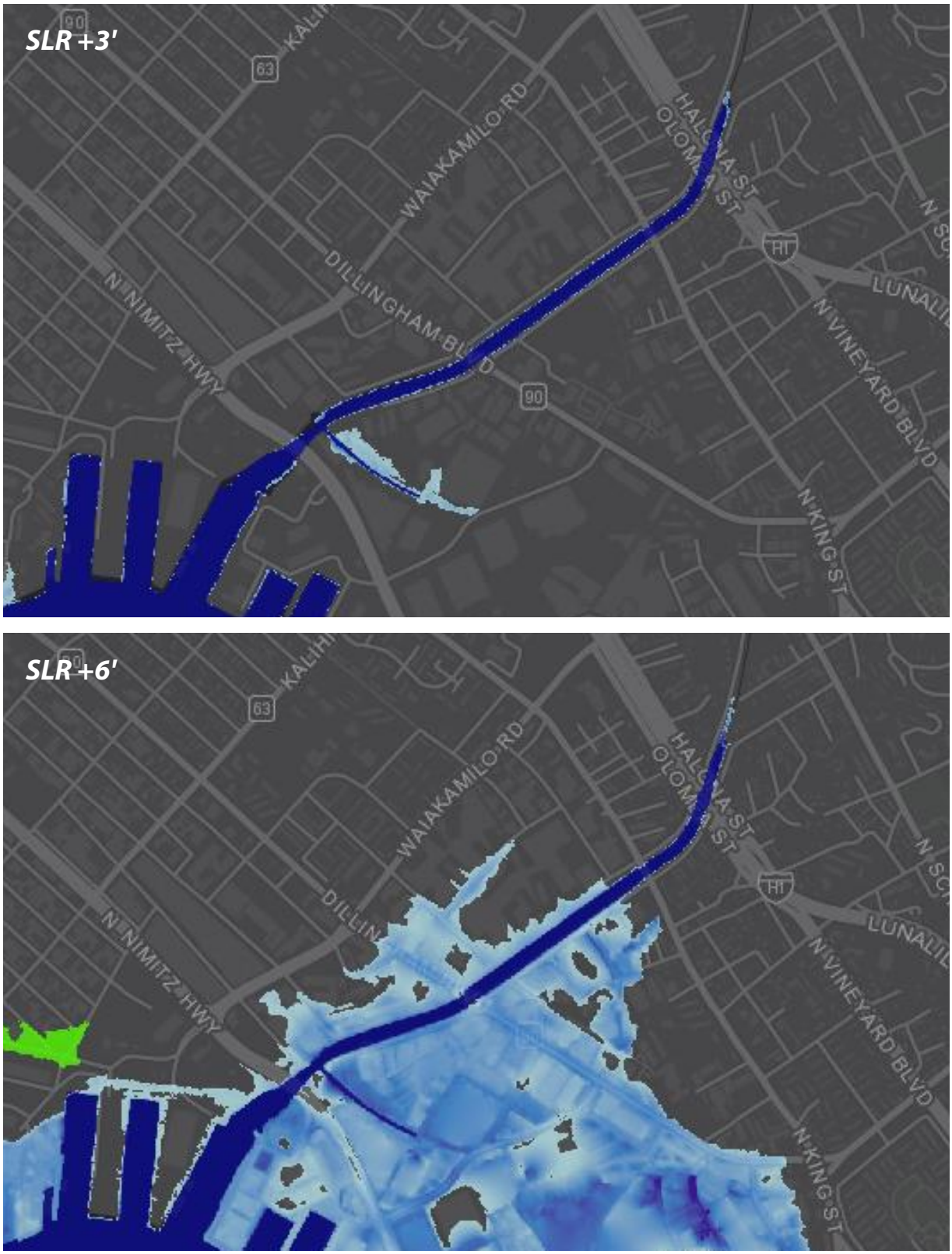


Fig. 3-6 NOAA Sea Level Rise Viewer depicting +3.0′ SLR and +6.0′ SLR

3.4 Designing for Sea Level Rise

In September 2019, WCIT Architecture and ARUP conducted a SLR study workshop with the City Department of Design and Construction and DPP for the KCCP. The workshop began with an introduction to general resiliency strategies to protect against SLR, paired with case studies of projects in the U.S. of similar scope and challenges. Discussion followed to refine the design parameters originally identified in the Conceptual Master Plan, identify project-specific resiliency strategies, and summarize project constraints and opportunities for the KCCP.

3.5 Hydraulic Modeling Report

In-depth hydraulic modeling and analysis were performed through the duration of the SLR study to support the Resilient Master Plan. A final Hydraulic Modeling Report was completed in January 2020 that assessed and validated the existing flood capacity conditions based on cross-sectional surveys, and determined the specific probable flooding conditions within the project area of the Canal at projected +3.2' SLR and +6' SLR. The Report analyzed the proposed in-Canal structures and flood protection features that would improve the Canal's function as a flood control channel while still providing community park amenities. A 100-year flood water surface elevation for the Canal was determined and is referred herein as the Base Flood Elevation (BFE). It is noted that the BFE listed in the Report and referenced in the Resilient Master Plan is not synonymous with the Federal Emergency Management Agency (FEMA) regulatory Flood Map BFE. Presently, there is no existing FEMA-approved 100-year flood flow estimate for the Kapālama Canal and the Design Flood Elevation (DFE) was developed per Plate 6 of the Honolulu DPP Rules Relating to Storm Drainage Standards. This DFE represents the Freeboard plus the BFE where Freeboard is a function of the velocity and water depth at a cross section of the Canal. Fig. 3-7 shows the extent of "Enhanced Flood Protection Needed" along the Canal based on +3.2' SLR DFE requirements, which necessitated the design of a continuous floodwall on both sides of the Canal to meet +3.2' SLR DFE requirements. The Report can be found in the Appendix of the FEIS (Appendix B10-A).

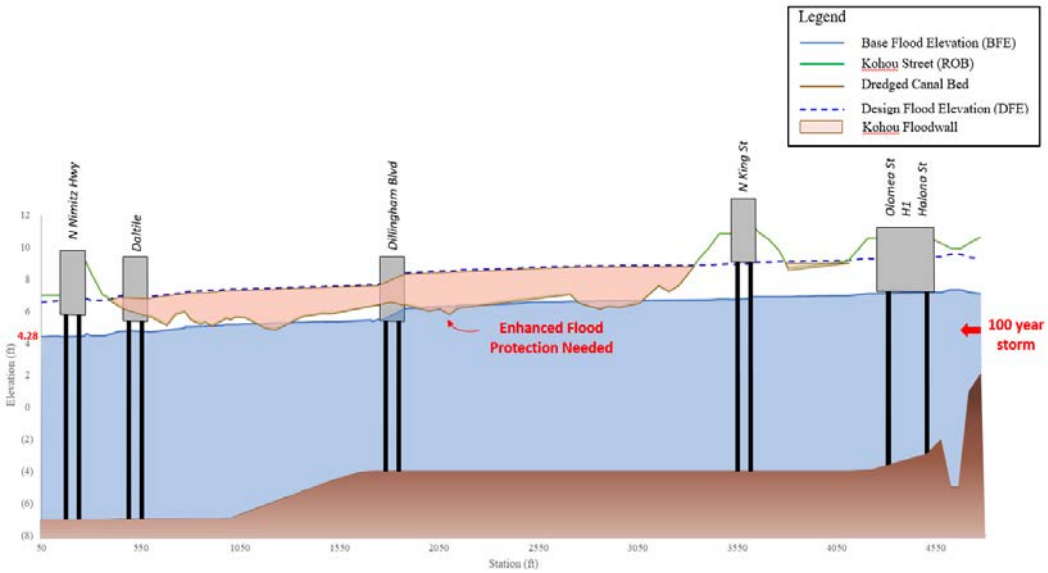


Fig. 3-7 Cross section of Kapālama Canal Enhanced Flood Protection with 3.2 feet of SLR

3.6 Project Goals

The process of community engagement and considerations for SLR resulted in the following goals for the KCCP:

- **Community**
  By creating a place that welcomes all, provides a source of Kalihi pride, and reflects the neighborhood's diverse population, the Canal will serve as an active place for locals to gather, relax, learn, and celebrate.
- **Infrastructure**
  The Canal will serve not only as infrastructure for flood control but would reimagine water as a resource rather than a liability, while providing enhanced connectivity to and around the Canal.
- **Environment**
  More greenery, restoration of native landscapes, and cleaning the water will bring nature into the neighborhood, providing much needed park space that would also serve as a catalyst for kuleana throughout the neighborhood.
- **Resiliency**
  By enhancing the Canal's flood protection system, the Canal will help protect the neighborhood from SLR and allow for the enjoyment of the linear park for generations to come.

The goals of Community, Infrastructure, and Environment were the guiding posts for the Conceptual Master Plan completed in 2017, while the goal of Resiliency was added as a fourth goal in 2019 in response to the Mayor's Directive on Climate Change resulting in a Resilient Master Plan completed in 2020. The Resilient Master Plan, which incorporates the Conceptual Master Plan, is considered the final master plan.



Fig. 3-8 Samples from various event booths utilized to collect feedback on the KCCP

4 Conceptual Master Plan (2017)

Organized around three different experiences—Makai, Central, and Mauka—the Conceptual Master Plan for the KCCP embraced the project goals of Community, Environment, and Infrastructure through various design interventions within the Canal, its edges and banks, and the streetscapes of Kohou and Kōkea Streets (*Fig. 4-1*), primarily by increasing open space, enhancing accessibility, and improving the environmental quality of the water within and the land around the Canal.

The Environment goal inspired strategies for cleaning the waterway, dredging, sediment and erosion control, and installing green infrastructure to manage and filter stormwater, and encouraging environmental stewardship through education and community-building. The Infrastructure goal drove proposals for Complete and Shared Streets, continuous pedestrian and bicycle paths along the Canal, new connections across the Canal in the form of bridges to improve accessibility, and underground utilities. Finally, the Community goal gave rise to the reclamation of streets for green space, designs for bank-widening and in-Canal structures that provide additional open space for community amenities and activities, and incorporation of cultural elements in the design of architectural and landscaping elements.

Incorporating feedback from the community and information from the various technical reports, the Conceptual Master Plan evolved from a three alternative approach to a final master plan. Initial plans included three alternatives: a “Base Plan” and two “Integrated Plans." The Base Plan studied an area strictly within the City Right-of-Way, while the Integrated Plans explored ways to incorporate adjacent land owned by KS and HCC into the open space plan for the Canal. After meeting with the PAC on December 12, 2016, it was decided that the design team would move forward with the Base Plan.

The Base Plan evolved into a plan with three distinct experiences along the Canal—Makai, Central, and Mauka. The Makai Canal below Dillingham Boulevard was envisioned to be a nature park with amenities for picnicking and where marine habitats can be restored for the community to enjoy activities such as fishing (*Fig. 1-3 and 4-2*). The Central Canal between Dillingham Boulevard and N. King Street was envisioned to be an urban gathering place with facilities for events, outdoor performances, keiki play areas, and fitness activities (*Fig. 1-1 and 4-3*). The Mauka Canal from N. King Street to Olomea Street was envisioned to be an amenity-based community destination (*Fig. 4-4 and 4-5*). All three experiences were tied together with a continuous pedestrian and bicycle path along the Canal’s edge, tree and bio-filter lined Complete and Shared Streets, a landscaping and architectural palette inspired by local culture and history, public art, interpretive signage, and street furniture.

The concepts surrounding the three different Canal experiences were tempered with realities of safety, maintenance, existing and future hydrologic conditions, environmental conditions, and geotechnical conditions. Hydraulic modeling, dredging studies, geotechnical investigation, and structural studies further informed the feasibility and refinement of various components of the Conceptual Master Plan.

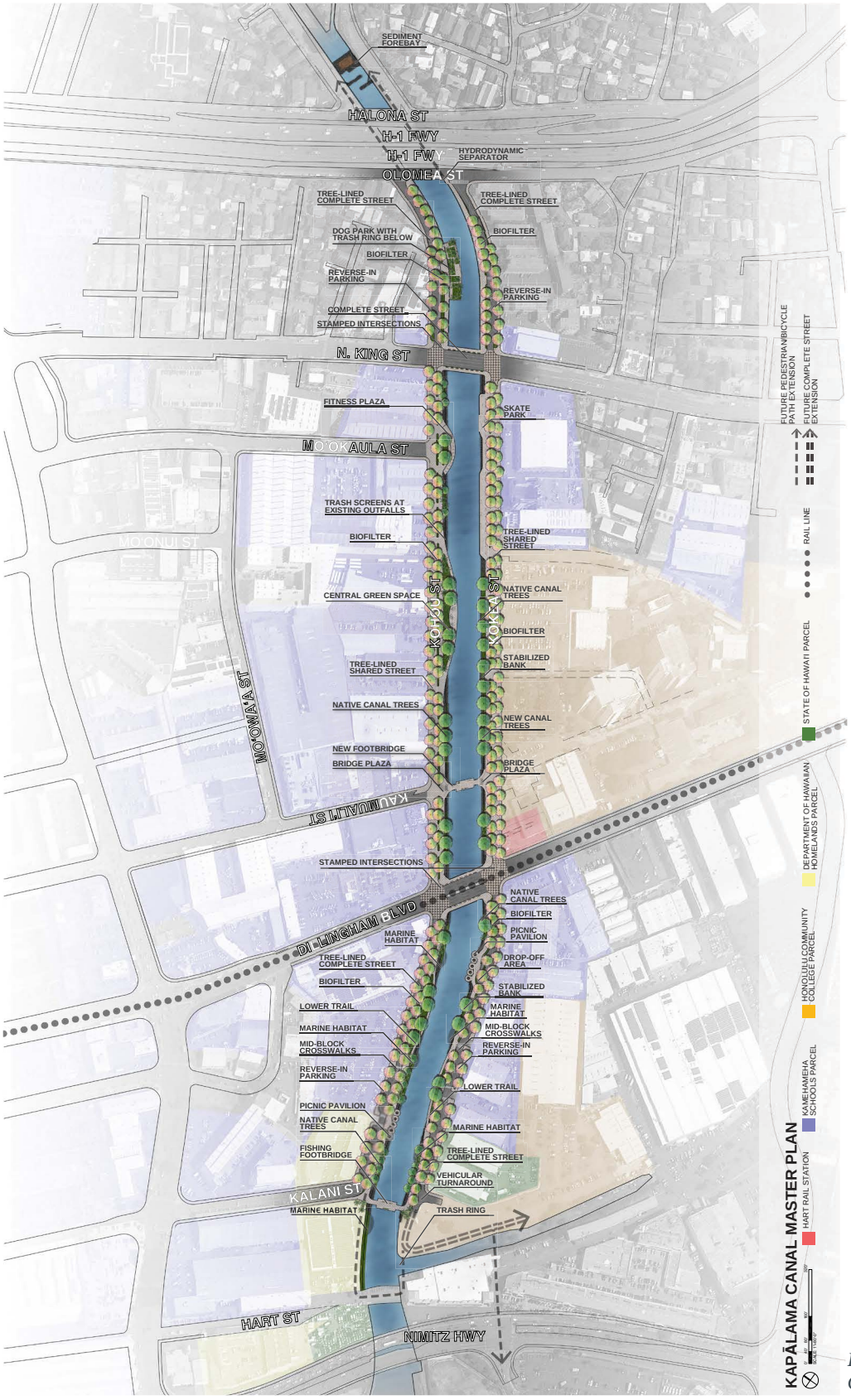


Fig. 4-1
Conceptual Master Plan (2017)

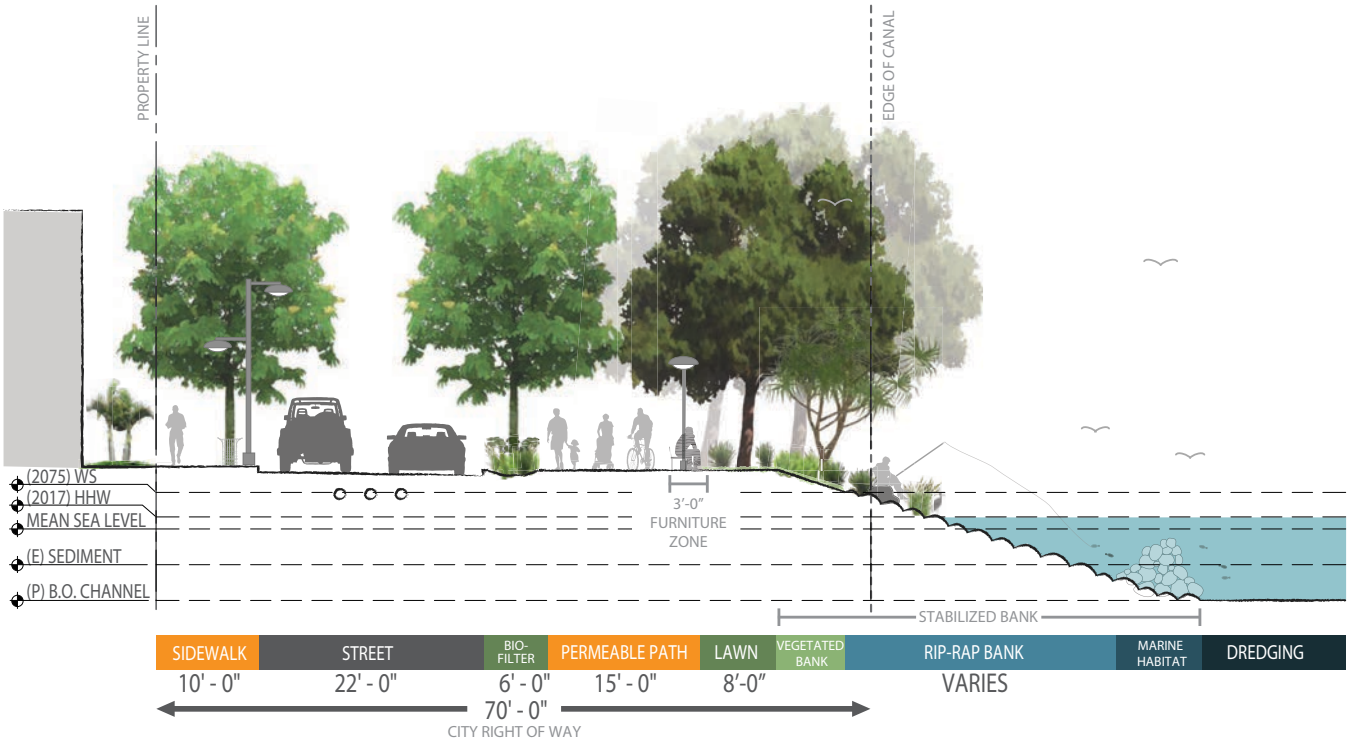


Fig. 4-2 Makai Canal Section (2017 Master Plan)

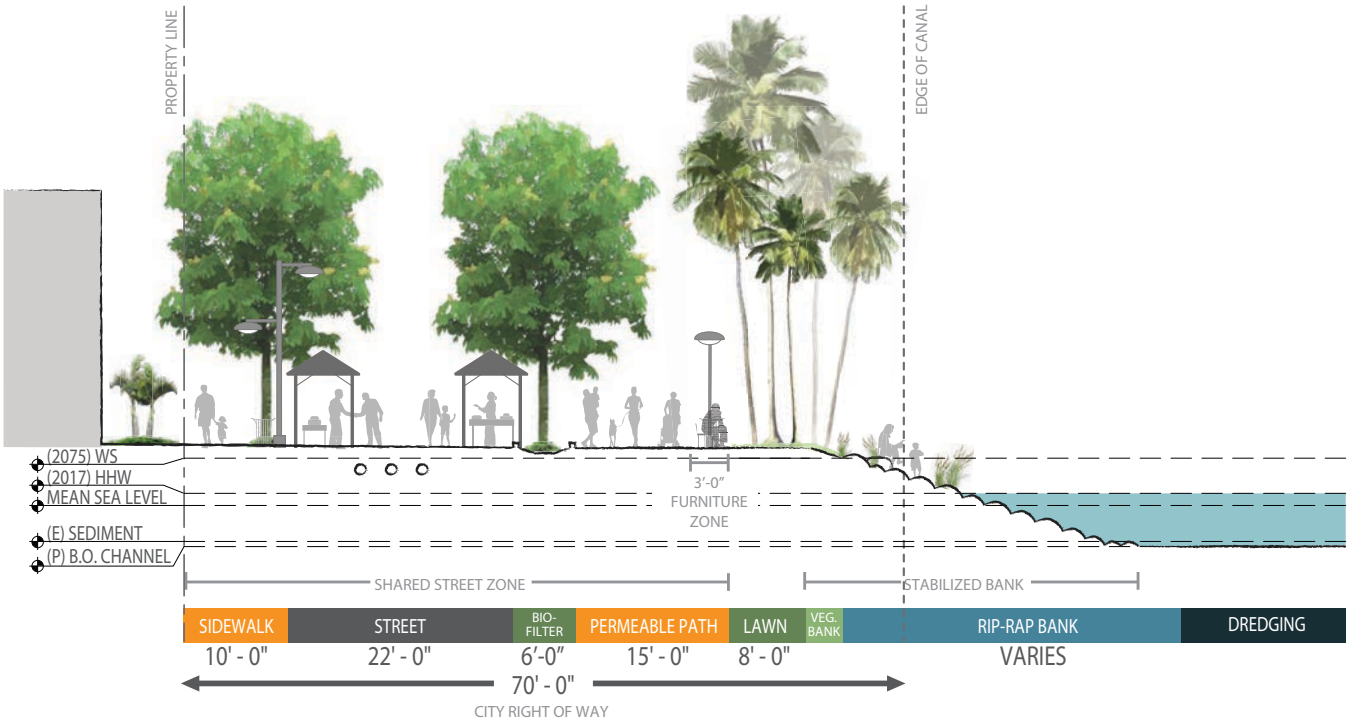


Fig. 4-3 Central Canal Section (2017 Master Plan)

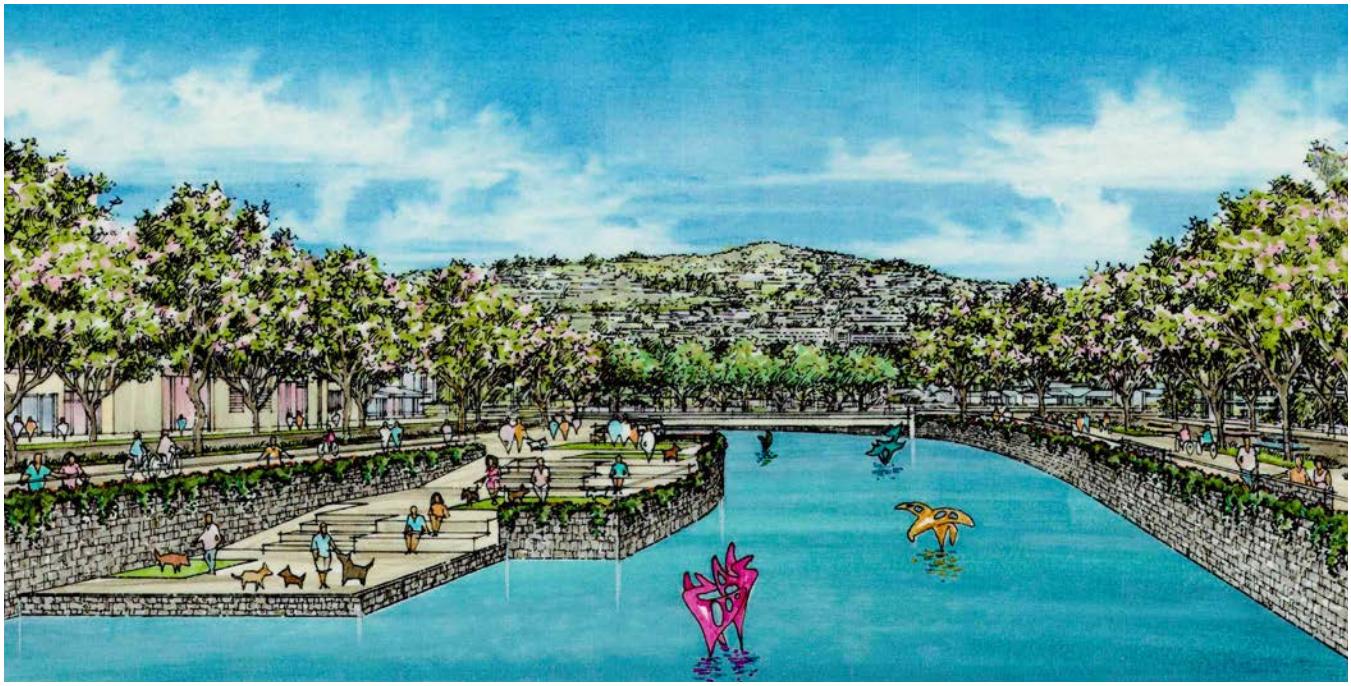


Fig. 4-4 Conceptual Master Plan: Mauka Canal Rendering (2017)

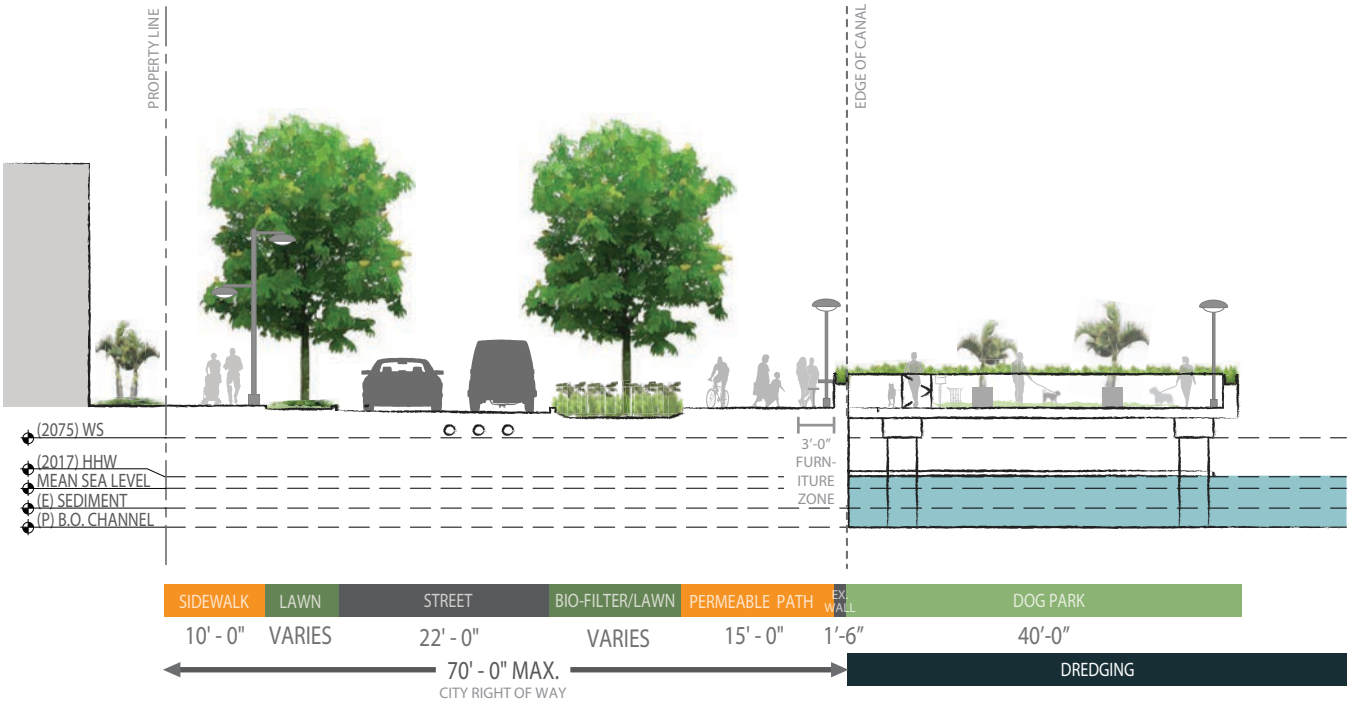


Fig. 4-5 Mauka Canal Section (2017 Master Plan)

5 Resilient Master Plan (2020)

5.1 Designing for +3.2' SLR

With the addition of the fourth project goal of Resiliency, components of the Conceptual Master Plan were tempered with the realities of SLR, deeming certain features no longer feasible while highlighting other features as opportunities to enhance the Canal's function as a flood control system through the integration of community amenities into a continuous floodwall system. The result is a final Resilient Master Plan that benefits the community with a linear park that also provides protection for up to +3.2' SLR in conjunction with the 100-year flood event (*Fig. 5-1 to 5-8*).

5.2 Makai Canal

The Makai Canal is envisioned as a nature park where the community can enjoy picnicking in the proposed picnic pavilions, jog, bicycle, and fish off of the Canal's edge or the proposed pedestrian bridge extending from Kalani Street across the Canal. Marine habitats and plants intended to attract and protect wildlife are proposed along this portion of the Canal. Partially shaded picnic pavilions are proposed with picnic tables and reverse-in parking and a drop-off area at the Kōkea Street pavilion. The proposed pedestrian bridge crossing the Canal at Kalani Street is designed as a path for pedestrian and cyclists, with a widened center to accommodate space for fishing. The continuous floodwall begins at the Kalani Street footbridge, continuing the length of the KCCP area, and is disguised as linear park amenities along both sides of the Canal through the integration of seating along the path and a lawn area along the Canal that provides opportunities for sitting along the water's edge (*Fig. 5-2*). The picnic pavilions and Kalani Street bridge are raised to DFE level to accommodate SLR, with floodwall ramps for accessibility (*Fig. 5-3*). The Conceptual Master Plan proposed lower paths to allow for closer interaction with the water; however, due to SLR these were replaced with wider lawn areas that incorporate seating and shade trees in the Resilient Master Plan (*Fig. 5-4*).

5.3 Central Canal

The Central Canal is an urban gathering place where visitors may congregate and watch performances, cross the Canal at Kaumualiʻi Street, attend block parties within the Shared Streets of Kohou and Kōkea Streets, and enjoy a park set on piers above the Canal. Seating and landscaping are integrated into the floodwall design, disguising the flood control system as a community amenity (*Fig. 5-5*). In the Conceptual Master Plan, a Central Green off of Kohou Street was proposed adjacent to KS's planned open space that included a keiki play area, a performance area, and a recreation lawn. A fitness plaza off of Kohou Street was also designed with fitness stations and a lawn area for group fitness. However, hydraulic studies during the SLR study showed that new encroachments into the Canal were undesirable and the Central Green was replaced with a raised promenade along the Canal's continuous path in the Resilient Master Plan, with the idea that the raised promenade could be used as a stage for performances when Kohou Street is closed for events (*Fig. 5-6*). Similarly, the proposed fitness lawn was removed from the Resilient Master Plan in order to maximize the Canal's flood capacity. A footbridge raised to DFE level at Kaumualiʻi Street is designed to improve accessibility between KS' planned development and HCC for pedestrians and cyclists, with a central widened path, stepped plazas at either end serving as additional gathering spaces, and

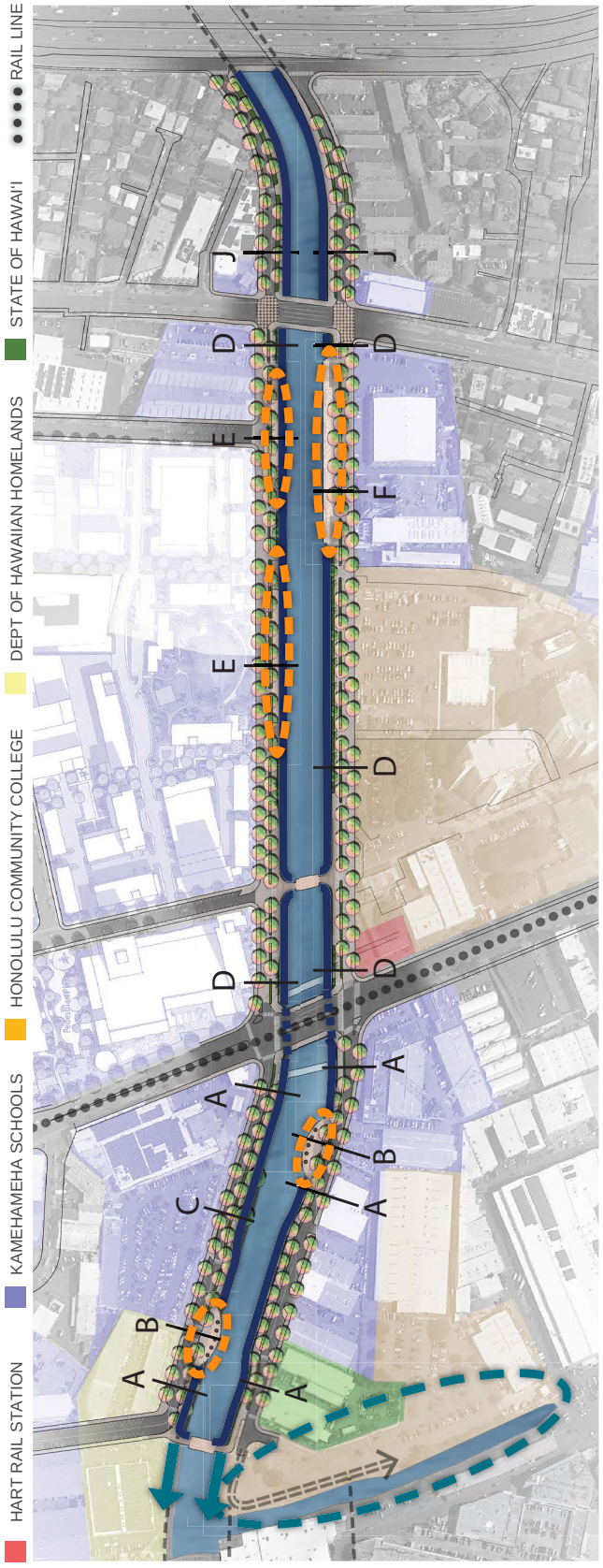


Fig. 5-1 Resilient Master Plan; see the following figures for referenced sections

accessibility ramps, while being incorporated into the continuous floodwall system. On Kōkea Street, a pier park is proposed at current street level, which is largely unaffected by +3.2' SLR (*Fig. 5-7*).

5.4 Mauka Canal

The Conceptual Master Plan for the Mauka Canal from N. King Street to Olomea Street was originally designed as a community destination with a dog park within the Canal (*Fig. 4-4*). However, the realities of SLR and findings from the hydraulic studies necessitated the removal of the dog park from the Resilient Master Plan. Counter height seating overlooking the Canal is proposed along both Kohou and Kōkea Streets to provide a place where people can enjoy the Canal. To soften the existing wall and provide additional flood protection, planters are proposed as a means to raise the height of the rock wall to guardrail height (*Fig. 5-8*). Reverse-in parking is proposed on both Kohou and Kōkea Streets. Mauka of the H-1 Freeway, a sediment forebay is proposed to capture upstream sediment.

5.5 Streetscape

A continuous pedestrian and bicycle trail connects the Makai, Central, and Mauka Canal along the water's edge. The trail would be permeable, as initial green infrastructure calculations indicate that proposed biofilters are not sufficient to filter runoff from Kohou and Kōkea Streets. In order to accommodate the new trail, on-street parking is replaced with reverse-in parking and the streets are redesigned to accommodate two 11-foot travel lanes, one lane going in each direction. Street trees on either side of Kohou and Kōkea Streets provide shade, and biofilters along the trail filter stormwater runoff, all while beautifying and greening the streetscape. Other street improvements include undergrounding utilities, new energy efficient street lights for vehicles and pedestrians, and road diets along the existing bridges with edge planters to provide wider landscaped sidewalks for pedestrians and cyclists, ultimately creating continuous trails that loop around each of the three sections of the Canal. During the SLR study, Dillingham Bridge was identified as safe under daily conditions at +3.2' SLR, but would be vulnerable to flooding in a storm event such that a gap closure is proposed that could be initiated to protect the roadways during a storm event.

5.6 Landscape Design

Native plant species are identified for the overall streetscape experience as well as for the green spaces of the Makai, Central, and Mauka Canal. Identified trees and their roots are compatible with the proposed Canal infrastructure and its structural integrity. True kamani trees are proposed along the Canal to replace the kamani trees being displaced by the HART rail line along Dillingham Boulevard. Existing mangroves in the Canal are to be removed as a strategy to clean the waterway, while existing kiawe trees along the bank are to remain where possible.

Proposed plantings for the biofilters lining both Kohou and Kōkea Streets on the Canal side include ʻahuʻawa, ʻakulikuli, aeʻae, kalo, ʻilieʻe, carex, and pohinahina. Rainbow shower trees are the proposed street tree along Kohou and Kōkea Streets. On the Canal side of the street, rainbow showers are spaced approximately 40 feet apart with biofilters between, while on the other side of the street, rainbow showers are planted in custom tree grates in order to maximize sidewalk accessibility. The custom tree grates are envisioned to incorporate cultural story-

telling. Culturally significant trees such as hala, hau, milo, and coconut palms are proposed along the Canal edge of the pedestrian trail. Planters with small plants such as ʻakia and carex are also proposed along the existing and proposed bridges.

Proposed plantings that provide bank stabilization and erosion control along the entire length of the Canal's bank include pohinahina, ʻahuʻawa, ʻilieʻe, kawelu, and pili. Where rip-rap is proposed for bank stabilization, sedges such as ʻahuʻawa, makaloa, and kaluha are proposed to soften the edges.

In addition to the plantings proposed for bank stabilization and erosion control, green space within the Makai Canal is landscaped with plants intended to attract and protect wildlife, such as naupaka, ʻaeʻae, ʻahuʻawa, and ʻakulikuli, as well as plants culturally related to fishing such as lama, ʻaʻaliʻi, ʻulei, naio, pohuehue, and ʻaweoweo. Trees such as hala, hau, milo, and coconut palms are also incorporated into the Makai plant palette.

Within the Central Canal, a variety of plants are proposed for their cultural significance. Near the Kaumualiʻi Street footbridge, plants used for cordage are proposed to symbolize the connection between KS and HCC, including niu, ʻukiʻuki, ʻahuʻawa, ʻakia, ʻhala, hau, and milo. At and around the raised promenade where performances may be held, plants associated with hula and lei are proposed to include niu, hala, alaheʻe, ʻohiʻa lehua, ʻilima, ti, and lama. Along the Canal wall of the pier park, pohinahina are proposed to soften the wall's edge.

Landscaping along the Mauka Canal includes pohinahina in the wall planters to soften the existing stone wall.

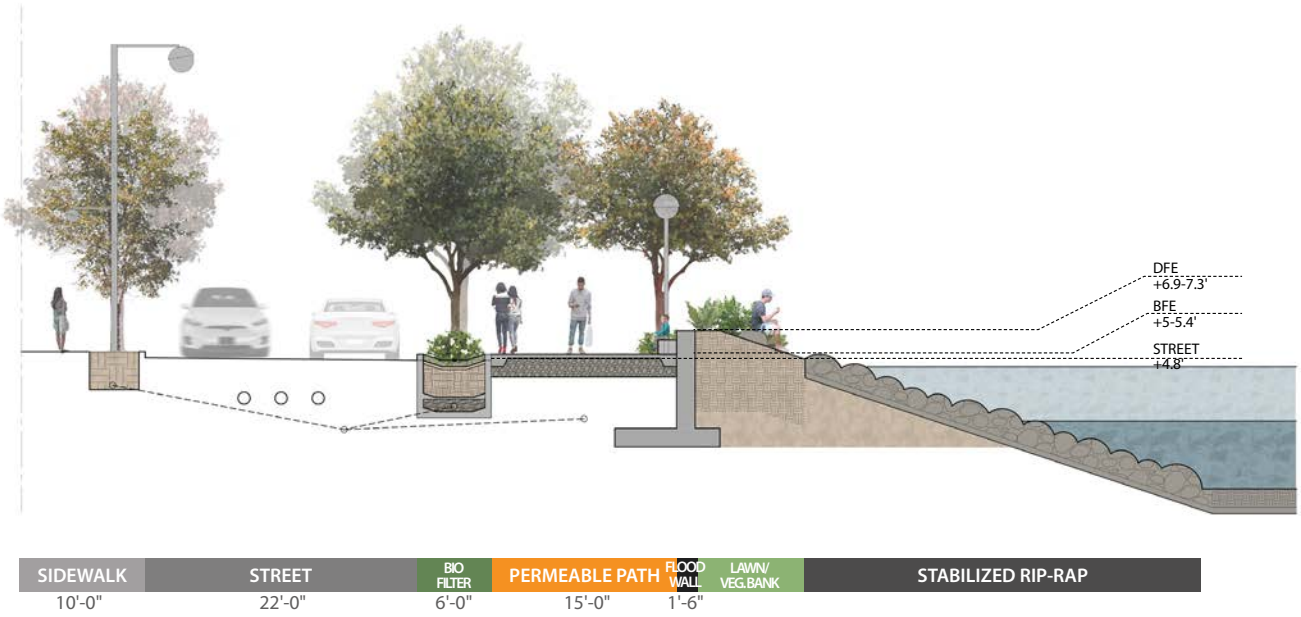


Fig. 5-2 Resilient Master Plan @ SLR +3.2': Makai Canal, Section A (typical)

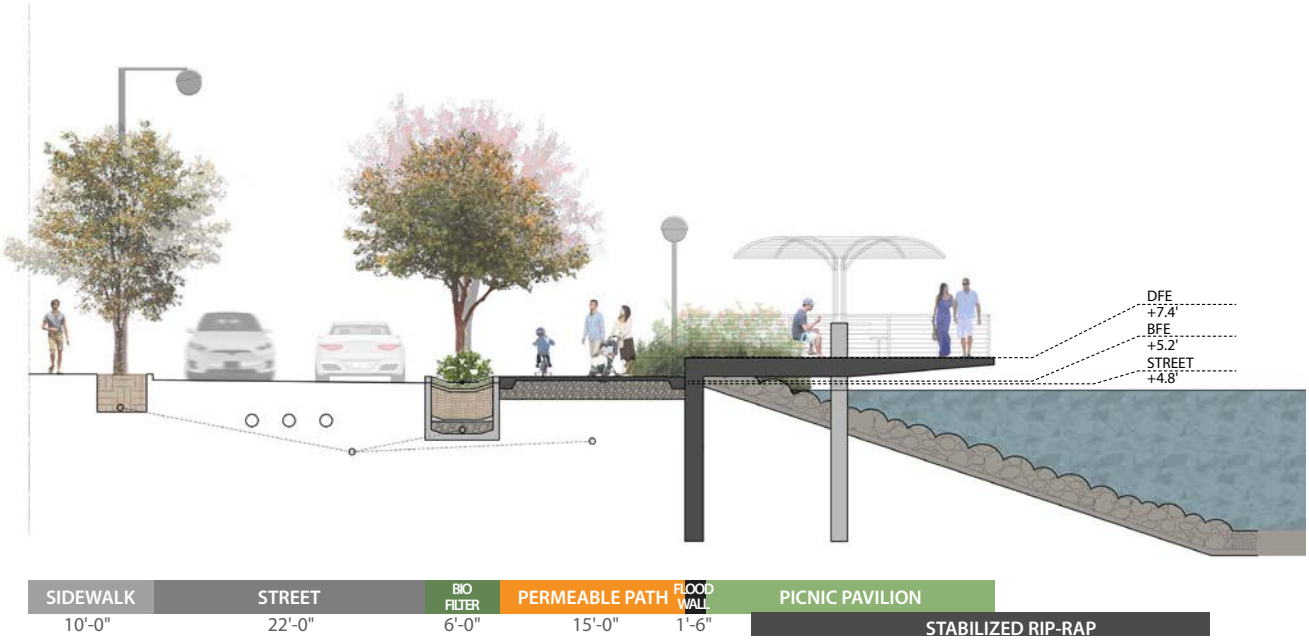


Fig. 5-3 Resilient Master Plan @ SLR +3.2': Makai Canal, Section B at Picnic Pavilion

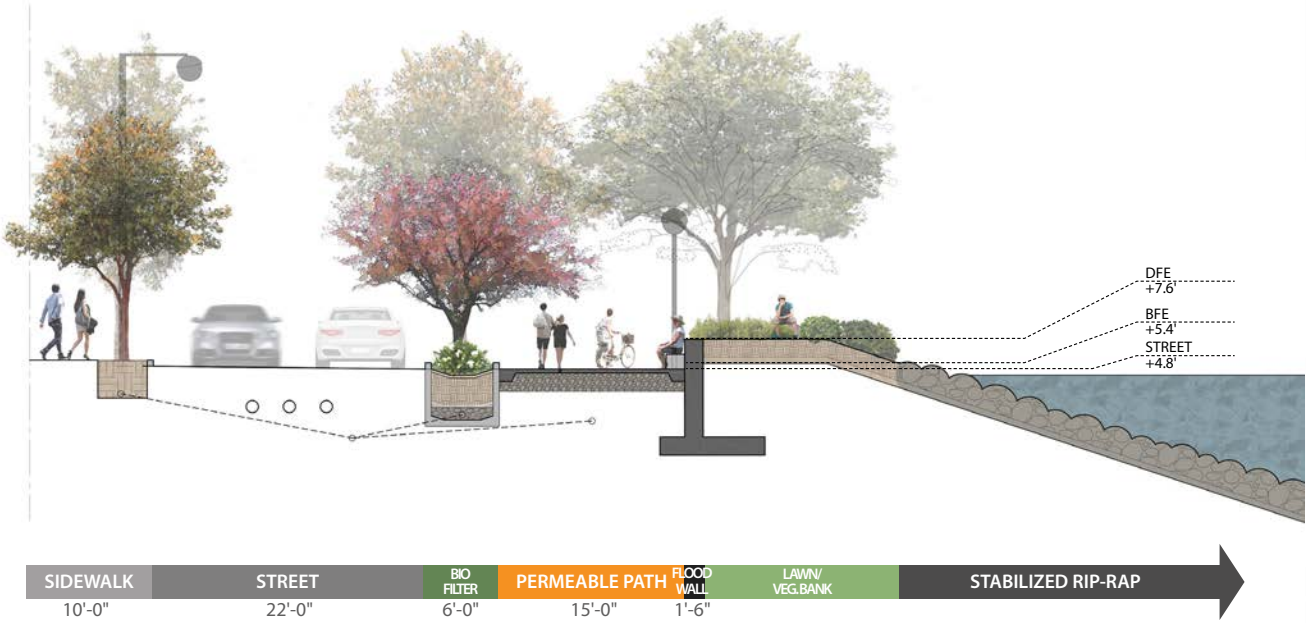


Fig. 5-4 Resilient Master Plan @ SLR +3.2': Makai Canal, Section C at wide bank

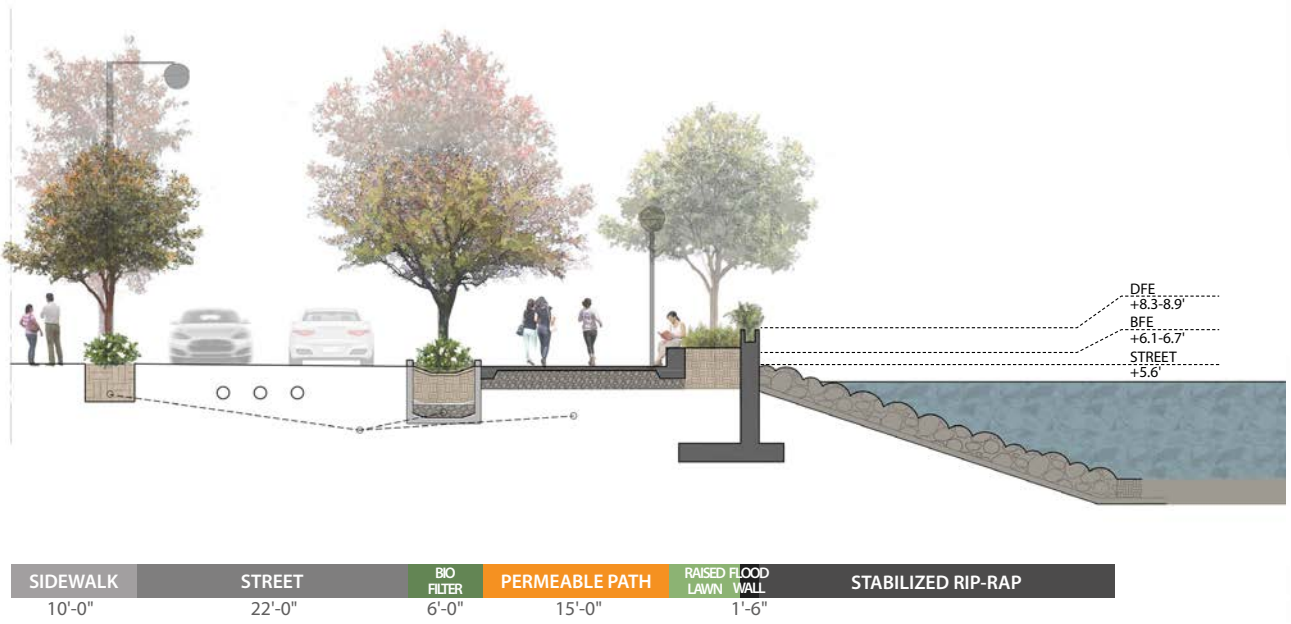


Fig. 5-5 Resilient Master Plan @ SLR +3.2': Central Canal, Section D (typical)

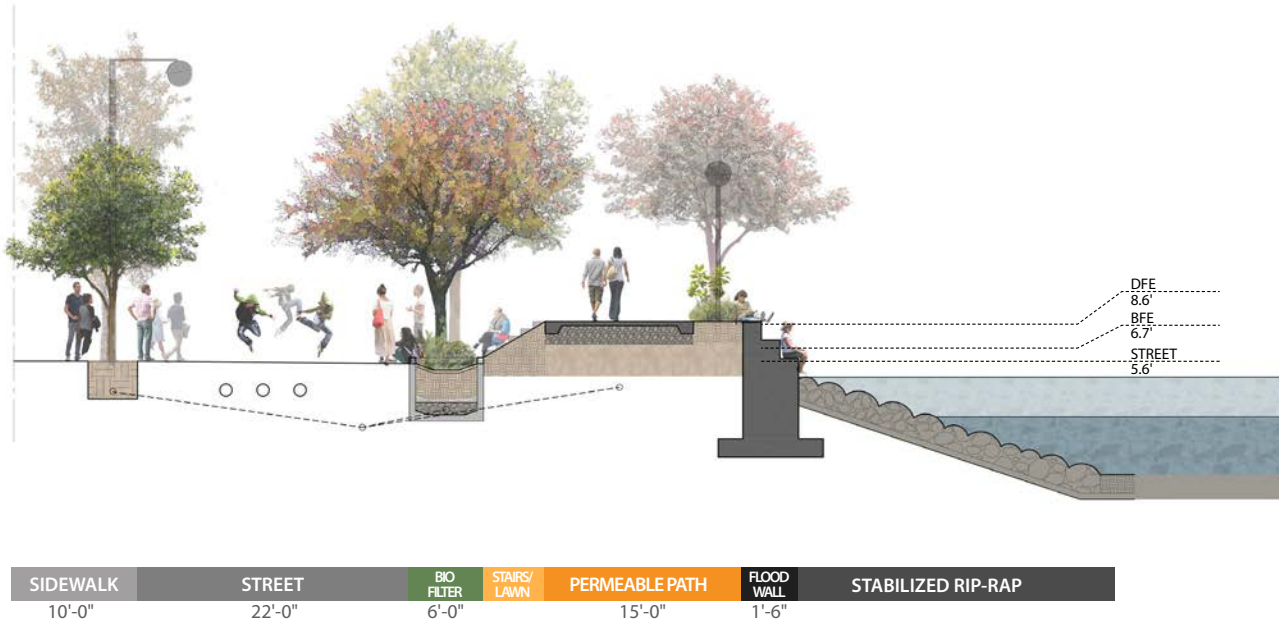


Fig. 5-6 Resilient Master Plan @ SLR +3.2': Central Canal, Section E at raised path

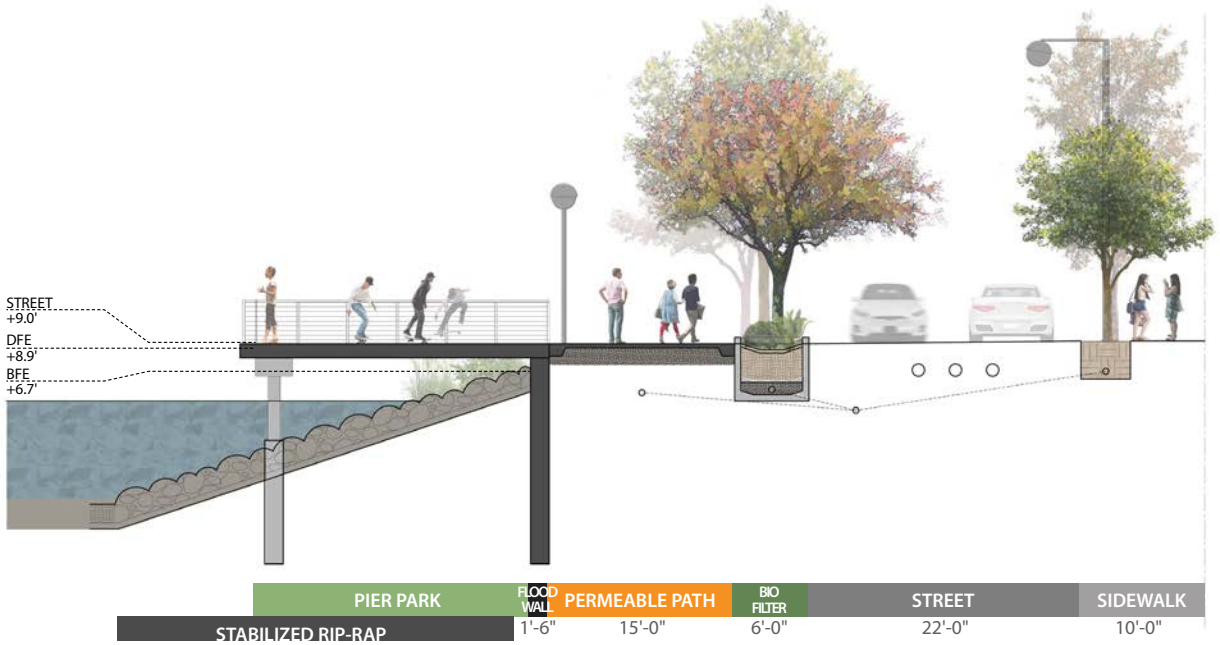


Fig. 5-7 Resilient Master Plan @ SLR +3.2': Central Canal, Section F at pier park

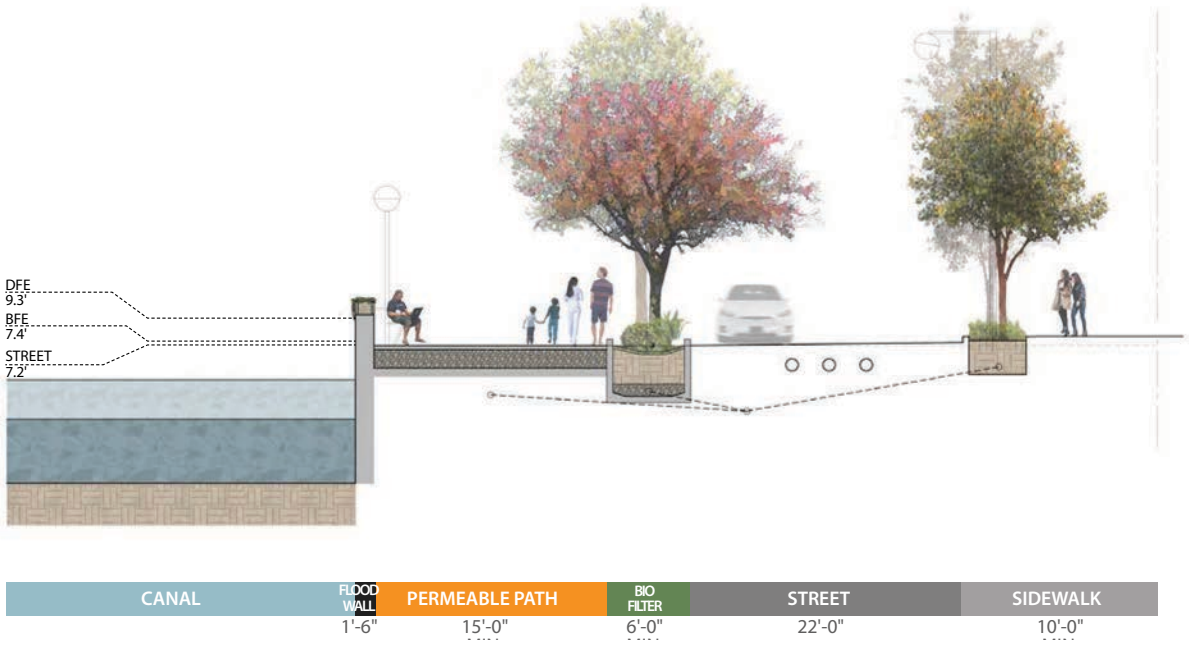


Fig. 5-8 Resilient Master Plan @ SLR +3.2': Mauka Canal, Section J

5.7 Resilient Phasing for +6' SLR

In the Resilient Master Plan, the floodwall for +3.2' SLR was designed in anticipation of +6' SLR such that raising the floodwall, associated paths, in-Canal structures, and amenities would provide the appropriate level of flood defense based on +6' SLR DFE. At +6' SLR, raising Kohou and Kōkea Streets becomes a necessity in order to maintain visual and physical connectivity to the Canal's linear park and waterway. Rebuilding Dillingham Bridge and associated HART utilities would also be required in order to meet the necessary DFE at projected +6' SLR conditions. Figures 5-9 to 5-13 demonstrate how the various cross sections along the Canal may be raised to accommodate +6' SLR.

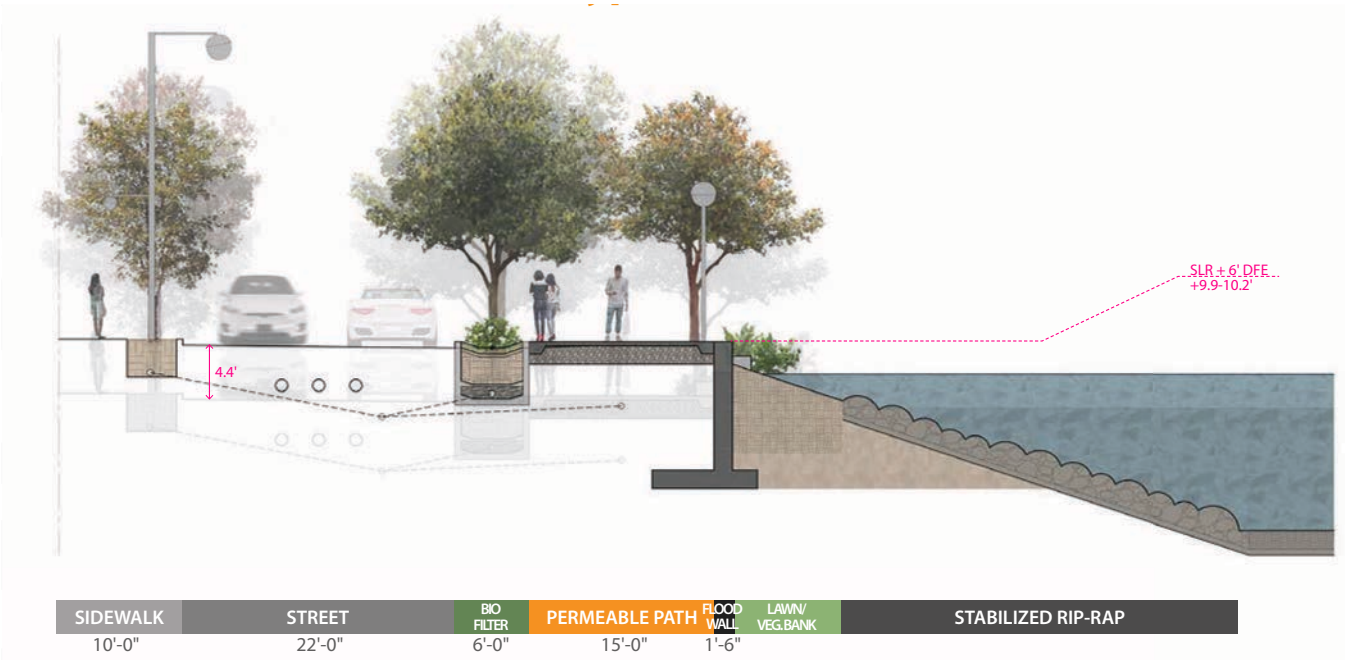


Fig. 5-9 Resilient Phasing @ +6' SLR: Central Canal, Section A (typical)

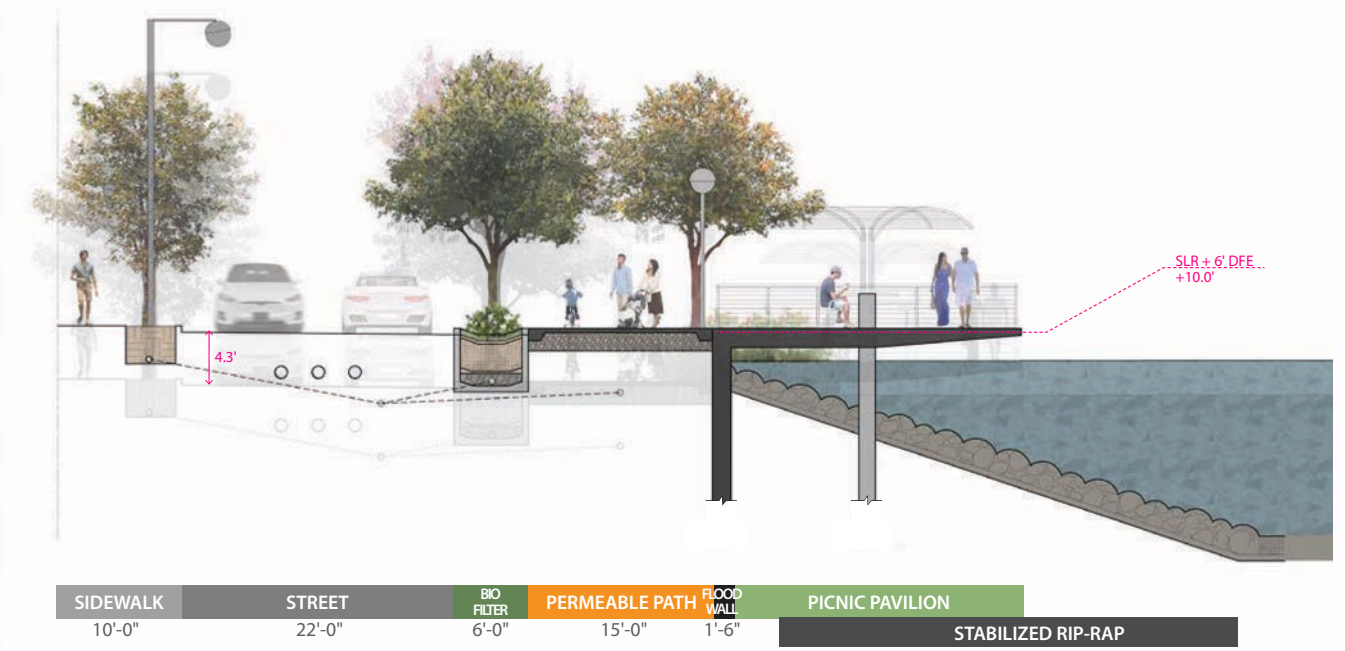


Fig. 5-10 Resilient Phasing @ +6′ SLR: Central Canal, Section B at picnic pavilion

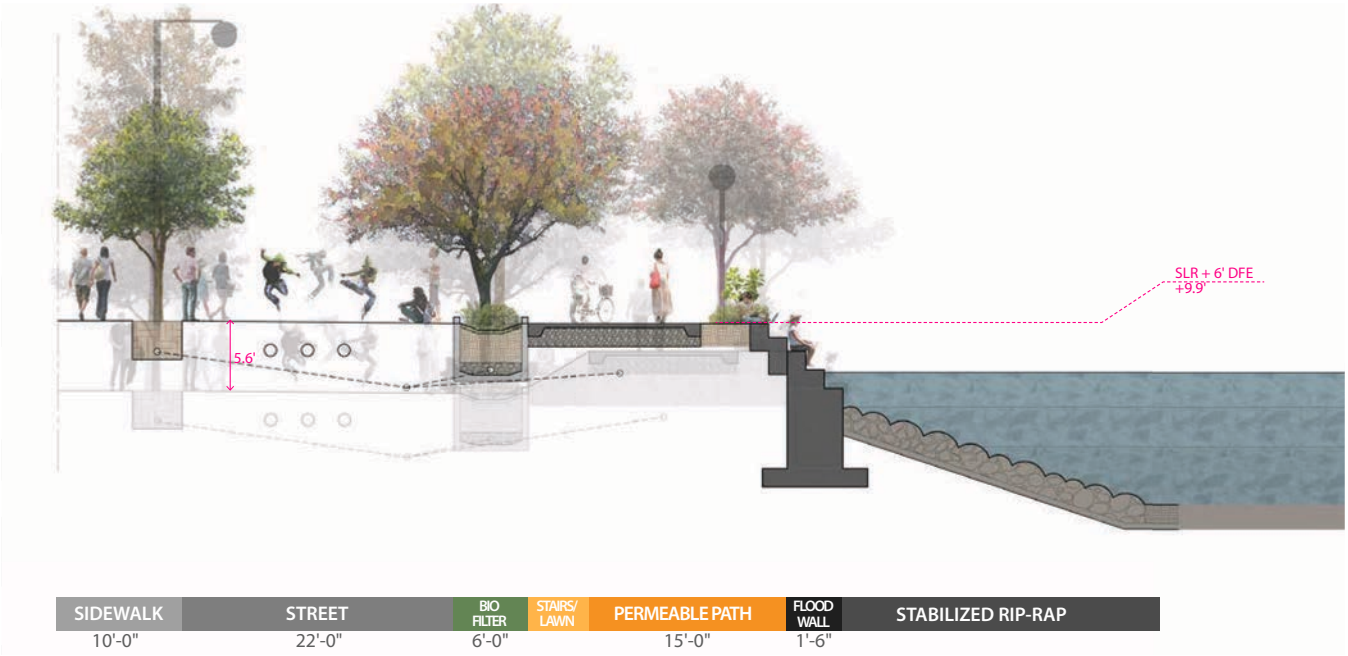


Fig. 5-11 Resilient Phasing @ +6′ SLR: Central Canal, Section E at raised path



Fig. 5-12 Resilient Phasing @ +6′ SLR: Central Canal, Section F at pier park

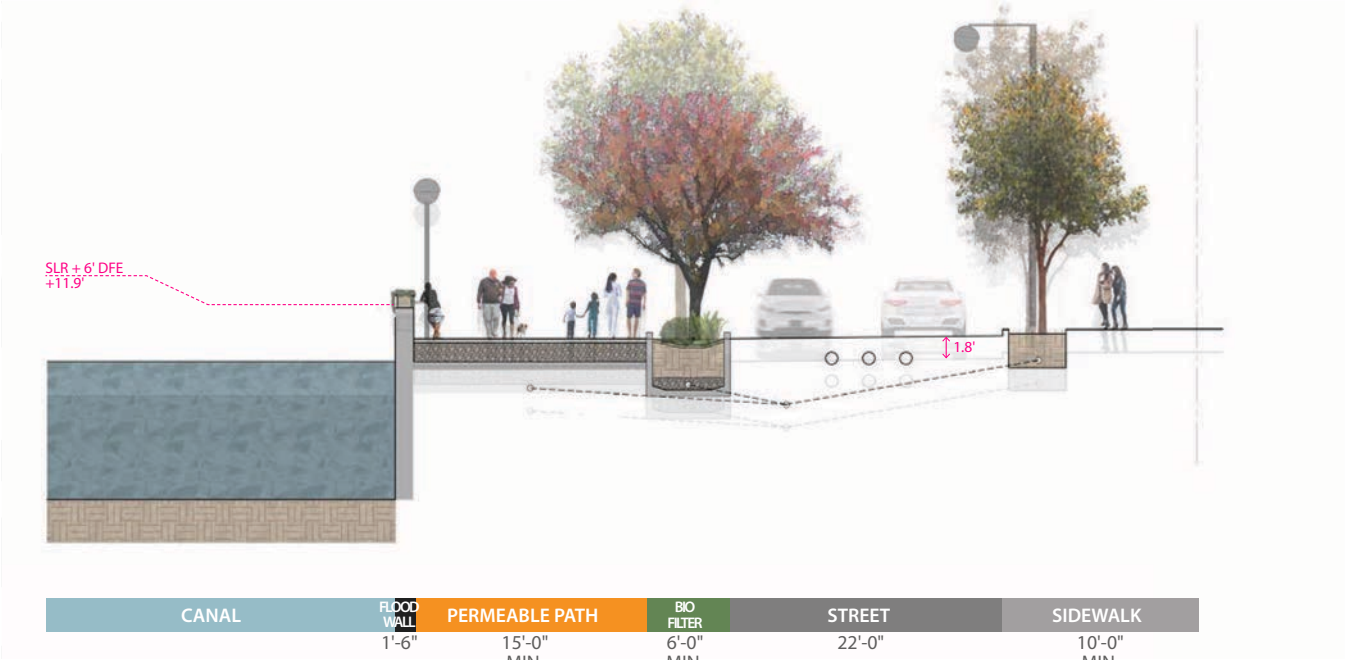


Fig. 5-13 Resilient Phasing @ +6′ SLR: Central Canal, Section J

6 ENVIRONMENTAL IMPACT STATEMENT SUMMARY

The DPP determined that the preparation of an EIS was required for the KCCP pursuant to Chapter 343, HRS, and Title 11, Chapter 200, HAR. The EISPN was published April 23, 2017, presenting a description of the Proposed Action of the KCCP and formalizing the determination that an EIS is required for the Proposed Action. The purpose of the EIS process is to disclose to government agencies, the general public, stakeholders, and decision-makers the anticipated impacts of a project and to identify feasible measures that might be taken to mitigate potential impacts.

While the EISPN presented the Conceptual Master Plan as the Proposed Action, the Draft EIS (DEIS), which was published August 8, 2020, presented the Resilient Master Plan as the Proposed Action in response to the Mayor's Directive on Climate Change. The publication of the DEIS was followed by a 45-day comment period, during which time 19 comment letters were received from various State and City agencies, community organizations, and members of the public. Due to COVID-19 lockdowns, a public meeting could not be held during the DEIS comment period. Instead, community outreach was accomplished through media and a video produced and uploaded on YouTube that publicized the DEIS and encouraged comments (Appendix C18). Copies of all written comments received, along with their respective responses and updates, are included in the FEIS, which was accepted June 24, 2021 (Appendix B10), followed by a 60-day Legal Challenge Period with no legal challenges.



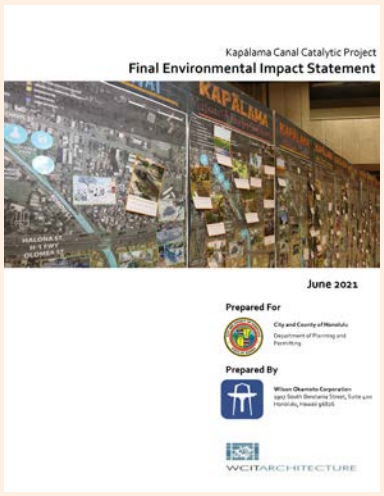


Fig. 6-1 Screenshot of YouTube video about KCCP and its DEIS, along with the FEIS

7 IMPLEMENTATION

7.1 Floodwall Type Selection

Upon completion of the Resilient Master Plan, which proposed the design of a continuous floodwall lining both sides of the Canal to not only provide protection against SLR in the years to come but also to provide park amenities by integrating landscape and furniture into the design of the floodwall, a floodwall type selection study was conducted to advance the design and planning of the KCCP. Floodwall type selection was determined by a number of factors including cost, geotechnical conditions, structural performance, constructability, risk, compliance with FEMA standards, and consistency with design intent set forth in the Resilient Master Plan. The Floodwall Type Selection Report, completed in May 2021, determined that the two wall types to best meet the KCCP objectives are a cantilever T-type reinforced concrete wall (*Fig. 7-1*) and a cantilever I-type sheet pile wall (*Fig. 7-2*). The Report describes in detail the advantages and disadvantages of each type specific to the different sections of the Canal (Appendix B11). Final selection will require further assessment of tradeoffs, feasibility, and study of unique conditions along the Canal, such as bridge interfaces and storm drain perforations.

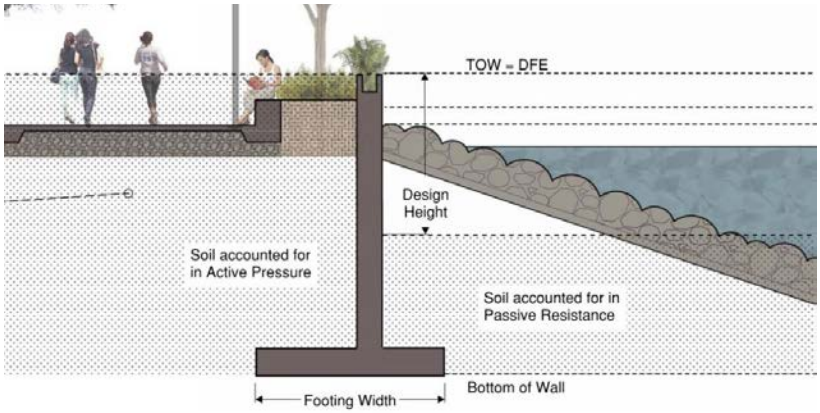


Fig. 7-1 Cantilever T-type Reinforced concrete wall (Floodwall Type Selection Report)

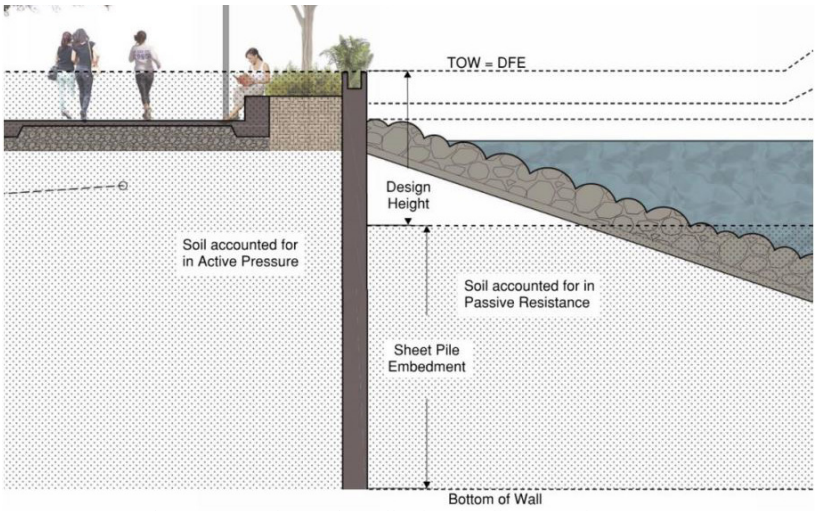


Fig. 7-2 Cantilever I-type Sheet pile wall (Floodwall Type Selection Report)

7.2 Bioassay Testing

The process for bioassay testing began in 2019 to evaluate sediment at various points along the Canal to determine suitability for ocean disposal at the U.S. Environmental Protection Agency (USEPA)-designated ocean disposal site offshore of Oʻahu, or for upland disposal. The Canal was divided into three composite areas based on design dredge depths noted in the Dredging Report: Areas K-1, K-2, and K-3 (*Fig. 7-3*). A Draft Sampling and Analysis Plan was issued December 2019 detailing the proposed procedures for characterizing dredge material, and was reviewed by USEPA. USEPA provided comments that were incorporated into the Final Sampling and Analysis Plan issued and accepted by USEPA in April 2020. Field sampling was performed shortly thereafter, followed by testing and analysis which were summarized in a Draft Sampling and Analysis Report issued March 2021. Additional sampling, testing, and analysis were performed in Area K-1 to account for additional dredging depths that would provide flexibility to dredge to the original design depth of the Canal. Based on test results and correspondence with USEPA, the following was determined:

- Proposed dredged material in Area K-1 limited to material downstream of Station K-1-03 and shallower than -7 feet Mean Lower Low Water (MLLW) plus 1 foot overdredge may be considered for ocean disposal.
- Proposed dredged material in Area K-1 upstream of Station K-1-03 and deeper than -7 feet MLLW plus 1-foot overdredge is not suitable for ocean disposal.
- Proposed dredged material in Areas K-2 and K-3 is not suitable for ocean disposal.

The Final Sampling and Analysis Plan and Final Sampling and Analysis Report can be found in Appendix B12 and B13, respectively. The USEPA suitability letter can be found in Appendix B14.



Fig. 7-3 Bioassay Testing Map

7.3 Construction Phasing Plan

Due to the scope and scale of the proposed improvements, it is anticipated that the Resilient Master Plan will be implemented in phases. Four phases were identified under the Conceptual Master Plan, with Resiliency identified as a future phase. However, under the Resilient Master Plan, Resiliency is incorporated into each phase with the construction of the floodwall and the elevation of areas vulnerable to flooding at +3.2' SLR. The sequence of the various phases was also reconsidered, such that following the Central portion of the KCCP the improvements in the more flood-vulnerable Makai portion are prioritized over improvements in the less vulnerable Mauka portion of the Canal. The four phases of the Resilient Master Plan are as follows and as described in Fig. 7-4:

- **Phase 1: Clean Water**
  Cleaning the Canal was noted as a top priority during community outreach; without clean water, people would be unlikely to gather around the water. Strategies to clean the waterway that would be employed during Phase 1 include dredging the length of the Canal, mangrove removal, bank stabilization to prevent further erosion, and the installation of a sediment forebay mauka of the H-1 Freeway to capture upstream sediment.

- **Phase 2: Central Canal**
  In anticipation of development on adjacent KS and State properties, and to address community needs, Phase 2 focuses on the Central Canal portion of the project area between Dillingham Boulevard and N. King Street and consists of three sub-phases. Phase 2A includes actions to construct the floodwall and disguise it as seating and landscaping; bank stabilization; street restriping to accommodate 11-foot travel lanes; adding crosswalks on Dillingham Boulevard and N. King Street; a raised promenade and permeable trail; biofilters; shade trees and landscaping; lighting; the Kamualiʻi Street footbridge; the pier park; and installation of trash hoods. Phase 2B includes creating a shared street experience along Kohou and Kōkea Streets and undergrounding utilities. Finally, Phase 2C includes actions to provide trail and open space furniture, interpretive signage, and public art as a means of placemaking.

- **Phase 3: Makai Canal**
  Phase 3 focuses on the Makai Canal and consists of two sub-phases. Phase 3A includes actions to construct the floodwall and associated amenities to disguise the floodwall as seating and landscaping, bank stabilization, the reconfiguration of Kohou and Kōkea Streets into Complete Streets, undergrounding utilities, and the construction of the Kalani Street footbridge. Phase 3B includes actions geared toward creating a sense of place, including the construction of picnic pavilions, a stamped intersection at Dillingham Boulevard that would slow down traffic for pedestrian safety and enhance the pedestrian experience through the integration of cultural motifs, supporting marine habitat, and the installation of a trash ring at the Iwilei drainage ditch.

- **Phase 4: Mauka Canal**
  Phase 4 is dedicated to improvements in the Mauka Canal between N. King Street and Olomea Street and consists of two sub-phases. Phase 4A includes the construction of the final segment to the Canal's continuous floodwall and bank stabilization. In addition, Phase 4A includes road diets at N. King and Olomea Streets, the addition of a hydrodynamic separator on Olomea Street, Complete Street improvements, and undergrounding utilities. Phase 4B includes stamped intersections on N. King Street, planters at the existing Canal wall, trash hoods at Canal outfalls, trail furniture, public art, and interpretive signage.

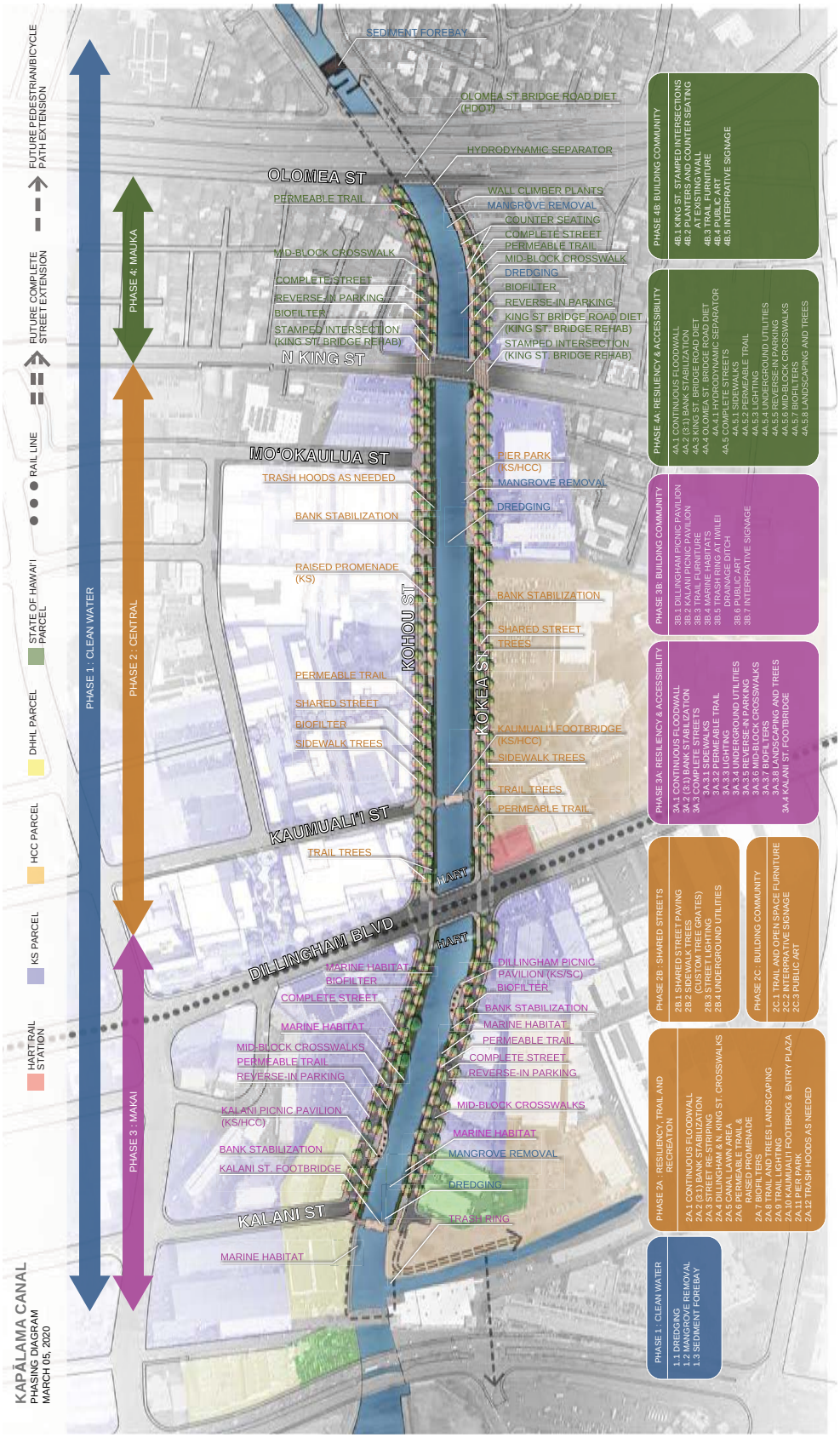


Fig. 7-4 Resilient Master Plan Phasing Diagram

7.4 Rough Order of Magnitude Cost Estimate

A Rough Order of Magnitude (ROM) cost estimate was completed for the Conceptual Master Plan in 2017 that projected construction costs in the range of $107,788,137 to $121,384,017 depending on the method of dredging disposal (Appendix A3). Organized by the KCCP areas (Makai, Central, Mauka), the ROM cost estimate was further broken down into phases, as detailed in Appendix A5.

The ROM cost estimate was updated in 2021 based on the Resilient Master Plan and outcomes of the bioassay testing, with construction costs estimated in the range of **$226,509,320** to **$258,188,180** depending on method of dredging disposal (all landfill or combination of landfill and ocean disposal) and final floodwall type selection (I-wall or T-wall) (Appendix A7). A phased ROM cost estimate was also updated based on the Resilient Master Plan and projects the following for each phase (*Fig. 7-4*), with a more detailed breakdown included in Appendix A8.

- **Phase 1: Clean Water**
  The Phase 1 cost estimate includes two options for dredging disposal of the entire Canal in the KCCP area.
  1. Combination of landfill and ocean disposal: $16,170,800
  2. All landfill: $19,682,900
- **Phase 2: Central Canal**
  The Phase 2 cost estimate for Central Canal improvements includes roadway improvements; drainage; terrace and footbridge; platforms and bank stabilization; electrical; landscape and irrigation; and miscellaneous, including two options for a floodwall.
  1. All items with I-wall floodwall: $123,749,520
  2. All items with T-wall floodwall: $141,161,640
- **Phase 3: Makai Canal**
  The Phase 3 cost estimate for the Makai Canal improvements includes roadway improvements; drainage; footbridge; platforms and bank stabilization; electrical; landscape and irrigation; and miscellaneous, including two options for a floodwall.
  1. All items with I-wall floodwall: $73,997,640
  2. All items with T-wall floodwall: $84,752,280
- **Phase 4: Mauka Canal**
  The Phase 4 cost estimate for the Mauka Canal improvements includes roadway improvements; drainage; electrical; landscape and irrigation; and miscellaneous.
  1. All items: $12,591,360

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Appendix C

Iwilei Sewer, Water, and Drainage Infrastructure Improvement Master Plan Assessment Methodology

IWILEI SEWER, WATER, AND DRAINAGE INFRASTRUCTURE IMPROVEMENT MASTER PLAN ASSESSMENT METHODOLOGY

PREPARED FOR

PBR HAWAII & Associates, Inc.

PREPARED BY

R. M. Towill Corporation

SUBMITTED ON

February 28, 2023

1 Sewer System

1 Existing Sewer System and Criteria

1.1 Criteria for Equivalent Single-Family Unit (ESDU) Calculations

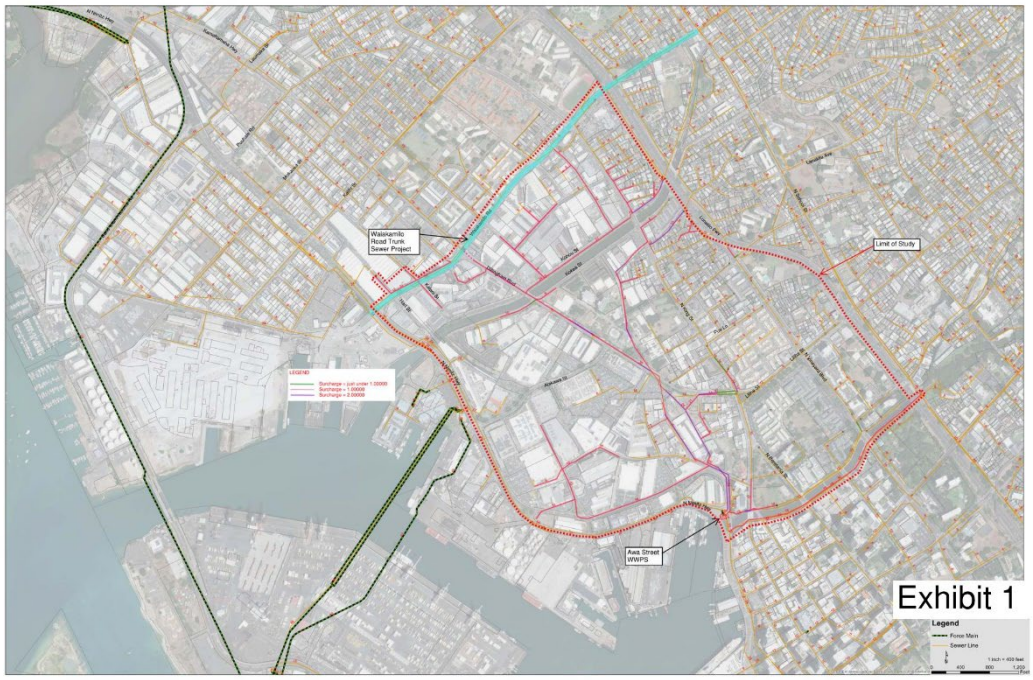
Gallons per capita	70
Commercial/Industrial capita per square foot	150
Capita per Single Family Unit	4
Capita per Multi-Family Unit	2.8
Gallons per Equivalent Single-Family Unit	280

1.2 Existing Conditions

Existing Conditions. Sand Island Wastewater Treatment Plant (WWTP) services the Iwilei Master Plan Area. To address existing capacity restrictions and in anticipation of future development, ENV improved the sewer capacity with the Iwilei Master Plan Area by completing the Awa Street Wastewater Pump Station (WWPS) Force Main and Sewer System Improvements and the Waiakamilo Road Trunk Sewer projects. ENV is proceeding with the Hart Street/Waiakamilo Road Replacement Sewer project, which completes the connection of existing sewer lines on Waiakamilo Road to the new trunk sewer. Other rehabilitation and improvement projects include the Awa Street WWPS Improvements/Rehabilitation and the Hart Street WWPS Force Main Improvements Phase 3 projects. The existing trunk sewer system along Dillingham Boulevard has increased capacity to serve new TOD development with the completion of the Waiakamilo Road Trunk Sewer Project. Additional sewer projects are also being implemented to solve other known sewer capacity issues described in Table 1-4, but local sewer collection improvements may be required, based on the site-specific development plans that may be proposed by individual landowners.

Exhibit 1 presents the existing surcharged sewer lines prior to the Waiakamilo Road Trunk Sewer Project.

Exhibit 1



2 Proposed TOD Development

Table 1-1 and Table 1-2 illustrate the existing and projected sewer system demands for residential, commercial, and industrial uses in the Iwilei Master Plan Area based on anticipated shifts in land use from planned TOD for the area. Based on the anticipated TOD development, sewer improvements are needed to implement projects such as the Mayor Wright Homes, Liliha Civic Center, and Kalanihuia Homes.

The Iwilei TOD Master Plan developed a preferred land use plan and proposed development plans with a phasing plan.

2.1 Flow Projections

From these plans existing and proposed sewer demands and ESDU's are estimated from the land use development plans and parcel land areas. The estimated ESDU increase can be used by the Department of Environmental Services (ENV) to model the sewer system whether system improvements are required to service these projects.

Exhibit 2 attached, presents the TOD Development Plan with Phases 1 to 4 and ESDU's per parcel.

Exhibit 3 attached, presents the TOD Spreadsheet which includes the calculations for existing and proposed average daily flow and ESDUs.

Table 1-1: Summary of Existing Sewer Demand

Residential Units	**Total Units**	**Capita**	**Flow GPD**	**ESDU[1]**
Single Family	413	1,652	115,640	413
Multi Family (Low)	3,824	10,707	749,540	2,677
Subtotal			865,144	3,090
Commercial	**Total SF**	**Capita**	**GPD**	**ESDU**
Commercial	9,696,269	64,642	4,524,926	16,160
Industrial	825,617	5,504	385,288	1,376
Subtotal			4,910,213	17,536
		Total GPD[2]	**5,775,357**	
			Total Existing ESDU	**20,626**

1 ESDU - Equivalent Single Dwelling Unit
2 GDP = Gallons per Day

Table 1-2: Summary of Projected Sewer Demand

Residential Units	**Total Units**	**Capita**	**Flow GPD**	**ESDU**
Single Family	331	1,324	92,680	331
Multi Family	31,718	88,810	6,216,728	22,203
Subtotal			6,309,408	22,534
Commercial	**Total SF**	**Capita**	**GPD**	**ESDU**
Commercial	5,815,649	38,771	2,713,969	9,693
Industrial	1,025,704	6,838	478,662	1,710
Subtotal			3,192,631	11,402
		Total GDP	**9,502,039**	
			Total Proposed ESDU	**33,936**

2.2 Infrastructure Improvements

ENV is in the process of improving the area sewer capacity. Most of the projects currently being implemented by ENV focus on relieving the known sewer issues in the system. ENV models proposed projects on a case-by-case basis to determine potential sewer issues due to these developments within the sewer system by flow and ESDU.

2.2.1 ESDU by Phase

Phases 1 through 4 of the preferred land use development assumptions for the full development of Iwilei-Kapālama TOD area projects are presented in Table 1-3, which illustrates the increase in ESDU for the Iwilei-Kapālama TOD, by phase.

Table 1-3: Sewer Demand, ESDU Calculations by Phase

Phase	Existing ESDU Flow	Proposed ESDU	Increase in ESDU
1: present to 2030	2,785	9,894	7,108
2: 2031 to 2040	3,266	9,018	5,752
3: 2041 to 2050	1,359	2,479	1,121
4: 2051+	924	1,694	770

Exhibit 2

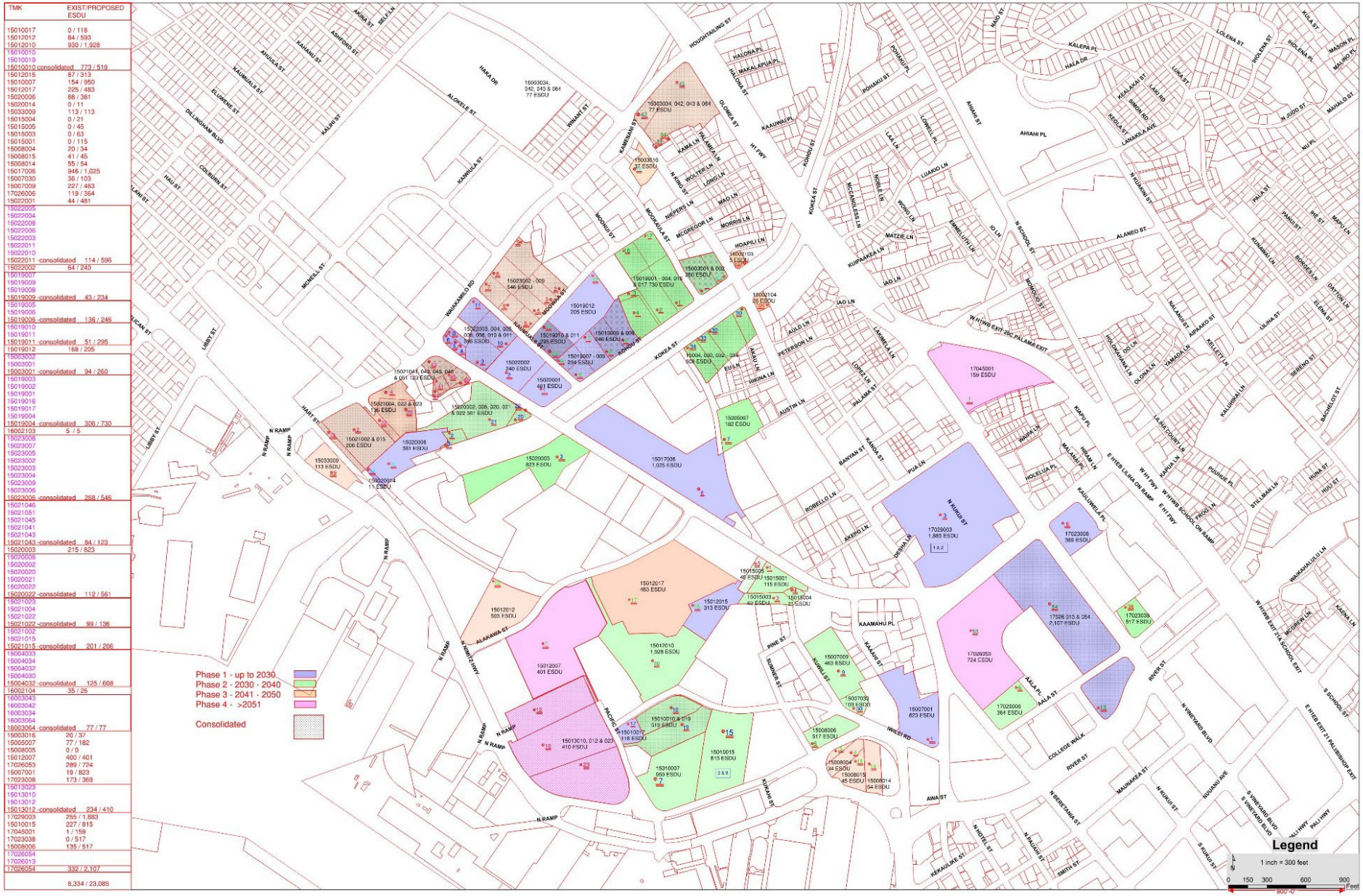

TMK EXIST/PROPOSED ESDU
15010017 0 / 118
15012012 84 / 593
15012010 930 / 1,928
15010010
15010019
15010012 consolidated 773 / 519
15012015 87 / 313
15010007 154 / 950
15012017 225 / 483
15020006 68 / 381
15020014 0 / 11
15033009 113 / 113
15015004 0 / 21
15015005 0 / 45
15015003 0 / 63
15015001 0 / 115
15008004 20 / 34
15008015 41 / 45
15008014 55 / 54
15017006 946 / 1,025
15007030 36 / 103
15007009 227 / 483
17026006 119 / 364
15022001 44 / 481
15022009
15022004
15022008
15022006
15022003
15022011
15022010
15022011 consolidated 114 / 596
15022002 64 / 240
15019007
15019009
15019008
15019009 consolidated 43 / 234
15019005
15019006
15019006 consolidated 136 / 246
15019010
15019011
15019011 consolidated 51 / 295
15019012 168 / 205
15003002
15003001
15003001 consolidated 94 / 260
15019003
15019002
15019001
15019016
15019017
15019004
15019004 consolidated 306 / 730
16002103 5 / 5
15023008
15023007
15023005
15023002
15023003
15023004
15023009
15023006
15023006 consolidated 268 / 546
15021046
15021051
15021045
15021041
15021043
15021043 consolidated 84 / 123
15020003 215 / 823
15020008
15020002
15020020
15020021
15020022
15020022 consolidated 112 / 561
15021023
15021004
15021022
15021022 consolidated 99 / 136
15021002
15021015
15021015 consolidated 201 / 206
15004033
15004034
15004032
15004030
15004032 consolidated 125 / 608
16002104 35 / 26
16003043
16003042
16003034
16003064
16003064 consolidated 77 / 77
15003016 20 / 37
15005007 77 / 182
15008005 0 / 0
15012007 400 / 401
17026053 289 / 724
15007001 19 / 823
17023008 173 / 369
15013023
15013010
15013012
15013012 consolidated 234 / 410
17029003 255 / 1,883
15010015 227 / 815
17045001 1 / 159
17023038 0 / 517
15008006 135 / 517
17026054
17026013
17026054 332 / 2,107
8,334 / 23,085
Phase 1 - up to 2030
Phase 2 - 2030 - 2040
Phase 3 - 2041 - 2050
Phase 4 - >2051
Consolidated
Legend
1 inch = 300 feet
0 150 300 600 900
Feet

Exhibit 3

15019002	1.5720	2														-	-	
15019001	1.5755	2														-	-	
15019016	0.9032	2														-	-	
15019017	0.9046	2														-	-	
15019004	1.2537	2														-	-	
15019004 -consolidated	6.5299	2					0	1,223	85,589	306		2380	541	204,493	730	306	730	425
16002103	0.2607	3					2.8	19	1,512	5		2.8	19	1,512	5	5	5	-
15023008	1.0221	3														-	-	
15023007	0.7547	3														-	-	
15023005	0.5248	3														-	-	
15023002	0.6956	3														-	-	
15023003	0.6956	3														-	-	
15023004	0.6956	3														-	-	
15023009	1.0751	3														-	-	
15023006	0.5133	3														-	-	
15023006 -consolidated	5.9769	3					0	1,074	75,169	268		1456	729	152,949	546	268	546	278
15021046	0.1374	3														-	-	
15021051	0.0649	3														-	-	
15021045	0.6205	3														-	-	
15021041	0.0010	3														-	-	
15021043	0.6545	3														-	-	
15021043 -consolidated	1.4784	3					0	337	23,558	84		310.8	180	34,378	123	84	123	39
15020003	5.0471	2					0	861	60,289	215		3080	212	230,440	823	215	823	608
15020008	0.0429	2														-	-	
15020002	0.3340	2														-	-	
15020020	0.2160	2														-	-	
15020021	3.5390	2														-	-	
15020022	0.0658	2														-	-	
15020022 -consolidated	4.1978	2					0	448	31,336	112		2100	143	157,033	561	112	561	449
15021023	1.5290	3														-	-	
15021004	0.7834	3														-	-	
15021022	0.3856	3														-	-	
15021022 -consolidated	2.6980	3					0	398	27,858	99		0	543	38,018	136	99	136	36
15021002	3.3219	3														-	-	
15021015	0.4670	3														-	-	
15021015 -consolidated	3.7890	3					0	806	56,412	201		0	825	57,766	206	201	206	5
15004033	0.7420	2														-	-	
15004034	0.8880	2														-	-	
15004032	1.3420	2														-	-	
15004030	0.5870	2														-	-	
15004032 -consolidated	3.5590	2					0	499	34,919	125		2380	53	170,333	608	125	608	484
16002104	0.5803	3					0	139	9,713	35		64.4	38	7,162	26	35	26	(9)
16003043	4.5290	3														-	-	
16003042	0.5745	3														-	-	
16003034	0.0806	3														-	-	
16003064	0.0583	3														-	-	
16003064 -consolidated	5.2424	3					5.6	304	21,660	77		5.6	304	21,660	77	77	77	-
15003016	0.8270	3					0	81	5,666	20		92.4	54	10,251	37	20	37	16
15005007	2.1000	2					0	308	21,588	77		420	308	50,988	182	77	182	105
15008005	0.2440	3					0	-	-	-		0	-	-	-	-	-	
15012007	9.0010	4					0	1,600	111,987	400		1016.4	588	112,317	401	400	401	1
17026053	9.4350	4					1089.2	67	80,911	289		2763.6	133	202,785	724	289	724	435
15007001	3.7910	1					0	77	5,413	19		1680	1,614	230,580	823	19	823	804
17023008	2.1490	1					380.8	311	48,418	173		1164.8	311	103,298	369	173	369	196
15013023	4.8320															-	-	-
15013010	5.6491															-	-	-
15013012	3.5416															-	-	-
15013012 -consolidated	9.1907	4					0	937	65,559	234		1038.8	601	114,752	410	234	410	176
17029003	14.8451	1 and 2					1019.2	-	71,344	255		7000	533	527,333	1,883	255	1,883	1,629
15010015	4.9819	2 and 3					0	907	63,496	227		2494.8	765	228,198	815	227	815	588
17045001	6.5560	4					2.8	-	196	1		635.6	-	44,492	159	1	159	158

Iwilei Kapalama BWS-ENV demand-ESDU 2-14-2023 for standalone

17023038	1.1215	2					0	-	-	-		1400	667	144,667	517	-	517	517
15008006	1.3244	2					0	539	37,747	135		1400	667	144,667	517	135	517	382
17026054	9.4480	1														-	-	
17026013	2.4054	1														-	-	
17026054 -consolidated	11.8534	1					1302	27	93,007	332		8400	27	589,867	2,107	332	2,107	1,775

Tax Map Key for GIS Join (Updated 06-2021)	Legal Acreage Value Recorded at Real Property (Updated 06-2021)	Phasing_OPTOD (2021-06-07 update)					EXISTING SEWER - Single Family Capita	Multi-Family Capita	Commercial-Industrial Capita	Flow	EXISTING ESDU	PROPOSED SEWER - Single Family Capita	Multi-Family Capita	Commercial-Industrial Capita	Flow	PROPOSED ESDU		SEWER Existing	Proposed	Increase
TMK_21	REC_AREA_A_21	Phase_OPTOD																		
15010017	0.5893	1						0	-	-	-		400.4	71	32,990	118		-	118	118
15012012	3.6720	3						0	335	23,421	84		2240	133	166,133	593		84	593	510
15012010	6.7832	2						0	3,720	260,402	930		3990	3,720	539,702	1,928		930	1,928	998
15010010	1.7695	2																-	-	
15010019	2.2733	2																-	-	
15010010 -consolidated	4.0428	2						0	3,091	216,379	773		1610	467	145,367	519		773	519	(254)
15012015	2.1974	1						0	347	24,287	87		1120	133	87,733	313		87	313	227
17026004	0.4559																			
17026016	0.9811																			
15010007	4.4396	2						0	617	43,218	154		2800	1,000	266,000	950		154	950	796
15012017	10.8262	3						0	1,018	71,273	255		1223.6	707	135,169	483		255	483	228
15020006	2.7500	1						0	351	24,583	88		1400	123	106,633	381		88	381	293
15020014	0.1366	1						0	-	-	-		28	17	3,126	11		-	11	11
15033009	1.5727	3+						0	454	31,761	113		0	454	31,761	113		113	113	-
15015004	0.2565	2						0	-	-	-		53.2	31	5,914	21		-	21	21
15015005	0.5387	2						0	-	-	-		114.8	66	12,635	45		-	45	45
15015003	0.7614	2						0	-	-	-		159.6	93	17,673	63		-	63	63
15015001	1.3833	2						0	-	-	-		291.2	169	32,194	115		-	115	115
15008004	0.7652	3						0	80	5,621	20		86.8	50	9,576	34		20	34	14
15008015	1.0222	3						0	164	11,499	41		114.8	67	12,711	45		41	45	4
15008014	1.2101	3						0	219	15,295	55		137.2	79	15,139	54		55	54	(1)
15017006 -consolidated	42.3393	1						0	3,784	264,851	946		0	4,100	287,008	1,025		946	1,025	79
15007030	0.6291	1						0	153	10,691	38		336	77	28,891	103		38	103	65
15007009	3.0123	1						0	909	63,649	227		1484	367	129,598	463		227	463	236
17026006	1.8964	2						420	55	33,270	119		1400	55	101,870	364		119	364	245
15022001	1.7449	1						0	175	12,218	44		1710.8	213	134,689	481		44	481	437
15022005	0.0858	1																-	-	
15022004	0.1465	1																-	-	
15022008	0.2189	1																-	-	
15022006	0.1331	1																-	-	
15022003	1.1848	1																-	-	
15022011	0.7188	1																-	-	
15022010	1.2142	1																-	-	
15022011 -consolidated	3.7021	1						0	458	32,033	114		1850.8	534	166,936	596		114	596	482
15022002	2.3878	1						0	256	17,933	64		828.8	132	67,256	240		64	240	176
15019007	0.9751	1																-	-	
15019009	0.4950	1																-	-	
15019008	0.4870	1																-	-	
15019009 -consolidated	1.9571	1						0	174	12,163	43		854	83	65,613	234		43	234	191
15019005	1.1362	1																-	-	
15019006	0.9792	1																-	-	
15019006 -consolidated	1.0577	1						0	544	38,077	136		949.2	33	68,777	246		136	246	110
15019010	0.5846	1																-	-	
15019011	0.5626	1																-	-	
15019011 -consolidated	1.1472	1						0	205	14,315	51		988.4	191	82,581	295		51	295	244
15019012	3.2604	1						0	671	46,941	168		526.4	292	57,288	205		168	205	37
15003002	0.5511	2																-	-	
15003001	1.0811	2																-	-	
15003001 -consolidated	1.6322	2						0	376	26,290	94		980	60	72,800	260		94	260	166
15019003	0.3209	2																-	-	

15019002	1.5720	2															-	-	
15019001	1.5755	2															-	-	
15019016	0.9032	2															-	-	
15019017	0.9046	2															-	-	
15019004	1.2537	2															-	-	
15019004 -consolidated	6.5299	2					0	1,223	85,589	306		2380	541	204,493	730		306	730	425
16002103	0.2607	3					2.8	19	1,512	5		2.8	19	1,512	5		5	5	-
15023008	1.0221	3															-	-	
15023007	0.7547	3															-	-	
15023005	0.5248	3															-	-	
15023002	0.6956	3															-	-	
15023003	0.6956	3															-	-	
15023004	0.6956	3															-	-	
15023009	1.0751	3															-	-	
15023006	0.5133	3															-	-	
15023006 -consolidated	5.9769	3					0	1,074	75,169	268		1456	729	152,949	546		268	546	278
15021046	0.1374	3															-	-	
15021051	0.0649	3															-	-	
15021045	0.6205	3															-	-	
15021041	0.0010	3															-	-	
15021043	0.6545	3															-	-	
15021043 -consolidated	1.4784	3					0	337	23,558	84		310.8	180	34,378	123		84	123	39
15020003	5.0471	2					0	861	60,289	215		3080	212	230,440	823		215	823	608
15020008	0.0429	2															-	-	
15020002	0.3340	2															-	-	
15020020	0.2160	2															-	-	
15020021	3.5390	2															-	-	
15020022	0.0658	2															-	-	
15020022 -consolidated	4.1978	2					0	448	31,336	112		2100	143	157,033	561		112	561	449
15021023	1.5290	3															-	-	
15021004	0.7834	3															-	-	
15021022	0.3856	3															-	-	
15021022 -consolidated	2.6980	3					0	398	27,858	99		0	543	38,018	136		99	136	36
15021002	3.3219	3															-	-	
15021015	0.4670	3															-	-	
15021015 -consolidated	3.7890	3					0	806	56,412	201		0	825	57,766	206		201	206	5
15004033	0.7420	2															-	-	
15004034	0.8880	2															-	-	
15004032	1.3420	2															-	-	
15004030	0.5870	2															-	-	
15004032 -consolidated	3.5590	2					0	499	34,919	125		2380	53	170,333	608		125	608	484
16002104	0.5803	3					0	139	9,713	35		64.4	38	7,162	26		35	26	(9)
16003043	4.5290	3															-	-	
16003042	0.5745	3															-	-	
16003034	0.0806	3															-	-	
16003064	0.0583	3															-	-	
16003064 -consolidated	5.2424	3					5.6	304	21,660	77		5.6	304	21,660	77		77	77	-
15003016	0.8270	3					0	81	5,666	20		92.4	54	10,251	37		20	37	16
15005007	2.1000	2					0	308	21,588	77		420	308	50,988	182		77	182	105
15008005	0.2440	3					0	-	-	-		0	-	-	-		-	-	
15012007	9.0010	4					0	1,600	111,987	400		1016.4	588	112,317	401		400	401	1
17026053	9.4350	4					1089.2	67	80,911	289		2763.6	133	202,785	724		289	724	435
15007001	3.7910	1					0	77	5,413	19		1680	1,614	230,580	823		19	823	804
17023008	2.1490	1					380.8	311	48,418	173		1164.8	311	103,298	369		173	369	196
15013023	4.8320																-	-	-
15013010	5.6491																-	-	-
15013012	3.5416																-	-	-
15013012 -consolidated	9.1907	4					0	937	65,559	234		1038.8	601	114,752	410		234	410	176
17029003	14.8451	1 and 2					1019.2	-	71,344	255		7000	533	527,333	1,883		255	1,883	1,629
15010015	4.9819	2 and 3					0	907	63,496	227		2494.8	765	228,198	815		227	815	588
17045001	6.5560	4					2.8	-	196	1		635.6	-	44,492	159		1	159	158

17023038	1.1215	2					0	-	-	-		1400	667	144,667	517		-	517	517
15008006	1.3244	2					0	539	37,747	135		1400	667	144,667	517		135	517	382
17026054	9.4480	1															-	-	
17026013	2.4054	1															-	-	
17026054 -consolidated	11.8534	1					1302	27	93,007	332		8400	27	589,867	2,107		332	2,107	1,775

2 Water System

1 Existing Conditions

The Board of Water Supply (BWS) owns and operates the water system in the Iwilei Master Plan Area. The backbone water infrastructure is relatively strong in the Iwilei area; however, upgrading aging infrastructure is an ongoing challenge. The BWS will require water conservation measures for proposed residential developments.

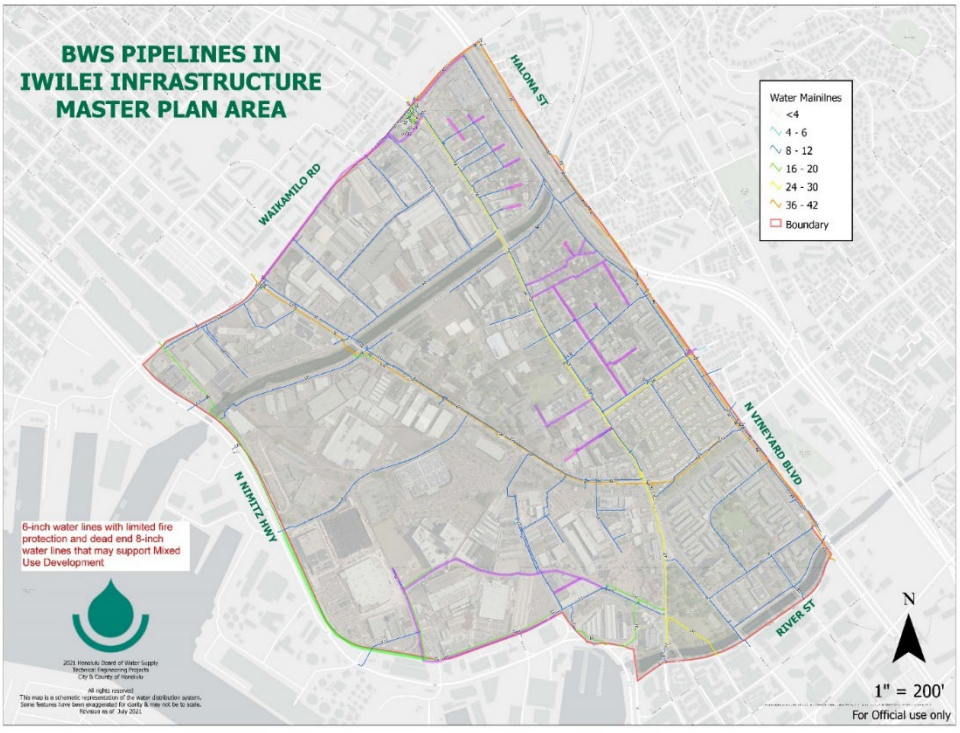
1.1 Criteria for Water Demand Calculations

Single Family	500 gallons per unit
Multi-Family (low rise)	400 gallons per unit
Multi-Family (high rise)	300 gallons per unit
Commercial	3,000 gallons per acre
Light Industrial	4,000 gallons per acre
Commercial/Industrial	100 gallons per 1,000 square foot of floor area or 0.1 gallons per square foot of floor area
Commercial/Residential	120 gallons per 1,000 square foot of floor area or 0.12 gallons per floor area
School/Park	4,000 gallons per acre

1.2 Existing Conditions

The area has older 6-inch lines and dead end 8-inch lines. The existing 6-inch water lines areas where fire protection is limited and the dead end 8-inch water lines that may not be able to support commercial mixed use developments. Exhibit 4 presents the existing BWS water distribution system and the 6-inch and dead-end 8-inch water lines are highlighted.

Exhibit 4



1.3 Recent Water System Conditions

1.3.1 Red Hill Water Contamination

In the short-term, water availability is a concern for new development until the Red Hill water contamination issue is resolved. The BWS shut down three water sources in the Hālawa/Aiea area and is presently providing supplemental water from Waipahu and increasing the pumping of the remaining wells in Honolulu to make up the difference. Water conservation is strongly urged to avoid building moratoriums for proposed projects. Water system improvements are presently needed based on the existing water line sizes and the required fire flow for the proposed land uses for industrial and mixed-use development. The BWS will check the system when the applicants prepare their environmental documents or come in for land use or building permits. The BWS has multiple projects in its capital improvements program (CIP) that will address current deficiencies and increase local and regional capacity.

In May 2022 at the Honolulu City Council Housing and Economy Committee meeting, the BWS announced that construction projects are not anticipated to be delayed by the Red Hill Storage Tank water contamination issue and may move ahead as planned. The BWS stated:

"The Board of Water Supply remains steadfast in our commitment to providing safe, dependable and affordable water for Oahu's needs today and in the future. This includes taking a strong stance when protecting our groundwater aquifers. And, the Red Hill Bulk Fuel Storage Facility – whose 20 underground fuel tanks are located above Oahu's sole source aquifer – continues to be a cause of concern.

The underground storage tanks (USTs) at Red Hill were built by the military in the 1940s and have a history of fuel leaks. The aquifer helps to provide water for nearly 25 percent of Oahu residents, from Moanalua to Hawaii Kai, as well as those living on base housing connected to the Navy's water system. Since the U.S. Navy reported a leak of 27,000 gallons of jet fuel from Tank #5 at the Red Hill in January 2014, BWS has continued to stand firm in its recommendations that the underground tanks either be double-lined or be relocated away from the aquifer."

The final decision on availability of water will be confirmed when the building permit application is submitted for approval, pending evaluation of the water system conditions at that time on a first-come, first-served basis. The BWS continues to request a 10% voluntary water conservation of all customers until new sources are completed and require water conservation measures in all new developments.

1.3.2 2016 BWS Water Master Plan

The 2016 BWS Water Master Plan studied the entire water system serving the greater City and County of Honolulu. The Iwilei Master Plan Area is within the Primary Urban Center Development Plan (PUC-DP) and is served by the Metro Low system. Metro Low is the largest model system by demand and system complexity. It encompasses bulk of the makai portion of urban Honolulu, extending from Salt Lake to Hawai'i Kai, and represents about 38 percent of the total island-wide demand. Metro Low includes Metro 180 West, Metro 180 East, Metro 170, and upper ridge pressure zones, and other segments that pump out of the Metro 180 West, Metro 180 East, and Metro 170. The Iwilei TOD Area is in the Metro 180 Low East pressure zone.

This system has the largest length of pipelines and highest demand of the ten (10) model systems. The average day demand in 2012 for the Metro Low system was 55.6 millions of gallons per day (mgd). The largest pressure zone in this model system is Metro 180 West, which had an average day demand of 42.9 mgd or 77 percent of the Metro Low system demand in 2012. About 70

percent of Metro Low supply originates from aquifers on the west side of Metro 180 West or near the Pearl Harbor area. There are three (3) major sources of supply in Honolulu that have historically contributed up to 20 percent of total Metro Low supplies: Kalihi; Beretania; and Kaimuki Wells. These have also been essential in meeting peak hour demands.

In total, the Metro Low system maintains capacity for approximately thirty-eight (38) million gallons of water storage, with most of the storage facilities located in the upper zones. However, Metro 180 West, the largest zone in the Metro Low model system, has a relatively small volume of storage compared to the water demand for the zone, maintaining approximately thirteen (13) million gallons of storage capacity. This has been adequate because of reliance on wells in the area to supply peak demands.

The 2016 BWS Water Master Plan provided water demand projections, which included average day demand (ADD) estimates used in the system analysis. The BWS Water Master Plan delineated water demand by land use district defined in the City and County of Honolulu General Plan based on watershed areas across Oʻahu, however, the hydraulic model system boundaries are different from the defined land use district boundaries. Model systems are divided at locations where the water distribution system was either hydraulically disconnected or connected by a pump station or control valve.

According to the BWS Water Master Plan, the 2012 Actual Demand for the PUC-DP is 67.4 mgd, and the projected water demand for the Primary Urban Center for 2025 is 67.0 mgd and 68.7 mgd for 2040. For all of Oahu, the increase in total demand is just over 8 mgd, an approximately 5 percent increase from 2012 to 2040. Total demand is flat between 2012 and 2025, with a decrease of less than 1 mgd. There is a wide variation in land use district water demand growth from 2012 to 2025 (-16 to 19 percent) and from 2012 to 2040 (-17 to 43 percent). ʻEwa has the largest increase in demand from 2012 to 2040 at approximately 8.0 mgd (43 percent). Central Oʻahu has the second largest increase in demand, 2.6 mgd for 2012 to 2040. Waiʻanae, Koʻolaupoko, and East Honolulu are projected have negative growth in demand (-8, -17, and -3 percent, respectively) through the planning period under the most probable demand projection.

The BWS Water Master Plan also estimated the most probable demand projected by ADD based on their hydraulic model analysis water systems. The ADD demand for 2012 is 55.6 mgd and the most probable ADD demand for the Metro Low system is 56.2 mgd for 2025 and 58 mgd for 2040.

2 Water Demands

For the Iwilei Master Plan Area, additional water demand is projected due to the increase in residential units and commercial-industrial square footage anticipated by the City in conjunction with projects by both public and private landowners. The calculated increase in commercial-industrial activity will result in an increase in water demand. Table 2-1 summarizes the estimated increase in ADD for the Iwilei-Kapālama TOD area and the most probable demand projections from the BWS Water Master Plan for the PUC-DP area and the Metro Low water system. Exhibit 5, presents the spreadsheet calculating the water demand for Phases 1 to 4.

Table 2-1: Iwilei-Kapālama TOD Additional Requirements in Average Daily Demand (ADD)

Phases	TOD Master Plan Estimated Increase in Demand	2016 BWS Water Master Plan for PUC-DP Area (2025)	2016 BWS Water Master Plan for Metro Low (2040)
Present (2012)	N.A.	67.4 mgd	55.6 mgd
1: Present to 2030	2.84 mgd	67 mgd	56.2 mgd
2: 2031 to 2040	2.88 mgd	68.7 mgd	58 mgd
3: 2041 to 2050	0.64 mgd	N.A.	N.A.
4 2051+	0.49 mgd	N.A.	N.A.

3 Source, Storage, Distribution and Transmission

This increase in demand would require additional water source, storage, distribution, and transmission system requirements as described in Table 2-2. As described above, the increase in demand can guide water distribution needs and storage requirements. This will be worked out on a case-by-case basis with the BWS as the TOD and BWS CIP projects progress. Honolulu TOD proponents can assist the BWS with environmental clearances and water use permits to facilitate or accelerate new water source and storage developments projects that may benefit TOD. The BWS continuously monitors water usage in the PUC. Should the water usage increase above the anticipated water demand of the Water Master Plan, the BWS will re-*evaluate* if there is any impact from the development of TOD projects on the increase in water demand, and work with other City and State Agencies involved in TOD on the need for additional water source and storage projects." Based on historical trends, the Iwilei TOD project is not intended to increase the population of the area.

Table 2-2: Iwilei-Kapālama TOD Additional Requirements in Average Daily Demand (ADD)

Phases	TOD Master Plan Estimated Increase in Demand	Water Source – Pump capacity	Storage
1: Present to 2030	2.84 mgd	6.40 mgd	5 mgd
2: 2031 to 2040	2.88 mgd	6.48 mgd	5 mgd
3: 2041 to 2050	0.64 mgd	1.43 mgd	1 mgd
4: 2050+	0.49 mgd	1.11 mgd	0.75 mgd

For all in the PUC-DP area, the present water source situation is complicated by the recent issues with the Red Hill underground fuel storage facility water contamination which has caused the BWS to shut down the Hālawa Shaft, Hālawa Well and Aiea Well close to the Red Hill Facility. The Hālawa Shaft, which provides 20 percent of the Metro Low and High systems water supply is presently turned off along with two other sources that serve the PUC-DP area. The BWS has embarked on a program to drill exploratory wells for development into production wells. The increase in water demand due to TOD in the Iwilei Master Plan Area and potential requirement for new water sources will have to be negotiated with the BWS. The Navy is now pumping the Red Hill well and flushing the aquifer which may allow the BWS to turn on the sources near the Red Hill Fuel Storage Facility. Until that time, conversations should be ongoing with BWS to confirm up to date water source information.

The BWS Water Master Plan identified new storage requirements for the Metro Low system. The major new storage system identified for the Metro Low system prior to the Iwilei TOD project is the 10 million-gallon Waiawa 228 Reservoir for capacity expansion. This is part of the West Side Supply Project that will include the ten (10) mgd variable speed booster pump station and control valve that

draws from the new 10-million-gallon Waiawa 228 Reservoir into Metro 180 West for capacity expansion.

The BWS Water Master Plan also identified capacity expansion recommendations for the 2.0 MG Kalawahine 180 Reservoir and the Kalawahine Well with a maximum daily demand (MDD) capacity of two (2) mgd near the Kalawahine 180 Reservoir. Other recommendations and planned projects for the PUC-DP area were identified with transmission pipelines for capacity expansion, including the two and a half (2.5) miles of thirty-six (36) inch pipeline planned to connect the thirty-six (36) inch Moanalua Road pipeline to the Hālawa forty-two (42) inch pipelines and redundancy with four (4) miles of forty-two (42) inch pipeline from Liliha Street to Isenberg Street along Beretania Street, Richards Street, King Street, and Victoria Street. Other projects include 0.1 MG of additional storage in Pālolo 605 zone, 14.6 mgd of additional pumping in various zones and 0.1 mile of eight (8) to twenty (20) inch pipe to meet peak hour needs.

According to the BWS Water Master Plan, planned development of new supplies to meet the more conservative MDD and ADD (MDD/ADD) factor requirement of 1.5, to provide additional flexibility, redundancy, and capacity for future growth in the system beyond 2040. New supplies proposed in the ʻEwa-Waipahu model system can offset the Metro Low supply need by about seven (7) mgd. Depending on the actual demand increase and observed MDD/ADD factors in the future, some of the identified projects may be accelerated or deferred beyond the 30-year CIP planning period. It is recommended that BWS continue to evaluate the actual MDD/ADD factors to accurately reflect the system needs now and into the future.

While the BWS has water source capacity for ADD, it does not have source capacity to meet the one and a half (1.5) MDD factor as required by the City Water Standards. The BWS Water Master Plan, identified supply needs estimated for the Metro Low Model System with a water source requirement in 2012 of twenty (20) mgd and twenty-six (26) mgd in 2040. The BWS will expand supply over time to meet the 2040 need. The existing Metro Low system needs approximately fifty (50) million gallons (MG) of additional storage as identified by the City Water Standards. By 2040, this increases to just over sixty (60) MG. Finding appropriate and large sites in the Metro Low system service area to meet the storage need will be difficult. It is preferred to locate as much of the storage in the service area as possible; however, it is possible to locate storage further away and provide peak-hour pumping. An analysis of alternatives is needed to determine the most feasible options to address this deficiency. The BWS will expand storage capacity over time to meet the 2040 need. The pumping capacity needs identified in BWS Water Master Plan include well pumps, booster pumps operating between pressure zones, and in-line booster pumps. A substantial portion of the pumping capacity required in the ʻEwa-Waipahu System will be able to deliver MDD over a sixteen (16) hour period as per the City Water Standards. As with the supply requirements, the 1.5 ratio of MDD to ADD specified in the City Water Standards drives the pumping capacity needs for Metro Low. The BWS is looking to meet the pumping needs over time as it expands pumping capacity to meet the Standards for 2040 demands. Over the next several years, the BWS will review those factors and their impact on costs and rates to determine the correct balance for the system. The BWS Water Master Plan identified pumping capacity needs for the Metro Low System Model with a 2012 requirement of twenty-four (24) mgd and a 2040 requirement of twenty-nine (29) mgd.

Several water transmission improvements have been identified to improve water service in the Iwilei Master Plan Area. Recommendations for the Iwilei Master Plan Area include improvements to areas with insufficient water systems to provide fire flow for mixed-use TOD development projects. This primarily includes areas served by 6-inch pipes and areas with dead-end 8-inch pipes.

Exhibit 5

Tax Map Key for GIS Join (Updated 06-2021)	Legal Acreage Value Recorded at Real Property (Updated 06-2021)	Phasing_OPTOD (2021 06-07 update)				**WATER** Existing Single Family Residential gpd	Existing MF (low rise) gpd	Existing MF (high rise) gpd	Existing Comm gpd	Existing Comm/Ind gpd	Existing Industrial gpd	Existing Comm/Residential gpd	Existing Park/School gpd	**WATER** Total Existing gpd	Proposed Single Family Residential gpd	Proposed MF (low rise) gpd	Proposed MF (high rise) gpd	Proposed Comm gpd	Proposed Comm/Ind gpd	Proposed Industrial gpd	Proposed Comm/Residential gpd	Proposed Park/School gpd	Total Proposed gpd	WATER Existing	Proposed	Increase
TMK_21	REC_AREA_A_21	Phase_OPTOD																								
15010017	0.5893	1					0							0			42900				1,275.96		44,176	0	44,176	44,176
15012012	3.6720	3					0		11,016					11,016			240000				2,400.00		242,400	11,016	242,400	231,384
15012010	6.7832	2					0		20,350					20,350			427500				66,960.60		494,461	20,350	494,461	474,111
15010010	1.7695																							0		
15010013	2.2739																							0		
15010010 -consolidated	4.0428	2					0		12,128					12,128			172500				8,400.00		180,900	12,128	180,900	168,772
15012015	2.1974	1					0			5,204				5,204			120000				2,400.00		122,400	5,204	122,400	117,196
17026004	0.4558																							0		
17029016	0.9611																							0		
15010007	4.4396	2					0		13,319					13,319			300000				18,000.00		318,000	13,319	318,000	304,681
15012017	10.8262	3					0		32,479					32,479		174800					12,732.90		187,533	32,479	187,533	155,054
15020006	2.7500	1					0		8,250					8,250			150000				2,220.00		152,220	8,250	152,220	143,970
15020014	0.1366	1					0							0		4000					299.88		4,300	0	4,300	4,300
15033009	1.5727	3+					0		4,718					4,718				4718.181818					4,718	4,718	4,718	0
15015004	0.2585	2					0							0		7600					563.07		8,163	0	8,163	8,163
15015005	0.5387	2					0							0		16400					1,182.59		17,583	0	17,583	17,583
15015003	0.7614	2					0							0		22800					1,671.67		24,472	0	24,472	24,472
15015001	1.1833	2					0							0			31200				3,036.90		34,237	0	34,237	34,237
15008004	0.7652	3					0		2,296					2,296		12400					899.99		13,300	2,296	13,300	11,004
15008015	1.0222	3					0		3,066					3,066		16400					1,202.18		17,602	3,066	17,602	14,536
15008014	1.2101	3					0		3,630					3,630		19600					1,423.20		21,023	3,630	21,023	17,393
15017006 -consolidated	42.3393	1					0		127,018					127,018					61,501.70				61,502	127,018	61,502	-65,516
15007030	0.6291	1					0		1,887					1,887			36000				1,381.11		37,381	1,887	37,381	35,494
15007009	3.0123	1					0		9,037					9,037			159000				6,613.24		165,613	9,037	165,613	156,576
17026006	1.8964	2					60000					995.16		60,995			150000				995.16		150,995	60,995	150,995	90,000
15022001	1.7449	1					0		5,235					5,235			183300				3,840.00		187,140	5,235	187,140	181,905
15022005	0.0858	1																						0		
15022004	0.1465	1																						0		
15022008	0.2188	1																						0		
15022006	0.1331	1																						0		
15022003	1.1848	1																						0		
15022011	0.7188	1																						0		
15022010	1.2142	1																						0		
15022011 -consolidated	3.7021	1					0			6,864				6,864			198300				9,612.00		207,912	6,864	207,912	201,048
15022002	2.3878	1					0			3,843				3,843			68800				2,376.00		91,176	3,843	91,176	87,333
15019007	0.9751	1																						0		
15019009	0.4953	1																						0		
15019008	0.4870	1																						0		
15019009 -consolidated	1.9571	1					0			2,606				2,606			91500				1,500.00		93,000	2,606	93,000	90,394
15019005	1.1962	1																						0		
15019006	0.9792	1																						0		
15019006 -consolidated	1.0577	1					0			8,159				8,159			101700				600.00		102,300	8,159	102,300	94,141
15019010	0.5846	1																						0		
15019011	0.5625	1																						0		
15019011 -consolidated	1.1472	1					0			3,068				3,068			105900		2,870.00				108,770	3,068	108,770	105,703
15019012	3.2694	1					0		9,781					9,781			56400		4,380.00				60,780	9,781	60,780	50,999
15003002	0.5511	2																						0		
15003001	1.0811	2																						0		
15003001 -consolidated	1.6322	2					0			5,634				5,634			105000				1,080.00		106,080	5,634	106,080	100,446
15019003	0.3205	2																						0		
15019002	1.5720	2																						0		
15019001	1.5755	2																						0		
15019016	0.9032	2																						0		
15019017	0.9048	2																						0		
15019004	1.2537	2																						0		
15019004 -consolidated	6.5296	2					0			18,340				18,340			255000		8,120.00				263,120	18,340	263,120	244,780
16002103	0.2607	3					400		-			338.40		738		400					338.40		738	738	738	0
15023008	1.0221	3																						0		
15023007	0.7547	3																						0		
15023005	0.5248	3																						0		
15023002	0.6956	3																						0		
15023003	0.6956	3																						0		
15023004	0.6956	3																						0		
15023009	1.0751	3																						0		
15023006	0.5133	3																						0		
15023006 -consolidated	5.9769	3					0			16,108				16,108			156000				13,121.74		169,122	16,108	169,122	153,014
15021046	0.1374	3																						0		
15021051	0.0648	3																						0		
15021049	0.8209	3																						0		
15021041	0.0010	3																						0		
15021042	0.6545	3																						0		
15021043 -consolidated	1.4784	3					0			5,048				5,048			33300				3,245.71		36,546	5,048	36,546	31,498
15020003	5.0471	2					0			12,919				12,919			330000				3,816.00		333,816	12,919	333,816	320,897
15020005	0.0429	2																						0		
15020002	0.3340	2																						0		
15020020	0.2169	2																						0		
15020021	3.5390	2																						0		
15020019	0.0653	2																						0		
15020022 -consolidated	4.1978	2					0		12,593					12,593			225000				2,580.00		227,580	12,593	227,580	214,987
15021023	1.5290	3																						0		
15021004	0.7834	3																						0		
15021022	0.3856	3																						0		
15021022 -consolidated	2.6080	3					0			5,970				5,970					8,146.74				8,147	5,970	8,147	2,177
15021002	3.3219	3																						0		
15021015	0.4670	3																						0		

15021015 -consolidated	3.7690	3				0			12,088				12,088					12,378.53				12,379		12,088	12,379	290
15004033	0.7420	2																						0		
15004034	0.8880	2																						0		
15004032	1.3420	2																						0		
15004030	0.5870	2																						0		
15004032 -consolidated	3.5590	2				0		10,677					10,677			255000				960.00		255,960		10,677	255,960	245,283
16002104	0.5803	3				0		1,741					1,741		9200					682.56		9,883		1,741	9,883	8,142
16003043	4.5290	3																						0		
16003042	0.5745	3																						0		
16003034	0.0806	3																						0		
16003064	0.0583	3																						0		
16003064 -consolidated	5.2424	3				800					5,469.00		6,269		800					5,469.00		6,269		6,269	6,269	0
15003016	0.8270	3				0		2,481					2,481		13200					972.65		14,173		2,481	14,173	11,692
15005007	2.1000	2				0		6,300					6,300			45000				5,551.08		50,551		6,300	50,551	44,251
15008005	0.2440	3				0							0									0		0	0	
15012007	9.0010	4				0		27,003					27,003		145200					10,586.26		155,786		27,003	155,786	128,783
17026053	9.4350	4				155600					1,200.00		156,800			296100				2,400.00		298,500		156,800	298,500	141,700
15007001	3.7910	1				0		11,373					11,373			180000				29,051.88		209,052		11,373	209,052	197,679
17023008	2.1490	1				54400					5,595.96		59,996			124800				5,595.96		130,396		59,996	130,396	70,400
15013023	4.8320																							0	0	
15013010	5.6491																							0	0	
15013012	3.5416																							0	0	
15013012 -consolidated	9.1907	4				0		27,572					27,572		148400					10,809.32		159,209		27,572	159,209	131,637
17029003	14.8451	1 and 2				145600							145,600			750000				9,600.00		759,600		145,600	759,600	614,000
15010015	4.9819	2 and 3				0		14,946					14,946			267300				13,773.00		281,073		14,946	281,073	266,127
17045001	6.5560	4				400							400		90800							90,800		400	90,800	90,400
17023038	1.1215	2				0							0			150000				12,000.00		162,000		0	162,000	162,000
15008006	1.3244	2				0		3,973					3,973			150000				12,000.00		162,000		3,973	162,000	158,027
17026054	9.4480	1																						0		
17026013	2.4054	1																						0		
17026054 -consolidated	11.8534	1				186000					480.00		186,480			900000				480.00		900,480		186,480	900,480	714,000

3 Drainage System

1 Criteria

1.1 Hydrologic Criteria and Methodology

The hydrologic criteria used in this report are the same as the Iwilwi Drainage Master Plan in accordance with the "Storm Drainage Standards" by the Department of Planning and Permitting, City and County of Honolulu (City) dated August 2017, hereafter referred to as "Drainage Standards".

1.2 Design Flow Criteria

The recurrence intervals (Tm) used in this study are summarized in Table 3-1.

Table 3-1: City Recurrence Criteria

Component	Drainage Area	Tm (year)
Drainage System	≤ 100 acres	10-year
Drainage System	> 100 acres and all streams	50-year * 100-year

* In sump or tailwater condition, and for roadway culverts and bridges

Low ground elevations and shallow canal and stream depths dictate that it would not be feasible to construct a drainage system that is designed for the 50-year, 1-hour storm. The design to accommodate a 50-year storm will require huge culverts with deep discharge pipe lowering Kapalama Canal and Nuuanu Stream. Another option is to raise the finished grade and the entire drainage system.

1.3 Runoff Quantity

The study drainage areas within the Iwilei area are less than 100 acres (small). For hydrology of small drainage areas, the Rational Method was used to compute storm peak runoff rates for 10-year storms.

1.3.1 Rational Method

The drainage areas were analyzed based on the following assumptions:

a. Rainfall intensity is constant over the entire catchment area;
b. Storm duration exceeds the time of concentration; and
c. Runoff is via overland flow.

Rational Method: Q = CIFA

Q = peak flow rate in cubic feet per second (cfs)
C = runoff coefficient (dimensionless)
I = rainfall intensity for a duration equal to the time of concentration (inches per hour)
F = correction factor based on time of concentration
A = drainage area (acres)

a. Runoff Coefficient

Runoff coefficients are used to account for runoff abstraction losses (infiltration) and diffusion (attenuation from storage). Coefficients were obtained using Tables 1, 2, and 3 from the Drainage Standards. Table 2-2 summarizes the runoff coefficients.

Table 2-2: Rational Method Runoff Coefficients

Land Use	Runoff Coefficient (C)
Residential	0.70
Hotel – Apartment Areas	0.80
Business Areas	0.85
Industrial Areas	0.90
Undeveloped	0.40
Paved Road, Parking	0.90

b. Time of Concentration

The time of concentration is a measure of flow travel time through a drainage area. It reflects drainage area slope, ground cover, and drainageway hydraulic characteristics.

The time of concentration values for existing conditions were determined using Plate 3 of the Drainage Standards. A value of 5 minutes was used as the minimum value for time of concentration.

c. Drainage Areas

1.4 Hydraulic Criteria and Methodology

Drain lines were evaluated using Manning's equation as prescribed by the Drainage Standards. Proposed pipes were sized to maintain a minimum freeboard of 1-foot between the hydraulic grade surface and the top of manhole or invert of catch basin.

Manning's Equation: $V = \frac{1.486 r^{2/3} s^{1/2}}{n}$

V = average flow velocity (feet per second)
r = hydraulic radius (feet)
s = channel slope (feet/feet)
n = Manning's roughness coefficient

V = average flow velocity (feet per second)
r = hydraulic radius (feet)
s = channel slope (feet/feet)
n = Manning's roughness coefficient

Manning's roughness coefficient for Reinforced Concrete Pipe (RCP): n = 0.013

Continuity Equation: Q = VA

Q = flow discharge (cubic feet per second)
V = flow velocity (feet per second)
A = area of flow (square feet)

2 Existing Conditions

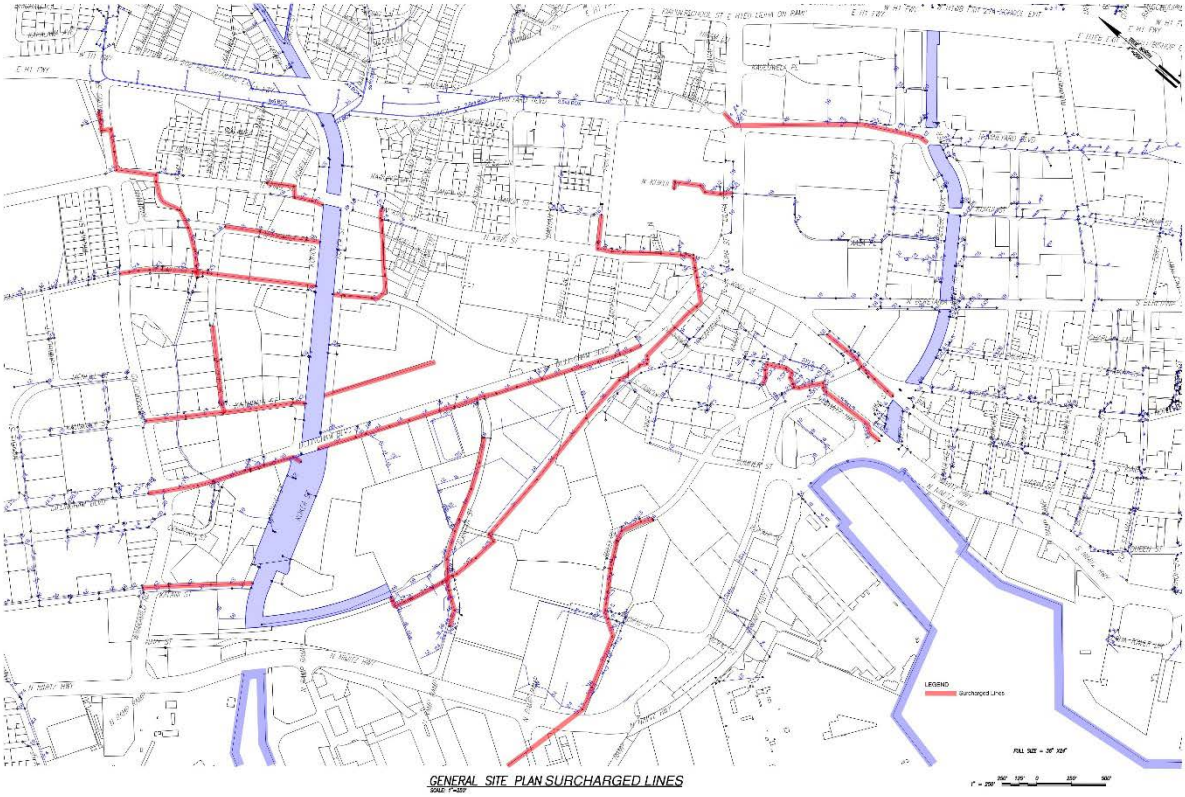
The Iwilei Master Plan Area is located within the southern and central portion of the Kapālama and Nu‘uanu watersheds. The Kapālama Canal and Nu‘uanu Stream are the two major drainageways that flow through the Iwilei Master Plan Area and empty into Honolulu Harbor. The existing backbone drainage systems consist of drain lines owned by the City, State, and private entities. The systems have various deficiencies and constraints due to the limited capacity of the major drainageways, a flat low-lying terrain, and a high water table. Other factors such as tidal effect, a plugged shallow drain, and a malfunctioning pump (only one of the two private pumps is operational) may contribute to existing flooding conditions.

The drainage system in the Iwilei Master Plan Area does not meet the City Storm Drainage Standards and will need to be upgraded.

2.1 Existing Drainage Systems

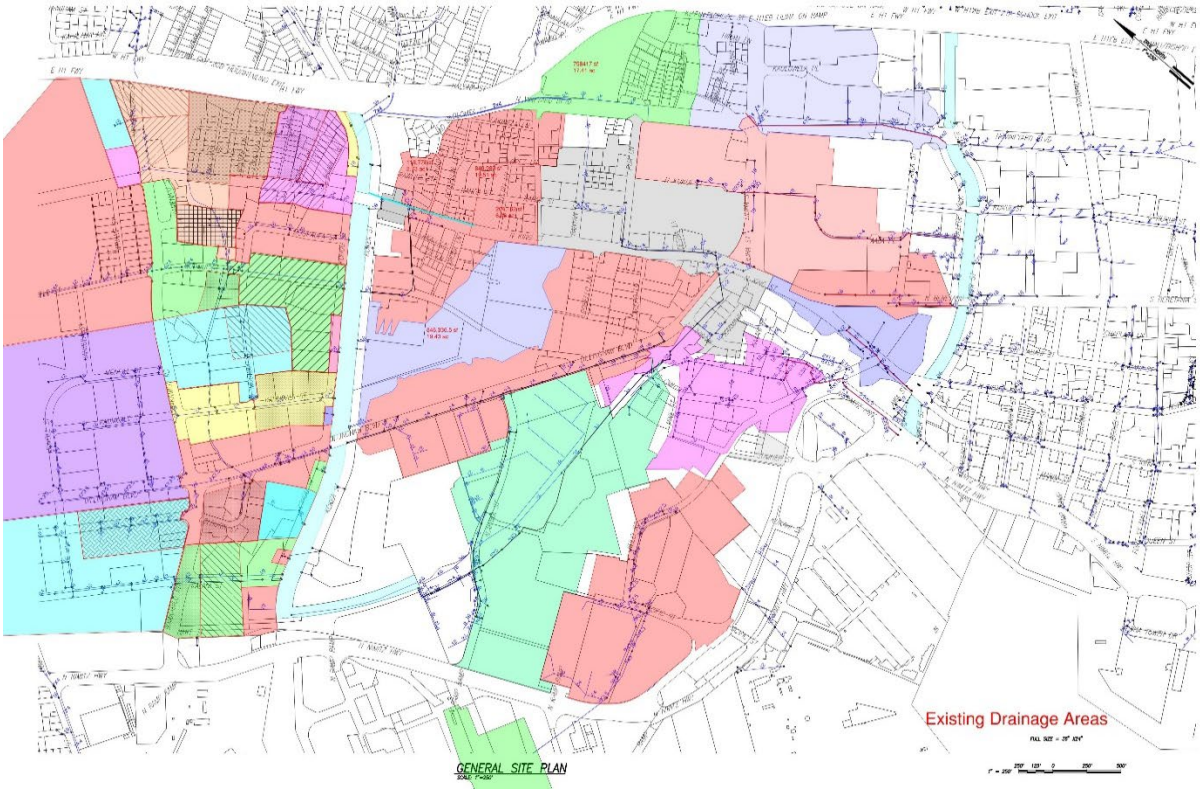
The Iwilei Drainage Study identified the major surcharged lines between Kapālama Canal and Nu‘uanu Stream below the freeway. This study supplemented this study up to Waiakamilo Road. Exhibit 6 presents the surcharged lines within the Iwilei TOD Area.

Exhibit 6



In order to supplement the Iwilei Drainage Master Plan the existing drainage areas were determined based on the elevations from the City GIS drainage app manhole elevations. The combined drainage areas for the Iwilei TOD Areas are shown in Exhibit 7

Exhibit 7



2.2 Flood Zones

There are four distinct flood mechanisms threatening the Iwilei Master Plan Area: coastal flooding, storm water flooding, riverine flooding, and groundwater flooding. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) shown in Exhibit 8, the majority of the Iwilei Master Plan Area is located in Zone X[1], an area determined to be outside the 0.2% annual chance of flooding (or 500-year floodplain). Although most of the Iwilei Master Plan Area is designated as having 'low flood potential,' several areas, including the makai portions of Iwilei, suffer from severe flooding and ponding after heavy rainfall events due to storm water runoff and deficiencies in the storm water drainage system.

The City has requested new detailed studies from the Federal Emergency Management Agency (FEMA) for Kapālama Stream and Nu'uanu Stream for these flood hazard areas, which are currently being developed and reviewed. When completed, the City will adopt the new FIRM being prepared. A forthcoming Nu'uanu Stream improvement study will be refined after the FEMA study is completed as well. FEMA's Base Level Engineering (BLE) illustrates approximate flooding areas which show extensive flooding in the Iwilei Master Plan Area. The City is required to regulate the BLE until the new FEMA Preliminary Maps are submitted. The draft Preliminary Maps are anticipated to be available in late 2022.

Until FEMA prepares the new Preliminary FIRM, the City will use the Base Level Engineering (BLE[2]) data developed by FEMA to assist communities with Flood Plain Management. The City is not planning

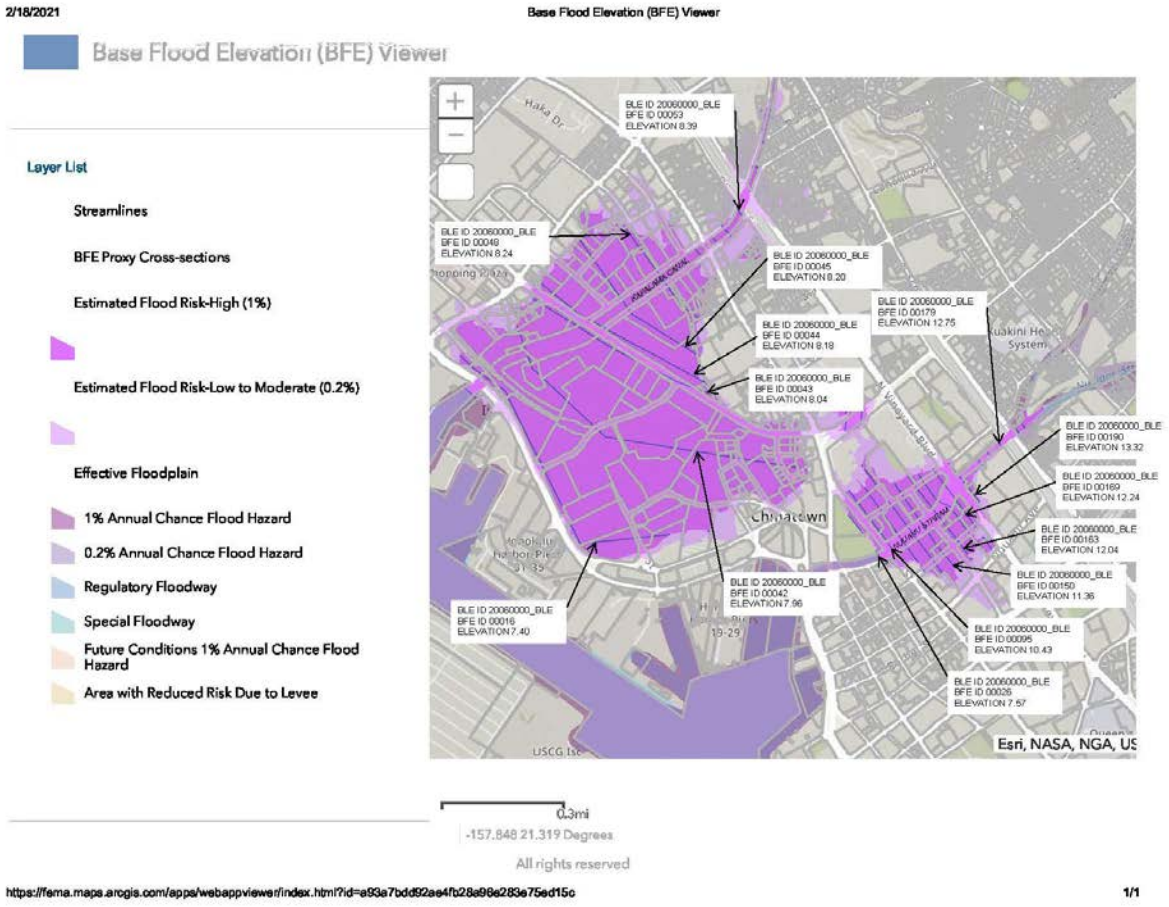
[1] Zone X is an area determined to be outside of the 0.2% annual chance of flooding (or 500-year floodplain).

[2] According to the FEMA website, *"Base Level Engineering (BLE) generates watershed-wide flood hazard information built from foundation level hydrologic and hydraulic engineering models – providing floodplain boundaries, flood depth and water surface elevation grids. BLE is*

to adopt the BLE for O'ahu, though it may be utilized to regulate areas of Zone A[3] and Zone X that are next to streams as part of the Flood Plain Management strategy.

Exhibit 8 also shows the approximate 100-year flood plain for the Iwilei Master Plan Area and the FEMA BLE. The FEMA BLE shows that the approximate 100-year storm flowing in the Kapālama Canal will cause flooding with a Base Flood Elevation (BFE) of 7.40 feet at Nimitz Highway to 8.04 feet immediately makai of Vineyard Boulevard, where the existing ground elevations are at approximately 6-feet or less. The City will require that the Finished Floor Elevations (FFE) be raised to the identified elevations until the new preliminary FIRM maps are submitted to the City, as soon as next summer or fall. Flood proofing is allowed for commercial structures and non-residential portions of a residential building.

Exhibit 8



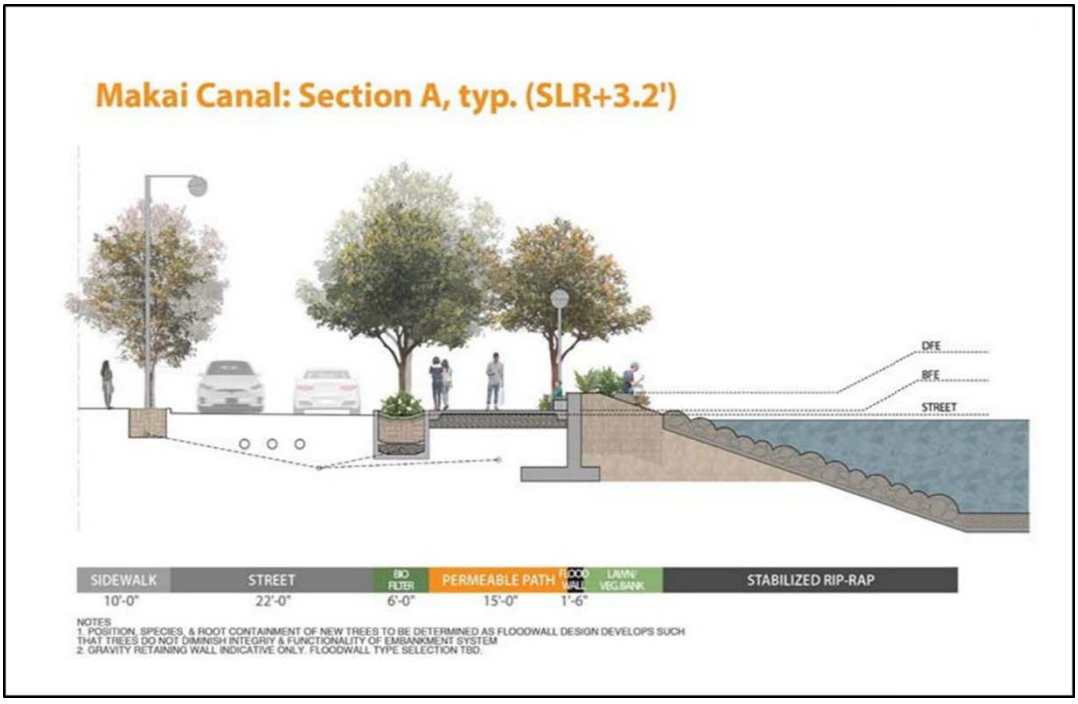
Source: FEMA BLE Viewer

developed using high resolution ground elevation, using the latest modeling software to create modeling in agreement with FEMA's Standards for Flood Risk Projects. These results agree with a Zone A mapping designation.
While this data does not immediately replace a community's Flood Insurance Rate Map (FIRM), the analysis provides information to support for local communities to determination Base Flood Elevations (BFEs) for Zone A and newly identified flood prone areas identified by the BLE analysis." (FEMA Region 6, 2021).

[3] Zone A is an area subject to inundation by the 1-percent annual chance flood event using approximate methodologies. No BFE or flood depths are shown because detailed hydraulic analyses have not been completed. Flood insurance is required and floodplain management standards apply.

The Kapālama Revitalization Project may resolve most of this flooding issue. A typical cross-section of the Kapālama Canal from Dillingham Boulevard to Nimitz Highway as presented in the Kapālama Canal Catalytic Project – Resilient Master Plan (City and County of Honolulu, 2022) is shown in Exhibit 9

Exhibit 9



Source: City and County of Honolulu, Kapālama Canal Catalytic Project – Resilient Master Plan

2.3 Sea Level Rise (SLR)

The four distinct flood mechanisms threatening the Iwilei Master Plan Area (coastal flooding, storm water flooding, riverine flooding, and groundwater flooding) are expected to be impacted by climate change through both SLR and variabilities in storm frequency and intensity.

According to the *Sea Level Rise Guidanc*e document adopted on June 5, 2018, the City Climate Change Commission identified a planning benchmark up to 3.2 feet of SLR for critical infrastructure with long lifespans and low-risk tolerance (Climate Change Commission, 2018). The 3.2-foot SLR scenario modeled in the Pacific Islands Ocean Observing System (PacIOOS) Hawai'i Sea Level Rise Viewer (Viewer), included as https://www.pacioos.hawaii.edu/shoreline/slr-hawaii/ , identifies a substantial portion of the Iwilei Master Plan Area within the SLR Exposure Areas (SLR-XA) (2021). The SLR-XA for the 3.2-foot scenario includes the area between Dillingham Boulevard and Nimitz Highway and along the areas bordering Kapālama Canal and Nu'uanu Stream.

Although detailed flood modeling has not been completed for the entire Iwilei Master Plan Area, recommendations to mitigate impacts from Sea Level Rise will be required to address flooding within the Iwilei Master Plan Area that could result in overwhelmed infrastructure systems, such as water pumping, or complete failure of certain systems, such as underground electrical facilities and backup generators that may become filled with water if they are not properly protected.

In January 2022, the City completed the *Kapālama Canal Catalytic Project – The Resilient Master Plan* which studied flooding and SLR along the Kapālama Canal and proposed specific solutions through extensive planning, hydrology studies, and technical analysis (2022).

4 Storm Water Quality

4.1 Existing Conditions

The O‘ahu storm drain system is regulated under a National Pollutant Discharge Elimination (NPDES) permit. NPDES permits contain limits on what can be discharged into waters of the United States. They also create monitoring and permitting requirements to ensure that discharge does not impact water quality or health and safety. Discharge or pollutants include sewage, garbage, agricultural waste, industrial waste, and construction materials. The most current permit, NPDES Permit No. HI S000002, was issued on August 7, 2020, by the State of Hawai‘i Department of Health (DOH) to the City. The effective date is September 1, 2020, until midnight, August 31, 2025.

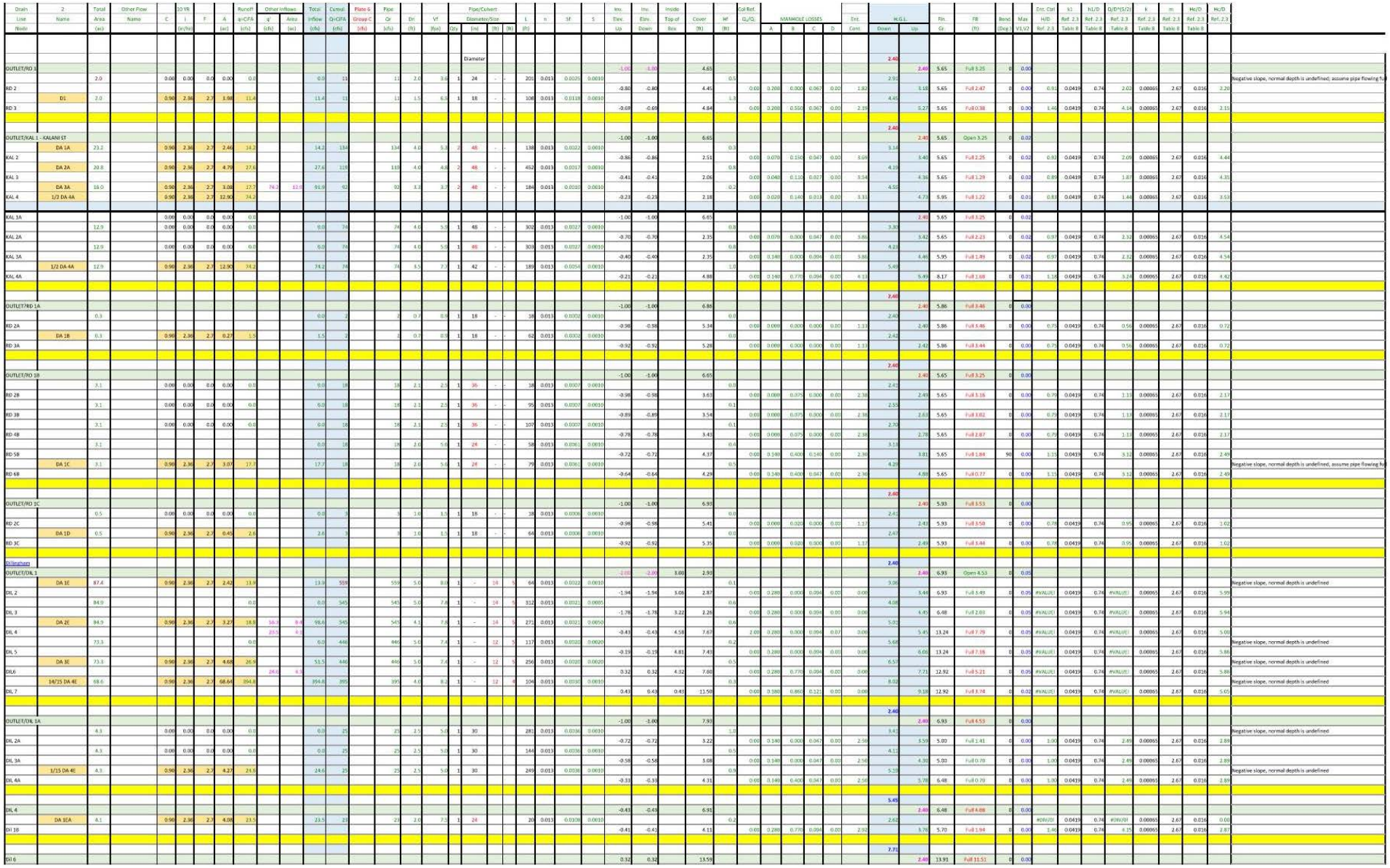
Because the O‘ahu storm drain system is regulated under an NPDES permit, the City is required to implement a Storm Water Management Program Plan (SWMPP), updated in September 2021, to outline the steps the City will enact to reduce the discharge of storm water pollutants into State waters.

In addition to the SWMPP, the City has adopted guidelines for Storm Water Best Management Practices (SW-BMP) for New and Redevelopment, which have been in effect since August 16, 2017. The SW-BMP guidelines apply to all development and land disturbing activities within the City and establish minimum requirements for Best Management Practices (BMPs). The 2017 guidelines for post-construction treatment control BMPs may include retention measures, biofiltration, and BMPs for alternative compliance.

For retention BMPs, detention basins or underground chambers can be used for both flood control and storm water quality purposes, provided that the soil infiltration rate meets the minimum requirement of 0.5 inches an hour and the ground water table is below the detention basin and the underground chamber invert. Due to space limitations, underground chambers may be the preferred option. As applicable, low-impact development (LID) solutions, such as capturing runoff from rooftops or impervious surfaces and conveying them to rain gardens, catchment basins, and other green infrastructure solutions should be implemented.

The location and method of the post-construction treatment control BMPs will be determined during the design phase of each project in the Iwilei Master Plan Area.

Exhibit 10



| | | |

| | | |

Appendix D

Infrastructure Improvement Master Plan for the Iwilei Area Transportation Assessment Report

Iwilei Infrastructure Improvement Master Plan

Transportation Assessment Report

Prepared for:

PBR HAWAII

October 31, 2022

FEHR PEERS

SD21-0357

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Appendix F: Baseline 2035 + Project + Improvements Intersection Analysis Worksheets

1. Executive Summary

The Iwilei Infrastructure Improvement Master Plan (IIMP) area is on the island of O'ahu, within the ahupua'a of Honolulu and Kapālama, in the Iwilei neighborhood. The study area is immediately adjacent to Downtown Honolulu and is generally bounded by Waiakamilo Road on the Ewa side, River Street on the Diamond Head side, Interstate H-1 on the mauka side, and Nimitz Highway on the makai side.

One element of the IIMP is the identification of the roadway and mobility infrastructure required to support the redevelopment of multiple land uses in the Iwilei-Kapālama area. The anticipated redevelopment of land uses within the study area is based on input from land owners including the likely type and density of future land uses for each parcel compared to a comprehensive database of existing land uses developed by the IIMP project team. The number of net new daily and peak hour vehicle trips for each land use was estimated using the *Trip Generation Manual* (11th Edition) published by the Institute of Transportation Engineers (ITE). Fehr & Peers' MainStreet web application (which incorporates the ITE rates) was used to estimate trip reductions resulting from mixed-use development, as well as anticipated active transportation and transit use. For this analysis, where the future study year is 2035, the City's rail project that is being constructed by the Honolulu Authority for Rapid Transit (HART) is assumed to be fully operational to support the proposed redevelopment.

The net increase in traffic with the proposed redevelopment is expected to be substantial with approximately 64,000 net new daily vehicle trips and just over 5,000 net new vehicle trips in each of the AM and PM peak hours. These trips were added to the year 2035 baseline traffic volumes that were grown from existing volumes. The Year 2035 plus redevelopment peak hour volumes were then used to analyze operations at a total of 30 key intersections within the master plan area.

The study document estimates traffic movements at the analyzed intersections and then determines average delay times and the resulting level of service (LOS) ratings pursuant to guidelines established by the State of Hawai'i Department of Transportation - Highways Division Planning Branch (HDOT), as well as for the City and County of Honolulu (City) Department of Planning & Permitting (DPP) Traffic Review Branch (TRB). Potential impacts on the pedestrian, bicycle, and transit facilities and services were also evaluated at an areawide level.

Considering that the study area is an already urbanized environment with extensive existing development and most roadways are built to capacity, major improvements such as widening roadway segments are not considered feasible. In general, peak hour traffic operations will degrade, which is a common occurrence in urban core areas and their immediate environs, and the study area will essentially be an extension of the Downtown Honolulu core with planned intensification. However, some focused improvements can be

implemented to reduce delays and minimize impacts on peak hours and off-peak operations. Recommended improvements at select locations include new traffic signals, signal timing optimization, realignment or reconfiguration of intersection approaches, the addition of a right-turn overlap phase, and the addition of a new street segment.

Additionally, pedestrian, bicycle, and transit improvements are recommended to encourage non-auto modes of transportation and improve the quality of walking, biking, and using transit in the area. New pedestrian and bicycle connections are also recommended to improve network connectivity to adjacent neighborhoods. It is critical that off-street parking supplies serving proposed redevelopment projects be limited to the lowest possible ratios consistent with Transit-Oriented Development principles to encourage the use of non-auto modes. **Section 7** of the report provides details on all recommended improvements.



2. Introduction

The Iwilei Infrastructure Improvement Master Plan (IIMP) Area is located on the island of O'ahu, within the ahupua'a of Honolulu and Kapālama, in the Iwilei neighborhood. Located near downtown Honolulu and along the City's future rail project to be constructed by the Honolulu Authority for Rapid Transit (HART), the Iwilei neighborhood has significant potential for smart growth and supports Transit-Oriented Development (TOD).

The IIMP proposes the development of multiple state-owned developable lands in the Iwilei neighborhood, within a half-mile distance of future rail transit stations. The master planning and construction of the infrastructure improvements for the State and City-owned parcels are conducted under the intergovernmental agreement between Hawaii Housing Finance & Development Corporation (HHFDC) and the City.

The Transportation Assessment Report (TAR) presented here assists with the redevelopment of the proposed parcels in the master plan area including identifying the impacts of the proposed project on the surrounding transportation system and providing input on required transportation infrastructure and multi-modal facilities to improve mobility and connectivity of the transportation network.

2.1 Project Description

The master plan area is an extension of Downtown Honolulu and is generally bounded by Waiakamilo Road on the Ewa side, River Street on the Diamond Head side, Interstate H-1 on the mauka side, and Nimitz Highway on the makai side.

The IIMP area is comprised of over 700 properties, covering approximately 555 acres. Various State agencies are responsible for some properties within the IIMP area comprising office, open space, educational, and residential uses, including large landholdings considered for redevelopment such as:

- Liliha Civic Center (Department of Accounting and General Services, DAGS);
- Mayor Wright Homes and Kalanihuia Homes (Hawai'i Public Housing Authority, HPHA);
- City Square Shopping Center, portion (Department of Hawaiian Home Lands, DHHL);
- Honolulu Community College (HCC) (University of Hawai'i, UH); and
- Nā Lama Kukui Business Center (Office of Hawaiian Affairs, OHA—a semi-autonomous State agency).



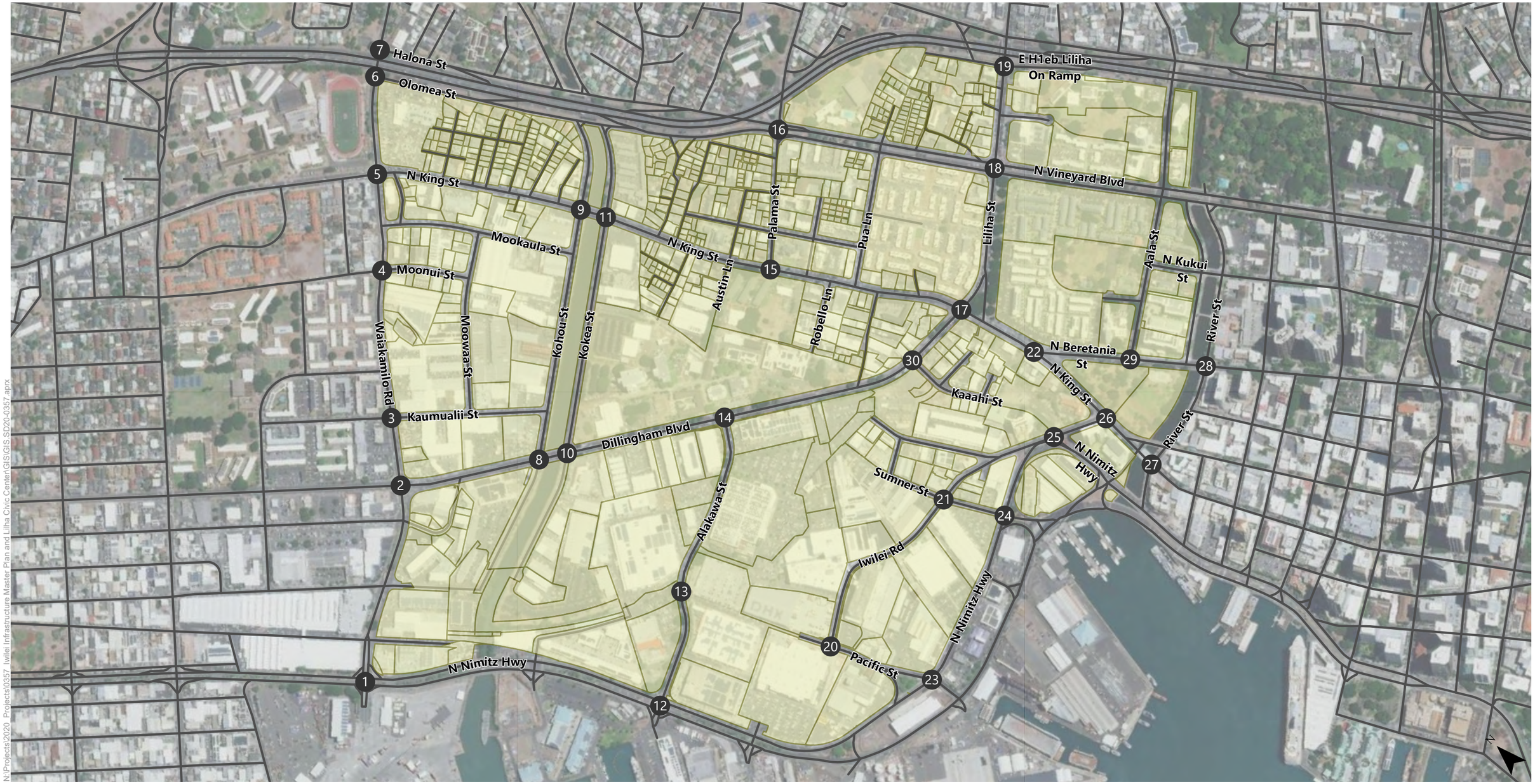
Private landowners with large properties in the Iwilei Master Plan Area include, but are not limited to:

- B P Bishop Trust Estate (Kamehameha Schools, KS);
- Castle & Cooke Commercial, Inc. (Castle and Cooke);
- City Mill Co. Ltd. (City Mill);
- Costco Wholesale Corp. (Costco),
- Douglas Emmett (Waena Apartments);
- The Salvation Army;
- Liliha Square (Liliha Square Shopping Center); and
- H & J Weinberg Foundation, Inc.

Within the next 30 years, the Iwilei Master Plan Area is expected to include nearly 27,500 new housing units, with a change in use for nearly 2 million square feet of existing commercial, institutional, and mixed-use space. According to the analysis of preferred development assumptions with landowner input, (updated in the summer of 2021), the overall number of housing units is anticipated to increase, while the total amount of commercial/institutional and industrial space is expected to remain constant or decrease as existing land uses transition to residential or mixed-use.

To accommodate the anticipated growth in the Iwilei neighborhood, the IIMP area will require upgrades and improvements for wastewater, water, electrical, telecommunications, drainage, and transportation systems. In addition, the IIMP will support broader Transportation Oriented Development (TOD) goals for the State and City and facilitate the vision for redeveloping the Iwilei neighborhood into a more walkable community with affordable housing and access to services and employment centers.

Figure 1 illustrates the master plan study area.



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Figure 1

● Study Intersections

Iwilei Infrastructure Master Plan (IIMP) Study Area

Resource Mapping Hawaii, Maxar

2.2 Project Study Area

The transportation analysis starts with the review of the existing and planned pedestrian, bicycle, and transit improvements and qualitatively discusses the impact of the redevelopment on each mode. The analysis is followed by evaluating the potential project-related traffic impacts at 30 key intersections within the master plan area. The analyzed intersections are listed below:

1. Waiakamilo Rd / N Nimitz Hwy
2. Waiakamilo Rd / Dillingham Blvd
3. Waiakamilo Rd / Kaumualii St
4. Waiakamilo Rd / Alokele St & Moonui St
5. Waiakamilo Rd / N King St
6. Olomea St / Houghtailing St
7. Halona St / Houghtailing St
8. Kohou St / Dillingham Blvd
9. Kohou St / N King St
10. Kokea St / Dillingham Blvd
11. Kokea St / N King St
12. Alakawa St / N Nimitz Hwy
13. Pacific St / Alakawa St
14. Alakawa St / Dillingham Blvd
15. N King St / Palama St
16. Vineyard Blvd / Halona St /Olomea St / Palama St
17. Dillingham Blvd / Liliha St / N King St
18. Vineyard Blvd / Liliha St
19. H-1 On Ramp / Kiapu Pl / Liliha St
20. Iwilei Rd / Pacific St
21. Iwilei Rd / Sumner St
22. N King St / Beretania St
23. Pacific St / N Nimitz Hwy WB
24. Sumner St / N Nimitz Hwy WB
25. Iwilei Rd / Ka'aahi St
26. Iwilei Rd / N King St
27. N King St / River St
28. N Beretania St / River St
29. N Beretania St / A'ala St
30. Dillingham Blvd / Ka'aahi St

Vehicle turning movement count data for 21 locations were obtained from 2018 and 2019 databases from assorted studies conducted by Fehr & Peers and others in the area. Counts for nine (9) study locations were collected on October 13, 2021.

It is acknowledged that the COVID-19 global pandemic has affected travel patterns and traffic volumes due to changes in the proportion of individuals working from home, reluctance by some individuals to travel during recent surges in positive cases due to subvariants, and a higher number of virtual events. While some of these adjustments such as working from home may be permanent for some individuals, it is not possible accurately predict how volumes will ultimately be affected. As such, volumes collected in 2021 were adjusted to pre-pandemic conditions to provide a conservative analysis. To adjust 2021 volumes to pre-pandemic conditions, all turning movement volumes were increased by 10% based on HDOT data for count stations near the Iwilei area (https://hidot.hawaii.gov/highways/covid-19-traffic-volume-comparison/).

The study intersections were evaluated during the highest one-hour of travel demand of the morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak periods. The total number of bicyclists and pedestrians crossing each street leg was also counted at the study intersections.

2.3 Analysis Scenarios

The transportation evaluation is conducted during the morning and evening commute peak hours for the following three scenarios:

Existing Conditions – The analysis of existing traffic conditions was based on adjusted 2021 counts collected for the weekday peak hours.

Baseline 2035 Conditions – The proposed redevelopment and land use changes are expected to occur over a period of time. Based on discussions with the project team, the year 2035 was assumed as the future baseline year. Baseline 2035 volumes were estimated by increasing the existing volumes using an annual growth factor of 0.5% per year to account for ambient growth per year until 2035. This rate has been used historically in this area, most recently for City's rail project studies related to utility relocations within the Dillingham Boulevard corridor. No network changes were assumed in the 2035 Baseline Scenario.

Baseline 2035 Plus IIMP – Includes traffic projections from Baseline 2035 Conditions plus traffic estimated from projected changes in land use and type within the master plan area. The analysis assumes a number of the proposed network improvements identified in the 2021 Iwilei-Kapālama Transportation Network Assessment based on requests included in a May 9, 2022 letter from the City and County Department of Transportation Services (DTS) to the project team, and coordination with City staff at a subsequent virtual meeting.

2.4 Transportation Analysis Methods

2.4.1 Active Transportation and Transit Review

Active transportation and transit impacts were evaluated based on whether a proposed project would: 1) conflict with the existing or planned pedestrian, bicycle, or transit facilities and services, or 2) create substantive walking, bicycling, or transit use demand without providing adequate and appropriate facilities for non-motorized mobility. If the proposed project is expected to conflict with existing or planned improvements to pedestrian and bicycle facilities, or if the project is expected to generate a substantial demand, recommendations are provided. It should be noted that this evaluation was conducted at a high level because the project represents a wide range of properties and future redevelopment sites.

2.4.2 Roadway Network Analysis

The analysis of roadway network operations performed for this study is based on procedures presented in the *Highway Capacity Manual 6th Edition* (HCM), published by the Transportation Research Board in 2016. The operations of roadway facilities are described with the term level of service (LOS).

LOS is a qualitative description of traffic flow based on such factors as speed, travel time, delay, and freedom to maneuver. Six (6) levels are defined; from LOS A, with the least congested operating conditions, to LOS F, with the most congested operating conditions. LOS E represents "at-capacity" operations. Operations are designated as LOS F when volumes exceed capacity, resulting in stop-and-go conditions. The methodologies for signalized and unsignalized intersections are described below.

2.4.2.1 Signalized Intersections

Signalized intersection operations were analyzed using the method described in Chapter 19: Signalized Intersections of the HCM 6th edition. The LOS method analyzes a signalized intersection's operation based on average control delay per vehicle. Control delay alone is used to characterize LOS for the entire intersection or an approach. Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average control delay for signalized intersections is calculated using Synchro 11.0 software. LOS criteria for signalized intersection are shown in **Table 1**.

Table 1: Signalized Intersection Level of Service Criteria

LOS	Description	Delay (sec)
A	Progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	≤ 10.0
B	Progression is good, cycle lengths are short, or both. More vehicles stop than with LOS A, causing higher levels of average delay.	> 10.0 to 20.0
C	Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many still pass through the intersection without stopping.	> 20.0 to 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	> 35.0 to 55.0
E	This level is considered by many agencies to be the limit of desirable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0
F	This level is considered undesirable with oversaturation, which is when arrival flow rates exceed the capacity of the intersection. This level may also occur at high V/C ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to such delay levels.	> 80.0

Source: Highway Capacity Manual 6th Edition, Transportation Research Board, 2016.

2.4.2.2 Unsignalized Intersections

Unsignalized intersection operations were evaluated using the methods contained in Chapter 20 of the HCM 6th edition. LOS ratings for stop-sign-controlled intersections are based on the average control delay expressed in seconds per vehicle. In a two-way or side-street-controlled (SSSC) intersection, the average control delay is calculated for each minor-street-stopped movement and the major street left turns; not for the intersection as a whole. For approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. For approaches with multiple lanes, the control delay is computed for each movement; the movement with the worst (i.e., longest) delay is presented. The average control delay for unsignalized intersections is calculated using Synchro 11. LOS criteria for unsignalized intersections are shown in **Table 2**.

Table 2: Unsignalized Intersection Level of Service Criteria

LOS	Description	Delay in Seconds
A	Little or no delay	≤ 10.0
B	Short traffic delay	> 10.0 to 15.0
C	Average traffic delays	> 15.0 to 25.0
D	Long traffic delays	> 25.0 to 35.0
E	Exceptionally long traffic delays	> 35.0 to 50.0
F	Extreme traffic delays with intersection capacity exceeded	> 50.0

Source: Highway Capacity Manual 6th Edition, Transportation Research Board, 2016.

3. Existing Conditions

This chapter reviews the study area's existing transportation network conditions. The assessment of existing conditions relevant to this study establishes the scenario against which the Baseline 2035 and proposed project changes may be compared.

3.1 Existing Pedestrian Network

Pedestrian facilities consist of crosswalks, curb ramps, and pedestrian signals at signalized intersections, as well as sidewalks and paths near segments between intersections. Based on 5-year American Community Survey (ACS) data from 2014 to 2018, the walking mode share in the urban center of Honolulu is estimated at nearly 8.7% which is higher than the average of the island at 5.4% (2022 O'ahu Pedestrian Plan).

In terms of overall connectivity, the Iwilei area provides good connectivity across the neighborhood through sidewalks along most streets with some gaps in the network. One issue within the overall area is the presence of exceptionally large blocks where street connectivity is limited. This is especially true of the area makai of Dillingham Boulevard and Diamond Head of Alakawa Street.

In the 2021 O'ahu Pedestrian Plan (OPP) published by DTS, the pedestrian demand model results indicate locations where people are more likely to walk based on several factors (e.g. schools nearby, parks, transit, major retails, rail station, demographics, and the built environment factors). Based on the model, the Iwilei neighborhood falls under High Pedestrian Demand areas, which is consistent with high concentrations of housing, employment, schools and supporting commercial uses. **Figure 2** illustrates a snapshot of the Iwilei neighborhood in the Pedestrian Demand Model.

The pedestrian comfort model is a tool used to identify locations with low pedestrian comfort and is also included in the OPP. Based on the Pedestrian Comfort Map model, a number of corridors and intersections in the Iwilei area are identified as low comfort zones including sections of Waiakamilo Road, Dillingham Boulevard, Kohou Street, Kokea Street, Iwilei Road, and Beretania Street. **Figure 3** illustrates the segments where pedestrians experience lower comfort levels and higher stress levels while walking.

Figure 2: Pedestrian demand model (2022 O'ahu Pedestrian Plan)

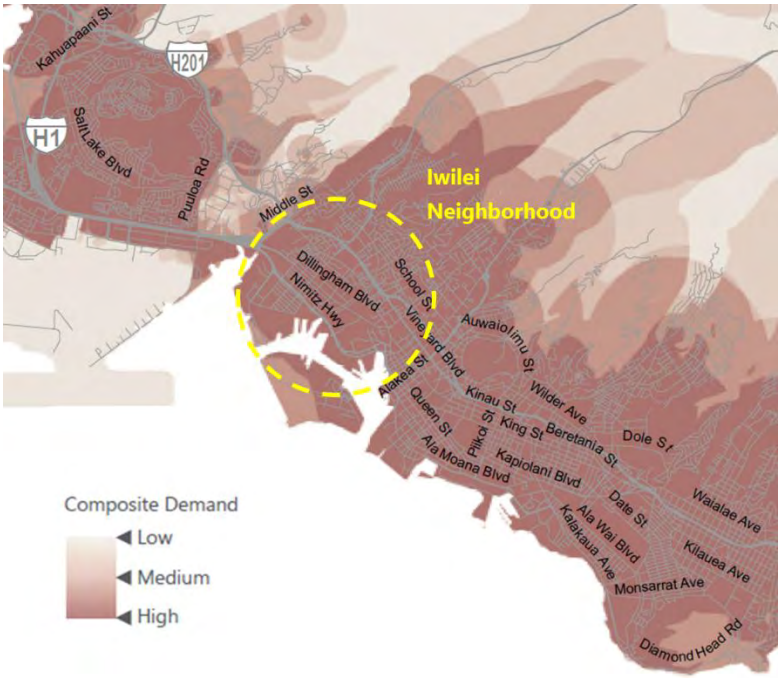
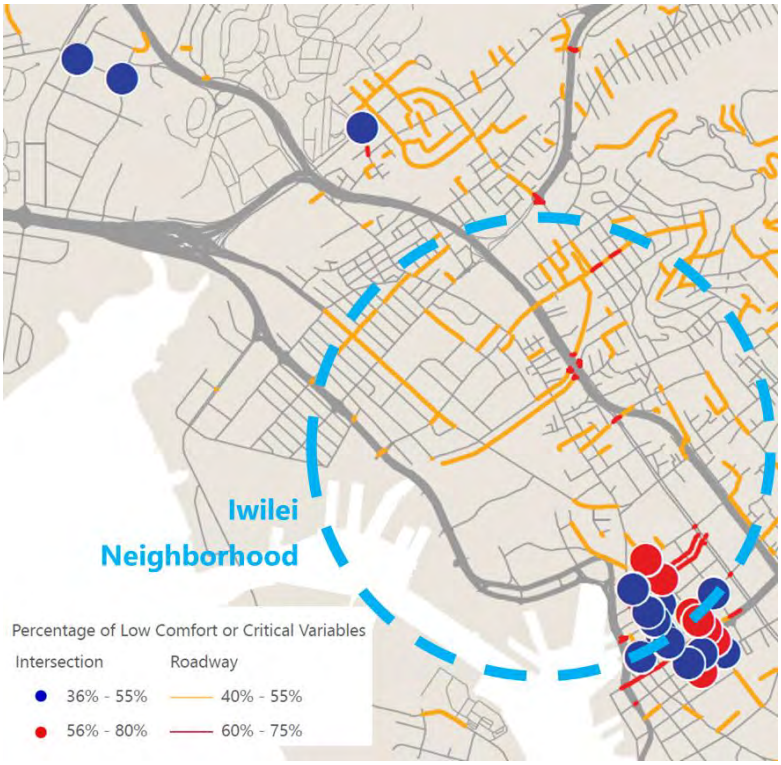


Figure 3: Pedestrian comfort map (2022 O'ahu Pedestrian Plan)



3.2 Existing Bicycle Network

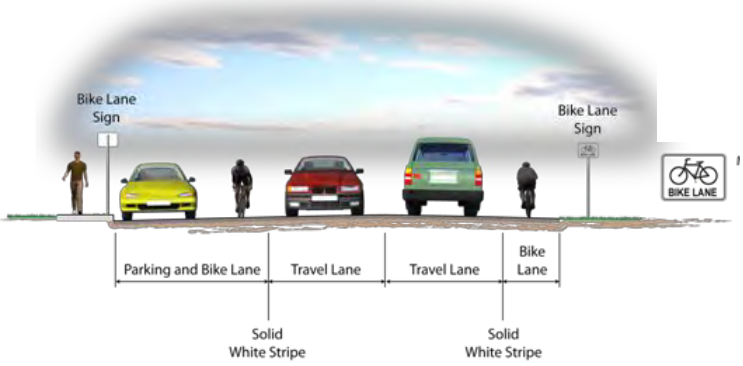
Bicycle facilities generally consist of four types of facilities, which are outlined below:

- *Bike or Shared Use Paths* provide a separate right-of-way and are designated for the exclusive use of bicycles and pedestrians (or exclusively bicycles) with the vehicle and pedestrian crossflow minimized. Generally, the recommended pavement width for a two-directional bike or multi-use path is ten (10) feet.



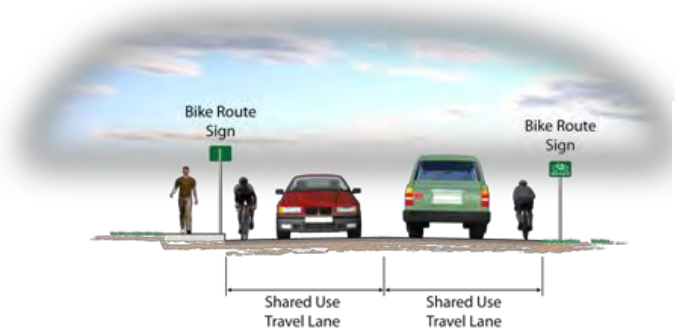


- *Bike Lanes* provide a restricted right-of-way and are designated for the use of bicycles with a striped lane on a street or highway. Bicycle lanes are generally five (5) feet wide. Adjacent vehicle parking and vehicle/pedestrian crossflow are permitted.



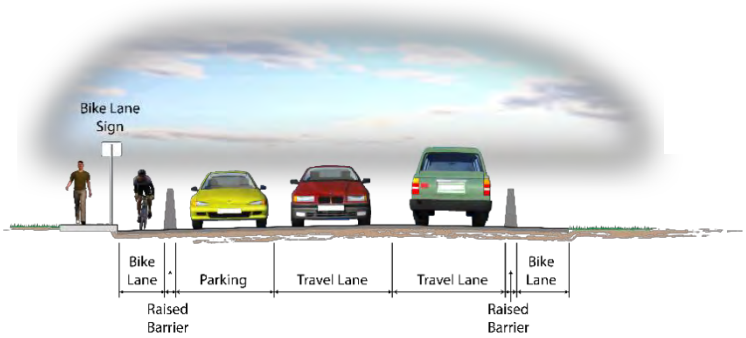


- *Bike Route or Signed Shared Roadways* provide for a right-of-way designated by signs or shared lane pavement markings, or "sharrows," for shared use with pedestrians or motor vehicles.



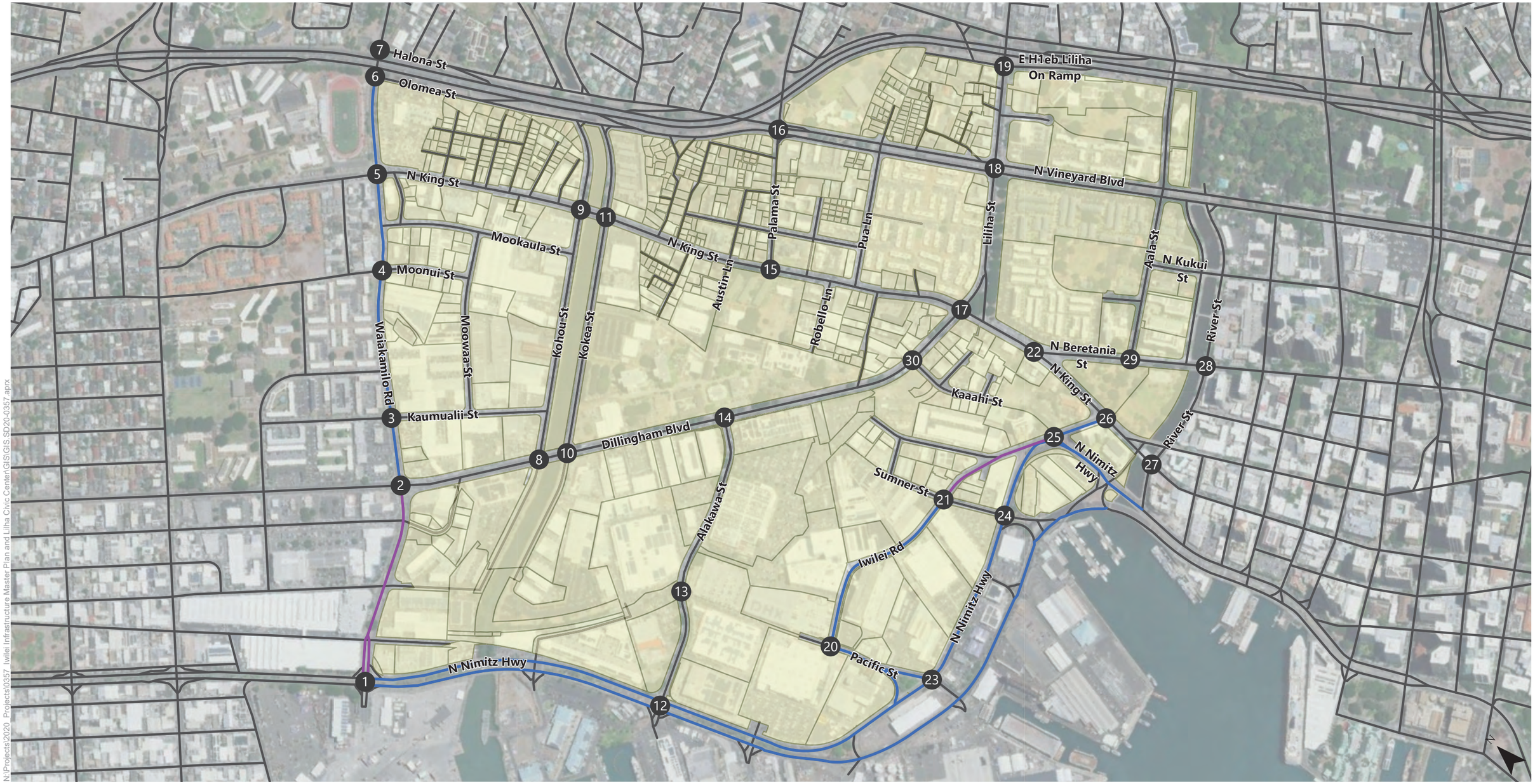


- *Separated Bikeways of Cycle Tracks* provide a restricted right-of-way with physical separation and are designated for the use of bicycles with a raised barrier such as curbs or bollards. Separated bikeways are generally five (5) feet wide with a three (3) foot minimum horizontal and vertical separation area. Adjacent vehicle parking is permitted, and vehicle/pedestrian crossflow is restricted to selected locations (e.g., driveways) indicated by breaks in the barrier and buffer.





Existing bike facilities are very sparse in the IIMP area. Waiakamilo Road, North Nimitz Highway, Iwilei Road, and parts of Pacific Street south of Iwilei Road are a few corridors in the study area that include bike lanes. On nearly all other facilities, bicyclists must share the lane with vehicle traffic, and in most cases with limited available travel lane width. **Figure 4** illustrates the existing bicycle facilities within the Master Plan area.



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Bike Lane

Buffered Bike Lane

Study Intersections

Iwilei Infrastructure Master Plan

Figure 4

Existing Bicycle Network

Resource Mapping Hawaii, Maxar

3.3 Existing Transit Network

TheBus is operated by Oahu Transit Service (OTS) and serves several bus stops in the Iwilei area. Following is a list of routes serving the IIMP area:

Frequent Urban Route:

- CityExpress - Waipahu/Kalihi/University of Hawaii
- Route 1 – Kaimuki/Kalihi
- Route 3 – Kaimuki/Salt Lake
- Route 19 – Waikiki/Airport/Hickam
- Route 20 – Waikiki/Airport/Pearlridge

Major Suburban Routes

- CountryExpress – Kapolei/Makaha
- Route 40 – Honolulu/Makaha
- Route 42 – Ewa Beach/Waikiki
- Route 51 – Honolulu/Wahiawa
- Route 52 – Honolulu/Mililani/Haleiwa
- Route 54 – Honolulu/Pearl City
- Route 61 – Kalihi/Kaneohe/Haleiwa

Local Routes

- Route 7 – Kalihi Valley
- Route 9 – Kaimuki/Pearl Harbor
- Route 10 – Kalihi/Alewa Heights
- Route 11 – Makalapa/Halawa/Aica Heights
- Route 43 – Waipahu/Honolulu/Alapai
- Route 53 – Honolulu/Pacific Palisades

Overall, the Iwilei neighborhood has reasonably good access to The Bus transit network with several stops along the major corridors in the study area. The streets with the greatest bus frequency include Dillingham Boulevard and N. King Street. From Iwilei, bus passengers are directly connected as far as Mākaha, Hale'iwa, and Hawai'i Kai.

Currently, a bus only lane is striped on N. King Street from Dillingham Boulevard-Liliha Street to River Street within the study areas, but the lane does extend to Punchbowl Street Diamond Head of Downtown Honolulu. This lane helps to expedite bus flow and minimize delays from general vehicle traffic, but does permit right turns to be made by any vehicle at all street intersections and driveways.



3.4 Existing Roadway Network

The key roadways serving the master plan area are described below. Complete Streets Ordinance (Number 12-15) adopted by the City Council in 2012. Complete street classifications for roadways under City and County jurisdiction were obtained from *Right of Way Widths for Planned Street Improvements* (November 2021) published by DTS. Classifications for DOT facilities are based on roadway characteristics and their function.

King Street is a Main Street (based on its DTS Complete Streets classification) that extends between Middle Street and Kapiolani Boulevard with a posted speed limit of 25 miles per hour (mph) in the IIMP study area. This roadway is under the jurisdiction of the City and County of Honolulu. In the study area, sidewalks are provided along both sides of the roadway and crosswalks are marked at signalized intersections plus at Morris Lane ewa of Kohou Street . King Street is a parallel facility to H-1 and serves the Primary Urban Center of Oahu; therefore, during the AM and PM peak periods, this roadway experiences substantial peak period vehicle demand and frequent queuing as some regional traffic avoids freeway congestion.

North of the King Street/Beretania Street intersection, King Street is generally an undivided four-lane arterial with parking permitted on both sides except at intersections where separate left-turn lanes are provided. One exception is the Diamond Head-bound section between Austin Lane and Beretania Street where three through lanes are striped. N. King Street is fronted by a wide variety of community-oriented facilities, including churches, schools, residential dwellings, and retail stores.

South of the King Street/Beretania Street intersection and adjacent to the project site and 'A'ala Park, King Street is comprised of three Diamond Head-bound lanes and two northbound lanes and no on-street parking. As noted in Section 3.3 above, the makai curb lane on N. King Street from Dillingham Boulevard to Punchbowl Street was converted to a bus-only/right-turn lane in 2020.

South of the project site and south of the Hotel Street Intersection, King Street is a one-way, Diamond Head bound roadway with three general purpose lanes plus one bus only lane. It is fronted by dense commercial and residential land uses with no on-street parking.

Liliha Street is a major arterial intersecting North King Street and Dillingham Boulevard north of the project site, and it is under HDOT jurisdiction. Within the project area, this roadway comprises four travel lanes, two in each direction, with separate left-turn lanes at signalized intersections. Regional access to the study area is provided via North School Street and the H-1 interchange. Liliha Street serves high traffic volumes during the AM and PM peak periods, where mauka-bound queues heading towards the H-1 interchange were observed. Sidewalks are provided on both sides of the roadway, and marked crosswalks are provided at all signalized intersections. The posted speed limit is 25 miles per hour (mph) and there are multiple bus stations along the street.

Dillingham Boulevard is classified as an Avenue by DTS and extends between Kamehameha Highway/Puuhale Road and the North King Street (opposite Liliha Street). The speed limit of this City and County roadway is posted as 35 mph, except nearest to the King Street intersection where it is reduced to 25 mph. Within the master plan area, this roadway contains four travel lanes, two in each direction, with separate left-turn lanes at intersections. The roadway provides access to major traffic generators including Costco, the Dole Cannery shopping mall, and Honolulu Community College. Dillingham Boulevard is a parallel facility to both H-1 and Nimitz Highway. As such, it serves as an important connection to the urban core of Honolulu including serving as a primary bus corridor. Like N. King Street, this roadway experiences substantial peak period vehicle demand and queueing. Sidewalks are provided on both sides of the roadway with marked crosswalks at signalized intersections. Multiple bus stops are located along Dillingham Boulevard and through traffic in the curb lanes is frequently albeit temporarily delayed during peak periods as multiple buses stop to load/unload passengers.

Iwilei Road is a two-lane, mauka-makai, DTS-classified Street running between Pacific Street and King Street and provides access to the Dole Cannery shopping mall and other commercial and industrial land uses. Sidewalks and bike lanes extend in both directions along the roadway, with striped buffers provided on the section east of the Ka'aahi Street extension. Marked crosswalks are provided at controlled intersections with a mid-block crosswalk also provided at the Dole Cannery.

Nimitz Highway is a major arterial/expressway facility on the makai side of the IIMP area that connects to H-1 and the Honolulu Airport to the west and the harbor front and downtown core of Honolulu. This HDOT-maintained roadway is a six to eight-lane facility with a landscaped median. Bike lanes with striped buffers are provided in both directions along the roadway. Sidewalks are provided on both sides of the roadway, as well as marked crosswalks at both controlled intersections and uncontrolled locations. Nimitz Highway is a regional-serving roadway providing access to major commercial and employment centers; therefore, during the AM and PM peak periods, this roadway experiences substantial vehicle demand. There are multiple bus stops along the Nimitz Highway.

Beretania Street is a six-lane, DTS-classified Avenue within the master plan area with four ewa-bound lanes and two Diamond Head-bound lanes. The portion of Beretania Street along a section of 'A'ala Park allows for metered parking in the curb lanes outside of the peak periods. Further Diamond Head or Maunakea Street, it is a one-way ewa-bound facility with five lanes. Sidewalks are provided on both sides of the street, as well as marked crosswalks at signalized intersections. Multiple bus stations serve along the Beretania street.

Hotel Street is a two-lane, DTS-classified Street Diamond Head of King Street in the master plan area providing local access to Chinatown and the rest of Downtown. Hotel Street is restricted to bus and bike use only between Alakea and King Streets, and marked crosswalks are provided along the roadway.



Waiakamilo Road is a DTS-classified Boulevard that extends between North King Street (opposite Houghtailing Street) and Nimitz Highway. The north part of the roadway between North King Street and Dillingham Boulevard is undivided and contains four travel lanes, two in each direction, with separate left-turn lanes at intersections. However, the makai section of the roadway between North Nimitz Highway and Dillingham Boulevard is divided by a raised median and left-turn lanes to side streets are not always provided. Sidewalks are provided on both sides of the roadway with marked crosswalks at the intersections. On-street parking is allowed on both sides of the roadway and bike lanes with striped buffers are provided in both directions along the roadway.

N. Vineyard Boulevard is a major divided arterial under HDOT jurisdiction that extends between H-1 (Diamond Head of Punchbowl Street) and Palama Street with a posted speed limit of 30 miles per hour (mph). Sidewalks are provided along both sides of the roadway and crosswalks are marked at signalized intersections. N. Vineyard Boulevard is a parallel facility to H-1 and contains six travel lanes, three in each direction, with separate left-turn lanes at intersections.

Alakawa Street is an DTS-classified Avenue with four travel lanes, two in each direction with left-turn lanes at selected intersections that connects Nimitz Highway to Dillingham Boulevard. This street serves multiple big box retailers including Costco, Home Depot and Best Buy, in addition to other retail and commercial office establishments. Alakawa Street experiences substantial demand, primarily during the PM peak period, and sometimes on weekends. Sidewalks are provided along both sides of the roadway and crosswalks are marked at signalized intersections only.

A'ala Street is a two-lane DTS-classified Street that connects Beretania Street with School Street immediately mauka of the H-1 freeway (opposite Stillman Lane). Parallel parking is permitted on both sides of the roadway along selected sections, and the posted speed limit is 25 mph. Sidewalks are provided on both sides of the strees and crosswalks are included at both signalized intersections and at selected side street stop-controlled intersections.

River Street is a two-lane roadway between Nimitz Highway and N. Kukui Street on the Diamond Head side of Nu'uanu Stream with only one mauka-bound lane continuing to Vineyard Boulevard, River Street is DTS-classified as a Main Street makai of Beretania Street and a Street mauka of Beretania Street. Sidewalks are provided along both sides of the roadway and crosswalks are marked at signalized intersections.

Pacific St is a two-lane local street under DOT jurisdiction that technically connects Nimitz Highway to Alakawa Street. However, north of Iwilei Road, this roadway operates as a private driveway behind Lowe's store Sidewalks and Bike lanes with striped buffers are provided in both directions along the roadway south of Iwilei Road. Two Bus stations, one in each direction, serve the section of the roadway.



Ka'aahi Street is a two-lane, DTS-classified Residential Street that extends approximately 650 feet makai of Dillingham Boulevard. On-street parallel parking is permitted on both sides of the street, and sidewalks are included on both sides. This street will be extended to Iwilei Road in the future as part of redevelopment of the Liliha Civic Center site, and this roadway will provide direct access to the future Kūwili City's rail station located near the signalized Dillingham Boulevard intersection.

Other key streets in the study area include Palama Street, Kohou Street, Kokea Street, Kaumualii Street, Moowaa Street, Moonui Street, Mookaula Street, N. Kuki Street, and Pua Lane.

3.5 Existing Traffic Operations

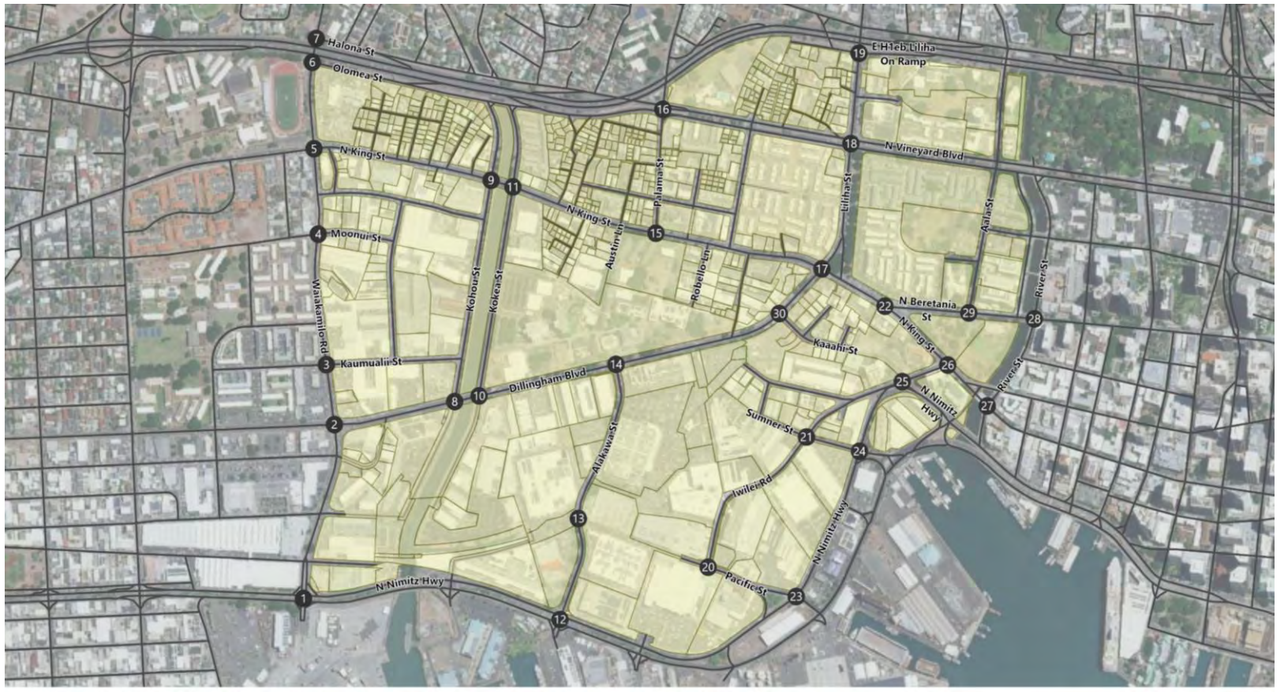
Operation levels of 30 key intersections within the master plan area were evaluated for the weekday AM and PM peak hours. Traffic counts were collected during the weekday AM and PM peak periods. Existing lane configurations and signal controls were obtained through aerial and confirmed through field observations.

Figure 5 presents the existing peak-hour turning movement volumes, corresponding lane configurations, and traffic control devices. Traffic count data sheets are provided in **Appendix A.**

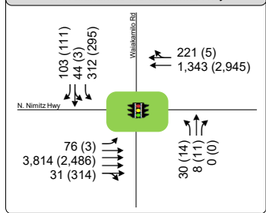
The results of the existing LOS analysis are presented in **Table 3** and the corresponding LOS worksheets are included in **Appendix B**. A review of the results in **Table 3** shows that a total of seven (7) study intersections (or the critical approaches) operate at a less than desirable LOS (E or F) during one or both peak hours:

2. Waiakamilo Rd / Dillingham Blvd (PM peak hour)
5. Waiakamilo Rd / N King St (AM peak hour)
13. Pacific St / Alakawa St (PM peak hour)
16. Vineyard Blvd/Halona St/Olomea St/Palama St (PM peak hour)
17. Dillingham Blvd / Liliha St / N King St (PM peak hour)
18. Vineyard Blvd / Liliha St (AM and PM peak hours)
24. Sumner St / N Nimitz Hwy WB (PM peak hour)

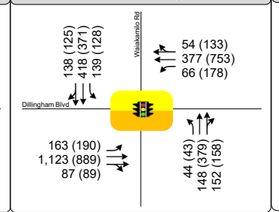
In general, these results reflect typical operating conditions in the study area based on field observations and findings from previous studies prepared by others. It should be noted that an incident (e.g., collision or maintenance closure) on one of the key ewa-Diamond Head roadways including H-1, King Street, Dillingham Boulevard, or Nimitz Highway will cause traffic to divert to other roadways and result in delays greater than those presented in Table 3. These incidents happen infrequently but do cause substantial congestion and queuing that is notable but is not indcative of operations during the majority of the year.



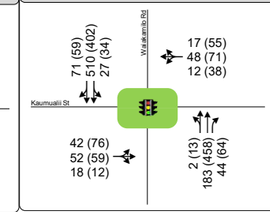
1. Waiakamilo Rd/N. Nimitz Hwy



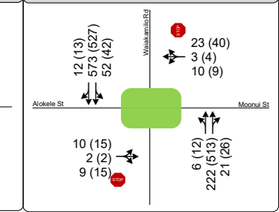
2. Waiakamilo Rd/Dillingham Blvd



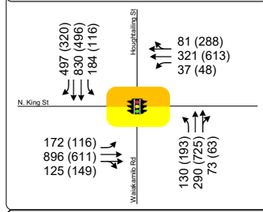
3. Waiakamilo Rd/Kaumualii St



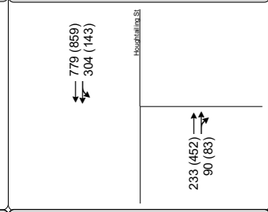
4. Waiakamilo Rd/Alokele St/Moonui St



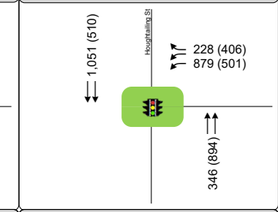
5. Houghtailing St/Waiakamilo Rd/N. King St



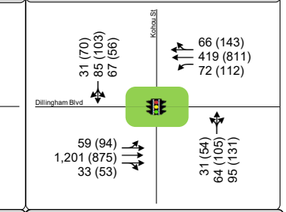
6. Houghtailing St/Olomea St



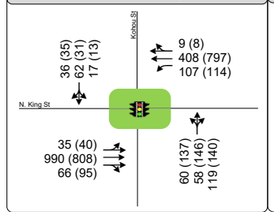
7. Houghtailing St/Halona St



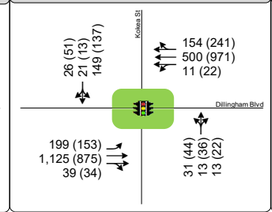
8. Kohou St/Dillingham Blvd



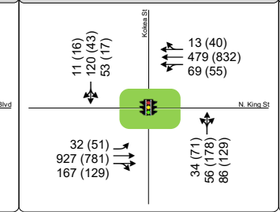
9. Kohou St/N. King St



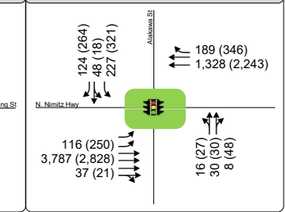
10. Kokea St/Dillingham Blvd



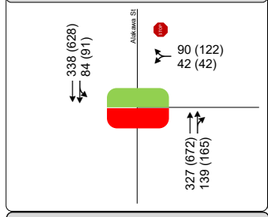
11. Kokea St/N. King St



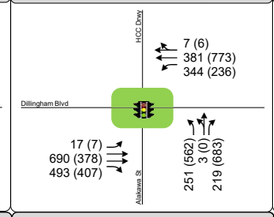
12. Alakawa St/N. Nimitz Hwy



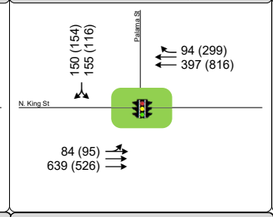
13. Alakawa St/Pacific St



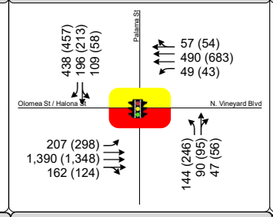
14. HCC Drwy/Alakawa St/Dillingham Blvd



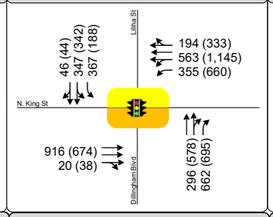
15. Palama St/N. King St



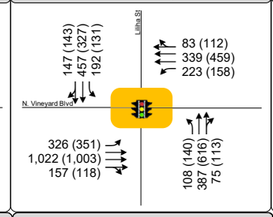
Palama St/Olomea St / Halona St/N. Vineyard E



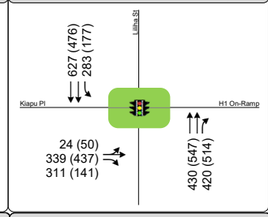
17. Liliha St/Dillingham Blvd/N. King St



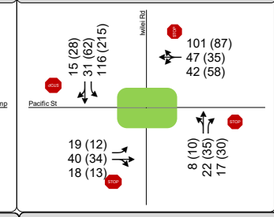
18. Liliha St/N. Vineyard Blvd



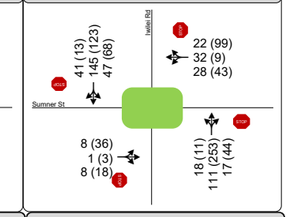
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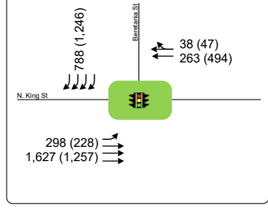
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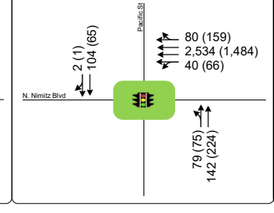
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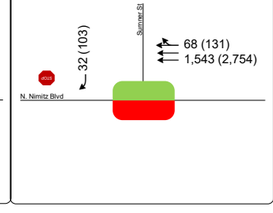
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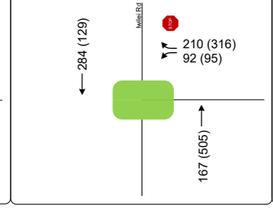
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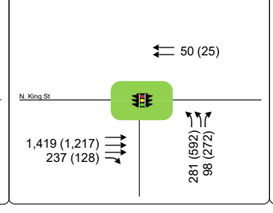
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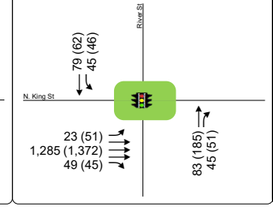
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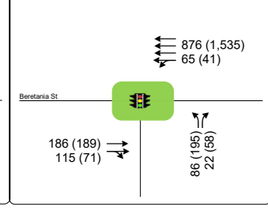
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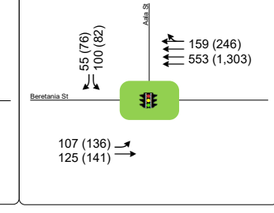
27. River St/N. King St



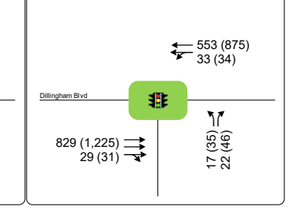
28. River St/Beretania St



29. Aala St/Beretania St



30. Kaaahi St/Dillingham Blvd



LEGEND

AM (PM) Peak Hour Traffic Volumes

Lane Configuration

AM / PM | A-C | D | E | F — Level of Service (LOS)

Figure 5

Peak Hour Traffic Volumes and Lane Configurations

Existing Conditions

Table 3: Existing Peak Hour Intersection Level of Service

Intersection	Traffic Control[a]	Peak Hour	Existing	
			Delay (sec)	LOS [b]
1. Waiakamilo Rd / N Nimitz Hwy	Traffic Signal	AM	25.2	C
		PM	17.7	B
2. Waiakamilo Rd / Dillingham Blvd	Traffic Signal	AM	51.6	D
		PM	**60.2**	**E**
3. Waiakamilo Rd / Kaumualii St	Traffic Signal	AM	5.6	A
		PM	6.2	A
4. Waiakamilo Rd / Alokele St & Moonui St	TWSC	AM	18.0	C
		PM	21.5	C
5. Waiakamilo Rd / N King St	Traffic Signal	AM	**56.3**	**E**
		PM	41.4	D
6. Olomea St / Houghtailing St	Uncontrolled	AM	-	-
		PM	-	-
7. Halona St / Houghtailing St	Traffic Signal	AM	20.4	C
		PM	19.3	B
8. Kohou St / Dillingham Blvd	Traffic Signal	AM	22.2	C
		PM	25.1	C
9. Kohou St / N King St	Traffic Signal	AM	8.7	A
		PM	14.2	B
10. Kokea St / Dillingham Blvd	Traffic Signal	AM	12.3	B
		PM	14.9	B
11. Kokea St / N King St	Traffic Signal	AM	6.7	A
		PM	10.6	B
12. Alakawa St / N Nimitz Hwy	Traffic Signal	AM	19.9	B
		PM	30.5	C
13. Pacific St / Alakawa St	TWSC	AM	16.8	C
		PM	**61.1**	**F**
14. Alakawa St / Dillingham Blvd	Traffic Signal	AM	31.7	C
		PM	29.7	C
15. N King St / Palama St	Traffic Signal	AM	9.7	A
		PM	9.2	A
16. Vineyard Blvd/Halona St/Olomea St/Palama St	Traffic Signal	AM	42.1	D
		PM	**82.6**	**F**
17. Dillingham Blvd / Liliha St / N King St	Traffic Signal	AM	47.1	D
		PM	**57.2**	**E**

Table 3: Existing Peak Hour Intersection Level of Service

Intersection	Traffic Control[a]	Peak Hour	Existing	
			Delay (sec)	LOS [b]
18. Vineyard Blvd / Liliha St	Traffic Signal	AM	**71.2**	**E**
		PM	**64.1**	**E**
19. H-1 On Ramp / Kiapu Pl / Liliha St	Traffic Signal	AM	19.3	B
		PM	23.2	C
20. Iwilei Rd / Pacific St	AWSC	AM	10.0	A
		PM	11.9	B
21. Iwilei Rd / Sumner St	AWSC	AM	9.6	A
		PM	12.9	B
22. N King St / Beretania St	Traffic Signal	AM	5.7	A
		PM	11.6	B
23. Pacific St / N Nimitz Hwy WB	Traffic Signal	AM	11.3	B
		PM	12.5	B
24. Sumner St / N Nimitz Hwy WB	TWSC	AM	22.9	C
		PM	**>180**	**F**
25. Iwilei Rd / Ka'aahi St	TWSC	AM	17.0	C
		PM	23.0	C
26. Iwilei Rd / N King St	Traffic Signal	AM	19.2	B
		PM	20.6	C
27. N King St / River St	Traffic Signal	AM	4.9	A
		PM	7.7	A
28. N Beretania St / River St	Traffic Signal	AM	5.2	A
		PM	8.5	A
29. N Beretania St / A'ala St	Traffic Signal	AM	14.9	B
		PM	13.0	B
30. Dillingham Blvd / Ka'aahi St	Traffic Signal	AM	2.8	A
		PM	3.8	A

a. TWSC = Two-Way Stop Control, AWSC = All-Way Stop Control
b. Intersections operating at an undesirable level are highlighted in **bold** type.

4. Baseline 2035

To evaluate the potential impacts of the proposed master plan on the surrounding street system, it was necessary to first develop future baseline conditions in the area without the project. The development of the baseline traffic scenario is described in this chapter.

This section starts with the description of the future pedestrian, bicycle, and transit network including proposed improvements from multiple planning documents. Following provide a list of some of the key planning documents reviewed:

- O'ahu Pedestrian Plan (2022)
- Iwilei-Kapālama Transportation Network Assessment[1] (2021)
- Downtown Neighborhood TOD Plan (2020)
- O'ahu Bike Plan (2019).

No changes were assumed in the conditions of the roadway network in the study area under the future baseline scenario.

4.1 Planned Pedestrian Network Improvements

The O'ahu Pedestrian Plan (OPP) was released in July 2022. One of the goals of the OPP is to focus on expanding the existing network to connect the gaps that are the most important related to safety, connectivity, and access to key destinations around the Island.

The OPP also identifies High Pedestrian Injury Corridors and Intersections/Crossings accounting for a disproportionate share of pedestrian injuries and fatalities on City streets. The corridors and intersection/crossings within the master plan area listed below are classified among the highest priority (Tier 1) corridors in the Plan. **Figure 6** illustrates the High Injury Pedestrian Network where existing issues have been identified. The critical roadway segments in this area include portions of N. King Street, Dillingham Boulevard, Waiakamilo Road and Iwilei Road. Key intersections include King Street/Dillingham Boulevard-Liliha Street and King Street/Beretania Street among others.

The updated pedestrian plan also identifies priority network needs for the pedestrian network on the island of O'ahu. **Figure 7** illustrates the pedestrian priority network and the proposed walkway projects within and near the IIMP study area.

[1] SSFM International, Inc.

Figure 6: High Pedestrian Injury Network (2022 Oʻahu Pedestrian Plan)

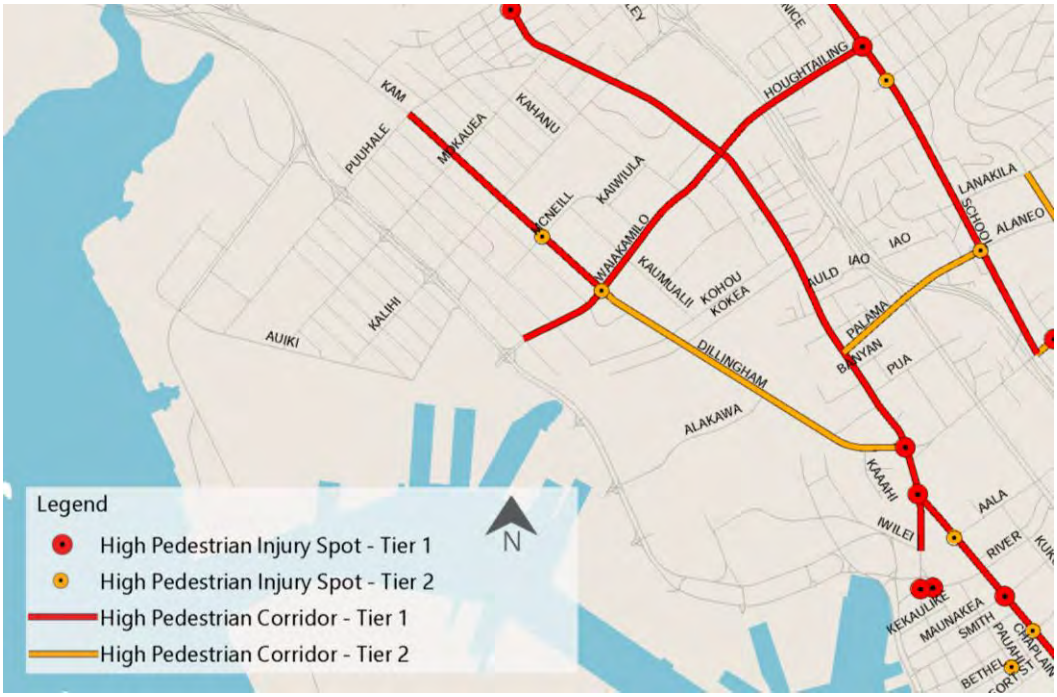


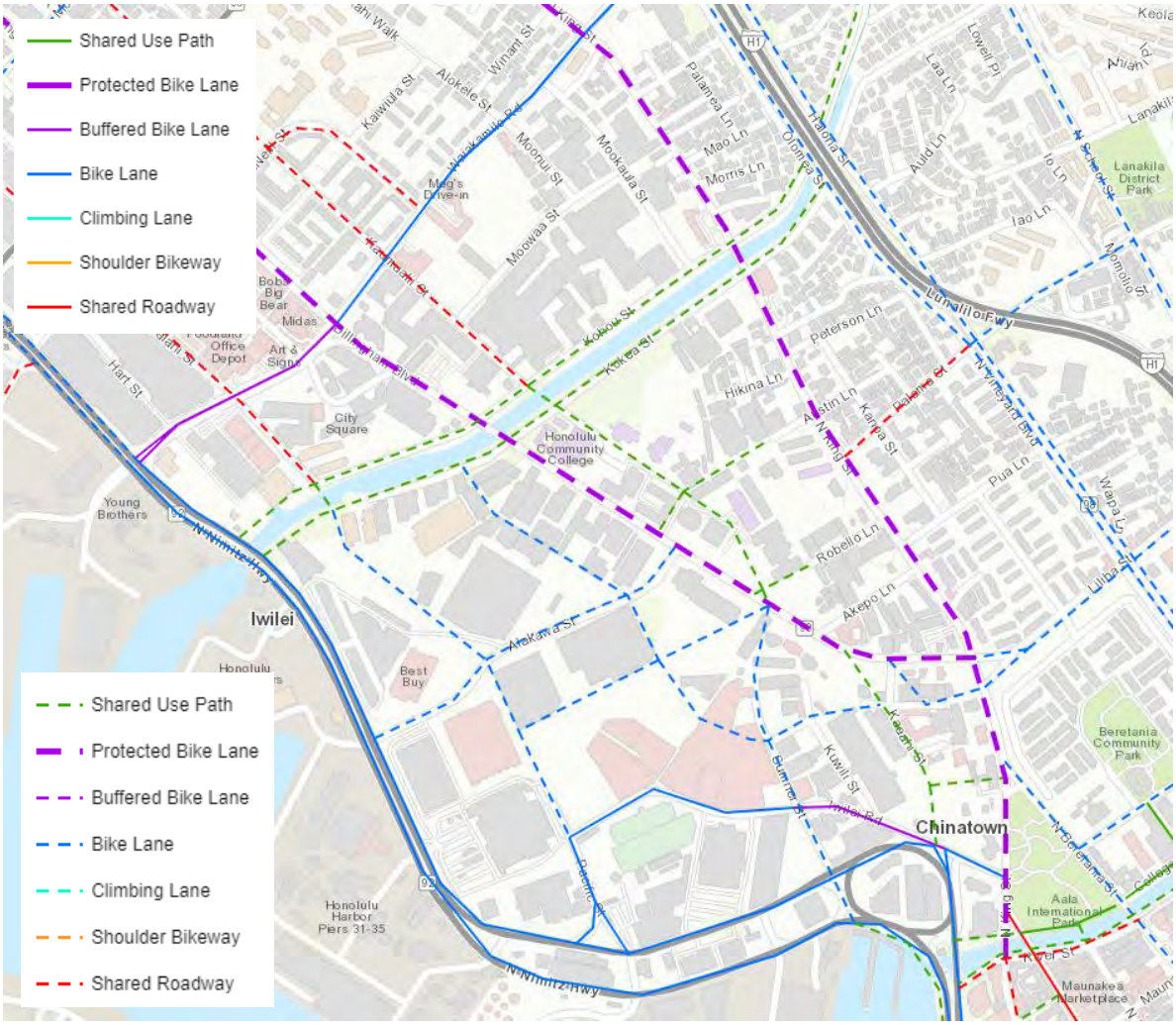
Figure 7: Proposed Walkway Projects (2022 Oʻahu Pedestrian Plan)



4.2 Planned Bicycle Network Improvements

The 2019 O'ahu Bike Plan is an update to the 2012 O'ahu Bike Plan. According to the 2019 O'ahu Bike Plan, some bike facilities and improvements are planned for the project area and vicinity. The areawide bike plan, which includes paths for pedestrians in some cases, is illustrated on **Figure 8** below.

Figure 8: Proposed bikeways (2019 O'ahu Bike Plan)



The section of the bikeway between Dillingham Boulevard and N. King Street is proposed as a Bike lane based on the 2019 O'ahu Bike Plan. However, according to the Kalihi Complete Streets Plans, the section is proposed to be constructed as a buffered bike lane.

Based on conversations with the City & County of Honolulu staff, planning for the following four roadway sections are underway:

- N. King Street between Beretania Street and Middle Street to provide a protected bike lane as part of the a 30-mile integrated South Shore Bikeway spanning from Nānākuli to Mānoa/Waikīkī.
- N. King Street Diamond Head side of the Beretania Street to provide protected bike lanes as part of the a 30-mile integrated South Shore Bikeway spanning from Nānākuli to Mānoa/Waikīkī. The proposed bike lane was under review during the preparation of this report. To accommodate the proposed protected bike lane, the bus lane between Beretania Street and River Street, was assumed to be repurposed into an all-vehicle access lane.
- Waiakamilo Road to be upgraded with protected bike lanes (plans for a road diet on some sections of the Waiakamilo were under review at the time of preparation of this document. The impact of the road diet is recommended to be studied when the design concepts are finalized)
- Ka'aahi Street extension to provide a shared-use path with limited POV access for local traffic circulation only.

4.3 Planned Transit Network Improvements

TheBus is the main mode of public transportation in the area. Bus services are periodically adjusted to respond to demand and to improve service and access for transit patrons. In addition to existing bus service, a new rail service is planned that connects the Ewa and central region of the island to Downtown Honolulu. The Honolulu Authority for Rapid Transportation (HART) is in the process of constructing a new, driverless, urban rail system along the south shore of Oahu. The current project extends from East Kapolei (Kualaka'i) to the Civic Center (Ka'ākaukukui) station, and the closest station will be the Kūwili Station on Ka'aahi Street serving the Iwilei, Kalihi, and adjacent areas. **Figure 9** illustrates the proposed rail alignment and stations. The first segment from Kualaka'i to Hālawa is expected be open to the public in the next year or so, but a schedule for the full system into the Primary Urban Center has not been identified at this time. However, the entire system is expected to operational and opened by 2035.

Figure 9: Planned Transit Improvements



Source: https://honolulutransit.org/about/route-map/

4.4 Baseline 2035 Traffic Operations

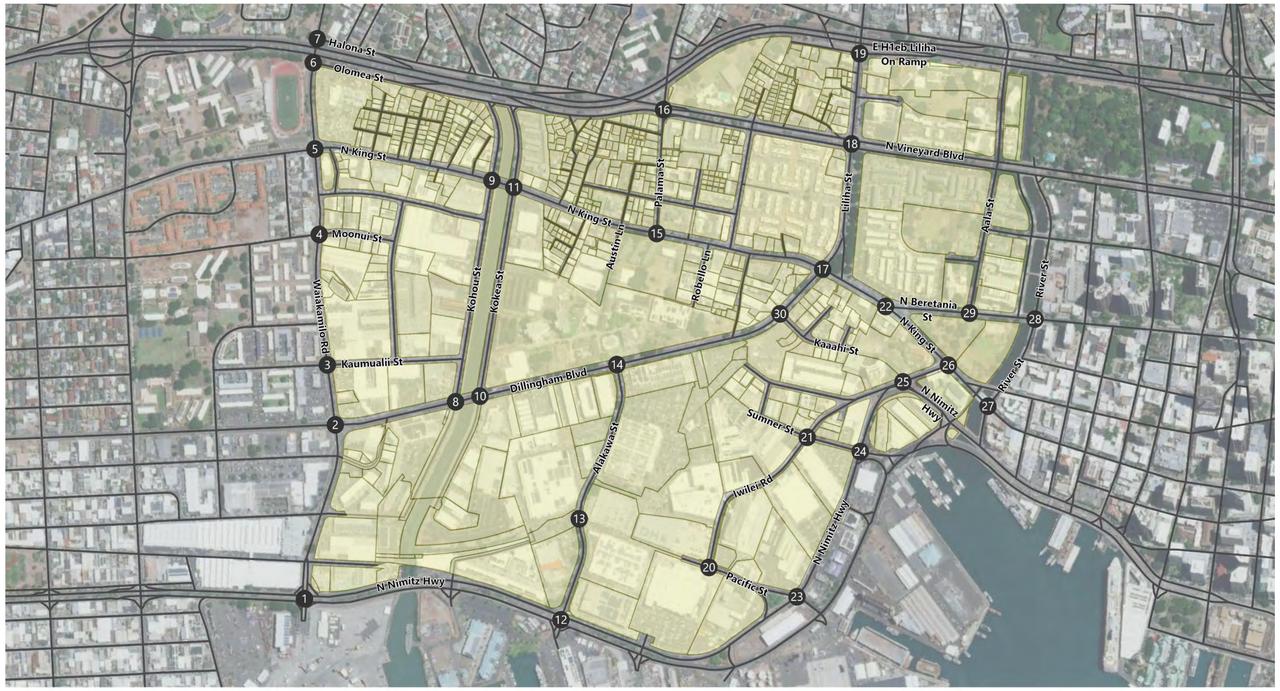
Baseline traffic conditions without the project reflect traffic increases due to regional growth and new development in the vicinity of the IIMP area. The forecasted future traffic volumes were then used as a baseline to identify potential impacts on the roadway system from the proposed master plan development.

To estimate Baseline 2035 volumes, a growth factor was applied to existing traffic volumes to account for future study area growth. A background annual growth rate of 0.5% was used. As noted in Secvtion 2.3, this rate has been used historically in this area, most recently for City's rail project studies related to utility relocations within the Dillingham Boulevard corridor. The growth rate was compounded over the 14-year timeframe (2021 to the end of 2035) and applied to each of the existing intersections turning movement traffic volumes. While select turning movements at some intersections may not realistically increase at the projected rate depending on the growth potential along those corridors, the resulting volumes provide a conservative analysis for this planning exercise. **Figure 10** illustrates the forecasted peak hour traffic volumes for the Baseline 2035 conditions.

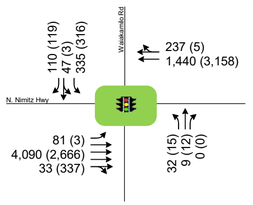
To evaluate the operating levels of the study intersections under Baseline 2035 conditions, operations were calculated using the projected 2035 baseline volumes from **Figure 10** and the existing lane configurations and traffic controls. The results of the LOS analysis are presented in **Table 4**, and the corresponding LOS calculation sheets are included in **Appendix C**.

Under future baseline conditions, a total of seven (7) study intersections (or the critical approaches) operate at a less than desirable LOS (E or F) during one or both peak hours:

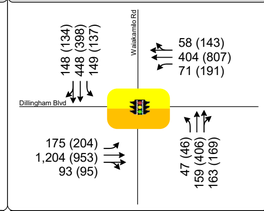
2. Waiakamilo Rd / Dillingham Blvd (PM peak hour)
5. Waiakamilo Rd / N King St (AM peak hour)
13. Pacific St / Alakawa St (PM peak hour)
19. Vineyard Blvd/Halona St/Olomea St/Palama St (PM peak hour)
20. Dillingham Blvd / Liliha St / N King St (PM peak hour)
21. Vineyard Blvd / Liliha St (AM and PM peak hours)
25. Sumner St / N Nimitz Hwy WB (PM peak hour)



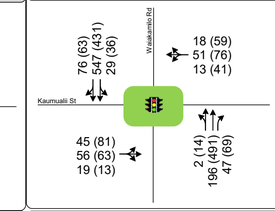
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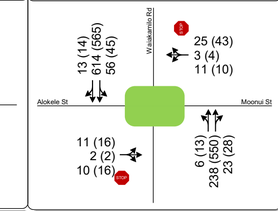
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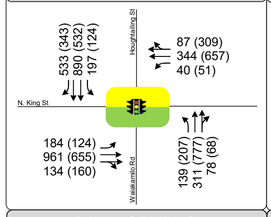
3. Waiakamilo Rd/Kaumualii St



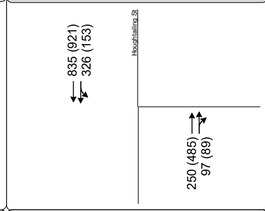
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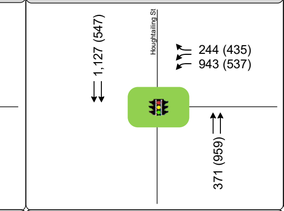
5. Houghtailing St/Waiakamilo Rd/N. King St



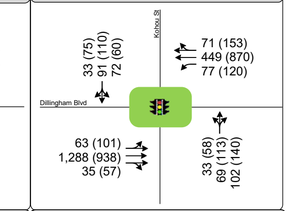
6. Houghtailing St/Olomea St



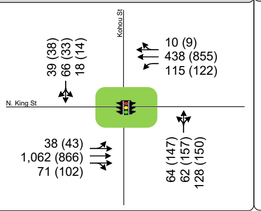
7. Houghtailing St/Halona St



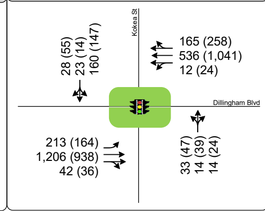
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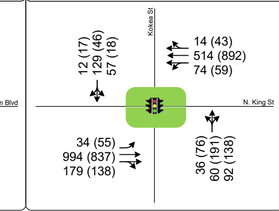
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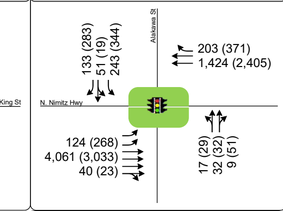
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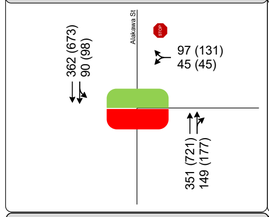
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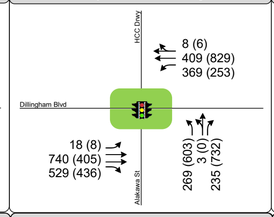
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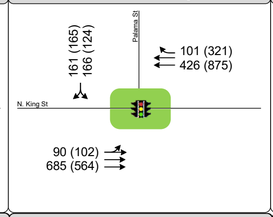
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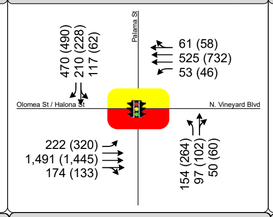
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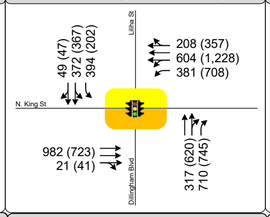
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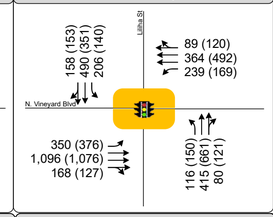
Palama St/Olomea St / Halona St/N. Vineyard Blvd



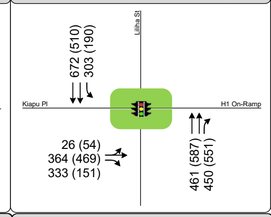
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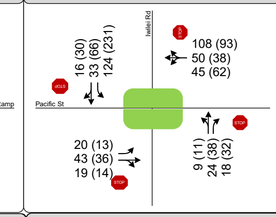
18. Liliha St/N. Vineyard Blvd



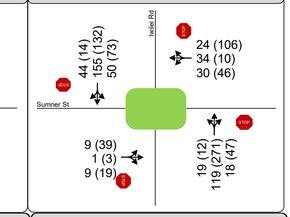
19. Liliha St/Kiapu Pl/H1 On-Ramp



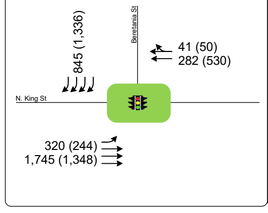
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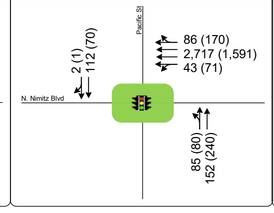
21. Iwilei Rd/Sumner St



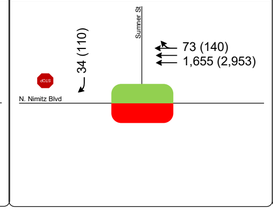
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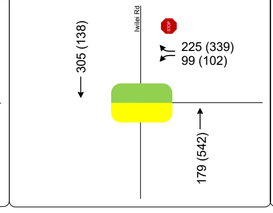
23. Pacific St/N. Nimitz Blvd



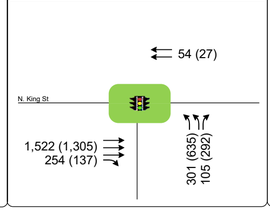
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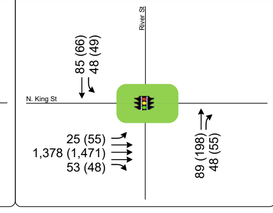
25. Iwilei Rd/Ka'aahi St



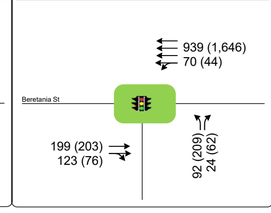
26. Iwilei Rd/N. King St



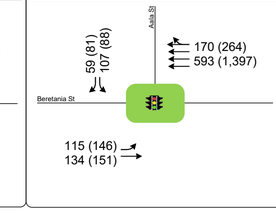
27. River St/N. King St



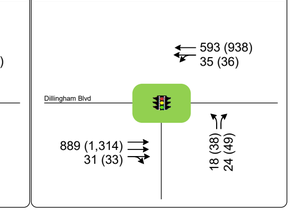
28. River St/Beretania St



29. Aala St/Beretania St



30. Kaaahi St/Dillingham Blvd



LEGEND

AM (PM) Peak Hour Traffic Volumes

Lane Configuration



Level of Service (LOS)

Figure 10

Peak Hour Traffic Volumes and Lane Configurations

Baseline 2035 Conditions

Table 4: Year 2035 Peak Hour Intersection Level of Service

Intersection	Traffic Control [a]	Peak Hour	Existing		Baseline 2035	
			Delay (sec)	LOS [b]	Delay (sec)	LOS [b]
1. Waiakamilo Rd / N Nimitz Hwy	Traffic Signal	AM	25.2	C	28.4	C
		PM	17.7	B	19.4	B
2. Waiakamilo Rd / Dillingham Blvd	Traffic Signal	AM	51.6	D	**56.6**	**E**
		PM	**60.2**	**E**	**65.9**	**E**
3. Waiakamilo Rd / Kaumualii St	Traffic Signal	AM	5.6	A	5.7	A
		PM	6.2	A	6.4	A
4. Waiakamilo Rd / Alokele St & Moonui St	TWSC	AM	18.0	C	19.4	C
		PM	21.5	C	24.1	C
5. Waiakamilo Rd / N King St	Traffic Signal	AM	**56.3**	**E**	**59.1**	**E**
		PM	41.4	D	44.5	D
6. Olomea St / Houghtailing St	Uncontrolled	AM	-	-	-	-
		PM	-	-	-	-
7. Halona St / Houghtailing St	Traffic Signal	AM	20.4	C	21.3	C
		PM	19.3	B	19.9	B
8. Kohou St / Dillingham Blvd	Traffic Signal	AM	22.2	C	23.7	C
		PM	25.1	C	31.4	C
9. Kohou St / N King St	Traffic Signal	AM	8.7	A	9.0	A
		PM	14.2	B	15.8	B
10. Kokea St / Dillingham Blvd	Traffic Signal	AM	12.3	B	13.5	B
		PM	14.9	B	16.8	B
11. Kokea St / N King St	Traffic Signal	AM	6.7	A	6.8	A
		PM	10.6	B	10.7	B
12. Alakawa St / N Nimitz Hwy	Traffic Signal	AM	19.9	B	21.9	C
		PM	30.5	C	33.7	C
13. Pacific St / Alakawa St	TWSC	AM	16.8	C	18.7	C
		PM	**61.1**	**F**	**117.9**	**F**
14. Alakawa St / Dillingham Blvd	Traffic Signal	AM	31.7	C	33.3	C
		PM	29.7	C	32.1	C
15. N King St / Palama St	Traffic Signal	AM	9.7	A	10.0	B
		PM	9.2	A	9.8	A
16. Vineyard Blvd/Halona St/Olomea St/Palama St	Traffic Signal	AM	42.1	D	49.1	D
		PM	**82.6**	**F**	**108.0**	**F**
17. Dillingham Blvd / Liliha St / N King St	Traffic Signal	AM	47.1	D	49.5	D
		PM	**57.2**	**E**	**66.1**	**E**
18. Vineyard Blvd / Liliha St	Traffic Signal	AM	**71.2**	**E**	**78.5**	**E**
		PM	**64.1**	**E**	**69.7**	**E**



Table 4: Year 2035 Peak Hour Intersection Level of Service

Intersection	Traffic Control [a]	Peak Hour	Existing		Baseline 2035	
			Delay (sec)	LOS [b]	Delay (sec)	LOS [b]
19. H-1 On Ramp / Kiapu Pl / Liliha St	Traffic Signal	AM	19.3	B	20.6	C
		PM	23.2	C	24.8	C
20. Iwilei Rd / Pacific St	AWSC	AM	10.0	A	10.2	B
		PM	11.9	B	12.5	B
21. Iwilei Rd / Sumner St	AWSC	AM	9.6	A	10.0	A
		PM	12.9	B	14.1	B
22. N King St / Beretania St	Traffic Signal	AM	5.7	A	6.6	A
		PM	11.6	B	12.1	B
23. Pacific St / N Nimitz Hwy WB	Traffic Signal	AM	11.3	B	12.3	B
		PM	12.5	B	12.9	B
24. Sumner St / N Nimitz Hwy WB	TWSC	AM	22.9	C	25.4	D
		PM	**>180**	**F**	**>180**	**F**
25. Iwilei Rd / Ka'aahi St	TWSC	AM	17.0	C	18.2	C
		PM	23.0	C	28.5	D
26. Iwilei Rd / N King St	Traffic Signal	AM	19.2	B	19.9	B
		PM	20.6	C	21.2	C
27. N King St / River St	Traffic Signal	AM	4.9	A	5.0	A
		PM	7.7	A	7.8	A
28. N Beretania St / River St	Traffic Signal	AM	5.2	A	5.4	A
		PM	8.5	A	8.9	A
29. N Beretania St / A'ala St	Traffic Signal	AM	14.9	B	15.2	B
		PM	13.0	B	13.3	B
30. Dillingham Blvd / Ka'aahi St	Traffic Signal	AM	2.8	A	2.9	A
		PM	3.8	A	3.9	A

a. TWSC = Two-Way Stop Control, AWSC = All-Way Stop Control
b. Intersections operating at an undesirable level are highlighted in **bold** type.

5. Project Traffic Estimates

This chapter describes the anticipated number of vehicle trips and the directionality of those trips that would result from the implementation of the proposed project. Future traffic added to the roadway system by the project is estimated using a three-step process: (1) trip generation, (2) trip distribution, and (3) trip assignment. The first step estimates the amount of project-generated traffic which will be added to the roadway network. The second step identifies the direction of travel to and from the project site and the proportion of traffic on each potential travel path. The new trips are assigned to specific street segments and intersection turning movements during the third step. This process is described in more detail in the following sections.

5.1 Trip Generation

The anticipated change in land use within the study area is based on input from land owners including the likely type and density of future land uses for each parcel compared to a comprehensive database of existing land uses developed by the IIMP project team. All land uses redevelopments were categorized into one of the five (5) main categories; residential, retail, office, industrial, and cinema. The number of net new daily and peak hour vehicle trips under each category was estimated using the *Trip Generation Manual* (11th edition) published by the Institute of Transportation Engineers (ITE).

Fehr & Peers' MainStreet web application, which incorporates the ITE rates, was used to estimate trip reductions resulting from mixed-use development, as well as active transportation and transit use. Main Street uses the MXD method developed in partnership with the Environmental Protection Agency (EPA) and estimates multimodal trip reductions and internalization using local travel data and has been shown to be statistically superior to other estimation methods used by ITE and other entities. The reduction was calculated at 53% during AM peak hour period and 43% during the PM peak hour period. **Appendix D** provides detailed land-use changes and a summary of the change in the number of vehicle trips generated by redeveloped uses in the study area.

Overall, the proposed land use redevelopment is estimated to generate a total of 64,057 net new daily vehicle trips on a weekday, including 5,256 net new vehicle trips during the AM peak hour (996 inbound/4,290 outbound) and 5,065 net new vehicle trips during the PM peak hour (3,261 inbound/1,804 outbound).

5.2 Trip Distribution and Assignment

The geographic distribution of trips generated by the proposed project is dependent on the characteristics of the street system, and the level of accessibility of routes to and from the master plan area. The resulting overall trip distribution pattern estimates for the peak hour project-generated traffic are shown on **Figure 11**.

Using the estimated trip generation and the distribution patterns discussed above, the traffic generated by the proposed project was assigned to the individual turning movements at intersections within the street network. The *Vistro* software package was utilized to assign the generated traffic to the roadway network by creating a network of smaller development zones and assigning the trips from each zone through each study intersection. Estimated project only volumes are shown on **Figure 12**.

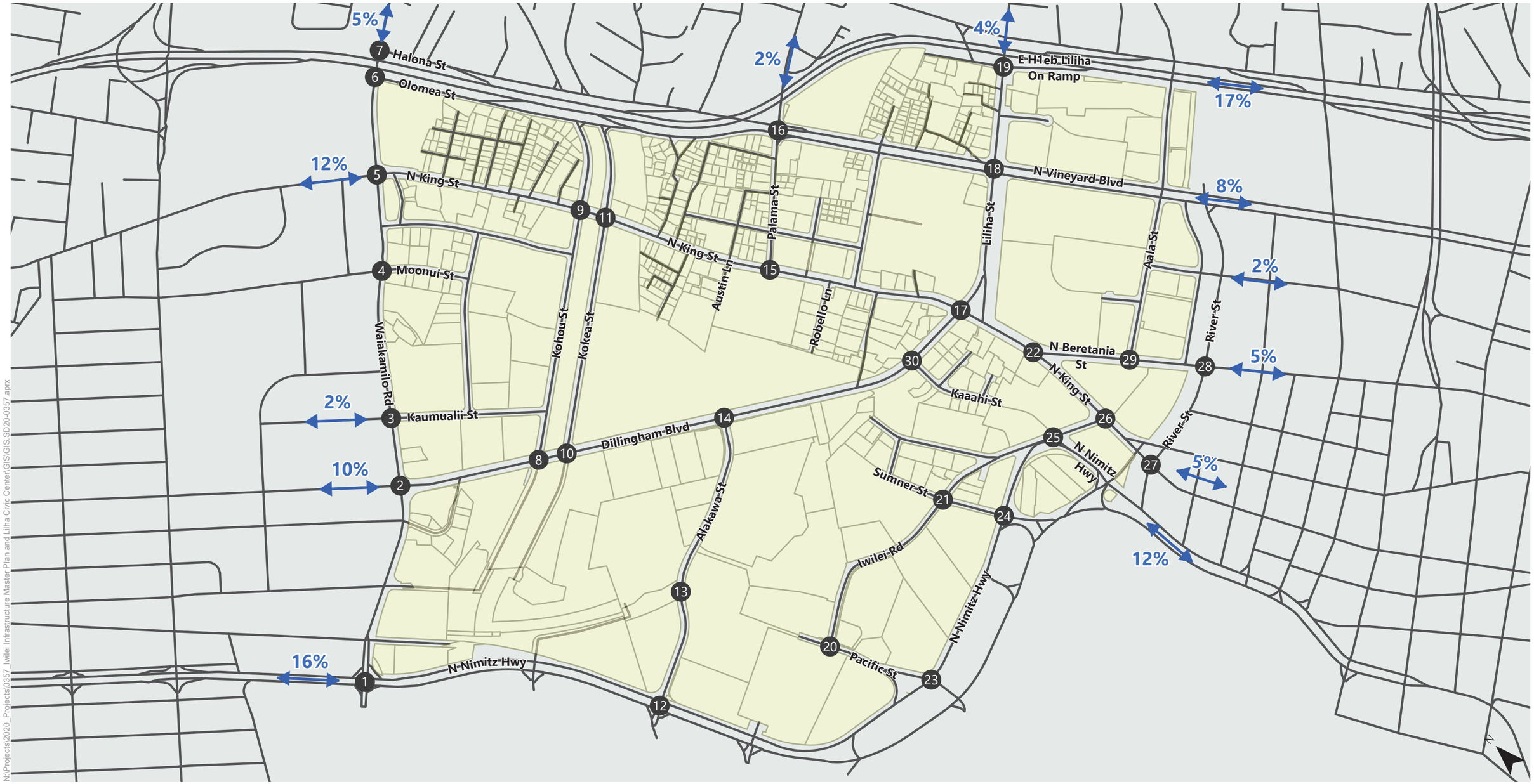
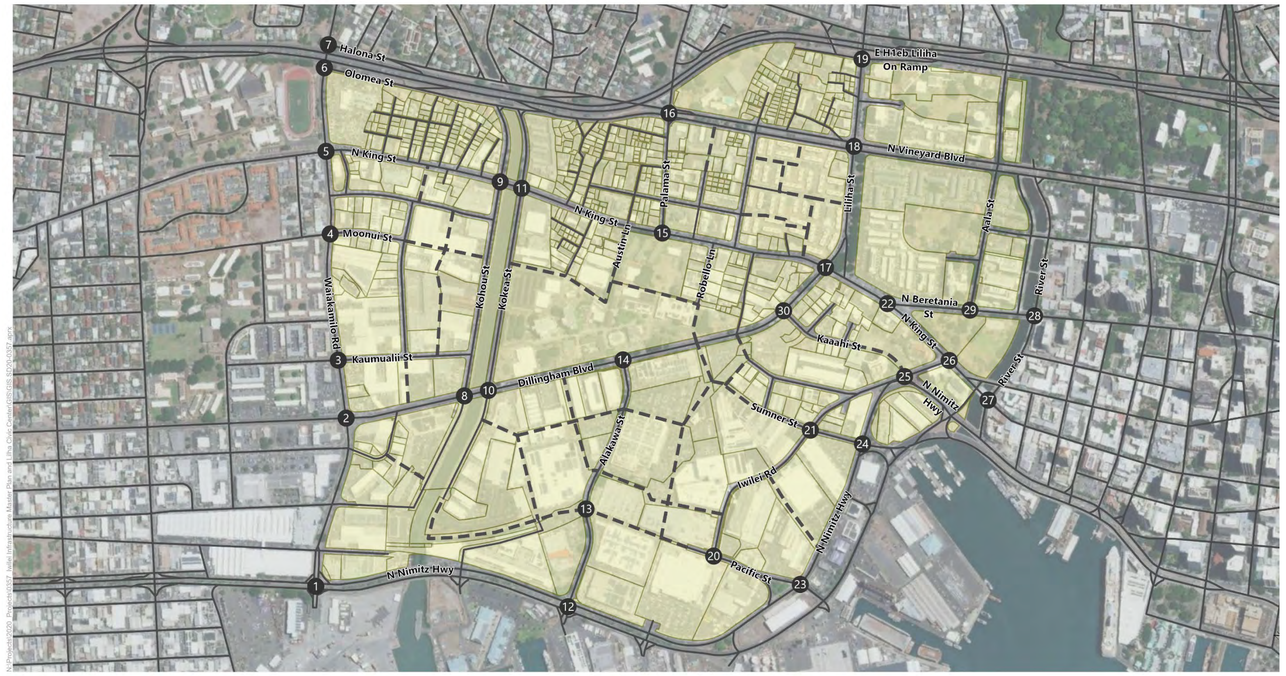


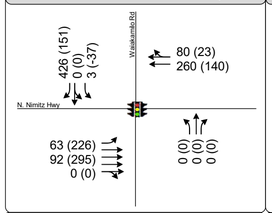
Figure 11

Study Intersections

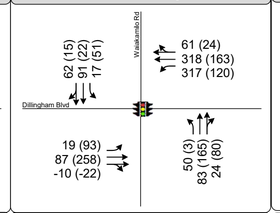
Project Traffic Distribution



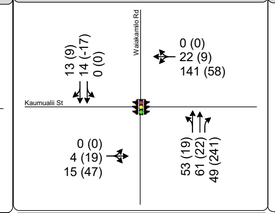
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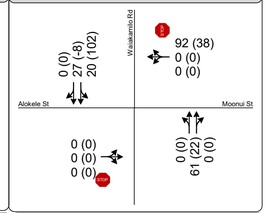
2. Waiakamilo Rd/Dillingham Blvd



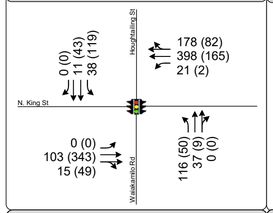
3. Waiakamilo Rd/Kaumualii St



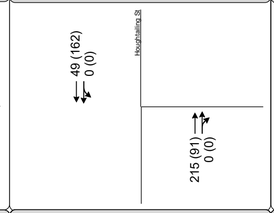
4. Waiakamilo Rd/Alokele St/Moonui St



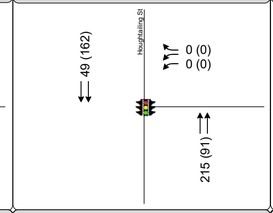
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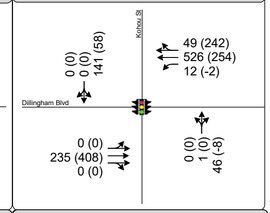
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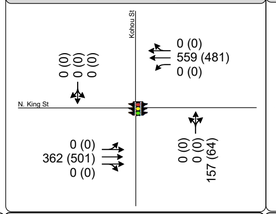
7. Houghtailing St/Halona St



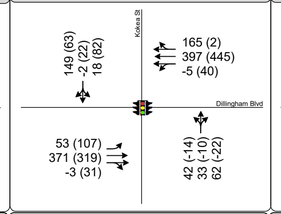
8. Kohou St/Dillingham Blvd



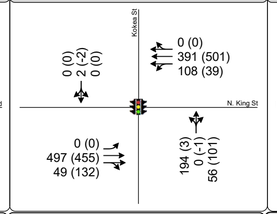
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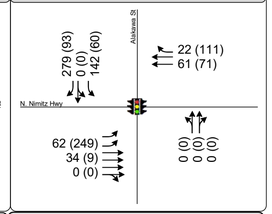
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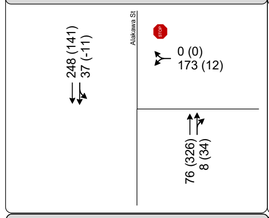
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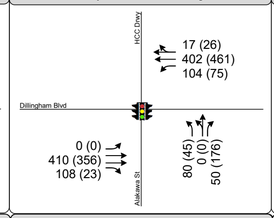
12. Alakawa St/N. Nimitz Hwy



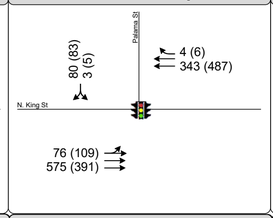
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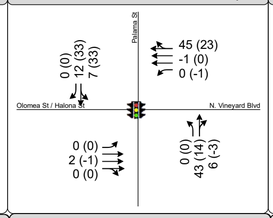
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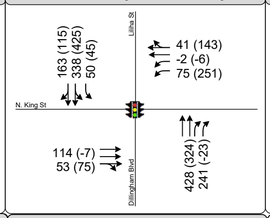
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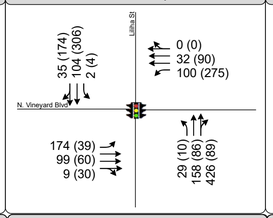
Palama St/Olomea St / Halona St/N. Vineyard B



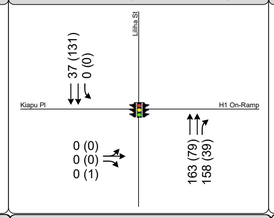
17. Liliha St/Dillingham Blvd/N. King St



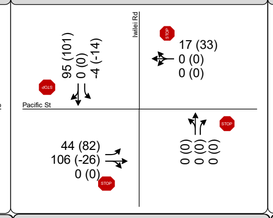
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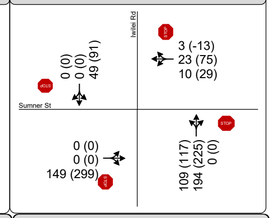
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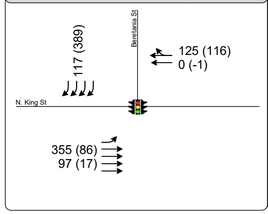
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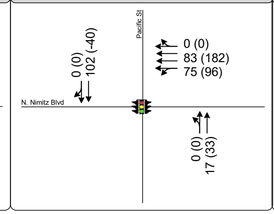
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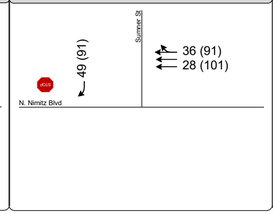
22. Beretania St/N. King St



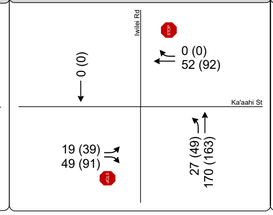
23. Pacific St/N. Nimitz Blvd



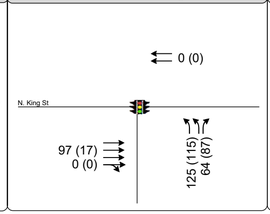
24. Sumner St/N. Nimitz Blvd



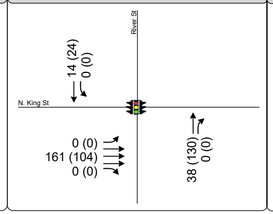
25. Iwilei Rd/Ka'aahi St



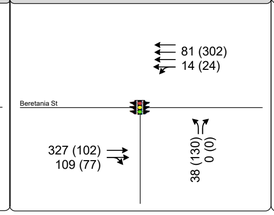
26. Iwilei Rd/N. King St



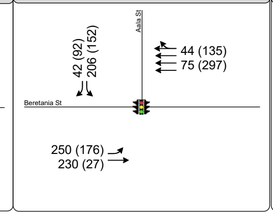
27. River St/N. King St



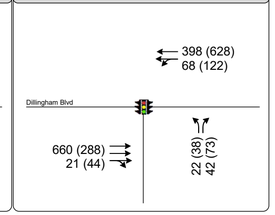
28. River St/Beretania St



29. Aala St/Beretania St



30. Kaaahi St/Dillingham Blvd



LEGEND

AM (PM) Peak Hour Traffic Volumes

Lane Configuration

Level of Service (LOS)

	A-C	D	E	F
AM				
PM				

Figure 12

Project-Generated Trips Only

6. Baseline 2035 Plus Project

This section starts with the description of the future roadway network improvements including proposed improvements from the Iwilei-Kapalama Transportation Network Assessment (SSFM International, Inc., 2021). The section is followed by identifying potential impacts on the roadway system due to projected future increases in traffic, including traffic generated by the proposed redevelopment in the year 2035.

6.1 Planned Roadway Network Improvements

Based on input from the Department of Transportation Services (DTS) on May 9, 2022, the analysis assumes a number of the proposed network improvements identified in the 2021 Iwilei-Kapalama Transportation Network Assessment (SSFM International, Inc.). Proposed improvements include both new roadways and intersection upgrades. Proposed improvements are described in the following section.

6.1.1 Planned Roadway Improvements

Planned Intersection Improvements

The following provides a list of proposed intersection improvements

- King Street/Dillingham Boulevard/Liliha Street Intersection:
    - Install a marked crosswalk across the south leg
    - Implement dual left-turn lanes for the northbound approach
    - Implement a single left-turn lane for the westbound approach.
    - Remove split signal phasing
    - Protected bike signal that lets bikes cross with pedestrians
    - Remove bus-only lanes along King Street to start at A'ala Street
- Iwilei and Ka'aahi Intersection:
    - Convert to a signalized intersection
    - Install a marked crosswalk across the east leg
    - Prohibit left-turn movement for a northbound approach out of Nimitz Highway Off-Ramp
    - Implement a left-turn lane for the eastbound approach

Figure 13 illustrates the proposed new roadway connections that are anticipated to be completed as part of the proposed redevelopment within the IIMP area. The analysis assumed all the proposed roadways except for the extension of A'ala Street (Roadway G). The extension of A'ala Street was not identified to be feasible within the timeframe of the proposed master plan.

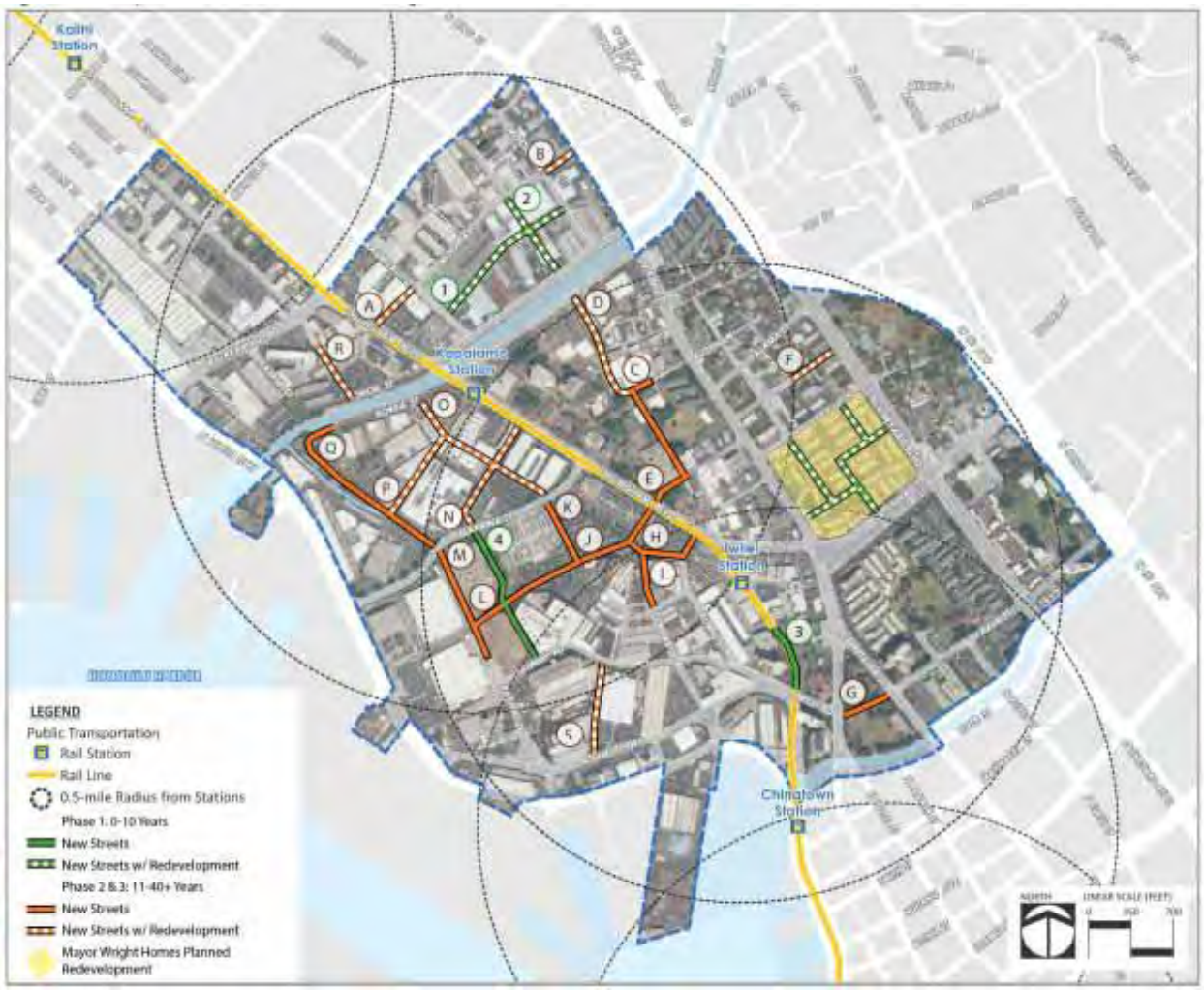
All the new roadways proposed within the study area are expected to include nor more than two vehicle travel lanes, as well as appropriate facilities to serve pedestrian and bicycle travel (and buses where applicable) based on travel priorities. As such, all roadways are expected to be classified as a Street, Residential Street, Mall or Lane/Alley per the *Right of Way Widths for Planned Street Improvements* document published in November 2021 by DTS. The Subdivision Street Standards that are currently being revised by DPP may also be used to determine the appropriate street cross-sections. The specific designations for each still need to be determined by the City & County of Honolulu.

6.1.2 Planned Intersection Improvements

The following provides a list of proposed intersection improvements

- King Street/Dillingham Boulevard/Liliha Street Intersection:
    - Install a marked crosswalk across the south leg
    - Implement dual left-turn lanes for the northbound approach
    - Implement a single left-turn lane for the westbound approach.
    - Remove split signal phasing
    - Protected bike signal that lets bikes cross with pedestrians
    - Remove bus-only lanes along King Street to start at A'ala Street
- Iwilei and Ka'aahi Intersection:
    - Convert to a signalized intersection
    - Install a marked crosswalk across the east leg
    - Prohibit left-turn movement for a northbound approach out of Nimitz Highway Off-Ramp
    - Implement a left-turn lane for the eastbound approach

Figure 13: Proposed roadway network improvements (2021 Iwilei-Kapalama Transportation Network Assessment, SSFM International, Inc.)



- Convert to protected intersections where feasible
    - Raised intersection corners provide protected space for pedestrians and bicyclists to wait
    - Protected bike signal that lets bikes cross with pedestrians. Requires modification of right-turn on red movements
    - Provide Lead Pedestrian Interval (LPI)

The impact of the protected intersection features such as bike signals, or raised intersection corners, should be analyzed with the detailed engineering plans in a separate study.

6.2 Potential Active Transportation and Transit Impacts

Implementation of the proposed project is not expected to conflict with any existing transit, pedestrian, or bicycle facilities, and it should not preclude the implementation of any other potential enhancements to walking biking, or transit activity (e.g., a path or sidewalk along with a facility where it does not currently exist).

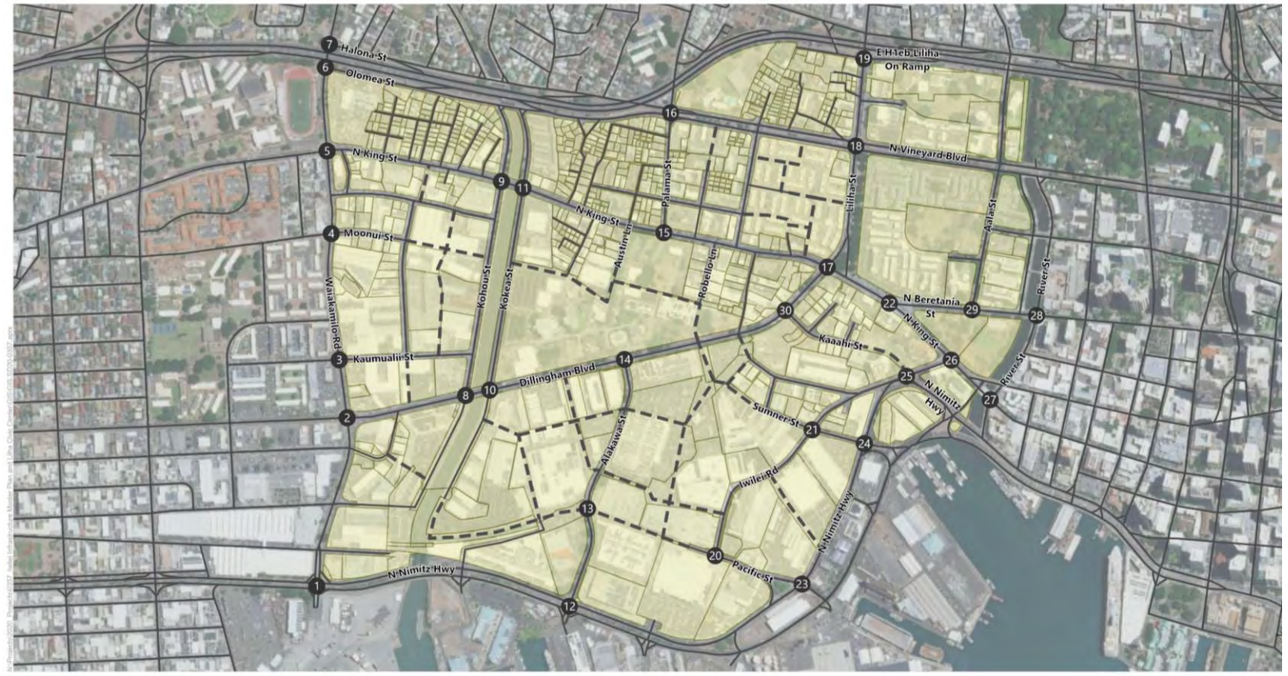
Developing pedestrian, bicycle, and transit facilities are paramount to reducing vehicle usage and developing an area that aligns with goals identified in the 2020 Downtown Neighborhood TOD plan.

6.3 Baseline 2035 Plus Project Intersection Level of Service

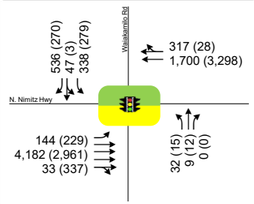
The analysis compares the project levels of service (LOS) at each study intersection with and without the addition of project-generated trips to determine potential impacts on the roadway network. This is done to determine whether the addition of project traffic is expected to result in any impacts on the surrounding roadways. As noted in Chapter 2 of this report, the minimum desired operating standard for a signalized or roundabout intersection is LOS D for the overall intersection, and this guideline is employed by both HDOT and DPP TRB.

Figure 14 presents the forecasted Baseline 2035 Plus Project AM and PM peak hour volumes. The LOS analysis results for the study intersections under both Baseline 2035 without and with estimated project trips are presented in **Table 5**. Detailed LOS results for intersection movements and corresponding LOS calculation sheets are included in **Appendix D**.

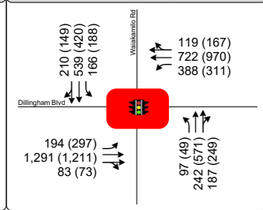
The results in **Table 5** show that the proposed redevelopment is expected to result in significant intersection impacts to 13 of the study intersections within the IIMP study area. In multiple cases, the projected increase in critical delay is projected to be in excess of 20 seconds, and in some cases, the increase is over 60 seconds. Given the magnitude of traffic that would be added, this finding is not unexpected. At some locations, because of the excessive delay, it is not possible to accurately calculate the change in delay. At those locations, the delay is assumed to be greater than five (5) seconds and is noted as such. Improvements are identified in the next chapter to reduce or eliminate these impacts where feasible.



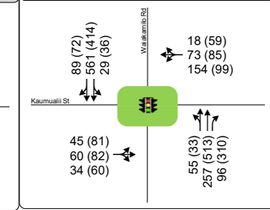
1. Waiakamilo Rd/N. Nimitz Hwy



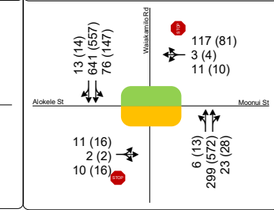
2. Waiakamilo Rd/Dillingham Blvd



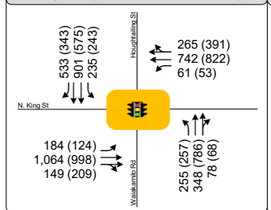
3. Waiakamilo Rd/Kaumualii St



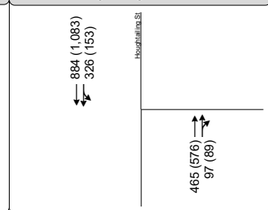
4. Waiakamilo Rd/Alokele St/Moonui St



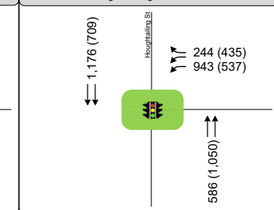
5. Houghtailing St/Waiakamilo Rd/N. King St



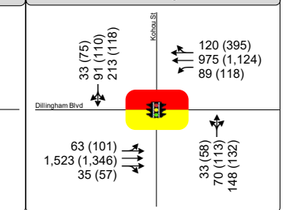
6. Houghtailing St/Olomea St



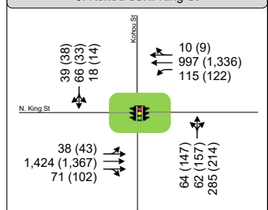
7. Houghtailing St/Halona St



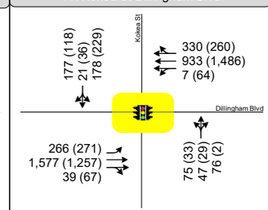
8. Kohou St/Dillingham Blvd



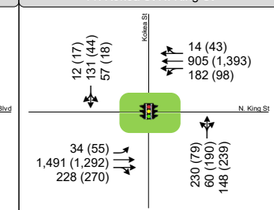
9. Kohou St/N. King St



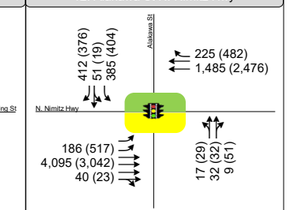
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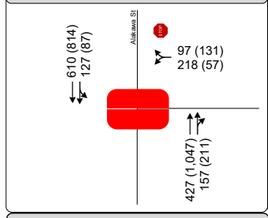
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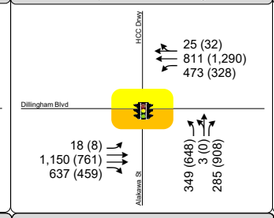
12. Alakawa St/N. Nimitz Hwy



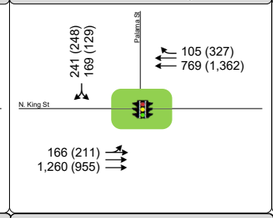
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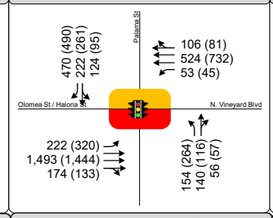
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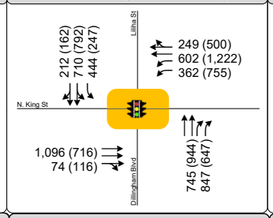
15. Palama St/N. King St



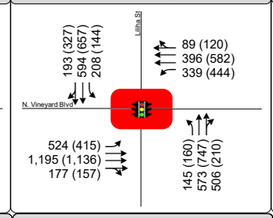
Palama St/Olomea St / Halona St/N. Vineyard B



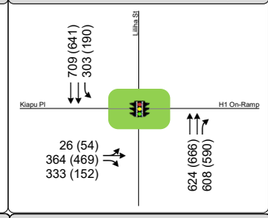
17. Liliha St/Dillingham Blvd/N. King St



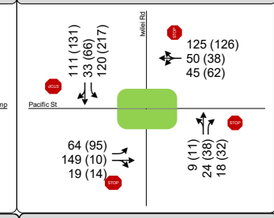
18. Liliha St/N. Vineyard Blvd



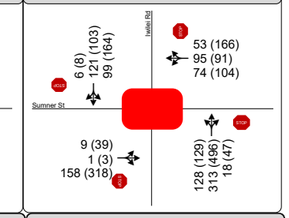
19. Liliha St/Kiapu Pl/H1 On-Ramp



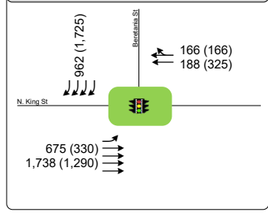
20. Iwilei Rd/Pacific St



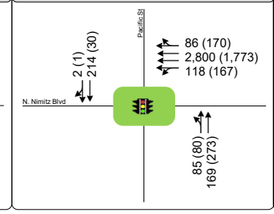
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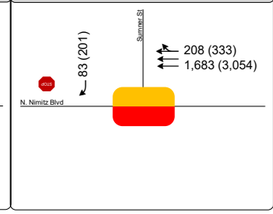
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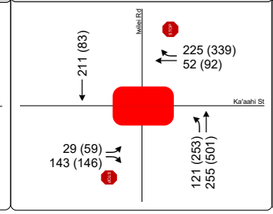
23. Pacific St/N. Nimitz Blvd



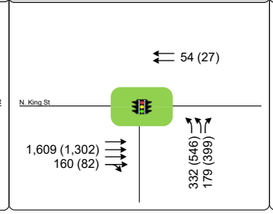
24. Sumner St/N. Nimitz Blvd



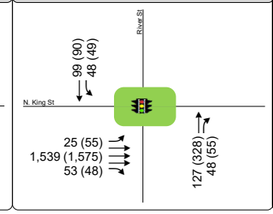
25. Iwilei Rd/Ka'aahi St



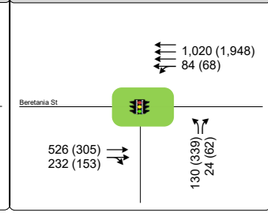
26. Iwilei Rd/N. King St



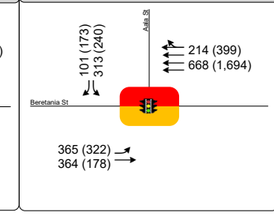
27. River St/N. King St



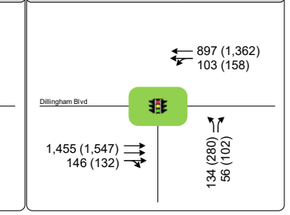
28. River St/Beretania St



29. Aala St/Beretania St



30. Kaaahi St/Dillingham Blvd



LEGEND

AM (PM) Peak Hour Traffic Volumes

Lane Configuration

AM / PM | A-C | D | E | F — Level of Service (LOS)

Figure 14

Peak Hour Traffic Volumes and Lane Configurations

Baseline 2035 Plus Project Conditions

Table 5: Year 2035 + Project Peak Hour Intersection Level of Service

Intersection	Traffic Control [a]	Peak Hour	Baseline 2035 Conditions		Baseline 2035 + Project Conditions		
			Delay (sec)	LOS	Delay (sec)	LOS	Δ
1. Waiakamilo Rd / N Nimitz Hwy	Traffic Signal	AM	28.4	C	27.9	C	-0.5
		PM	19.4	B	38.4	D	19.0
2. Waiakamilo Rd / Dillingham Blvd	Traffic Signal	AM	**56.6**	**E**	**153.5**	**F**	***96.9***
		PM	**65.9**	**E**	**123.8**	**F**	***57.9***
3. Waiakamilo Rd / Kaumualii St	Traffic Signal	AM	5.7	A	7.9	A	2.2
		PM	6.4	A	7.7	A	1.3
4. Waiakamilo Rd / Alokele St & Moonui St	TWSC	AM	19.4	C	24.5	C	5.1
		PM	24.1	C	**42.3**	**E**	***18.2***
5. Waiakamilo Rd / N King St	Traffic Signal	AM	**59.1**	**E**	**66.8**	**E**	***7.7***
		PM	44.5	D	**63.0**	**E**	***18.5***
6. Olomea St / Houghtailing St	Uncon-trolled	AM	-	-	-	-	-
		PM	-	-	-	-	-
7. Halona St / Houghtailing St	Traffic Signal	AM	21.3	C	20.7	C	-0.6
		PM	19.9	B	19.4	B	-0.5
8. Kohou St / Dillingham Blvd	Traffic Signal	AM	23.7	C	**92.8**	**F**	***69.1***
		PM	31.4	C	46.7	D	15.3
9. Kohou St / N King St	Traffic Signal	AM	9.0	A	11.8	B	2.8
		PM	15.8	B	23.8	C	8.0
10. Kokea St / Dillingham Blvd	Traffic Signal	AM	13.5	B	51.2	D	37.7
		PM	16.8	B	48.6	D	31.8
11. Kokea St / N King St	Traffic Signal	AM	6.8	A	13.9	B	7.1
		PM	10.7	B	18.7	B	8.0
12. Alakawa St / N Nimitz Hwy	Traffic Signal	AM	21.9	C	28.8	C	6.9
		PM	33.7	C	45.9	D	12.2
13. Pacific St / Alakawa St	TWSC	AM	18.7	C	**>180**	**F**	***>5.0***
		PM	**117.9**	**F**	**>180**	**F**	***>5.0***
14. Alakawa St / Dillingham Blvd	Traffic Signal	AM	33.3	C	40.9	D	7.6
		PM	32.1	C	**55.5**	**E**	***23.4***
15. N King St / Palama St	Traffic Signal	AM	10.0	B	10.0	B	0.0
		PM	9.8	A	25.8	C	16.0
16. Vineyard Blvd/Halona St/Olomea St/Palama St	Traffic Signal	AM	49.1	D	**66.8**	**E**	***17.7***
		PM	**108.0**	**F**	**>180**	**F**	***>5.0***
17. Dillingham Blvd / Liliha St / N King St	Traffic Signal	AM	49.5	D	**63.5**	**E**	***14.0***
		PM	**66.1**	**E**	**63.4**	**E**	-2.7
18. Vineyard Blvd / Liliha St	Traffic Signal	AM	**78.5**	**E**	**165.6**	**F**	***87.1***
		PM	**69.7**	**E**	**109.6**	**F**	***39.9***



Table 5: Year 2035 + Project Peak Hour Intersection Level of Service

Intersection	Traffic Control [a]	Peak Hour	Baseline 2035 Conditions		Baseline 2035 + Project Conditions		
			Delay (sec)	LOS	Delay (sec)	LOS	Δ
19. H-1 On Ramp / Kiapu Pl / Liliha St	Traffic Signal	AM	20.6	C	21.5	C	0.9
		PM	24.8	C	24.5	C	-0.3
20. Iwilei Rd / Pacific St	AWSC	AM	10.2	B	11.6	B	1.4
		PM	12.5	B	13.2	B	0.7
21. Iwilei Rd / Sumner St	AWSC	AM	10.0	A	**58.9**	**F**	***48.9***
		PM	14.1	B	**>180**	**F**	***>5.0***
22. N King St / Beretania St	Traffic Signal	AM	6.6	A	13.1	B	6.5
		PM	12.1	B	15.3	B	3.2
23. Pacific St / N Nimitz Hwy WB	Traffic Signal	AM	12.3	B	15.3	B	3.0
		PM	12.9	B	12.8	B	-0.1
24. Sumner St / N Nimitz Hwy WB	TWSC	AM	25.4	D	**42.0**	**E**	***16.6***
		PM	**>180**	**F**	**>180**	**F**	***>5.0***
25. Iwilei Rd / Ka'aahi St	TWSC	AM	18.2	C	31.8	D	13.6
		PM	28.5	D	**58.9**	**E**	***30.4***
26. Iwilei Rd / N King St	Traffic Signal	AM	19.9	B	21.1	C	1.2
		PM	21.2	C	22.6	C	1.4
27. N King St / River St	Traffic Signal	AM	5.0	A	10.2	B	5.2
		PM	7.8	A	11.7	B	3.9
28. N Beretania St / River St	Traffic Signal	AM	5.4	A	6.0	A	0.6
		PM	8.9	A	13.9	B	5.0
29. N Beretania St / A'ala St	Traffic Signal	AM	15.2	B	**108.9**	**F**	***93.7***
		PM	13.3	B	**59.1**	**E**	***45.8***
30. Dillingham Blvd / Ka'aahi St	Traffic Signal	AM	2.9	A	7.7	A	4.8
		PM	3.9	A	32.4	C	28.5

a. TWSC = Two-Way Stop Controlled, AWSC = All-Way Stop Controlled
b. Intersections operating at an undesirable level are highlighted in **bold** type. Significant impacts with an increase in delay of more than 5.0 seconds of delay are shown in ***bold, underlined and italicized*** type.

7. Recommended Improvements

This chapter includes recommended improvements to mitigate projected traffic operations and multimodal deficiencies beyond those planned improvements identified in **Section 4.1** of this report. To accommodate the proposed improvements, the project sponsors for each redevelopment site should coordinate with State agencies and/or DPP TRB and DTS as appropriate to determine the appropriate recommendations that should be implemented at each location. For developments located adjacent to impacted intersections, appropriate setbacks and dedications should be provided to allow for future intersection modifications and infrastructure implementation.

7.1 Recommended Active Transportation and Transit Improvements

Since the Iwilei Infrastructure Master Plan is a long-term development and will be constructed over a period of several years, one of the primary transportation objectives of this infrastructure master plan is to recommend improvements that improve pedestrian and bicyclist safety, improve mobility, encourage the use of non-automobile modes, integrate new development into the community context, complement the surrounding land uses, enhance accessibility, and support the downtown neighborhood transit-oriented development plan objectives. The feasibility of the recommended improvements at each location requires the preparation of conceptual plans during the planning phase of each project.

The following is a list of recommended active transportation and transit improvement:

<u>Pedestrian improvements:</u>

- Provide adequate walkways along both sides of all streets to improve accessibility. Sidewalks or paths should be context appropriate and account for furniture zones and other encroachments per the *City and County of Honolulu Complete Streets Design Manual* (September 2016).
- Provide pedestrian crossings of all legs of an intersection to reduce the need for a pedestrian to cross multiple legs to access their desired destination and encourage walking within and to/from the IIMP area.
- Provide pedestrian refuge islands, tighten curb radius, and/or widen the sidewalk at intersections or mid-block crossings to shorten the pedestrian crossing distance, make pedestrians more visible to vehicles, and reduce the speed of turning vehicles. The measure applies to both controlled and uncontrolled crossings

- Design project driveways to provide adequate sight distance for drivers and pedestrians. This includes the placement of monument signage, fencing, and other potential impediments to visibility. Install audible and visual warning features where sight distance is limited.
- Consider pedestrian scramble or all-pedestrian phase at locations with high pedestrian activity,
- Provide protected left or right-turn phasing where feasbile and appropriate to reduce or eliminate conflicts between pedestrians and turning vehicles
- Prohibit right-turn on red at locations where the parallel crossing carries a high volume of pedestrians, or at locations with sight distance issues (e.g., skewed intersections)
- Eliminate channelized right-turns to eliminate conflicts with pedestrians
- Implement leading pedestrian indications (LPIs)
- Provide "pedestrian recall" and shorten signal cycles, and/or provide additional crossing time to maximize walking opportunities for pedestrians during the pedestrian phase
- Improve street lighting to increase driver's ability to identify pedestrian
- Install Pedestrian Hybrid Beacons (PHB) or Rectangular Rapid Flashing Beacon (RRFB) on higher speed and/or multi-lane roadways, or where additional treatments are needed based on industry best practices.
- Minimize the length between crossing locations and limit the distance to no more than 500 feet where feasible
- Improve pedestrian signage at crossing locations to notify drivers of the presence of a pedestrian.
- Restrict parking near crosswalk approaches to improve drivers' and pedestrians' visibility of one another
- Provide advanced stop bars ahead of crosswalks at stop signs and signals to reduce the number of vehicles encroaching on the crosswalk
- Provide raised crosswalks or raised intersections, speed humps, and/or narrow lanes to reduce approaching vehicles' speed
- Focus pedestrian improvement projects on the priority network streets identified in the OPP before improving other roadway segments.

<u>Bicycle Improvements:</u>

- Provide adequate bikeways along both sides of the street to improve accessibility in all directions
- Provide buffered or protected bike lanes where feasible to eliminate conflict between vehicles and bicycles
- Design project driveways so that the path crossing locations of each driveway provide adequate sight distance for drivers and bicyclists
- Ensure that all new development provides bicycle parking consistent with the requirements in the Land Use Ordinance to encourage the use of non-automobile travel and minimize vehicle trips

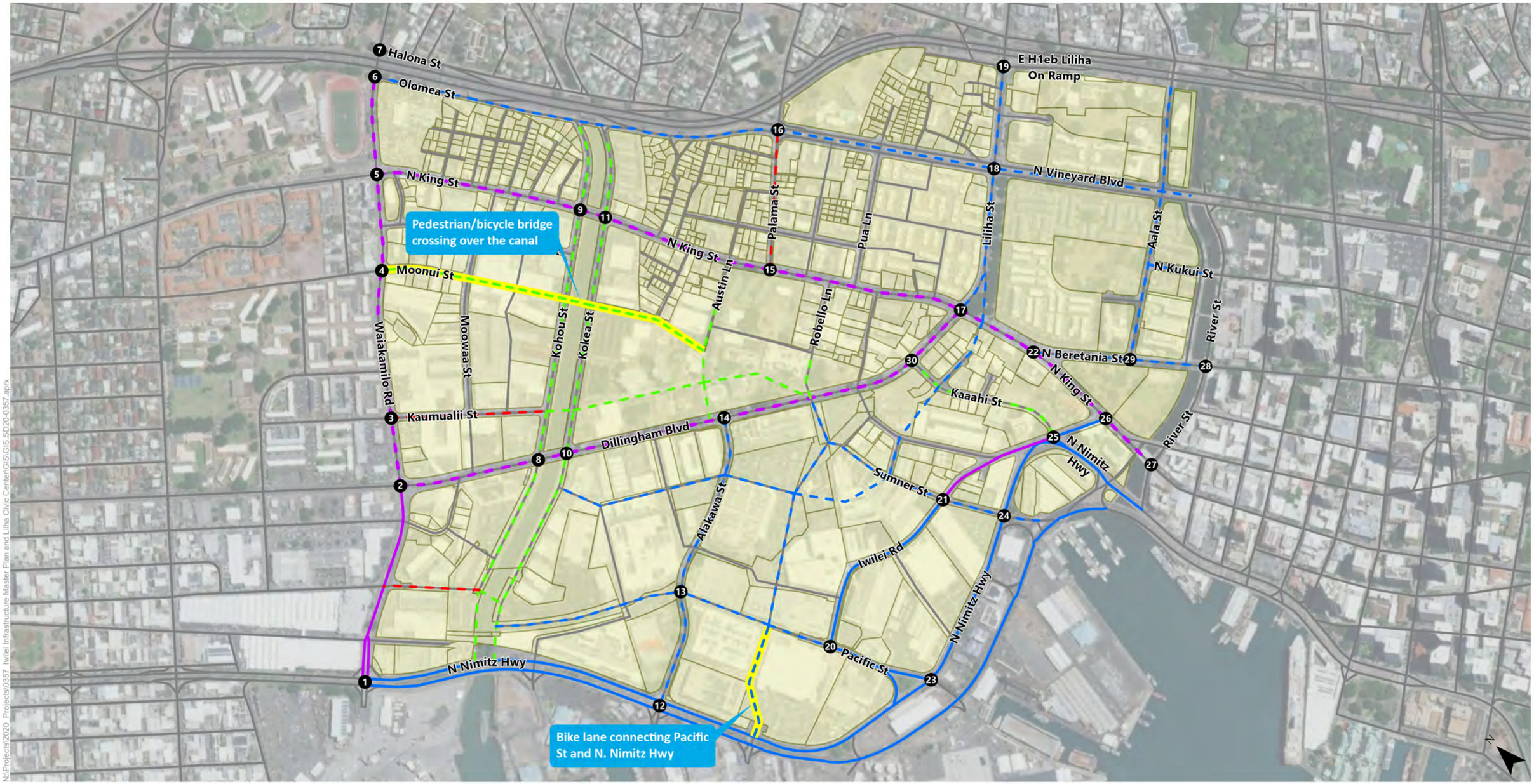


- Provide adequate wayfinding signs and/or markings to route people riding bicycles to key destinations
- Provide bike signals for bike lanes that cross high-speed or high-volumes streets. Leading Bicycle Intervals (LPIs) are a complimentary feature to bike signals
- Provide median refuges wide enough for a bicyclist to pass-through
- Provide a two-stage turn box at intersections where bicyclists are on the right side of protected bike lanes and need to make a left turn
- Provide colored pavement treatments where appropriate to highlight conflict areas between bike lanes and turn lanes
- Provide secure bicycle parking at key destinations
- Focus bicycle improvement projects on the facilities identified in the O'ahu Bike Plan before improving other segments or path connections.

Figure 15 illustrates the planned bike facilities from the O'ahu Bike Plan as well as additional recommended bikeway connections to improve overall network connectivity. Note that the O'ahu Bike Plan calls for two new bridge connections over Kapalama Canal (one at Kaumualii Street and one at Kalani Street). We recommend that a connection at Moonui Street be considered in lieu of or in addition to the Kaumualii Street crossing given its more central location between King Street and Dillingham Boulevard.

Transit

- Convert routes that connect to transit stations to walk- and bike-friendly routes
- Improve the pedestrian and bike users' experience with wayfinding signage that directs the user to transit stations and major bus stops
- Place transit stops near intersections with sufficient access for pedestrians and bicyclists to improve connectivity
- Eliminate parking near transit stops to provide clear bus access to curb stops or adjacent properties
- Provide shelters at bus stops based on their characteristics (see Honolulu Complete Streets Design Manual for more information on types of bus shelters)
- Upgrade current bus shelters with amenities that improve users' experience (lighting, seating, trash receptacles, real-time informational displays, wayfinding signs/maps, etc.)
- Reroute bus transit with limited POV access for local traffic circulation only through Ka'aahi Street for improved access to the future Kūwili (Iwilei) Station.
- Provide potential electric capacity for electric bus charging stations near the future Kūwili (Iwilei) Station.



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- Existing Bike Lane
- Existing Buffered Bike Lane
- Future Shared Use Path
- Future Bike Lane
- Future Shared Roadway
- Future Protected Bike Lane
- Recommended Bike Lane
- Recommended Shared Use Path
- Study Intersections
- Iwilei_Infrastructure_Master_Plan

Figure 15

Recommended Pedestrian & Bike Network Improvements

Resource Mapping Hawaii, Maxar

7.2 Recommended Roadway Network Improvements

For signalized study intersections, recommendations are proposed for conditions where the overall intersection LOS is calculated to operate at LOS E or lower. For unsignalized study intersections, recommendations are proposed for conditions where a critical movement or approach is calculated to operate at LOS E or lower. These recommendations were identified to illustrate the scope of improvements needed to eliminate or reduce impacts to vehicle operations. When evaluating the need for these improvements at any location, potential secondary impacts to pedestrians, bicyclists, and transit in terms of operations and safety should be considered.

Figure 16 summarizes the recommended roadway network improvements. **Table 6** shows intersection operation levels with and without proposed improvements, with the proposed improvements described in the last column. Operating levels are reported only for locations where improvements are proposed, but both peak hour operating levels with improvement are presented since they would enhance operations at all times of day.

It is expected that the City and County would take responsibility for obtaining funding for and implementing any or all these improvements. This could take the form of a Pro Rata Share District but would likely require coordination with the State of Hawaii given that some of the improvements involve HDOT-maintained facilities.

Include a SB right-turn overlap phase

Convert SBR movement to free movement, convert WB shared right & thru lane to right-turn only, optimize signal timing

New EBL lane on Vineyard Blvd, optimize signal timing

Proposed configuration based on Iwilei-Kapalama Transportation Network Assessment

Optimize signal timing

Install traffic signal

Convert middle lane to shared left-thru-right lane, optimize signal

Optimize signal timing

Optimize signal timing

Install signal with permitted left-turn in all directions

Proposed configuration based on Iwilei-Kapalama Transportation Network Assessment, install traffic signal

Install traffic signal

Align Pacific Street with the driveway across the street, install signal

New connection from Pacific St to N. Nimitz Hwy

Halona St
Olomea St
N King St
Moonui St
Waiakamilo Rd
Kaumualii St
Dillingham Blvd
Kohou St
Kokea St
Austin Ln
Palama St
N King St
Robello Ln
E H1eb Liliha On Ramp
N Vineyard Blvd
Liliha St
Aala St
River St
N Beretania St
N King St
Kaaahi St
N Nimitz Hwy
Sumner St
Alakawa St
Iwilei Rd
N Nimitz Hwy
Pacific St
N Nimitz Hwy

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

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Existing
0-10 Years (Iwilei-Kapalama Transportation Network Assessment)
11-40+ Years (Iwilei-Kapalama Transportation Network Assessment)
Recommended Connection
Study Intersections
Future Rail Transit Route

Figure 16

Recommended Roadway Network Improvements

Resource Mapping Hawaii, Maxar

Table 6: Intersection Level of Service with Improvements

Intersection	Traffic Control[a]	Peak Hour	Baseline 2035+Project		With Potential Improvements		Description of Improvements Needed to Mitigate Project Impact
			Delay (sec)	LOS	Delay (sec)	LOS	
1. Waiakamilo Rd / N Nimitz Hwy	Traffic Signal	AM	27.9	C	-	-	
		PM	38.4	D	-	-	
2. Waiakamilo Rd / Dillingham Blvd	Traffic Signal	AM	**153.5**	**F**	**97.0**	**F**	Optimize signal timing
		PM	**123.8**	**F**	**87.6**	**F**	
3. Waiakamilo Rd / Kaumualii St	Traffic Signal	AM	7.9	A	-	-	
		PM	7.7	A	-	-	
4. Waiakamilo Rd / Alokele St & Moonui St	TWSC	AM	24.5	C	5.9	A	Install traffic signal (DTS plans to implement road diet in lieu of signal)
		PM	**42.3**	**E**	5.4	A	
5. Waiakamilo Rd / N King St	Traffic Signal	AM	**66.8**	**E**	**64.0**	**E**	Add right turn overlap phase on SBR, optimize signal timing
		PM	**62.8**	**E**	**62.6**	**E**	
6. Olomea St / Houghtailing St	Uncon-trolled	AM	-	-	-	-	
		PM	-	-	-	-	
7. Halona St / Houghtailing St	Traffic Signal	AM	20.7	C	-	-	
		PM	19.4	B	-	-	
8. Kohou St / Dillingham Blvd	Traffic Signal	AM	**92.8**	**F**	32.9	C	Optimize signal timing
		PM	46.7	D	23.0	C	
9. Kohou St / N King St	Traffic Signal	AM	11.8	B	-	-	
		PM	23.8	C	-	-	
10. Kokea St / Dillingham Blvd	Traffic Signal	AM	51.2	D	-	-	
		PM	48.6	D	-	-	
11. Kokea St / N King St	Traffic Signal	AM	13.9	B	-	-	
		PM	18.7	B	-	-	
12. Alakawa St / N Nimitz Hwy	Traffic Signal	AM	28.8	C	-	-	
		PM	45.9	D	-	-	
13. Pacific St / Alakawa St	TWSC	AM	**>180**	**F**	9.7	A	Align Pacific Street with the driveway across the street, install signal
		PM	**>180**	**F**	7.5	A	
14. Alakawa St / Dillingham Blvd	Traffic Signal	AM	40.9	D	36.8	D	Convert center lane to shared left-thru-right movement, install signal
		PM	**55.5**	**E**	32.5	C	
15. N King St / Palama St	Traffic Signal	AM	10.0	B	-	-	
		PM	25.8	C	-	-	
16. Vineyard Blvd/Halona St/Olomea St/Palama St	Traffic Signal	AM	**66.8**	**E**	40.4	D	Convert SB right-turn movement to Free movement, convert WB Shared right-thru lane to Right-Turn Only, optimize signal timing
		PM	**>180**	**F**	47.3	D	

Table 6: Intersection Level of Service with Improvements

Intersection	Traffic Control[a]	Peak Hour	Baseline 2035+Project		With Potential Improvements		Description of Improvements Needed to Mitigate Project Impact
			Delay (sec)	LOS	Delay (sec)	LOS	
17. Dillingham Blvd / Liliha St / N King St	Traffic Signal	AM	**63.5**	**E**	-	-	No feasible improvements beyond proposed improvements from Iwilei-Kapalama Transportation Network Assessment
		PM	**63.4**	**E**	-	-	
18. Vineyard Blvd / Liliha St	Traffic Signal	AM	**165.6**	**F**	**95.5**	**F**	Add 2nd EB left-turn lane using existing median width, optimize signal
		PM	**109.6**	**F**	**90.2**	**F**	
19. H-1 On Ramp / Kiapu Pl / Liliha St	Traffic Signal	AM	21.5	C	-	-	
		PM	24.5	C	-	-	
20. Iwilei Rd / Pacific St	AWSC	AM	11.6	B	-	-	
		PM	13.2	B	-	-	
21. Iwilei Rd / Sumner St	AWSC	AM	**58.9**	**F**	8.9	A	Install signal with permitted left-turn on all directions
		PM	**>180**	**F**	32.2	C	
22. N King St / Beretania St	Traffic Signal	AM	13.1	B	-	-	
		PM	15.3	B	-	-	
23. Pacific St / N Nimitz Hwy WB	Traffic Signal	AM	15.3	B	-	-	
		PM	12.8	B	-	-	
24. Sumner St / N Nimitz Hwy WB	TWSC	AM	**42.0**	**E**	10.1	B	Install traffic signal
		PM	**>180**	**F**	33.7	C	
25. Iwilei Rd / Ka'aahi St	Signal	AM	31.8	D	-	-	No other improvements deemed feasible
		PM	**58.9**	**E**	-	-	
26. Iwilei Rd / N King St	Traffic Signal	AM	21.1	C	-	-	
		PM	22.6	C	-	-	
27. N King St / River St	Traffic Signal	AM	10.2	B	-	-	
		PM	11.7	B	-	-	
28. N Beretania St / River St	Traffic Signal	AM	6.0	A	-	-	
		PM	13.9	B	-	-	
29. N Beretania St / A'ala St	Traffic Signal	AM	**111.4**	**F**	27.5	C	Optimize signal timing
		PM	**59.1**	**E**	28.1	C	
30. Dillingham Blvd / Ka'aahi St	Traffic Signal	AM	7.7	A	-	-	
		PM	32.4	C	-	-	

a. TWSC = Two-Way Stop Controlled, AWSC = All-Way Stop Controlled

7.3 Travel Demand Management (TDM) Program and Parking

As noted in Chapter 5, the redevelopment within the IIMP will generate a substantial number of new vehicle trips within and into and out of the study area. To minimize automobile trips and to encourage and incentivize the use of walking, bicycling and transit (including the new rail system), a comprehensive travel demand management (TDM) program should be established and maintained for all new development within the study area. Applying TDM requirements to existing land uses is typically a challenge because of a lack of an enforcement mechanism, but the City and County could identify potential incentives to encourage participation.

Two key elements of a TDM program are the limitation and management of vehicle off-street parking supplies. Reduced and managed supplies have been proven to reduce overall vehicle demand and trip-making, and they are inherently consistent with transit-oriented development (TOD) core principles.

According to the *Trip and Parking Generation at Transit-Oriented Developments* (Report No. NITC-RR-767, January 2017), mixed-use sites with high density, low stress pedestrian environments, and adjacent to a high-quality transit stop require less parking than suggested in the Institute of Transportation Engineers (ITE) Parking Generation Manual or other industry standards that focus on suburban parking demand. Individual projects are expected to provide off-street parking supplies consistent with the Land Use Ordinance (LUO) and should be minimized to the greatest extent practicable to encourage the use of non-auto travel modes. The project area is nearly entirely located within the Downtown and Kalihi TOD areas along the HART rail corridor, and parking should be provided consistent with the applicable TOD principles at the lowest possible ratios.

A wide range of TDM measures can be applied to new and existing development and specific measures should be tailored for each development based on the land use, site context, availability and quality of non-auto mode infrastructure and services. The recommendations in Section 7.1 will help to increase the effectiveness of TDM and are integral to successful TDM implementation. A list of potential measures is presented below, and the relative effectiveness of a combination of measures would have to be evaluated on a project-by-project basis.



Table 7: Potential Travel Demand Management (TDM) Measures

TDM Measure	Program	Implementing/Party	Description
Compressed Work Week	Alternative Work Schedules	Tenant/Employer	Employees work more hours in a single day, but fewer days of the week reduces trips made to the employer site.
Flextime	Alternative Work Schedules	Tenant/Employer	Employees set or modify their arrival and departure times can provide the flexibility people need to use alternative modes.
Staggered Work Hours	Alternative Work Schedules	Tenant/Employer	Work units or groups select or are assigned different starting and ending times for their work day can provide the flexibility people need to use alternative modes.
Telecommuting	Alternative Work Schedules	Tenant/Employer	Telecommuting allows employees to work from home or from neighborhood telecenters via telecommunications and reduces trips made to the employer site.
Bike Share	Bicycle Programs	Building Manager	A bike share program provides employees with campus bicycles and free bicycle helmets and can help eliminate trips made by car during the day.
Bicycle Travel Assistance	Bicycle Programs	Building Manager	Bicycle programs encourage employees to bike to work and may include mapping routes, creating biking groups or buddies, and providing incentives.
Bicycle Riders Guide	Bicycle Programs	Building Manager	A guide with bicycle routes, lanes, and paths to the site and bicycle parking facilities on the site make it easier for people to bike and walk to work.
Electric Bicycle Charging Station	Bicycle Programs	Developer	Charging stations for electric bicycle could be located throughout the site which can be used for longer trips than standard bicycles.
Bike-to-Work Day	Bicycle Programs	Tenant/Employer	A regional event to introduce bicycle commuting can get people to start bicycling more frequently.
Subsidized Bicycle Expenses	Bicycle Programs	Tenant/Employer	Employers can reimburse employees up to $20 per month for qualified bicycle commuting expenses as a pre-tax payroll deduction.
Reduced Parking Supply	Building Design Elements	Developer	When combined with companion TDM measures, reduced parking discourages drive-alone commuting by limiting an abundance of easy and convenient parking options.
Pedestrian Connectivity and Access	Building Design Elements	Developer	Designing a site for pedestrian connectivity with attractive and safe connections between buildings and to the surrounding streets can encourage people to walk more.
Bicycle Parking	Building Design Elements	Developer	Consistent w Land Use Ordinance.

Table 7: Potential Travel Demand Management (TDM) Measures

TDM Measure	Program	Implementing/Party	Description
Electric Vehicle Parking	Building Design Elements	Developer	Install infrastructure to provide charging stations and conduit runs for electric vehicles - ratio is 3% of total spaces be station ready and 1.5% of those spaces (or 50% of total EV spaces) included chargers
Showers and Lockers	Building Design Elements	Developer	Shower and changing rooms help promote bicycling (and walking) as an alternative commute option.
Amenities	Building Design Elements	Developer	Amenities help to reduce the number of trips an employee needs to make during the day and may include the following: a cafeteria, grab-and-go meals (or other food access), a fitness facility, coffee bar, general store, an ATM, a barbershop, sport courts, banking, dry cleaning pick-up, health and wellness, day care, etc.
Building Orientation	Building Design Elements	Developer	Orient building entries towards plazas, parks or adjacent roadways with pedestrian facilities to create a more pedestrian friendly environment.
Building Setbacks	Building Design Elements	Developer	By reducing setbacks buildings are located closer to pedestrian and transit facilities which encourages walking and transit use.
Building Wiring	Building Design Elements	Developer	Fiber optics or other infrastructure that provides for fast internet access facilitates telecommuting.
Parking Location and Configuration	Building Design Elements	Developer	Locate parking in the rear of buildings so that it does not impede access to the building by other modes.
Passenger Loading Zones	Building Design Elements	Developer	Passenger loading zones near the main entries to buildings are convenient for carpools and vanpools and TNCs (Uber, Lyft, etc.) dropping off passengers.
Preferential parking	Building Design Elements	Developer	Designated parking spaces for carpools and vanpools near building entrances prioritizes non-drive-alone modes.
DIY Bike Repair Stands	Building Design Elements	Tenant/Employer	Do-it-yourself bicycle repair stands offer an air pump and basic tools to keep your bike in good operating condition, including bike-specific screwdrivers and wrenches, combination wrenches, tire levers, etc.
Financial Incentives	Financial	Tenant/Employer	Employees who use alternative modes can be provided other financial incentives to encourage continued use of that mode.

Table 7: Potential Travel Demand Management (TDM) Measures

TDM Measure	Program	Implementing/Party	Description
Tax Incentives	Financial	Tenant/Employer	Passing employer tax benefits to employees who use non drive alone modes provides a financial incentive to use alternative modes.
Traffic Calming	Other	Developer	Use traffic calming on site and around the site to create a more pedestrian and bicycle friendly environment.
Unbundled Parking	Parking Programs	Building Manager	Parking spaces in residential buildings are not associated with a specific dwelling unit and are rented separately on a monthly or annual basis. This can help to reduce car ownership and reduces the cost of each dwelling unit.
Priced Parking	Parking Programs	Building Manager	Unbundling parking from other benefits provided by an employer requires the user to consider the cost of driving which includes parking and will encourage people to use an alternative mode to driving alone.
Parking Cashout	Parking Programs	Tenant/Employer	Employees receive the cash equivalent of employer-provided parking if they elect to forgo parking which provides a financial incentive to use a mode other than driving alone to work.
Parking Subsidies	Parking Programs	Building Manager	Free parking or reduced fees for preferential spaces at sites that have paid parking provides a financial incentive for people to carpool or vanpool.
Real-time Parking Information	Parking Programs	Developer	Signs on the major approaches to the site indicating the number of available parking spaces in the public parking structures.
Time-Limited Street Parking	Parking Programs	Developer	Time limiting on-street parking spaces reduces the potential for vehicles to be stored for extended periods of time, which reduces overall vehicle ownership and encourages use of other modes.
Walking Program	Pedestrian Programs	Building Manager	Walking programs encourage employees to walk to work and may include mapping walking routes, creating walking groups or buddies, and providing incentives.
School Pool	Ridesharing Programs	Building Manager	Ride matching service for parents interested in carpooling students to area schools.
Vanpool Programs	Ridesharing Programs	Building Manager	Vanpool programs help vanpools to form by matching drivers and passengers and by providing or subsidizing vans.
Carpool Programs	Ridesharing Programs	Building Manager	Carpool programs help carpools to form by matching drivers and passengers.

Table 7: Potential Travel Demand Management (TDM) Measures

TDM Measure	Program	Implementing/Party	Description
Car share	Ridesharing Programs	Building Manager	Employees who bike or walk or use transit, carpools, or vanpools can utilize a car share vehicle located on site for errands or meetings which helps to reduce concerns and inconveniences of not having a vehicle during the day.
Last-Mile Connections	Ridesharing Programs	Tenant/Employer	Autonomous vehicles or pedi-cabs can be used as a last-mile strategy to get a group of people from a transit stop to the employer location which eliminates the barrier of last-mile transportation for people who want to use transit.
Commute Ambassadors	TDM Coordinator	Building Manager	An ambassador/buddy program eases people into commuting alternatives and can provide incentives for new commuters referred by a friend.
Commuter information center	TDM Coordinator	Building Manager	An on-site, one-stop shop for transit and commute alternatives information provides education and support for easy use of alternative modes.
Transportation coordinator	TDM Coordinator	Building Manager	Transportation coordinators are responsible for developing, marketing, implementing, and evaluating TDM programs. Having dedicated personnel on staff helps to make the TDM program more robust, consistent and reliable.
New employee orientation	TDM Coordinator	Tenant/Employer	Introducing new employees to the TDM program creates an awareness and culture of drive-alone alternatives.
Flyers, posters, emails	TDM Marketing	Building Manager	Messaging keeps TDM options in front of employees on a regular basis and reminds people to think about alternative modes.
Foster Competition and Engagement	TDM Marketing	Building Manager	Create competitions around any mode (bike-to-work competition, pedometer/walking challenges), develop recognition programs (Commuter of the Month, etc.), create company to company competitions with prize drawings to engage people in the TDM options provided.
Positive Messaging	TDM Marketing	Building Manager	Focus on encouragement, benefits of carpooling/ transit/ active modes to make people feel good about their choices to use alternative modes.
Transportation fairs	TDM Marketing	Building Manager	Transportation fairs provide alternative mode information in a fun event.
Employee Surveys	TDM Marketing	Tenant/Employer	Surveys are key for effective marketing and customer targeting.

Table 7: Potential Travel Demand Management (TDM) Measures

TDM Measure	Program	Implementing/Party	Description
Information Board	TDM Marketing	Tenant/Employer	Permanent locations for updated TDM information creates ease of access to information and makes alternative modes easier to use.
Newsletter articles	TDM Marketing	Tenant/Employer	Articles about TDM in company newsletters fosters a culture of awareness.
Real-Time Travel Information	TDM Marketing	Building Manager	goakamai, DaBus2, Twitter, etc. are all existing real-time platforms that many commuters are unaware of. Dedicated marketing to increase awareness of these platforms can make it much easier for people to use transit.
Guaranteed Ride Home Program	TDM Marketing	Tenant/Employer	Employees who use transit, carpools, or vanpools are guaranteed a ride home in case of emergency or if they need to work late which helps to reduce concerns about using alternative modes.
Install Neighborhood Electric Vehicle (NEV) Network	Transit Programs	Developer	Create a path/roadway system that accommodates NEVs and limits conflicts with standard automobiles
Transit Pass Subsidies	Transit Programs	Tenant/Employer	Employers subsidized transit passes through programs such as Commuter Check or by purchasing passes provides a financial incentive for employees to use transit.
Campus Shuttle	Transit Programs	Building Manager	Operation of a shuttle that circulates through the campus and residential area and connects the retail areas and trolley station.
Free trial rides	Transit Programs	Building Manager	Free transit tickets for employees interested in using transit can get people used to using transit and convince them that it is a viable alternative.
Transit Amenities	Transit Programs	Building Manager	Work with the transit agencies to improve facilities at existing bus stops such as benches, shelters, lighting, bicycle parking, etc. to make transit a more attractive option.
Transit riders guide	Transit Programs	Building Manager	A guide with transit routes and schedules to the site makes access using transit easier.
Mobility Hub	Transit Programs	Developer	Build a multi-modal transportation hub that includes access to transit, car share, bike/scooter share, on-site shuttle, package delivery facility, and other features to facilitate modal transfer and reduce vehicle trips
On-Site Shuttle Stop	Transit Programs	Developer	Shuttle stops on site making shuttle use convenient.

Table 7: Potential Travel Demand Management (TDM) Measures

TDM Measure	Program	Implementing/Party	Description
Transit Stop	Transit Programs	Developer	Bus stops near the employer facilitate transit access.
Transit App	Transit Programs	Other	Downloadable smart phone application providing schedule and stop information for private shuttles and public transit make transit use even more convenient.
Long Haul Buses	Transit Programs	Tenant/Employer	Providing bus service to pick up and drop off employees from home to work provides an attractive alternative to driving for people who live far away from their employer. By providing comfortable seats and a wireless internet connection on the bus employees can be productive while commuting which makes the service an appealing alternative.
On-site Pass Outlet	Transit Programs	Tenant/Employer	Providing transit passes for sale onsite as a convenience for employees makes it easier to commute using transit.
Transit Field Trips	Transit Programs	Tenant/Employer	Orient new transit riders by showing them the local routes, fare collection method, transfer points, and other operational features to eliminate the education barrier to using transit.

Appendix A: Traffic and Segment Counts

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Waiakamilo Rd -- N Nimitz Hwy

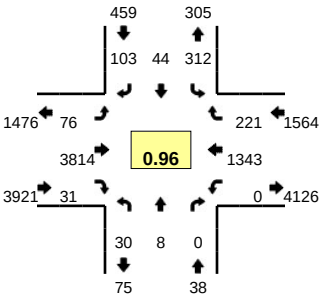
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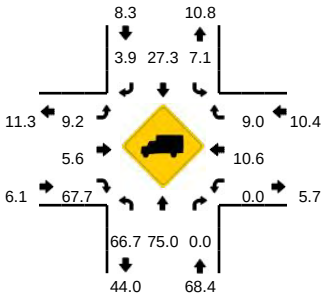
CITY/STATE: Honolulu, HI

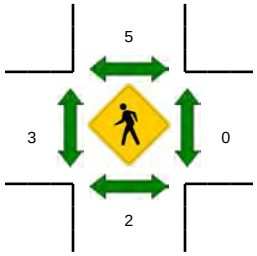
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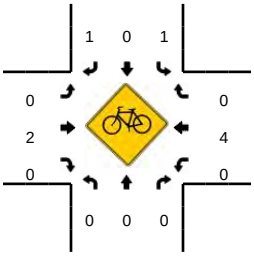
Peak-Hour: 7:05 AM -- 8:05 AM

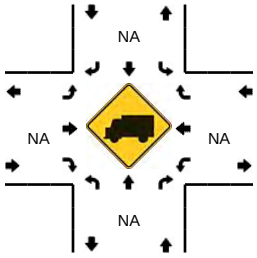
Peak 15-Min: 7:35 AM -- 7:50 AM

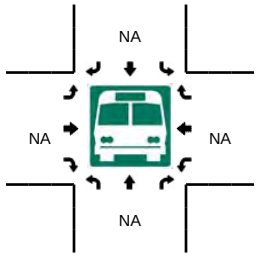


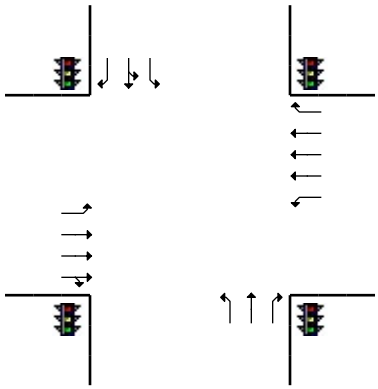












5-Min Count Period Beginning At	Waiakamilo Rd (Northbound)				Waiakamilo Rd (Southbound)				N Nimitz Hwy (Eastbound)				N Nimitz Hwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:35 AM	0	1	0	0	20	2	7	0	10	241	0	0	0	99	14	0	394	
6:40 AM	0	0	0	0	22	4	12	0	4	304	1	0	0	115	7	0	469	
6:45 AM	0	0	0	0	35	1	12	0	9	313	0	0	0	83	7	0	460	
6:50 AM	1	0	0	0	33	3	4	0	3	241	2	0	0	80	7	0	374	
6:55 AM	0	0	0	0	11	3	11	0	9	342	2	0	0	90	13	0	481	4284
7:00 AM	1	0	0	0	15	0	14	0	7	333	3	0	0	97	10	0	480	4486
7:05 AM	0	0	0	0	15	3	8	0	4	354	1	0	0	122	14	0	521	4751
7:10 AM	1	0	0	0	41	5	6	0	7	294	5	0	0	87	16	0	462	4962
7:15 AM	1	0	0	0	25	1	1	0	5	357	0	0	0	112	18	0	520	5178
7:20 AM	1	0	0	0	12	1	8	0	4	365	1	0	0	114	18	0	524	5359
7:25 AM	3	0	0	0	22	7	7	0	5	333	2	0	0	113	17	0	509	5517
7:30 AM	4	1	0	0	51	5	8	0	9	229	0	0	0	97	17	0	421	5615
7:35 AM	0	3	0	0	26	3	12	0	7	331	3	0	0	117	10	0	512	5733
7:40 AM	6	0	0	0	17	3	6	0	6	334	5	0	0	115	23	0	515	5779
7:45 AM	1	0	0	0	16	4	17	0	7	345	2	0	0	122	21	0	535	5854
7:50 AM	7	2	0	0	39	2	12	0	10	212	6	0	0	84	10	0	384	5864
7:55 AM	3	1	0	0	28	5	11	0	10	310	4	0	0	117	30	0	519	5902
8:00 AM	3	1	0	0	20	5	7	0	2	350	2	0	0	143	27	0	560	5982
8:05 AM	2	1	0	0	23	2	8	0	10	331	0	0	0	111	29	0	517	5978
8:10 AM	7	0	0	0	52	4	13	0	9	231	3	0	0	99	16	0	434	5950
8:15 AM	1	1	0	0	27	5	20	0	19	290	2	0	0	109	19	0	493	5923
8:20 AM	2	1	0	0	20	2	10	0	9	315	5	0	0	97	26	0	487	5886
8:25 AM	5	1	0	0	12	8	10	0	8	317	2	0	0	111	21	0	495	5872
8:30 AM	5	4	0	0	39	7	18	0	10	237	5	0	0	83	25	0	433	5884

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	28	12	0	0	236	40	140	0	80	4040	40	0	0	1416	216	0	6248
Heavy Trucks	20	12	0		12	8	0		12	164	28		0	156	20		432
Pedestrians		0				8				0				0			8
Bicycles	0	0	0		0	0	0		0	1	0		0	2	0		3
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/31/2018 4:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

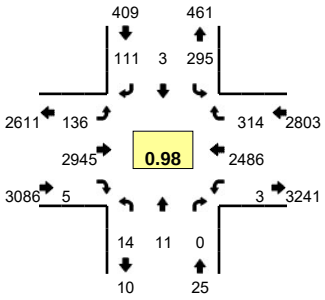
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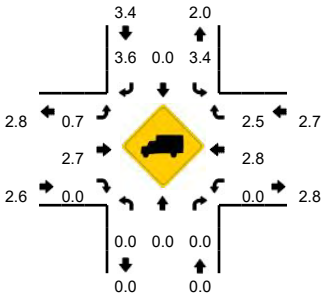
Method for determining peak hour: Total Entering Volume

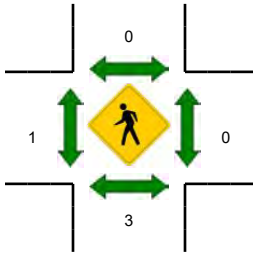
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CITY/STATE: Honolulu, HI

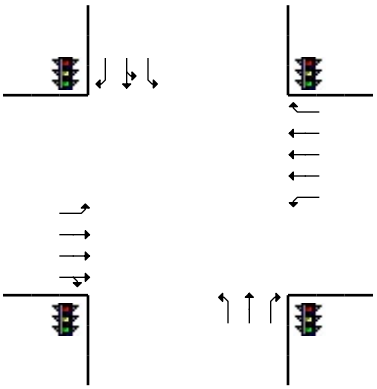
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DATE: Wed, Oct 03 2018

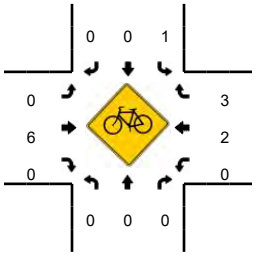
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Peak 15-Min: 4:35 PM -- 4:50 PM

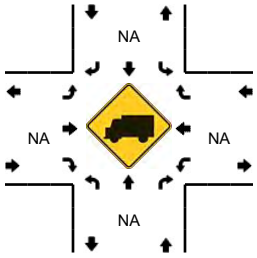


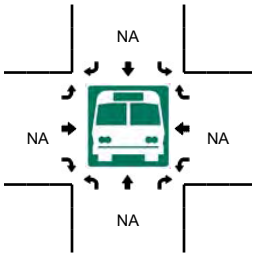












5-Min Count Period Beginning At	Waiakamilo Rd (Northbound)				Waiakamilo Rd (Southbound)				N Nimitz Hwy (Eastbound)				N Nimitz Hwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:50 PM	0	0	0	0	14	0	13	0	8	257	0	0	0	216	33	0	541	
3:55 PM	1	0	0	0	32	1	24	0	12	204	1	0	0	176	34	0	485	5920
4:00 PM	1	1	0	0	21	0	14	0	20	227	2	0	0	136	28	0	450	5894
4:05 PM	4	3	0	0	16	0	11	0	12	259	1	0	0	236	25	0	567	6035
4:10 PM	2	2	0	0	24	0	21	0	13	231	0	0	0	188	17	0	498	6111
4:15 PM	2	3	0	0	40	1	23	0	18	222	0	0	0	137	18	0	464	6056
4:20 PM	0	1	0	0	14	0	10	0	4	260	0	0	0	247	32	0	568	6057
4:25 PM	1	0	0	0	23	0	6	0	10	271	0	0	0	230	33	0	574	6210
4:30 PM	1	1	0	0	38	0	19	0	9	206	1	0	0	138	22	0	435	6139
4:35 PM	1	0	0	0	23	0	4	0	21	264	0	0	0	213	31	0	557	6136
4:40 PM	1	2	0	0	29	0	10	0	10	250	0	0	0	234	34	0	570	6241
4:45 PM	3	2	0	0	46	1	10	0	14	207	1	0	0	184	19	0	487	6196
4:50 PM	0	0	0	0	21	0	6	0	20	243	0	0	1	209	31	0	531	6186
4:55 PM	0	0	0	0	16	0	9	0	7	268	1	0	0	213	30	0	544	6245
5:00 PM	3	3	0	0	28	1	11	0	6	240	0	0	1	191	18	0	502	6297
5:05 PM	2	2	0	0	31	0	5	0	18	221	1	0	0	170	20	1	471	6201
5:10 PM	0	0	0	0	9	1	10	0	8	263	1	0	0	223	25	0	540	6243
5:15 PM	2	0	0	0	17	0	11	0	9	252	0	0	0	234	19	0	544	6323
5:20 PM	1	3	0	0	39	1	9	0	6	221	1	0	0	156	27	0	464	6219
5:25 PM	0	1	0	0	12	0	0	0	5	263	1	0	0	220	24	0	526	6171
5:30 PM	3	0	0	0	14	0	10	0	11	258	0	0	0	248	26	0	570	6306
5:35 PM	0	1	0	0	32	0	13	0	5	190	0	0	0	172	20	0	433	6182
5:40 PM	0	0	0	0	22	1	17	0	7	238	1	0	0	226	31	0	543	6155
5:45 PM	1	2	0	0	21	0	18	0	7	216	0	0	0	223	26	0	514	6182

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	16	0	0	392	4	96	0	180	2884	4	0	0	2524	336	0	6456
Heavy Trucks	0	0	0		0	0	0		0	84	0		0	64	4		152
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	1	0		0	1	1		3
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/31/2018 4:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

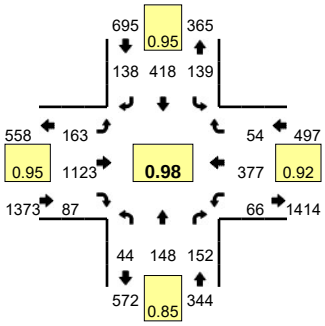
Method for determining peak hour: Total Entering Volume

LOCATION: Waiakamilo Rd -- Dillingham Blvd

QC JOB #: 14792311

CITY/STATE: Honolulu, HI

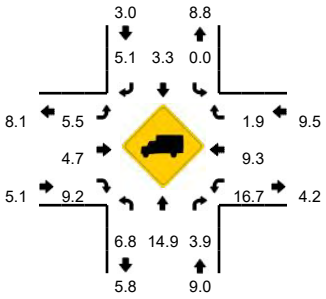
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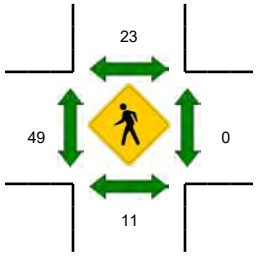


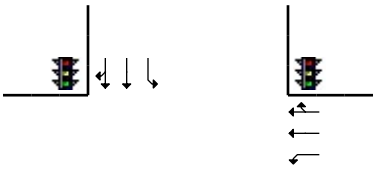
Peak-Hour: 7:30 AM -- 8:30 AM

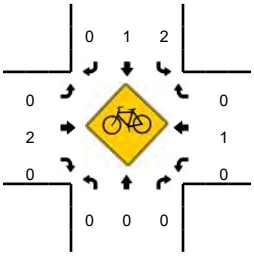
Peak 15-Min: 7:30 AM -- 7:45 AM

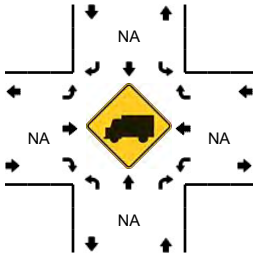


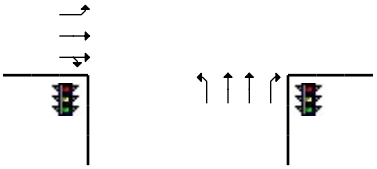


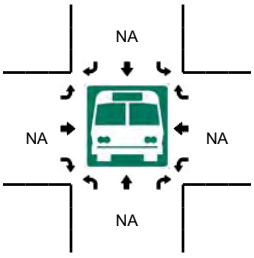












15-Min Count Period Beginning At	Waiakamilo Rd (Northbound)				Waiakamilo Rd (Southbound)				Dillingham Blvd (Eastbound)				Dillingham Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	6	26	10	0	20	65	18	0	29	106	7	0	20	52	9	0	368	
6:15 AM	4	17	25	1	20	86	25	0	25	129	22	0	7	61	6	0	428	
6:30 AM	2	22	20	1	25	110	21	0	28	184	22	0	7	50	8	0	500	
6:45 AM	7	31	22	0	21	95	24	0	24	205	17	1	14	67	5	0	533	1829
7:00 AM	7	32	26	0	16	105	24	0	34	312	15	0	17	67	9	0	664	2125
7:15 AM	7	56	26	0	29	122	28	0	41	264	17	0	16	74	15	0	695	2392
7:30 AM	13	39	39	1	33	98	38	0	44	297	20	0	14	89	15	0	740	2632
7:45 AM	9	41	32	0	31	112	45	0	30	276	25	0	18	91	10	0	720	2819
8:00 AM	13	34	38	0	44	102	30	0	50	256	25	0	20	89	10	0	711	2866
8:15 AM	8	34	43	0	31	106	25	0	39	294	17	0	14	108	19	0	738	2909
8:30 AM	14	51	41	0	32	97	24	0	40	257	28	0	19	110	12	0	725	2894
8:45 AM	7	50	26	0	28	120	20	0	39	245	38	1	17	84	16	0	691	2865

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	52	156	156	4	132	392	152	0	176	1188	80	0	56	356	60	0	2960
Heavy Trucks	0	36	8		0	0	4		8	52	4		0	28	0		140
Pedestrians		12				16				60				0			88
Bicycles	0	0	0		2	0	0		0	0	0		0	0	0		2
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/12/2018 2:54 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

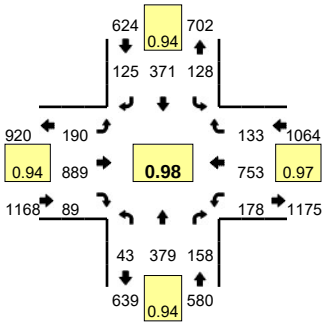
Method for determining peak hour: Total Entering Volume

LOCATION: Waiakamilo Rd -- Dillingham Blvd

QC JOB #: 14792312

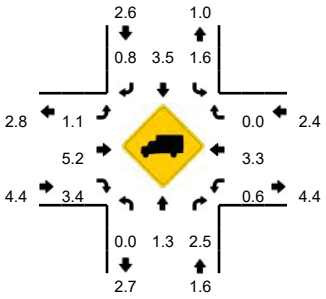
CITY/STATE: Honolulu, HI

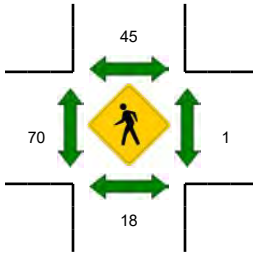
DATE: Thu, Sep 27 2018

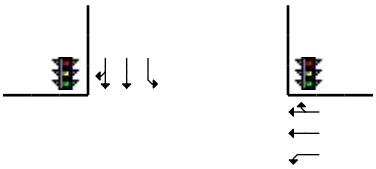


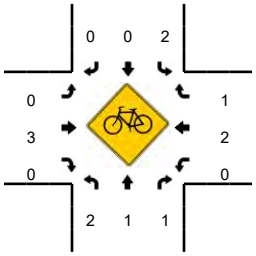
Peak-Hour: 3:45 PM -- 4:45 PM

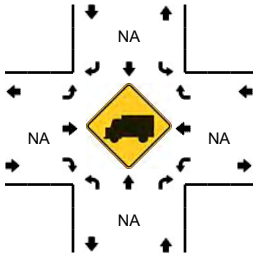
Peak 15-Min: 4:30 PM -- 4:45 PM

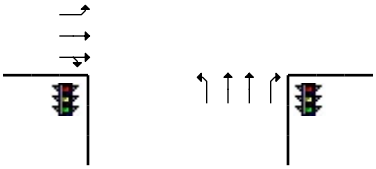


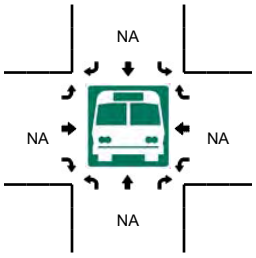












15-Min Count Period Beginning At	Waiakamilo Rd (Northbound)				Waiakamilo Rd (Southbound)				Dillingham Blvd (Eastbound)				Dillingham Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	14	76	41	0	20	94	19	0	48	176	24	0	27	163	44	0	746	
3:15 PM	12	79	33	1	43	82	28	0	51	220	24	0	33	157	39	0	802	
3:30 PM	13	95	45	0	47	96	27	0	46	212	21	0	39	177	33	0	851	
3:45 PM	13	96	37	0	34	98	38	0	44	226	31	0	42	178	32	0	869	3268
4:00 PM	11	88	37	1	30	83	26	0	54	244	20	0	49	190	33	0	866	3388
4:15 PM	9	89	44	0	36	98	25	0	49	206	18	0	41	171	36	0	822	3408
4:30 PM	9	106	40	0	28	92	36	0	43	213	20	0	46	214	32	0	879	3436
4:45 PM	22	100	36	0	22	110	25	0	43	184	24	0	38	207	48	0	859	3426
5:00 PM	15	87	28	0	37	75	32	0	46	140	23	0	42	222	39	0	786	3346
5:15 PM	12	80	36	0	25	73	28	0	46	139	18	0	51	214	43	0	765	3289
5:30 PM	25	83	32	0	24	71	20	0	37	150	13	0	35	194	37	0	721	3131
5:45 PM	17	73	29	0	24	82	24	0	36	134	22	0	32	184	46	0	703	2975

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	36	424	160	0	112	368	144	0	172	852	80	0	184	856	128	0	3516
Heavy Trucks	0	8	0		4	8	0		0	20	0		0	20	0		60
Pedestrians		28				52				80				4			164
Bicycles	1	0	1		0	0	0		0	0	0		0	1	0		3
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/12/2018 2:54 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

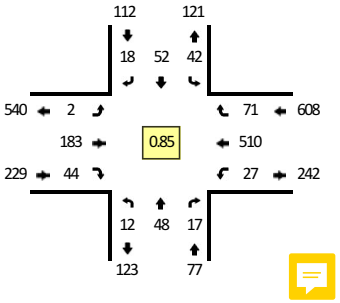
Type of peak hour being reported: System Peak

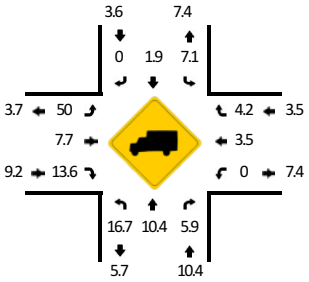
Method for determining peak hour: Total Entering Volume

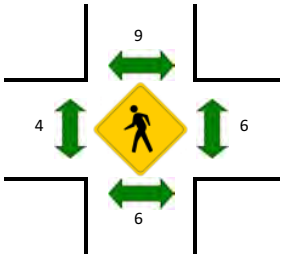
LOCATION: Kaumualii St -- Waiakamilo Rd
CITY/STATE: Honolulu, HI

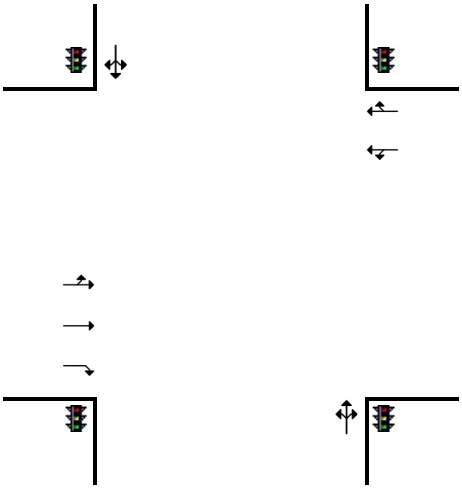
QC JOB #: 150844108
DATE: Wed, Oct 9 2019

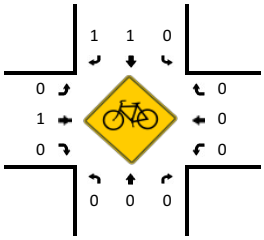
Peak-Hour: 6:45 AM -- 7:45 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

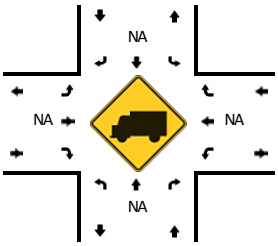


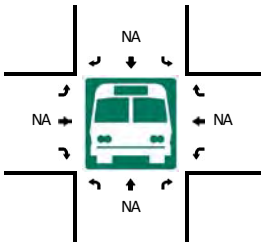












15-Min Count Period Beginning At	Kaumualii St (Northbound)				Kaumualii St (Southbound)				Waiakamilo Rd (Eastbound)				Waiakamilo Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	1	4	5	0	6	6	7	0	0	34	8	0	1	79	12	0	163	
6:15 AM	3	2	0	0	5	5	1	0	1	46	12	0	5	108	17	0	205	
6:30 AM	3	2	0	0	6	14	4	0	2	38	13	0	4	99	23	0	208	
6:45 AM	5	12	2	0	13	9	2	0	1	40	8	0	4	132	13	0	241	817
7:00 AM	3	6	3	0	4	12	5	0	0	40	13	0	6	108	17	0	217	871
7:15 AM	2	18	3	0	13	8	5	0	0	51	9	0	8	134	15	0	266	932
7:30 AM	2	12	9	0	12	23	6	0	1	52	14	0	9	136	26	0	302	1026
7:45 AM	3	6	0	0	14	8	4	0	0	43	17	0	7	133	23	0	258	1043
8:00 AM	4	16	9	0	8	17	2	0	3	66	15	0	13	110	18	1	282	1108
8:15 AM	6	6	6	0	8	11	4	0	4	68	15	0	5	114	10	0	257	1099
8:30 AM	7	8	3	0	13	12	1	0	2	52	22	0	15	94	13	0	242	1039
8:45 AM	3	10	11	0	10	15	3	0	2	62	21	0	8	87	19	0	251	1032

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	48	36	0	48	92	24	0	4	208	56	0	36	544	104	0	1208
Heavy Trucks	4	4	4		4	4	0		4	8	4		0	12	8		56
Pedestrians		4				8				8				8			28
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 10/28/2019 2:35 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

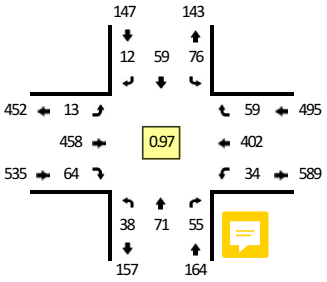
Type of peak hour being reported: System Peak

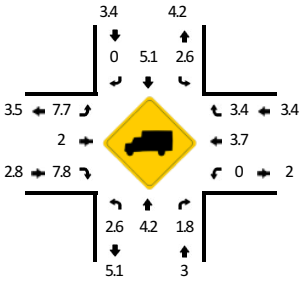
Method for determining peak hour: Total Entering Volume

LOCATION: Kaumualii St -- Waiakamilo Rd
CITY/STATE: Honolulu, HI

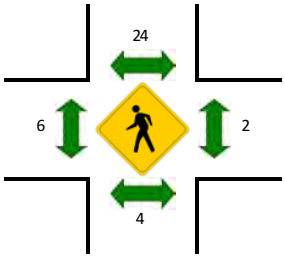
QC JOB #: 150844107
DATE: Wed, Oct 9 2019

Peak-Hour: 3:45 PM -- 4:45 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

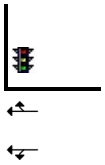


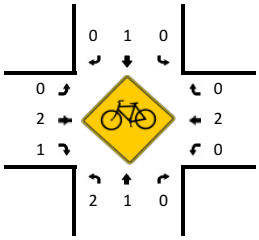


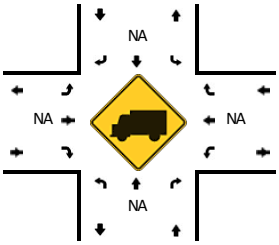
Quality Counts
DATA THAT DRIVES COMMUNITIES

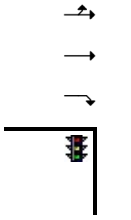


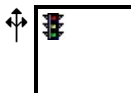


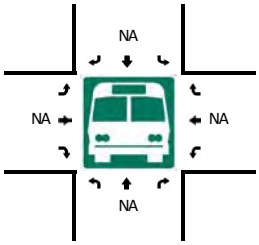












15-Min Count Period Beginning At	Kaumualii St (Northbound)				Kaumualii St (Southbound)				Waiakamilo Rd (Eastbound)				Waiakamilo Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	4	23	14	0	20	9	3	0	3	101	21	0	12	111	9	0	330	
3:15 PM	8	19	18	0	13	16	5	0	2	100	13	0	11	87	11	0	303	
3:30 PM	14	23	10	0	17	11	2	0	3	96	5	0	6	99	15	0	301	
3:45 PM	3	21	15	0	22	26	4	0	3	112	21	0	9	86	14	0	336	1270
4:00 PM	13	23	18	0	16	12	2	0	2	114	15	0	10	111	8	0	344	1284
4:15 PM	10	11	8	0	20	18	4	0	6	110	13	0	10	109	16	0	335	1316
4:30 PM	12	16	14	0	18	3	2	0	2	122	15	0	5	96	21	0	326	1341
4:45 PM	11	17	12	0	21	9	2	0	6	135	9	0	9	86	16	0	333	1338
5:00 PM	5	17	13	0	14	7	7	0	3	124	14	0	7	99	17	0	327	1321
5:15 PM	4	16	12	0	14	9	6	0	2	136	11	0	6	88	10	0	314	1300
5:30 PM	2	15	13	0	10	6	7	0	3	102	11	0	8	109	14	0	300	1274
5:45 PM	3	10	12	0	22	10	6	0	3	111	9	0	8	78	8	0	280	1221

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	52	92	72	0	64	48	8	0	8	456	60	0	40	444	32	0	1376
Heavy Trucks	0	8	4		4	0	0		4	12	4		0	12	0		48
Pedestrians		4				8				4				0			16
Bicycles	0	0	0		0	0	0		0	0	0		0	1	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2019 2:32 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 4. Waiakamilo Rd -- Alokele St/Moonui St

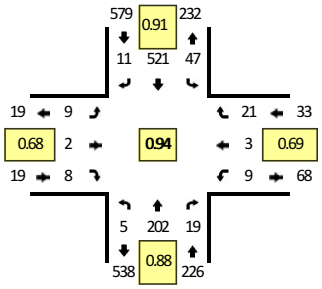
CITY/STATE: Urban Honolulu, HI

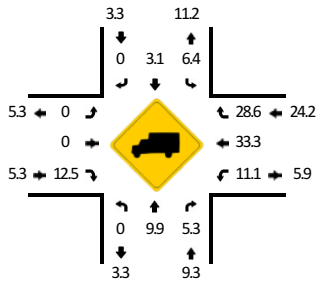
QC JOB #: 15596001

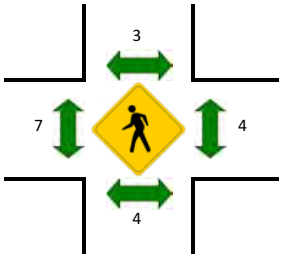
DATE: Wed, Oct 13 2021

Peak-Hour: 7:15 AM -- 8:15 AM

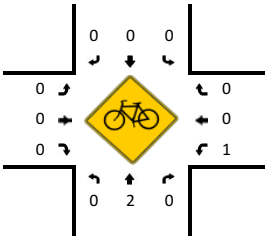
Peak 15-Min: 7:15 AM -- 7:30 AM

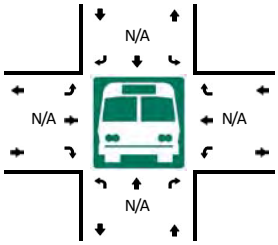




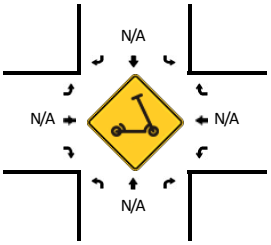












15-Min Count Period Beginning At	4. Waiakamilo Rd (Northbound)				4. Waiakamilo Rd (Southbound)				Alokele St/Moonui St (Eastbound)				Alokele St/Moonui St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	22	2	0	4	89	1	0	0	1	1	0	2	0	0	0	122	
6:15 AM	0	33	3	0	6	116	1	0	1	0	0	0	1	0	1	0	162	
6:30 AM	0	33	4	0	9	105	0	1	0	0	0	0	5	0	8	0	165	
6:45 AM	0	45	0	0	10	137	0	0	3	0	0	0	5	0	8	0	208	657
7:00 AM	1	54	1	0	8	112	1	0	0	1	2	0	2	0	6	0	188	723
7:15 AM	0	56	0	0	11	144	4	0	1	1	2	0	0	1	7	0	227	788
7:30 AM	2	44	2	0	7	138	0	0	3	0	3	0	3	0	0	0	202	825
7:45 AM	3	55	6	0	14	123	3	0	4	1	2	0	2	0	8	0	221	838
8:00 AM	0	47	11	0	15	116	4	0	1	0	1	0	4	2	6	0	207	857
8:15 AM	1	48	3	1	14	100	2	0	1	2	1	0	3	0	11	0	187	817
8:30 AM	5	60	4	0	17	106	4	0	1	0	1	0	3	0	5	0	206	821
8:45 AM	0	50	11	0	13	124	2	0	0	1	2	0	5	2	2	0	212	812

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	224	0	0	44	576	16	0	4	4	8	0	0	4	28	0	908
Heavy Trucks	0	16	0		0	12	0		0	0	0		0	0	4		32
Buses																	
Pedestrians		0				8				16				0			24
Bicycles	0	4	0		0	0	0		0	0	0		0	0	0		4
Scooters																	

Comments:

Report generated on 10/22/2021 10:01 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 4. Waiakamilo Rd -- Alokele St/Moonui St

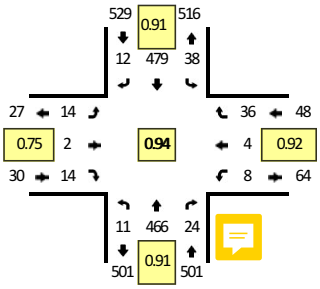
QC JOB #: 15596002

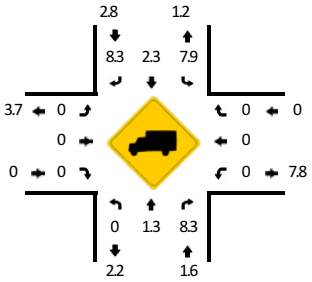
CITY/STATE: Urban Honolulu, HI

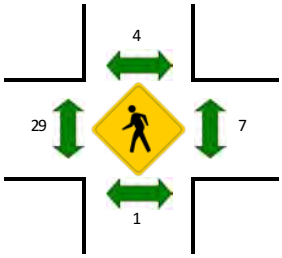
DATE: Wed, Oct 13 2021

Peak-Hour: 3:15 PM -- 4:15 PM

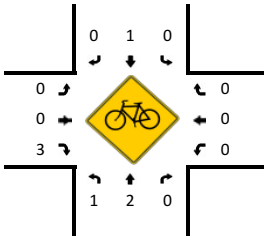
Peak 15-Min: 3:45 PM -- 4:00 PM

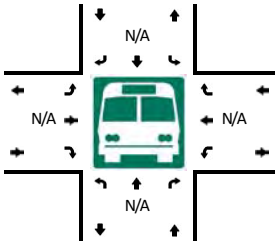




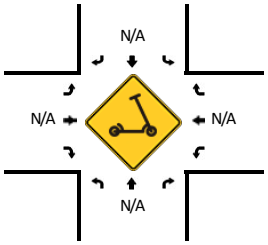












15-Min Count Period Beginning At	4. Waiakamilo Rd (Northbound)				4. Waiakamilo Rd (Southbound)				Alokele St/Moonui St (Eastbound)				Alokele St/Moonui St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	0	103	7	0	7	118	2	0	2	0	1	0	4	0	7	0	251	
3:15 PM	3	110	4	0	8	130	3	0	3	0	2	0	0	1	11	0	275	
3:30 PM	4	103	7	0	11	116	2	0	2	2	6	0	3	1	6	0	263	
3:45 PM	3	122	7	0	13	128	4	0	4	0	1	0	4	1	8	0	295	1084
4:00 PM	1	131	6	0	6	105	3	0	5	0	5	0	1	1	11	0	275	1108
4:15 PM	3	95	7	0	4	104	3	0	1	2	1	0	5	0	5	0	230	1063
4:30 PM	3	129	6	0	7	104	7	0	3	1	4	0	1	1	7	0	273	1073
4:45 PM	5	109	3	0	8	83	4	0	3	2	2	0	1	0	19	0	239	1017
5:00 PM	3	124	4	0	9	110	5	0	4	0	3	0	5	0	12	0	279	1021
5:15 PM	1	103	2	0	8	131	3	0	2	0	3	0	4	0	4	0	261	1052
5:30 PM	3	101	6	0	5	114	3	0	2	0	3	0	5	0	9	0	251	1030
5:45 PM	4	98	2	0	15	82	4	0	2	1	2	0	4	1	16	0	231	1022

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	488	28	0	52	512	16	0	16	0	4	0	16	4	32	0	1180
Heavy Trucks	0	4	0		8	12	0		0	0	0		0	0	0		24
Buses																	
Pedestrians		4				8				12				12			36
Bicycles	4	4	0		0	0	0		0	0	4		0	0	0		12
Scooters																	

Comments:

Report generated on 10/22/2021 10:01 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

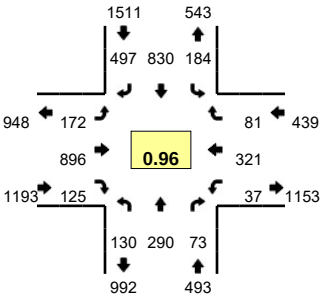
Method for determining peak hour: Total Entering Volume

LOCATION: Waiakamilo Rd -- N King St

CITY/STATE: Honolulu, HI

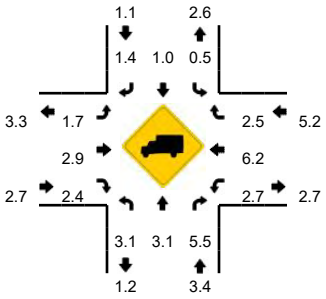
QC JOB #: 14802105

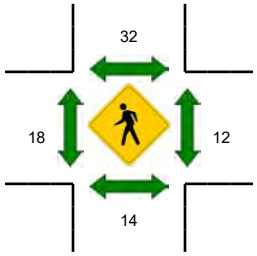
DATE: Wed, Oct 03 2018

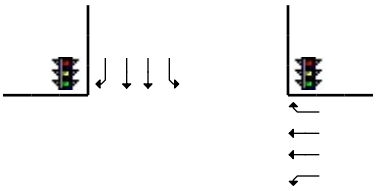


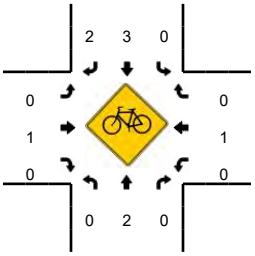
Peak-Hour: 7:15 AM -- 8:15 AM

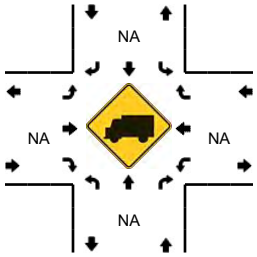
Peak 15-Min: 7:20 AM -- 7:35 AM

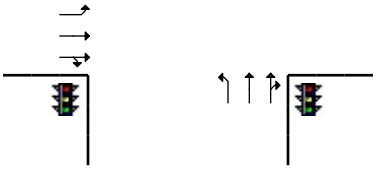


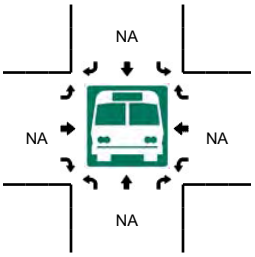












5-Min Count Period Beginning At	Waiakamilo Rd (Northbound)				Waiakamilo Rd (Southbound)				N King St (Eastbound)				N King St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:45 AM	5	26	3	0	13	60	27	0	9	46	7	0	1	17	7	0	221	
6:50 AM	4	14	2	0	15	44	26	0	16	62	14	0	1	20	14	0	232	
6:55 AM	2	10	5	0	10	58	30	0	17	77	11	0	2	14	5	0	241	2096
7:00 AM	9	24	3	0	14	75	29	0	17	55	8	0	2	12	10	0	258	2258
7:05 AM	10	10	2	0	20	48	31	0	14	84	4	0	4	21	6	0	254	2391
7:10 AM	6	26	4	0	10	63	34	0	18	83	13	0	3	22	8	0	290	2552
7:15 AM	13	33	9	0	17	82	36	0	9	66	4	0	0	18	4	0	291	2678
7:20 AM	7	18	3	0	18	45	46	0	18	106	7	0	2	31	12	0	313	2839
7:25 AM	6	21	7	0	10	75	47	0	15	87	8	0	3	27	4	0	310	2978
7:30 AM	14	32	6	0	18	87	46	0	11	64	9	0	6	24	2	0	319	3127
7:35 AM	12	14	3	0	19	47	54	0	18	74	7	0	4	25	8	0	285	3196
7:40 AM	10	33	6	0	10	80	40	0	12	74	11	0	0	34	8	0	318	3332
7:45 AM	9	30	5	0	18	82	53	0	19	50	12	0	0	18	4	0	300	3411
7:50 AM	25	20	7	0	19	39	35	0	15	80	15	0	6	30	8	0	299	3478
7:55 AM	3	24	7	0	9	88	41	0	13	78	15	0	1	30	7	0	316	3553
8:00 AM	14	27	7	0	18	81	55	0	12	53	10	0	5	23	9	0	314	3609
8:05 AM	15	14	3	0	17	48	25	0	14	82	13	0	7	22	6	0	266	3621
8:10 AM	2	24	10	0	11	76	19	0	16	82	14	0	3	39	9	0	305	3636
8:15 AM	8	27	7	0	18	73	16	0	17	67	17	0	2	25	8	0	285	3630
8:20 AM	8	20	4	0	17	42	27	0	8	76	5	0	6	25	5	0	243	3560
8:25 AM	9	29	6	0	5	60	21	0	8	68	20	0	7	27	11	0	271	3521
8:30 AM	6	28	10	0	15	67	9	0	9	57	11	0	2	24	6	0	244	3446
8:35 AM	7	12	2	0	17	43	28	0	12	79	12	0	5	25	11	0	253	3414
8:40 AM	6	24	8	0	4	47	18	0	15	74	14	0	3	33	10	0	256	3352

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	108	284	64	0	184	828	556	0	176	1028	96	0	44	328	72	0	3768
Heavy Trucks	0	4	0		0	8	4		4	20	4		0	24	0		68
Pedestrians		20				44				32				16			112
Bicycles	0	0	0		0	1	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/31/2018 4:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

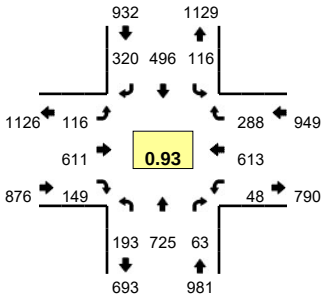
LOCATION: Waiakamilo Rd -- N King St

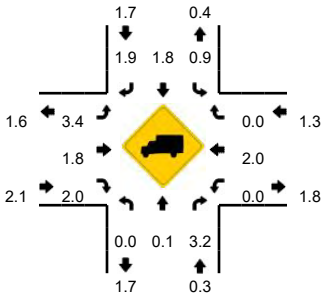
QC JOB #: 14802106

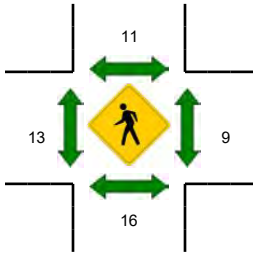
CITY/STATE: Honolulu, HI

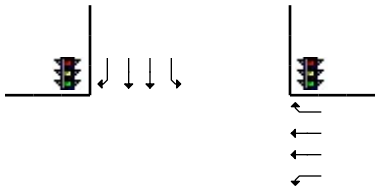
DATE: Wed, Oct 03 2018

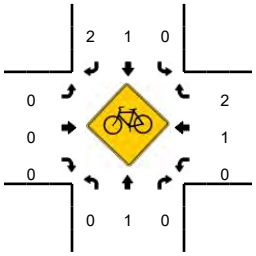
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 4:35 PM -- 4:50 PM

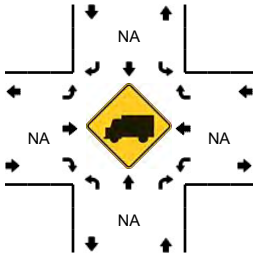




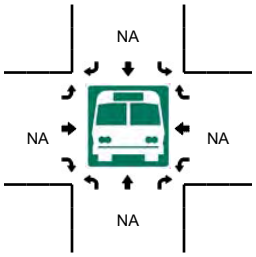












5-Min Count Period Beginning At	Waiakamilo Rd (Northbound)				Waiakamilo Rd (Southbound)				N King St (Eastbound)				N King St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	23	36	7	0	6	22	25	0	4	40	17	0	11	48	24	0	263	3332
4:05 PM	16	66	8	0	6	43	21	0	7	53	14	0	2	56	20	0	312	3379
4:10 PM	14	53	6	0	8	48	30	0	5	41	6	0	7	40	12	0	270	3382
4:15 PM	8	42	4	0	9	48	31	0	5	47	12	0	3	39	21	0	269	3399
4:20 PM	18	41	8	0	11	42	23	0	4	48	12	0	6	48	26	0	287	3437
4:25 PM	13	58	6	0	8	54	22	0	9	41	6	0	8	46	20	0	291	3453
4:30 PM	15	76	7	0	13	47	25	0	10	36	7	0	6	29	23	0	294	3446
4:35 PM	17	36	6	0	14	37	31	0	9	73	8	0	3	70	27	0	331	3504
4:40 PM	14	58	7	0	12	41	25	0	7	60	22	0	6	59	32	0	343	3540
4:45 PM	16	76	5	0	8	48	24	0	7	47	12	0	1	53	29	0	326	3569
4:50 PM	18	57	4	0	9	59	23	0	20	38	15	0	5	30	25	0	303	3572
4:55 PM	12	41	3	0	11	38	30	0	12	66	13	0	4	53	16	0	299	3588
5:00 PM	16	71	6	0	5	33	25	0	8	65	13	0	5	72	24	0	343	3668
5:05 PM	22	65	11	0	8	41	36	0	11	46	12	0	5	38	22	0	317	3673
5:10 PM	22	68	2	0	10	40	26	0	8	40	5	0	3	42	26	0	292	3695
5:15 PM	13	47	4	0	6	28	20	0	6	51	16	0	5	67	27	0	290	3716
5:20 PM	9	66	5	0	9	32	30	0	9	45	8	0	3	62	23	0	301	3730
5:25 PM	19	64	3	0	11	52	25	0	9	44	18	0	2	38	14	0	299	3738
5:30 PM	21	40	4	0	10	40	18	0	5	42	13	0	9	46	32	0	280	3724
5:35 PM	7	45	6	0	4	49	28	0	9	43	15	0	5	61	29	0	301	3694
5:40 PM	16	33	6	0	8	45	23	0	4	44	8	0	2	52	31	0	272	3623
5:45 PM	14	48	4	0	4	46	23	0	5	34	11	0	11	36	23	0	259	3556
5:50 PM	18	39	3	0	9	27	24	0	4	48	6	0	5	45	21	0	249	3502
5:55 PM	3	39	3	0	6	51	26	0	5	21	14	0	0	33	11	0	212	3415

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	188	680	72	0	136	504	320	0	92	720	168	0	40	728	352	0	4000
Heavy Trucks	0	0	4		0	12	8		4	8	8		0	12	0		56
Pedestrians		16				8				24				0			48
Bicycles	0	0	0		0	0	0		0	0	0		0	0	1		1
Railroad Stopped Buses																	

Comments:

Report generated on 10/31/2018 4:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

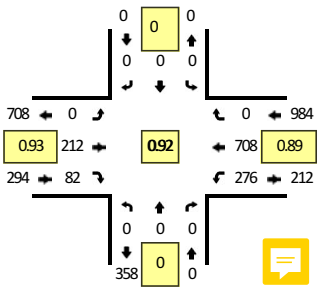
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

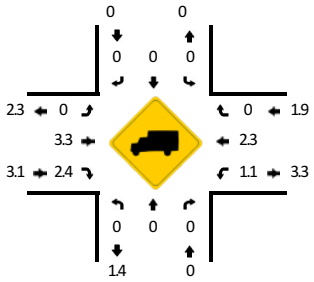
LOCATION: 6. Olomea St -- Houghtailing St
CITY/STATE: Urban Honolulu, HI

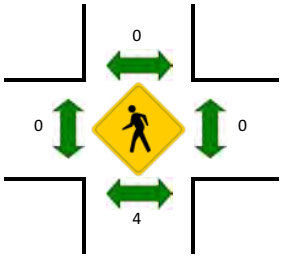
QC JOB #: 15596003
DATE: Wed, Oct 13 2021

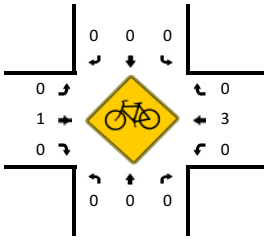
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

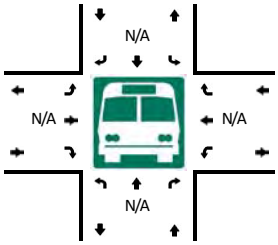


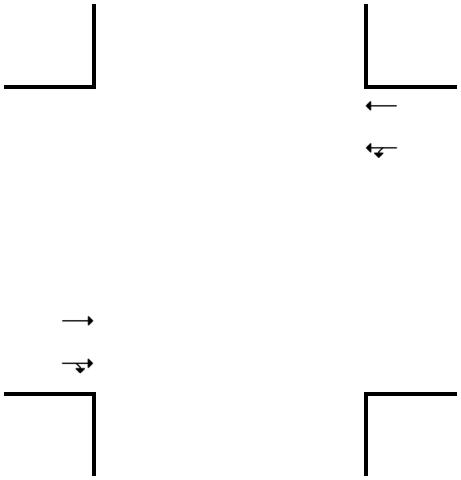
Quality Counts
DATA THAT DRIVES COMMUNITIES

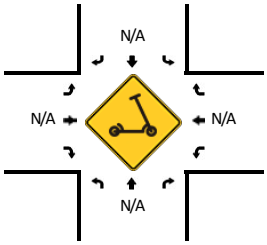












15-Min Count Period Beginning At	6. Olomea St (Northbound)				6. Olomea St (Southbound)				Houghtailing St (Eastbound)				Houghtailing St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	0	0	0	0	0	0	0	0	15	4	0	19	122	0	0	160	
6:15 AM	0	0	0	0	0	0	0	0	0	14	5	0	31	160	0	0	210	
6:30 AM	0	0	0	0	0	0	0	0	0	32	11	0	43	144	0	0	230	
6:45 AM	0	0	0	0	0	0	0	0	0	33	12	0	57	182	0	0	284	884
7:00 AM	0	0	0	0	0	0	0	0	0	49	30	0	54	166	0	0	299	1023
7:15 AM	0	0	0	0	0	0	0	0	0	53	20	0	59	181	0	0	313	1126
7:30 AM	0	0	0	0	0	0	0	0	0	58	14	0	83	194	0	0	349	1245
7:45 AM	0	0	0	0	0	0	0	0	0	52	18	0	80	167	0	0	317	1278
8:00 AM	0	0	0	0	0	0	0	0	0	38	11	1	53	176	0	0	279	1258
8:15 AM	0	0	0	0	0	0	0	0	0	41	10	0	42	154	0	0	247	1192
8:30 AM	0	0	0	0	0	0	0	0	0	42	11	0	52	138	0	0	243	1086
8:45 AM	0	0	0	0	0	0	0	0	0	50	15	0	59	187	0	0	311	1080

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	0	232	56	0	332	776	0	0	1396
Heavy Trucks	0	0	0		0	0	0		0	8	8		0	16	0		32
Buses																	
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/22/2021 10:01 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

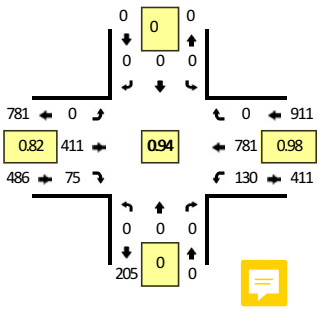
Type of peak hour being reported: Intersection Peak

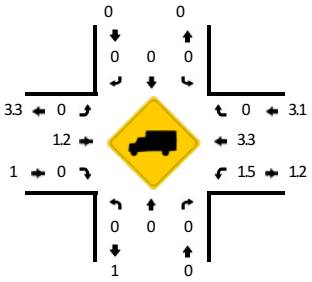
Method for determining peak hour: Total Entering Volume

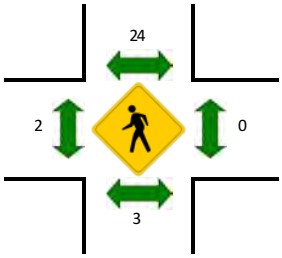
LOCATION: 6. Olomea St -- Houghtailing St
CITY/STATE: Urban Honolulu, HI

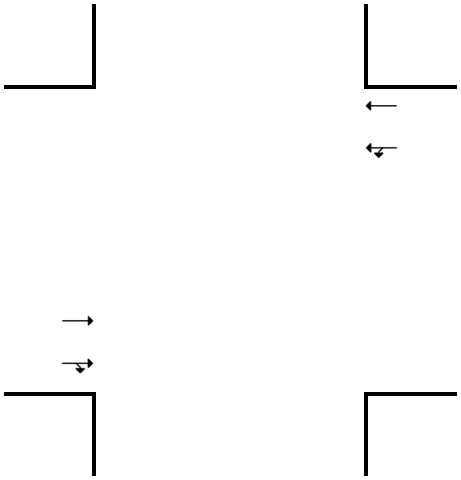
QC JOB #: 15596004
DATE: Wed, Oct 13 2021

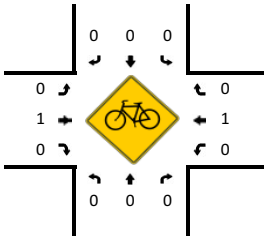
Peak-Hour: 3:00 PM -- 4:00 PM
Peak 15-Min: 3:45 PM -- 4:00 PM

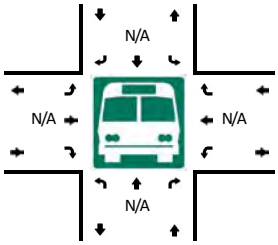


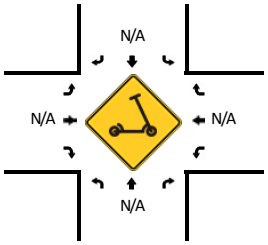












15-Min Count Period Beginning At	6. Olomea St (Northbound)				6. Olomea St (Southbound)				Houghtailing St (Eastbound)				Houghtailing St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	0	0	0	0	0	0	0	0	0	91	21	0	29	196	0	0	337	
3:15 PM	0	0	0	0	0	0	0	0	0	102	16	0	42	191	0	0	351	
3:30 PM	0	0	0	0	0	0	0	0	0	88	19	0	34	195	0	0	336	
3:45 PM	0	0	0	0	0	0	0	0	0	130	19	0	25	199	0	0	373	1397
4:00 PM	0	0	0	0	0	0	0	0	0	110	25	0	27	165	0	0	327	1387
4:15 PM	0	0	0	0	0	0	0	0	0	111	18	0	32	121	0	0	282	1318
4:30 PM	0	0	0	0	0	0	0	0	0	86	16	0	36	145	0	0	283	1265
4:45 PM	0	0	0	0	0	0	0	0	0	119	15	0	38	145	0	0	317	1209
5:00 PM	0	0	0	0	0	0	0	0	0	134	17	0	44	146	0	0	341	1223
5:15 PM	0	0	0	0	0	0	0	0	0	120	17	0	37	162	0	0	336	1277
5:30 PM	0	0	0	0	0	0	0	0	0	118	18	0	24	165	0	0	325	1319
5:45 PM	0	0	0	0	0	0	0	0	0	112	16	0	25	149	0	0	302	1304

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	0	520	76	0	100	796	0	0	1492
Heavy Trucks	0	0	0		0	0	0		0	4	0		0	32	0		36
Buses																	
Pedestrians		4				4				0				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/22/2021 10:01 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

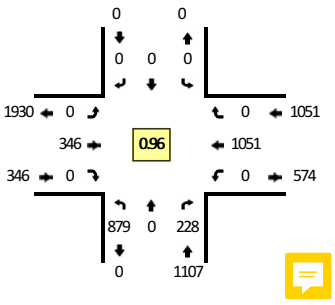
Type of peak hour being reported: System Peak

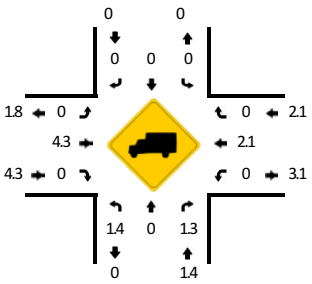
Method for determining peak hour: Total Entering Volume

LOCATION: Halona St -- Houghtailing St
CITY/STATE: Urban Honolulu, HI

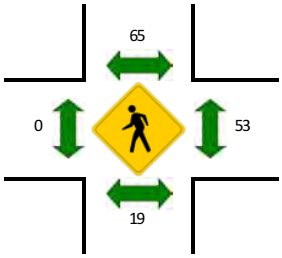
QC JOB #: 15138807
DATE: Wed, Dec 4 2019

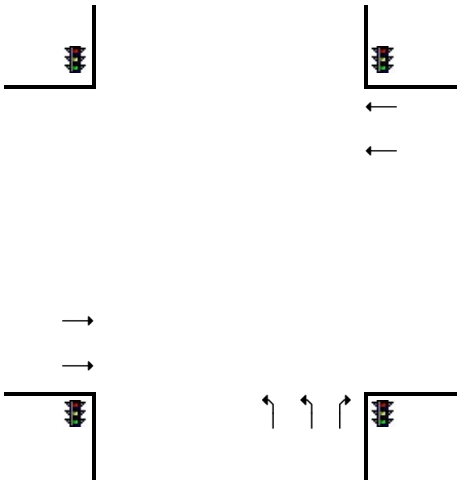
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

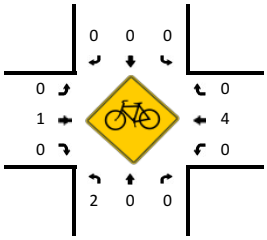


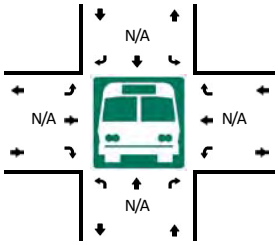


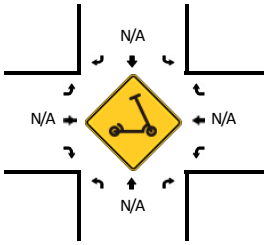
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	Halona St (Northbound)				Halona St (Southbound)				Houghtailing St (Eastbound)				Houghtailing St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	117	0	35	0	0	0	0	0	0	32	0	0	0	91	0	0	275	
6:15 AM	163	0	38	0	0	0	0	0	0	40	0	0	0	138	0	0	379	
6:30 AM	157	0	48	0	0	0	0	0	0	64	0	0	0	142	0	0	411	
6:45 AM	164	0	64	0	0	0	0	0	0	54	0	0	0	213	0	0	495	1560
7:00 AM	184	0	67	0	0	0	0	0	0	72	0	0	0	198	0	0	521	1806
7:15 AM	209	0	60	0	0	0	0	0	0	77	0	0	0	289	0	0	635	2062
7:30 AM	240	0	66	0	0	0	0	0	0	78	0	0	0	270	0	0	654	2305
7:45 AM	237	0	42	0	0	0	0	0	0	88	0	0	0	270	0	0	637	2447
8:00 AM	193	0	60	0	0	0	0	0	0	103	0	0	0	222	0	0	578	2504
8:15 AM	205	0	44	0	0	0	0	0	0	88	0	0	0	177	0	0	514	2383
8:30 AM	159	0	55	0	0	0	0	0	0	106	0	0	0	150	0	0	470	2199
8:45 AM	157	0	47	0	0	0	0	0	0	84	0	0	0	155	0	0	443	2005

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	960	0	264	0	0	0	0	0	0	312	0	0	0	1080	0	0	2616
Heavy Trucks	12	0	0		0	0	0		0	12	0		0	24	0		48
Buses																	
Pedestrians		32				84				0				64			180
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 12/11/2019 10:42 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

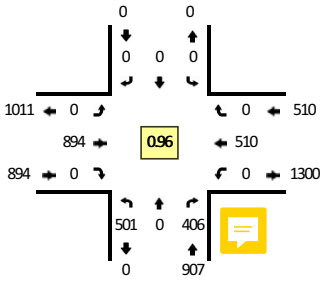
Type of peak hour being reported: System Peak

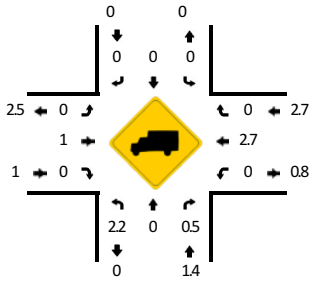
Method for determining peak hour: Total Entering Volume

LOCATION: Halona St -- Houghtailing St
CITY/STATE: Urban Honolulu, HI

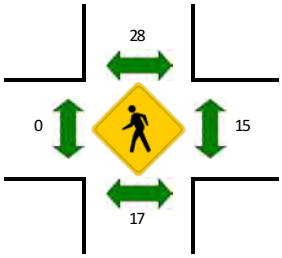
QC JOB #: 15138808
DATE: Wed, Dec 4 2019

Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

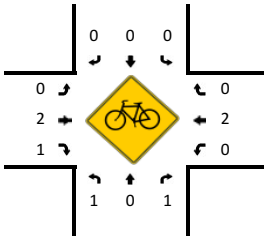


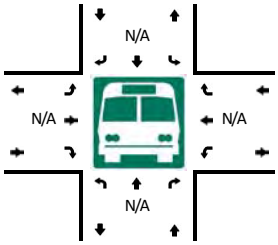


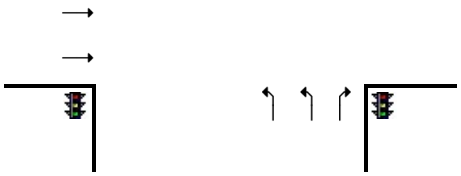
Quality Counts
DATA THAT DRIVES COMMUNITIES

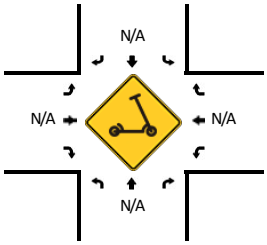












15-Min Count Period Beginning At	Halona St (Northbound)				Halona St (Southbound)				Houghtailing St (Eastbound)				Houghtailing St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	155	0	74	0	0	0	0	0	0	139	0	0	0	137	0	0	505	
3:15 PM	139	0	75	0	0	0	0	0	0	166	0	0	0	145	0	0	525	
3:30 PM	139	0	59	0	0	0	0	0	0	166	0	0	0	136	0	0	500	
3:45 PM	156	0	70	0	0	0	0	0	0	169	0	0	0	135	0	0	530	2060
4:00 PM	140	0	74	0	0	0	0	0	0	201	0	0	0	121	0	0	536	2091
4:15 PM	126	0	99	0	0	0	0	0	0	180	0	0	0	132	0	0	537	2103
4:30 PM	127	0	126	0	0	0	0	0	0	208	0	0	0	147	0	0	608	2211
4:45 PM	137	0	97	0	0	0	0	0	0	220	0	0	0	135	0	0	589	2270
5:00 PM	128	0	100	0	0	0	0	0	0	250	0	0	0	125	0	0	603	2337
5:15 PM	115	0	103	0	0	0	0	0	0	223	0	0	0	136	0	0	577	2377
5:30 PM	121	0	106	0	0	0	0	0	0	201	0	0	0	114	0	0	542	2311
5:45 PM	122	0	88	0	0	0	0	0	0	195	0	0	0	121	0	0	526	2248

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	512	0	400	0	0	0	0	0	0	1000	0	0	0	500	0	0	2412
Heavy Trucks	8	0	4		0	0	0		0	0	0		0	12	0		24
Buses																	
Pedestrians		24				32				0				4			60
Bicycles	0	0	1		0	0	0		0	0	0		0	1	0		2
Scooters																	

Comments:

Report generated on 12/11/2019 10:42 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

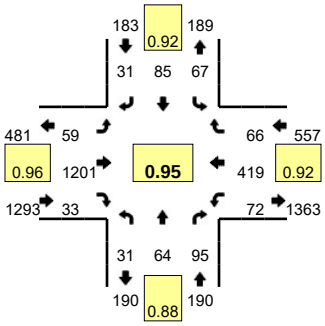
Method for determining peak hour: Total Entering Volume

LOCATION: Kohou St -- Dillingham Blvd

CITY/STATE: Honolulu, HI

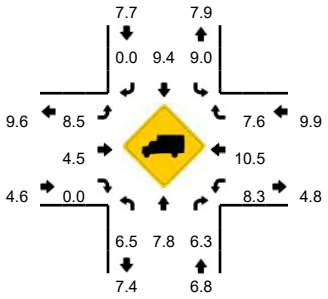
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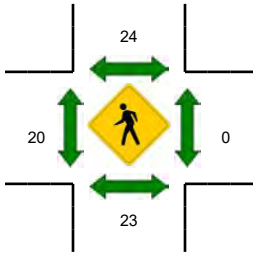
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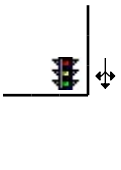


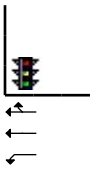
Peak-Hour: 7:45 AM -- 8:45 AM

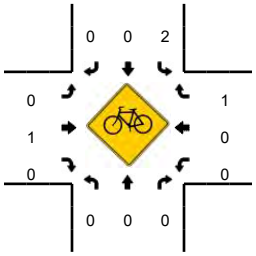
Peak 15-Min: 8:30 AM -- 8:45 AM

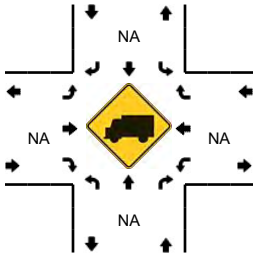


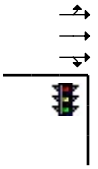


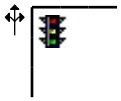


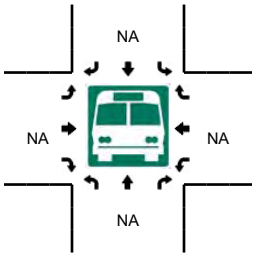












15-Min Count Period Beginning At	Kohou St (Northbound)				Kohou St (Southbound)				Dillingham Blvd (Eastbound)				Dillingham Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	4	7	17	0	7	6	7	0	5	102	6	0	10	45	8	0	224	
6:15 AM	1	4	16	0	4	9	9	0	6	130	7	0	11	45	7	0	249	
6:30 AM	3	7	12	0	8	10	9	0	13	188	7	0	5	77	8	0	347	
6:45 AM	0	3	15	0	20	5	4	0	16	250	6	0	7	62	12	0	400	1220
7:00 AM	2	6	21	0	16	6	8	0	15	264	6	0	3	85	13	0	445	1441
7:15 AM	2	12	15	0	20	15	9	0	18	328	8	0	11	83	5	0	526	1718
7:30 AM	3	10	29	0	15	20	10	0	15	337	4	0	14	86	11	0	554	1925
7:45 AM	6	15	25	0	14	17	7	0	15	300	4	0	19	117	16	0	555	2080
8:00 AM	11	17	18	0	17	24	7	0	19	310	10	0	14	87	22	0	556	2191
8:15 AM	6	10	28	0	21	23	8	0	13	282	7	0	16	99	16	0	529	2194
8:30 AM	8	22	24	0	15	21	9	0	12	309	12	0	23	116	12	0	583	2223
8:45 AM	15	15	16	0	14	28	12	0	8	211	8	0	20	101	15	0	463	2131

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	32	88	96	0	60	84	36	0	48	1236	48	0	92	464	48	0	2332
Heavy Trucks	4	8	8		16	4	0		4	68	0		8	28	0		148
Pedestrians		12				20				12				0			44
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/12/2018 2:54 PM

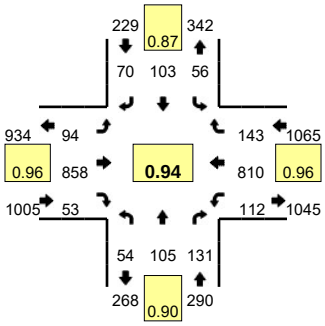
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

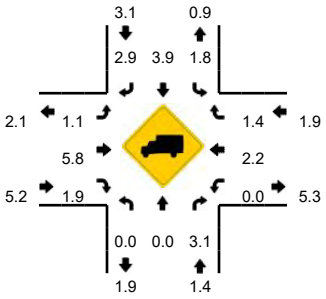
LOCATION: Kohou St -- Dillingham Blvd
CITY/STATE: Honolulu, HI

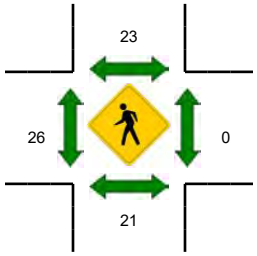
QC JOB #: 14792310
DATE: Tue, Sep 25 2018

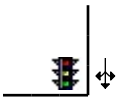


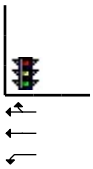
Peak-Hour: 3:45 PM -- 4:45 PM
Peak 15-Min: 4:30 PM -- 4:45 PM

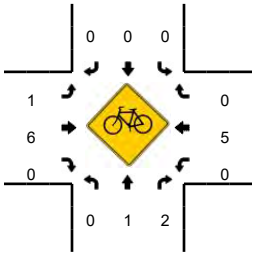


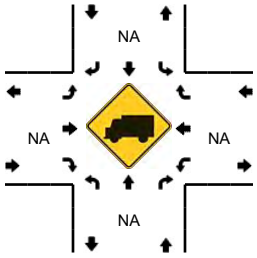


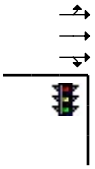


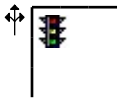


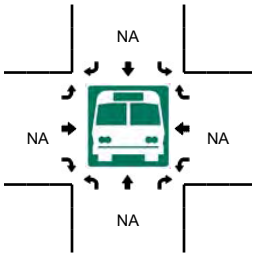












15-Min Count Period Beginning At	Kohou St (Northbound)				Kohou St (Southbound)				Dillingham Blvd (Eastbound)				Dillingham Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	7	20	24	0	13	20	17	0	14	186	13	0	24	184	32	0	554	
3:15 PM	16	19	29	0	23	22	16	0	21	207	15	0	17	178	30	0	593	
3:30 PM	12	20	21	0	16	25	19	0	25	228	14	0	26	204	34	0	644	
3:45 PM	15	30	36	0	13	28	19	0	25	228	12	0	29	167	40	0	642	2433
4:00 PM	10	23	30	0	10	19	16	0	22	202	18	0	32	194	35	0	611	2490
4:15 PM	18	25	31	0	21	25	15	0	28	206	13	0	25	205	38	0	650	2547
4:30 PM	11	27	34	0	12	31	20	0	19	222	10	0	26	244	30	0	686	2589
4:45 PM	14	24	31	0	15	22	17	0	14	176	12	0	18	220	34	0	597	2544
5:00 PM	11	25	25	0	13	19	23	0	20	202	9	0	19	232	39	0	637	2570
5:15 PM	9	31	22	0	21	26	22	0	14	177	6	0	26	229	30	0	613	2533
5:30 PM	17	12	19	0	9	8	14	0	12	181	10	0	15	227	22	0	546	2393
5:45 PM	11	11	22	0	14	19	18	0	16	141	8	0	14	198	28	0	500	2296

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	44	108	136	0	48	124	80	0	76	888	40	0	104	976	120	0	2744
Heavy Trucks	0	0	8		0	4	0		0	28	0		0	8	0		48
Pedestrians		28				8				12				0			48
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/12/2018 2:54 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

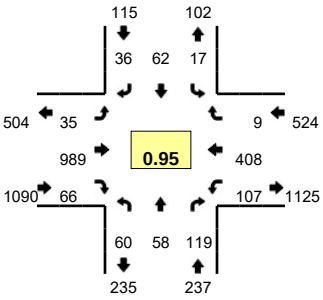
Type of peak hour being reported: Intersection Peak

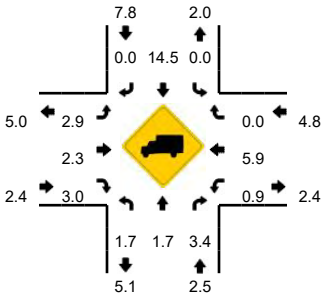
Method for determining peak hour: Total Entering Volume

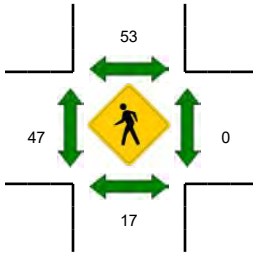
LOCATION: Kohou St -- N King St
CITY/STATE: Honolulu, HI

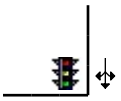
QC JOB #: 14802107
DATE: Tue, Oct 02 2018

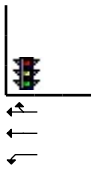
Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 8:00 AM -- 8:15 AM

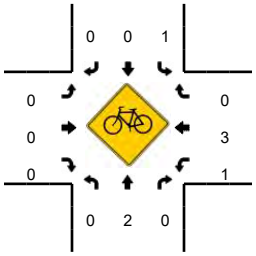


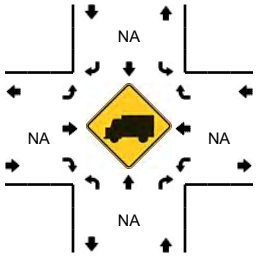


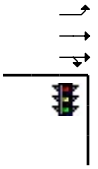


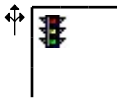


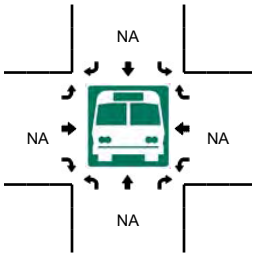












5-Min Count Period Beginning At	Kohou St (Northbound)				Kohou St (Southbound)				N King St (Eastbound)				N King St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:55 AM	3	2	6	0	0	3	1	0	1	73	2	0	4	20	2	0	117	1018
7:00 AM	4	3	7	0	0	0	4	0	2	75	2	0	5	16	3	0	121	1086
7:05 AM	5	10	9	0	1	0	2	0	3	72	3	0	6	31	1	0	143	1172
7:10 AM	0	3	3	0	0	1	3	0	0	108	4	0	8	24	5	0	159	1261
7:15 AM	0	7	6	0	2	2	3	0	4	92	4	0	1	23	1	0	145	1360
7:20 AM	4	7	8	0	2	4	3	0	3	69	0	0	6	31	0	0	137	1417
7:25 AM	3	2	15	0	2	3	1	0	2	87	4	0	7	37	1	0	164	1499
7:30 AM	5	4	11	0	1	2	4	0	1	91	6	0	7	23	0	0	155	1568
7:35 AM	5	4	12	0	1	8	3	0	3	86	8	0	9	31	0	0	170	1643
7:40 AM	4	5	17	0	3	4	4	0	7	77	4	0	9	34	1	0	169	1711
7:45 AM	7	3	7	0	4	4	3	0	5	81	6	0	5	39	1	0	165	1768
7:50 AM	3	7	12	0	1	5	5	0	0	64	4	0	12	32	1	0	146	1791
7:55 AM	3	4	8	0	0	5	2	0	2	77	1	0	12	39	0	0	153	1827
8:00 AM	5	4	6	0	2	13	3	0	6	88	6	0	8	40	0	0	181	1887
8:05 AM	5	10	11	0	1	2	4	0	3	71	3	0	10	33	1	0	154	1898
8:10 AM	6	6	8	0	0	6	3	0	0	106	8	0	7	32	3	0	185	1924
8:15 AM	5	3	7	0	2	6	2	0	2	92	7	0	12	32	0	0	170	1949
8:20 AM	9	6	5	0	0	4	2	0	4	69	9	0	9	36	1	0	154	1966
8:25 AM	0	7	10	0	0	5	3	0	4	75	3	0	13	43	1	0	164	1966
8:30 AM	8	3	9	0	1	4	2	0	2	71	5	0	6	27	0	0	138	1949
8:35 AM	7	5	9	0	0	2	3	0	4	58	8	0	8	33	0	0	137	1916
8:40 AM	5	4	12	0	0	2	1	0	3	63	7	0	10	33	1	0	141	1888
8:45 AM	7	7	5	0	0	5	3	0	0	52	7	0	10	20	1	0	117	1840
8:50 AM	2	6	16	0	1	6	2	0	3	49	11	0	2	35	1	0	134	1828

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	64	80	100	0	12	84	40	0	36	1060	68	0	100	420	16	0	2080
Heavy Trucks	4	4	0		0	4	0		4	28	0		0	32	0		76
Pedestrians		20				40				48				0			108
Bicycles	0	1	0		0	0	0		0	0	0		1	1	0		3
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/31/2018 4:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Kohou St -- N King St

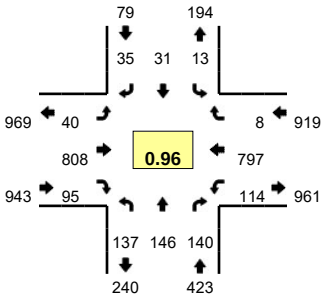
CITY/STATE: Honolulu, HI

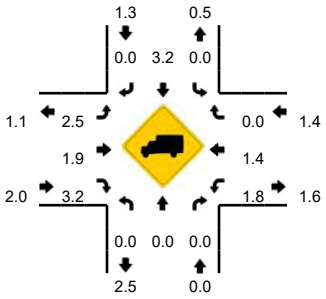
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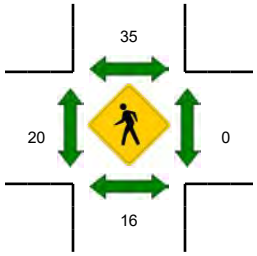
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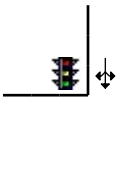
Peak-Hour: 3:50 PM -- 4:50 PM

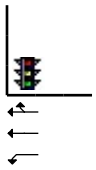
Peak 15-Min: 4:35 PM -- 4:50 PM

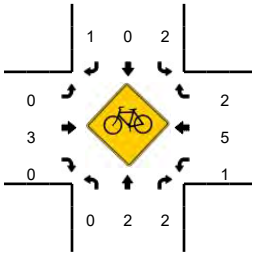


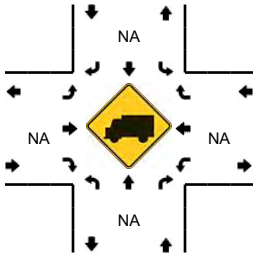


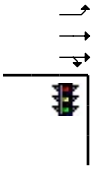


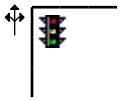


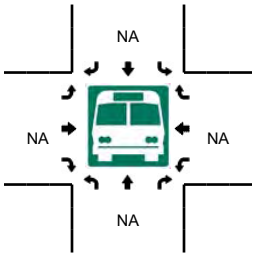












5-Min Count Period Beginning At	Kohou St (Northbound)				Kohou St (Southbound)				N King St (Eastbound)				N King St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:20 PM	14	11	12	0	0	5	0	0	2	44	4	0	11	42	1	0	146	
3:25 PM	5	13	4	0	1	6	4	0	0	47	12	0	5	37	2	0	136	
3:30 PM	12	6	11	0	3	0	2	0	3	45	3	0	7	53	0	0	145	
3:35 PM	10	9	16	0	0	0	1	0	3	58	3	0	8	55	1	0	164	
3:40 PM	7	6	12	0	3	2	3	0	0	42	11	0	10	63	1	0	160	
3:45 PM	9	11	21	0	1	1	5	0	4	65	6	0	9	50	1	0	183	
3:50 PM	11	12	5	0	2	3	2	0	1	68	9	0	9	59	0	0	181	
3:55 PM	10	17	14	0	1	3	2	0	4	68	14	0	13	81	1	0	228	1958
4:00 PM	10	15	13	0	1	0	0	0	6	65	5	0	8	55	0	0	178	1973
4:05 PM	15	11	10	0	1	4	3	0	3	74	11	0	13	50	0	0	195	2018
4:10 PM	8	12	8	0	1	5	3	0	4	71	4	0	10	60	1	0	187	2050
4:15 PM	12	15	10	0	0	1	0	0	4	71	13	0	12	64	2	0	204	2107
4:20 PM	14	9	11	0	4	2	6	0	4	63	8	0	12	66	0	0	199	2160
4:25 PM	10	12	12	0	1	2	2	0	0	56	5	0	9	67	0	0	176	2200
4:30 PM	11	9	13	0	0	5	3	0	2	69	6	0	5	79	1	0	203	2258
4:35 PM	9	13	21	0	1	2	3	0	6	67	7	0	4	53	0	0	186	2280
4:40 PM	12	10	8	0	1	1	8	0	0	57	9	0	11	83	1	0	201	2321
4:45 PM	15	11	15	0	0	3	3	0	6	79	4	0	8	80	2	0	226	2364
4:50 PM	11	9	6	0	1	5	2	0	4	46	3	0	9	68	0	0	164	2347
4:55 PM	8	14	6	0	1	6	2	0	1	64	8	0	8	81	0	0	199	2318
5:00 PM	9	6	15	0	1	3	1	0	4	51	3	0	8	78	0	0	179	2319
5:05 PM	10	9	16	0	1	4	2	0	1	66	11	0	10	65	1	0	196	2320
5:10 PM	7	9	8	0	0	0	5	0	5	57	8	0	13	74	2	0	188	2321
5:15 PM	11	10	5	0	1	2	0	0	3	35	3	0	11	74	3	0	158	2275

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	144	136	176	0	8	24	56	0	48	812	80	0	92	864	12	0	2452
Heavy Trucks	0	0	0		0	4	0		4	16	0		0	8	0		32
Pedestrians		20				48				16				0			84
Bicycles	0	0	1		0	0	0		0	1	0		0	2	0		4
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/31/2018 4:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

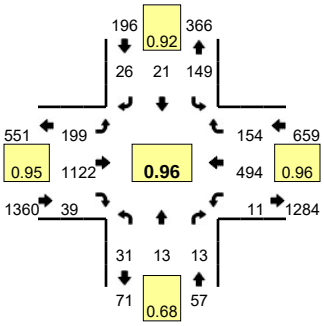
Type of peak hour being reported: Intersection Peak

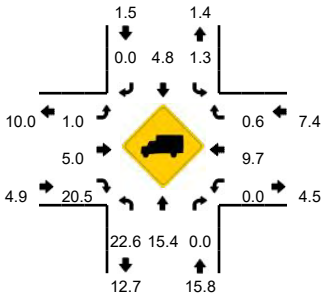
Method for determining peak hour: Total Entering Volume

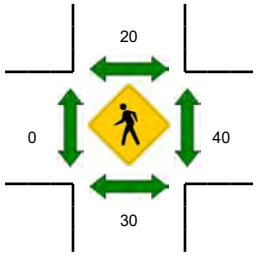
LOCATION: Kokea St -- Dillingham Blvd
CITY/STATE: Honolulu, HI

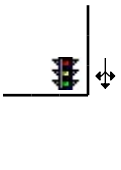
QC JOB #: 14792307
DATE: Tue, Sep 25 2018

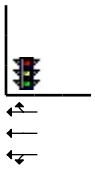
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:30 AM -- 8:45 AM

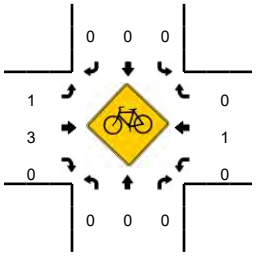


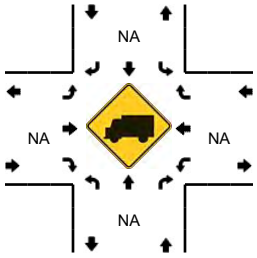


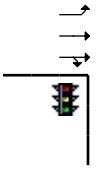


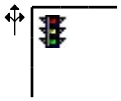


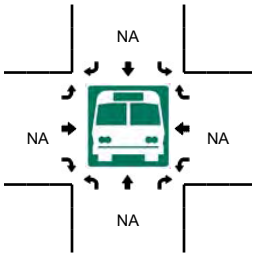












15-Min Count Period Beginning At	Kokea St (Northbound)				Kokea St (Southbound)				Dillingham Blvd (Eastbound)				Dillingham Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	2	2	2	0	23	5	3	0	10	107	5	0	1	60	8	0	228	
6:15 AM	4	1	2	0	24	8	4	0	11	125	14	0	6	57	11	0	267	
6:30 AM	1	3	2	0	20	3	6	0	20	172	12	0	7	80	8	0	334	
6:45 AM	9	0	3	0	29	8	2	0	20	246	13	0	7	72	9	0	418	1247
7:00 AM	7	0	2	0	34	5	3	0	19	289	4	0	3	84	24	0	474	1493
7:15 AM	1	2	3	0	35	6	3	0	28	331	3	0	4	100	29	0	545	1771
7:30 AM	5	2	6	0	46	8	5	0	30	335	11	0	3	104	31	1	587	2024
7:45 AM	10	4	4	0	32	3	4	0	57	277	8	0	2	132	27	0	560	2166
8:00 AM	3	0	3	0	35	4	6	0	49	281	13	0	1	114	41	0	550	2242
8:15 AM	6	3	3	0	44	3	7	0	58	269	5	0	5	119	46	0	568	2265
8:30 AM	12	6	3	0	38	11	9	0	35	295	13	0	3	129	40	0	594	2272
8:45 AM	4	1	5	0	47	6	4	0	19	221	7	0	3	122	25	0	464	2176

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	48	24	12	0	152	44	36	0	140	1180	52	0	12	516	160	0	2376
Heavy Trucks	8	4	0		0	4	0		4	76	12		0	24	4		136
Pedestrians		12				20				0				32			64
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/12/2018 2:54 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

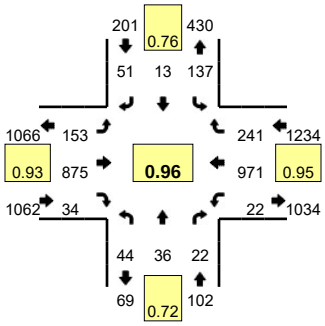
Method for determining peak hour: Total Entering Volume

LOCATION: Kokea St -- Dillingham Blvd

CITY/STATE: Honolulu, HI

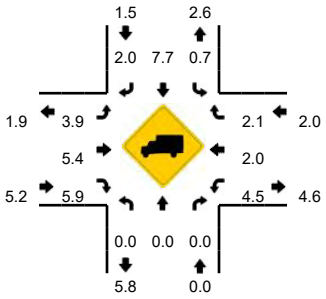
QC JOB #: 14792308

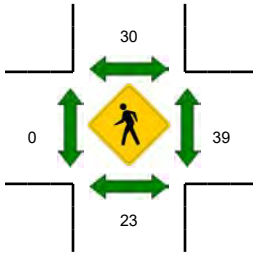
DATE: Tue, Sep 25 2018

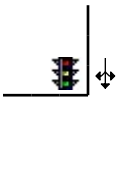


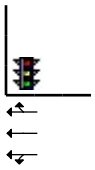
Peak-Hour: 3:45 PM -- 4:45 PM

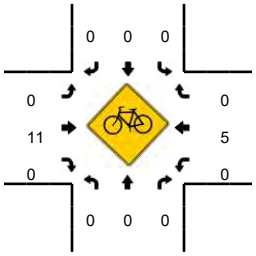
Peak 15-Min: 4:30 PM -- 4:45 PM

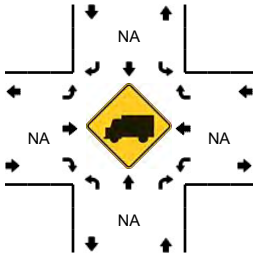


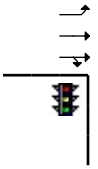


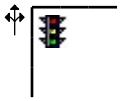


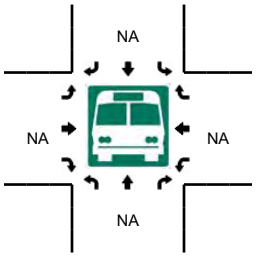












15-Min Count Period Beginning At	Kokea St (Northbound)				Kokea St (Southbound)				Dillingham Blvd (Eastbound)				Dillingham Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	6	1	5	0	27	1	14	0	25	193	9	0	4	225	50	0	560	
3:15 PM	15	7	9	0	27	3	16	0	30	223	7	0	5	186	63	0	591	
3:30 PM	10	9	6	0	31	4	11	0	41	219	4	0	2	243	56	0	636	
3:45 PM	6	3	4	0	39	4	11	0	50	223	11	0	9	214	58	0	632	2419
4:00 PM	8	7	8	0	31	3	13	0	42	196	6	0	4	248	76	0	642	2501
4:15 PM	13	11	6	0	41	2	10	0	39	218	8	0	6	242	53	0	649	2559
4:30 PM	17	15	4	0	26	4	17	0	22	238	9	0	3	267	54	0	676	2599
4:45 PM	6	4	5	0	33	7	18	0	27	189	8	0	2	246	40	0	585	2552
5:00 PM	8	8	5	0	29	3	13	0	26	208	7	0	3	269	40	0	619	2529
5:15 PM	13	5	4	0	50	3	20	0	28	185	9	0	2	258	39	0	616	2496
5:30 PM	6	12	7	0	29	3	13	0	12	191	9	0	1	241	35	0	559	2379
5:45 PM	5	8	8	0	38	1	10	0	9	162	1	0	9	225	31	0	507	2301

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	68	60	16	0	104	16	68	0	88	952	36	0	12	1068	216	0	2704
Heavy Trucks	0	0	0		4	4	0		0	32	4		0	8	4		56
Pedestrians		24				24				0				60			108
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/12/2018 2:54 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Kokea St -- N King St

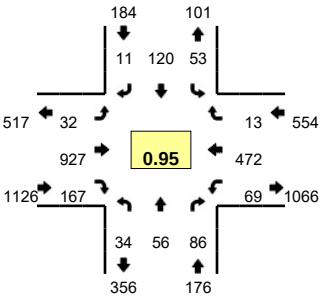
CITY/STATE: Honolulu, HI

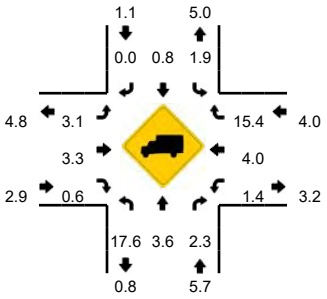
QC JOB #: 14802109

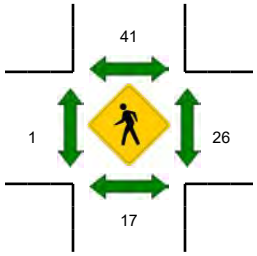
DATE: Tue, Oct 02 2018

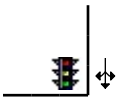
Peak-Hour: 7:25 AM -- 8:25 AM

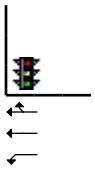
Peak 15-Min: 8:05 AM -- 8:20 AM

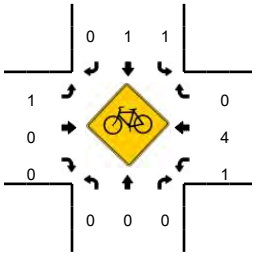


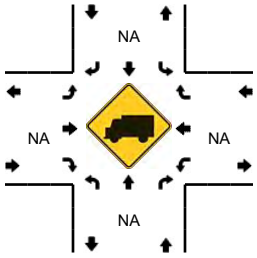


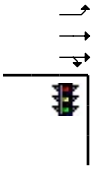


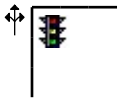


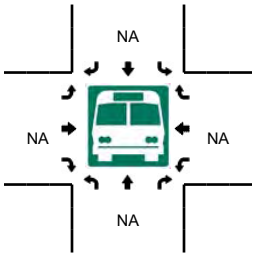












5-Min Count Period Beginning At	Kokea St (Northbound)				Kokea St (Southbound)				N King St (Eastbound)				N King St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:55 AM	2	2	1	0	3	7	2	0	3	57	6	0	2	14	1	0	100	1022
7:00 AM	0	4	2	0	2	6	3	0	5	77	7	0	4	26	0	0	136	1098
7:05 AM	0	5	5	0	6	5	1	0	5	75	7	0	3	37	0	0	149	1192
7:10 AM	1	5	7	0	5	7	5	0	8	86	9	0	2	25	0	0	160	1285
7:15 AM	0	2	5	0	5	6	0	0	3	84	3	0	4	29	4	0	145	1368
7:20 AM	3	3	3	0	4	11	2	0	2	73	13	0	3	33	1	0	151	1450
7:25 AM	2	5	15	0	3	9	4	0	5	84	8	0	6	33	1	0	175	1548
7:30 AM	0	4	6	0	3	4	0	0	3	90	10	0	3	32	2	0	157	1605
7:35 AM	1	3	6	0	4	7	2	0	2	95	9	0	3	37	2	0	171	1678
7:40 AM	2	4	9	0	7	7	0	0	4	77	9	0	4	37	1	0	161	1753
7:45 AM	1	5	6	0	6	8	1	0	2	65	11	0	4	42	0	0	151	1776
7:50 AM	0	3	5	0	5	10	1	0	5	74	19	0	5	53	1	0	181	1837
7:55 AM	5	7	9	0	8	16	1	0	3	56	14	0	6	33	2	0	160	1897
8:00 AM	4	4	5	0	4	11	0	0	0	70	19	0	5	52	1	0	175	1936
8:05 AM	5	8	4	0	2	12	1	0	2	92	16	0	5	36	1	0	184	1971
8:10 AM	7	2	5	0	2	21	0	0	2	81	16	0	2	36	1	0	175	1986
8:15 AM	3	3	7	0	6	8	0	0	0	84	19	0	9	38	0	0	177	2018
8:20 AM	4	8	9	0	3	7	1	0	4	59	17	0	17	43	1	0	173	2040
8:25 AM	5	9	4	0	5	10	1	0	2	67	10	0	5	39	1	0	158	2023
8:30 AM	1	7	8	0	1	5	1	0	6	57	15	0	4	38	0	0	143	2009
8:35 AM	2	3	4	0	0	8	2	0	4	64	10	0	5	43	0	0	145	1983
8:40 AM	2	8	8	0	0	5	0	0	4	57	5	0	1	33	4	0	127	1949
8:45 AM	1	1	5	0	5	5	0	0	4	53	5	0	3	35	4	0	121	1919
8:50 AM	1	1	9	0	2	5	1	0	4	52	13	0	5	39	4	0	136	1874

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	60	52	64	0	40	164	4	0	16	1028	204	0	64	440	8	0	2144
Heavy Trucks	16	4	0		0	0	0		0	40	0		0	20	4		84
Pedestrians		20				24				4				28			76
Bicycles	0	0	0		1	1	0		1	0	0		0	1	0		4
Railroad Stopped Buses																	

Comments:

Report generated on 10/31/2018 4:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Kokea St -- N King St

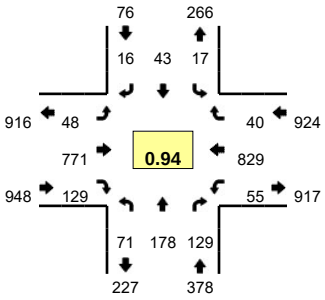
CITY/STATE: Honolulu, HI

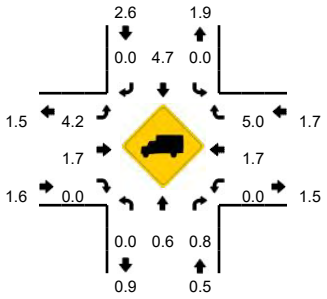
QC JOB #: 14802110

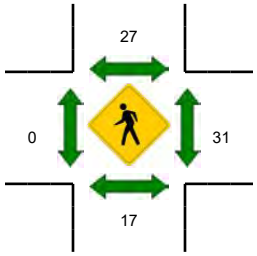
DATE: Tue, Oct 02 2018

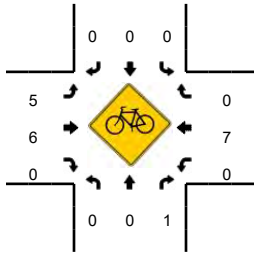
Peak-Hour: 3:50 PM -- 4:50 PM

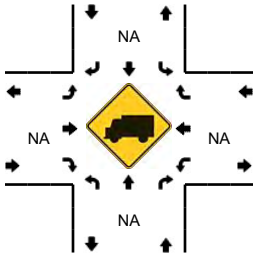
Peak 15-Min: 4:35 PM -- 4:50 PM

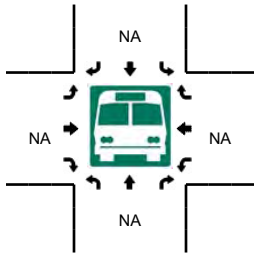












5-Min Count Period Beginning At	Kokea St (Northbound)				Kokea St (Southbound)				N King St (Eastbound)				N King St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:20 PM	5	16	17	0	0	6	1	0	5	40	9	0	2	59	1	0	161	
3:25 PM	4	12	5	0	2	6	1	0	3	41	17	0	10	42	2	0	145	
3:30 PM	8	12	12	0	2	8	0	0	2	52	7	0	7	50	1	0	161	
3:35 PM	7	12	10	0	0	4	2	0	3	53	14	0	3	51	3	0	162	
3:40 PM	6	9	9	0	1	3	1	0	7	46	8	0	4	72	6	0	172	
3:45 PM	11	8	11	0	1	4	1	0	3	66	16	0	4	49	3	0	177	
3:50 PM	3	15	9	0	1	5	2	0	3	61	8	0	9	67	3	0	186	
3:55 PM	9	15	7	0	3	2	2	0	4	67	13	0	4	82	1	0	209	1949
4:00 PM	7	11	8	0	0	5	0	0	4	61	18	0	3	50	2	0	169	1973
4:05 PM	8	13	16	0	1	3	0	0	3	64	16	0	6	55	3	0	188	2029
4:10 PM	9	19	6	0	1	4	0	0	2	66	13	0	6	63	3	0	192	2068
4:15 PM	4	10	10	0	2	2	3	0	7	64	7	0	5	70	4	0	188	2110
4:20 PM	5	17	14	0	6	5	1	0	5	64	12	0	5	71	2	0	207	2156
4:25 PM	4	7	9	0	1	3	1	0	6	58	7	0	4	70	5	0	175	2186
4:30 PM	5	11	10	0	0	10	2	0	5	58	7	0	2	77	5	0	192	2217
4:35 PM	4	15	12	0	0	2	0	0	3	78	9	0	2	53	3	0	181	2236
4:40 PM	7	23	10	0	1	1	2	0	3	54	12	0	6	88	6	0	213	2277
4:45 PM	6	22	18	0	1	1	3	0	3	76	7	0	3	83	3	0	226	2326
4:50 PM	11	14	8	0	1	3	1	0	4	55	7	0	6	62	1	0	173	2313
4:55 PM	4	8	7	0	3	0	2	0	5	54	6	0	5	81	3	0	178	2282
5:00 PM	6	10	9	0	0	3	2	0	1	58	3	0	4	80	1	0	177	2290
5:05 PM	4	11	6	0	3	1	0	0	5	67	7	0	1	84	3	0	192	2294
5:10 PM	5	9	6	0	1	5	2	0	10	54	8	0	2	81	3	0	186	2288
5:15 PM	6	10	7	0	3	1	0	0	2	40	4	0	6	80	6	0	165	2265

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	68	240	160	0	8	16	20	0	36	832	112	0	44	896	48	0	2480
Heavy Trucks	0	0	0		0	4	0		0	16	0		0	12	0		32
Pedestrians		20				40				0				44			104
Bicycles	0	0	0		0	0	0		1	2	0		0	1	0		4
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/31/2018 4:46 PM

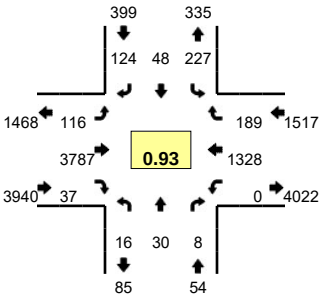
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

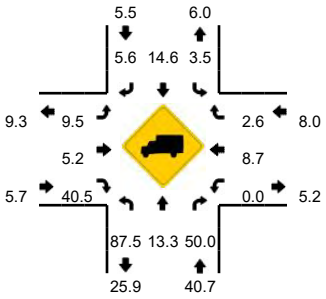
Method for determining peak hour: Total Entering Volume

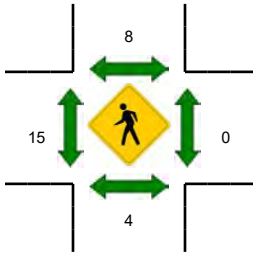
LOCATION: Alakawa St -- N Nimitz Hwy
CITY/STATE: Honolulu, HI

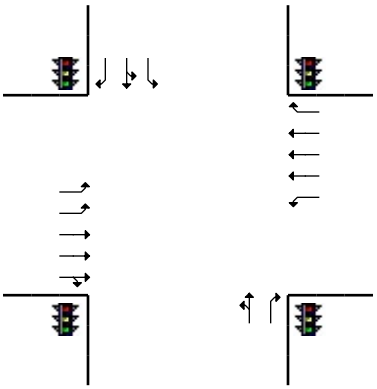
QC JOB #: 14802113
DATE: Wed, Oct 03 2018

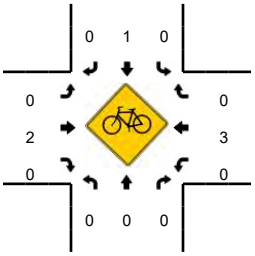


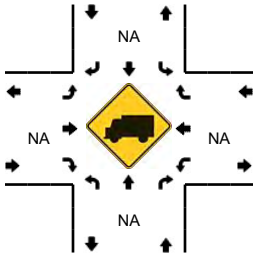
Peak-Hour: 7:10 AM -- 8:10 AM
Peak 15-Min: 7:20 AM -- 7:35 AM

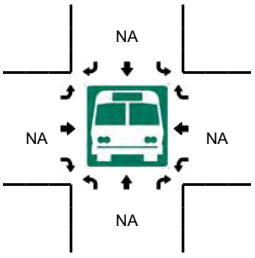












5-Min Count Period Beginning At	Alakawa St (Northbound)				Alakawa St (Southbound)				N Nimitz Hwy (Eastbound)				N Nimitz Hwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:40 AM	1	1	0	0	10	2	13	0	17	313	4	0	0	109	12	0	482	
6:45 AM	2	1	0	0	13	6	12	0	9	286	3	0	0	66	19	0	417	
6:50 AM	0	0	0	0	10	2	7	0	10	318	0	0	0	100	22	0	469	
6:55 AM	4	0	0	0	30	2	10	0	11	249	4	0	0	53	18	0	381	4246
7:00 AM	0	1	0	0	15	4	9	0	7	335	6	0	0	114	9	0	500	4479
7:05 AM	3	1	0	0	10	3	11	0	8	334	6	0	0	130	4	0	510	4713
7:10 AM	0	1	0	0	12	5	9	0	8	361	9	0	0	94	9	0	508	4955
7:15 AM	3	7	0	0	27	4	16	0	9	246	3	0	0	107	14	0	436	5141
7:20 AM	0	2	2	0	15	1	11	0	14	366	2	0	0	113	12	0	538	5324
7:25 AM	0	1	0	0	19	5	16	0	6	344	4	0	0	121	9	0	525	5504
7:30 AM	0	4	2	0	21	1	6	0	4	329	4	0	0	135	13	0	519	5638
7:35 AM	3	5	1	0	30	7	9	0	6	256	2	0	0	94	12	0	425	5710
7:40 AM	2	3	0	0	16	4	10	0	15	319	0	0	0	111	13	0	493	5721
7:45 AM	0	2	0	0	18	5	0	0	6	363	7	0	0	110	11	0	522	5826
7:50 AM	3	1	1	0	19	4	11	0	6	316	1	0	0	122	21	0	505	5862
7:55 AM	5	1	2	0	24	6	10	0	13	238	2	0	0	98	24	0	423	5904
8:00 AM	0	3	0	0	18	3	10	0	16	302	1	0	0	109	29	0	491	5895
8:05 AM	0	0	0	0	8	3	16	0	13	347	2	0	0	114	22	0	525	5910
8:10 AM	0	0	0	0	25	3	13	0	6	299	0	0	0	116	28	0	490	5892
8:15 AM	2	1	2	0	33	5	12	0	10	242	1	0	0	81	26	0	415	5871
8:20 AM	1	1	0	0	12	6	13	0	17	331	1	0	0	87	23	0	492	5825
8:25 AM	0	2	2	0	19	4	13	0	11	296	0	0	0	102	18	0	467	5767
8:30 AM	0	2	1	0	11	1	16	0	10	295	2	0	0	143	31	0	512	5760
8:35 AM	2	2	5	0	27	8	24	0	3	230	3	0	0	95	27	0	426	5761

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	28	16	0	220	28	132	0	96	4156	40	0	0	1476	136	0	6328
Heavy Trucks	0	4	12		8	4	16		8	228	20		0	112	0		412
Pedestrians		0				4				4				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/31/2018 4:46 PM

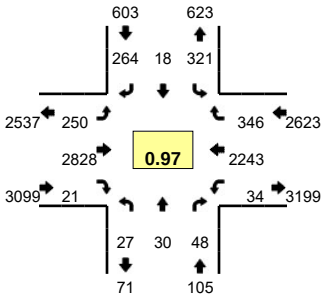
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

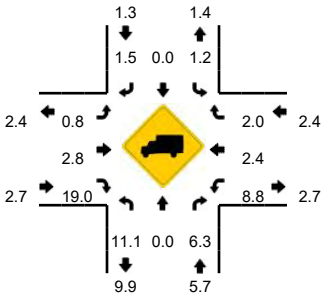
Method for determining peak hour: Total Entering Volume

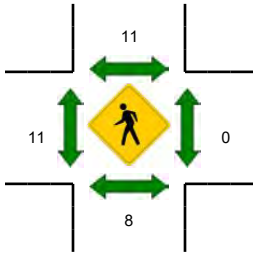
LOCATION: Alakawa St -- N Nimitz Hwy
CITY/STATE: Honolulu, HI

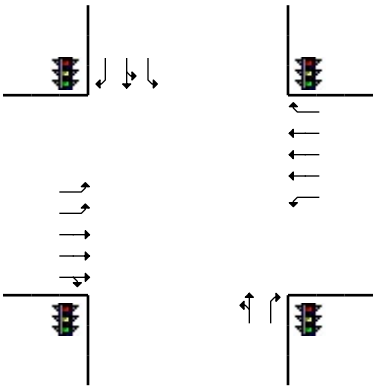
QC JOB #: 14802114
DATE: Wed, Oct 03 2018

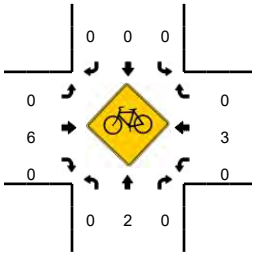


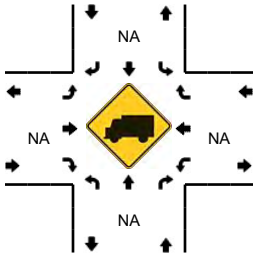
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 4:35 PM -- 4:50 PM

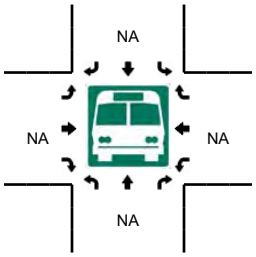












5-Min Count Period Beginning At	Alakawa St (Northbound)				Alakawa St (Southbound)				N Nimitz Hwy (Eastbound)				N Nimitz Hwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:45 PM	0	1	4	0	14	1	19	0	27	259	3	0	3	191	25	0	547	
3:50 PM	1	0	5	0	22	2	24	0	17	255	1	0	4	203	41	0	575	
3:55 PM	1	2	2	0	41	3	24	0	19	187	0	0	6	142	29	0	456	5982
4:00 PM	2	1	2	0	22	0	14	0	32	224	2	0	5	127	28	0	459	5969
4:05 PM	0	1	2	0	18	0	16	0	14	259	1	0	0	238	23	0	572	6144
4:10 PM	2	2	5	0	37	0	24	0	13	221	4	0	0	166	20	0	494	6170
4:15 PM	0	1	5	0	31	2	12	0	39	223	2	2	3	167	21	0	508	6142
4:20 PM	2	2	4	0	26	1	18	0	7	253	0	0	2	236	28	0	579	6242
4:25 PM	0	4	3	0	17	1	29	0	15	245	5	0	6	192	25	0	542	6324
4:30 PM	3	5	9	0	50	1	26	0	23	180	1	0	5	136	27	1	467	6204
4:35 PM	5	2	2	0	26	1	30	0	25	274	0	0	0	199	34	0	598	6251
4:40 PM	4	6	4	0	16	1	27	0	13	267	2	0	1	219	29	0	589	6386
4:45 PM	4	3	5	0	43	1	32	0	21	190	1	0	1	147	28	0	476	6315
4:50 PM	3	1	2	0	16	0	19	0	23	261	1	0	4	197	35	0	562	6302
4:55 PM	1	2	2	0	21	2	16	0	12	232	2	0	1	182	30	0	503	6349
5:00 PM	4	0	6	0	32	2	24	0	22	228	2	0	1	176	22	0	519	6409
5:05 PM	1	1	2	0	21	1	13	0	27	231	3	0	6	164	30	0	500	6337
5:10 PM	0	3	4	0	22	5	18	0	20	244	2	1	2	228	37	1	587	6430
5:15 PM	1	5	2	0	21	2	21	0	11	204	2	0	0	179	19	0	467	6389
5:20 PM	0	1	1	0	38	1	31	0	28	229	4	0	2	147	30	0	512	6322
5:25 PM	1	3	2	0	26	0	24	0	20	249	8	0	2	204	27	0	566	6346
5:30 PM	3	3	4	0	13	0	16	0	10	239	1	0	4	191	31	1	516	6395
5:35 PM	3	2	3	0	39	3	26	0	15	172	3	0	2	146	32	0	446	6243
5:40 PM	0	1	2	0	9	2	18	0	27	243	2	0	9	196	30	1	540	6194

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	52	44	44	0	340	12	356	0	236	2924	12	0	8	2260	364	0	6652
Heavy Trucks	8	0	0		4	0	4		0	92	8		0	40	12		168
Pedestrians		8				4				16				0			28
Bicycles	0	1	0		0	0	0		0	2	0		0	0	0		3
Railroad Stopped Buses																	

Comments:

Report generated on 10/31/2018 4:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

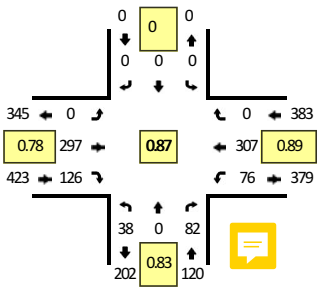
Type of peak hour being reported: Intersection Peak

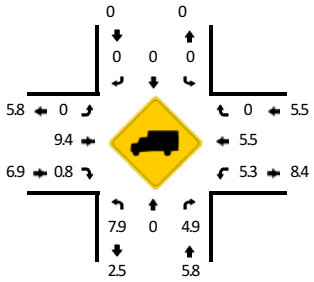
Method for determining peak hour: Total Entering Volume

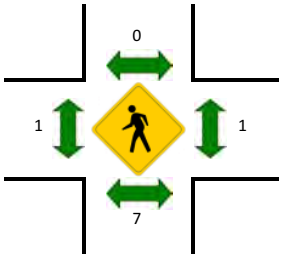
LOCATION: 13. Pacific St -- Alakawa St
CITY/STATE: Urban Honolulu, HI

QC JOB #: 15596005
DATE: Wed, Oct 13 2021

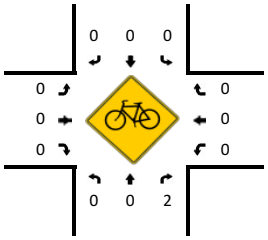
Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM

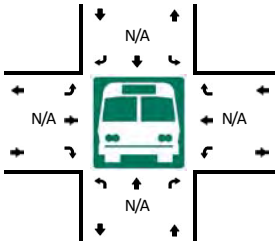




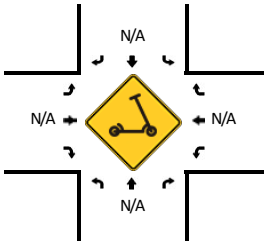












15-Min Count Period Beginning At	13. Pacific St (Northbound)				13. Pacific St (Southbound)				Alakawa St (Eastbound)				Alakawa St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	2	0	13	0	0	0	0	0	0	43	11	0	7	56	0	0	132	
6:15 AM	9	0	8	0	0	0	0	0	0	40	23	0	9	60	0	0	149	
6:30 AM	5	0	16	0	0	0	0	0	0	57	18	0	14	63	0	0	173	
6:45 AM	5	0	6	0	0	0	0	0	0	65	32	0	10	85	0	0	203	657
7:00 AM	8	0	10	0	0	0	0	0	0	49	19	0	8	57	0	0	151	676
7:15 AM	3	0	13	0	0	0	0	0	0	75	23	0	13	91	0	0	218	745
7:30 AM	6	0	14	0	0	0	0	0	0	70	25	0	21	82	0	0	218	790
7:45 AM	5	0	20	0	0	0	0	0	0	78	32	0	32	98	0	0	265	852
8:00 AM	5	0	17	0	0	0	0	0	0	62	27	0	25	82	0	0	218	919
8:15 AM	14	0	21	0	0	0	0	0	0	65	24	0	22	70	0	0	216	917
8:30 AM	9	0	18	0	0	0	0	0	0	73	36	0	16	74	0	0	226	925
8:45 AM	10	0	26	0	0	0	0	0	0	97	39	0	13	81	0	0	266	926

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	40	0	104	0	0	0	0	0	0	388	156	0	52	324	0	0	1064
Heavy Trucks	0	0	0		0	0	0		0	32	4		4	24	0		64
Buses																	
Pedestrians		8				0				0				0			8
Bicycles	0	0	4		0	0	0		0	0	0		0	0	0		4
Scooters																	

Comments:

Report generated on 10/22/2021 10:01 AM

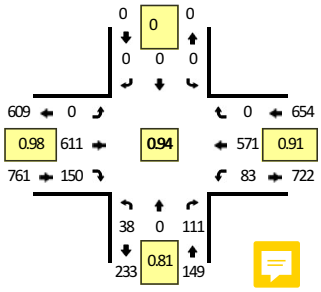
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

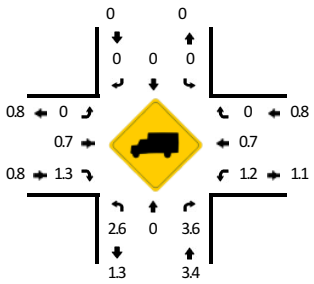
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

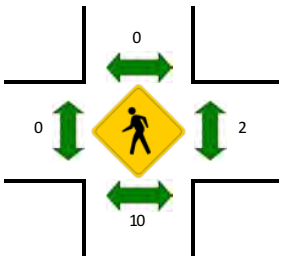
LOCATION: 13. Pacific St -- Alakawa St
CITY/STATE: Urban Honolulu, HI

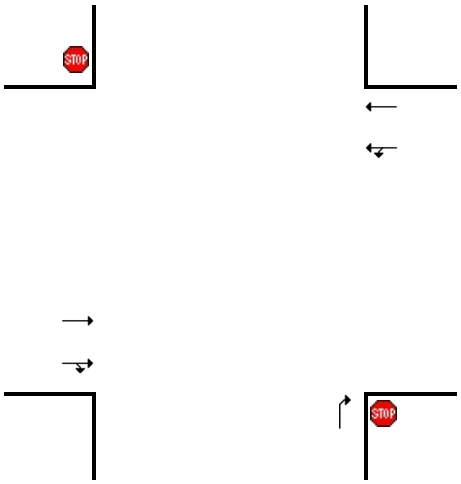
QC JOB #: 15596006
DATE: Wed, Oct 13 2021

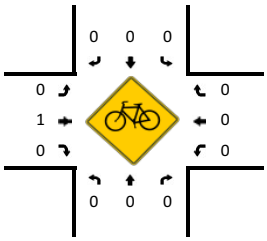
Peak-Hour: 3:00 PM -- 4:00 PM
Peak 15-Min: 3:15 PM -- 3:30 PM

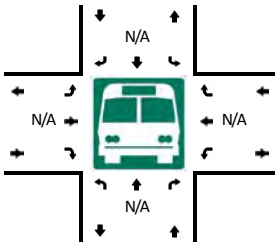


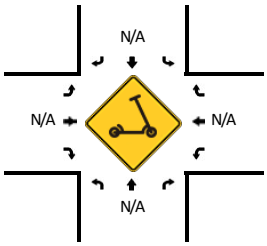












15-Min Count Period Beginning At	13. Pacific St (Northbound)				13. Pacific St (Southbound)				Alakawa St (Eastbound)				Alakawa St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	12	0	25	0	0	0	0	0	0	155	38	0	31	140	0	0	401	
3:15 PM	8	0	38	0	0	0	0	0	0	152	42	0	26	150	0	0	416	
3:30 PM	10	0	23	0	0	0	0	0	0	154	34	0	11	169	0	0	401	
3:45 PM	8	0	25	0	0	0	0	0	0	150	36	0	15	112	0	0	346	1564
4:00 PM	5	0	23	0	0	0	0	0	0	155	39	0	21	109	0	0	352	1515
4:15 PM	9	0	30	0	0	0	0	0	0	117	28	0	12	131	0	0	327	1426
4:30 PM	5	0	29	0	0	0	0	0	0	139	35	0	23	148	0	0	379	1404
4:45 PM	8	0	43	0	0	0	0	0	0	148	41	0	19	132	0	0	391	1449
5:00 PM	4	0	20	0	0	0	0	0	0	114	20	0	19	135	0	0	312	1409
5:15 PM	8	0	26	0	0	0	0	0	0	133	42	0	11	116	0	0	336	1418
5:30 PM	5	0	30	0	0	0	0	0	0	122	21	0	14	114	0	0	306	1345
5:45 PM	4	0	23	0	0	0	0	0	0	125	30	0	22	112	0	0	316	1270

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	32	0	152	0	0	0	0	0	0	608	168	0	104	600	0	0	1664
Heavy Trucks	0	0	4		0	0	0		0	4	0		0	8	0		16
Buses																	
Pedestrians		8				0				0				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/22/2021 10:01 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

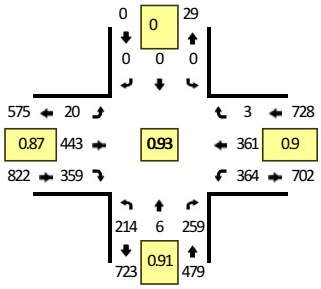
Type of peak hour being reported: Intersection Peak

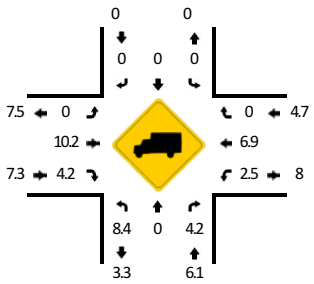
Method for determining peak hour: Total Entering Volume

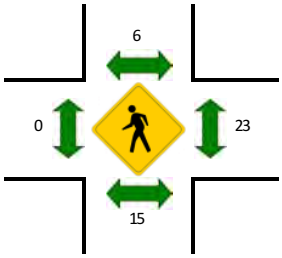
LOCATION: 14. Alakawa St -- Dillingham Blvd
CITY/STATE: Urban Honolulu, HI

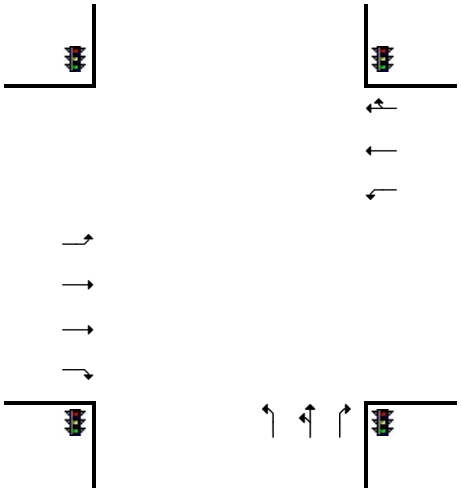
QC JOB #: 15596007
DATE: Wed, Oct 13 2021

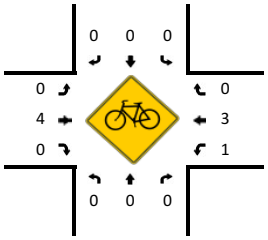
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

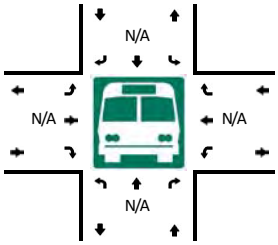


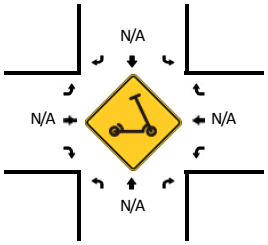












15-Min Count Period Beginning At	14. Alakawa St (Northbound)				14. Alakawa St (Southbound)				Dillingham Blvd (Eastbound)				Dillingham Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	20	1	36	0	0	0	0	0	2	40	47	0	55	31	1	0	233	
6:15 AM	27	0	42	0	0	0	0	0	5	38	52	0	63	35	1	0	263	
6:30 AM	37	0	55	0	0	0	0	0	5	59	66	0	64	47	0	0	333	
6:45 AM	29	1	55	0	0	0	0	0	5	71	68	0	70	51	2	0	352	1181
7:00 AM	34	3	49	0	0	0	0	0	3	102	56	0	63	42	0	0	352	1300
7:15 AM	41	1	55	0	0	0	0	0	6	120	90	0	66	67	2	0	448	1485
7:30 AM	52	1	52	0	0	0	0	0	8	144	85	0	79	84	1	0	506	1658
7:45 AM	61	1	70	0	0	0	0	0	3	101	105	0	106	95	1	0	543	1849
8:00 AM	55	1	62	0	0	0	0	0	5	113	87	0	92	82	0	0	497	1994
8:15 AM	46	3	75	0	0	0	0	0	4	85	82	0	87	100	1	0	483	2029
8:30 AM	55	1	72	0	0	0	0	0	2	72	81	0	79	85	0	0	447	1970
8:45 AM	56	1	70	0	0	0	0	0	6	66	83	0	94	93	0	0	469	1896

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	244	4	280	0	0	0	0	0	12	404	420	0	424	380	4	0	2172
Heavy Trucks	32	0	12		0	0	0		0	36	28		8	28	0		144
Buses																	
Pedestrians		12				8				0				12			32
Bicycles	0	0	0		0	0	0		0	0	0		4	8	0		12
Scooters																	

Comments:

Report generated on 10/22/2021 10:01 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

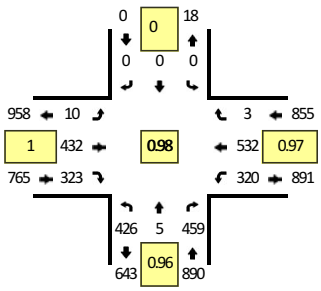
Type of peak hour being reported: Intersection Peak

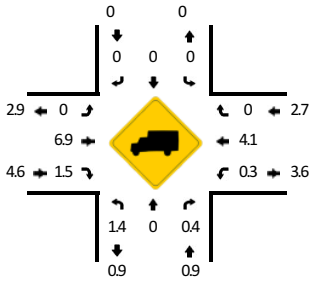
Method for determining peak hour: Total Entering Volume

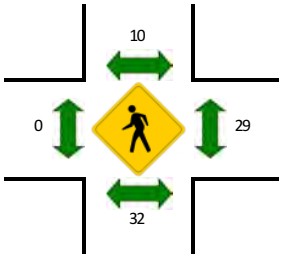
LOCATION: 14. Alakawa St -- Dillingham Blvd
CITY/STATE: Urban Honolulu, HI

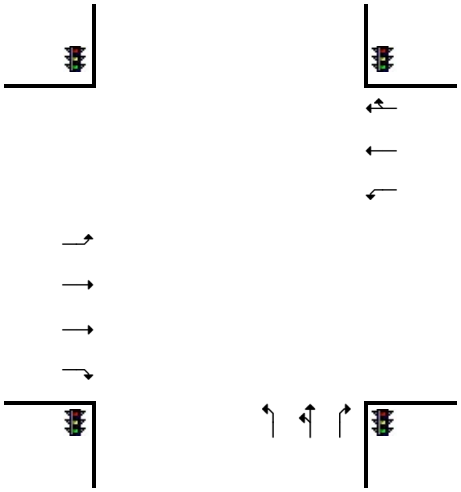
QC JOB #: 15596008
DATE: Wed, Oct 13 2021

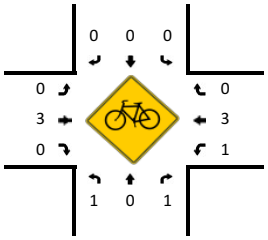
Peak-Hour: 3:15 PM -- 4:15 PM
Peak 15-Min: 3:30 PM -- 3:45 PM

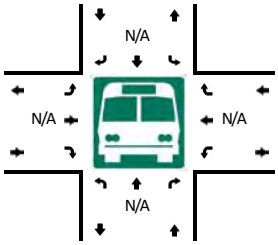


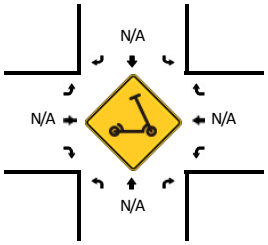












15-Min Count Period Beginning At	14. Alakawa St (Northbound)				14. Alakawa St (Southbound)				Dillingham Blvd (Eastbound)				Dillingham Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	91	0	117	0	0	0	0	0	1	88	92	0	103	95	1	0	588	
3:15 PM	98	3	131	0	0	0	0	0	0	99	93	0	84	121	0	0	629	
3:30 PM	119	1	111	0	0	0	0	0	5	113	74	0	81	138	1	0	643	
3:45 PM	100	0	110	0	0	0	0	0	2	115	75	0	72	137	0	0	611	2471
4:00 PM	109	1	107	0	0	0	0	0	3	105	81	0	83	136	2	0	627	2510
4:15 PM	91	0	90	0	0	0	0	0	2	109	58	0	60	113	0	0	523	2404
4:30 PM	118	1	103	0	0	0	0	0	3	101	57	0	96	146	0	0	625	2386
4:45 PM	143	1	112	0	0	0	0	0	1	104	75	0	64	137	1	0	638	2413
5:00 PM	101	1	99	0	0	0	0	0	0	97	57	0	85	141	0	0	581	2367
5:15 PM	110	0	96	0	0	0	0	0	1	99	68	0	68	123	1	0	566	2410
5:30 PM	86	0	95	0	0	0	0	0	1	92	45	0	78	112	0	0	509	2294
5:45 PM	95	0	104	0	0	0	0	0	0	103	54	0	72	85	0	0	513	2169

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	476	4	444	0	0	0	0	0	20	452	296	0	324	552	4	0	2572
Heavy Trucks	0	0	0		0	0	0		0	12	0		0	12	0		24
Buses																	
Pedestrians		48				4				0				32			84
Bicycles	0	0	0		0	0	0		0	0	0		4	4	0		8
Scooters																	

Comments:

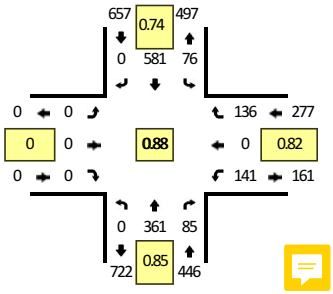
Report generated on 10/22/2021 10:01 AM

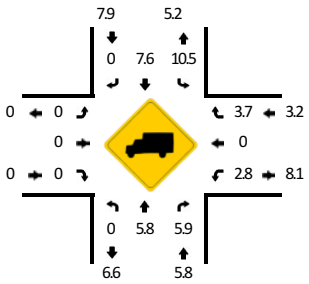
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

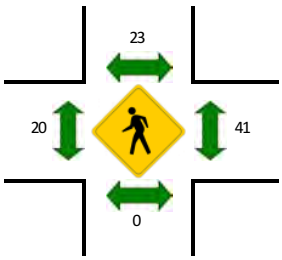
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

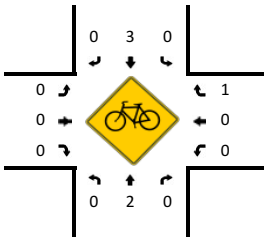
LOCATION: 15. N King St -- Palama St | **QC JOB #:** 15596009
CITY/STATE: Urban Honolulu, HI | **DATE:** Wed, Oct 13 2021

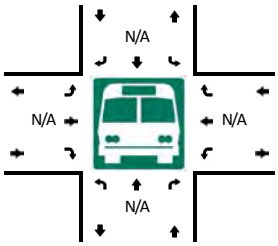
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:15 AM -- 7:30 AM

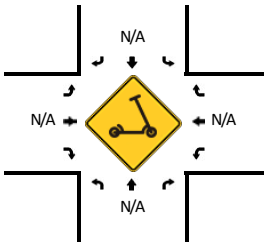












15-Min Count Period Beginning At	15. N King St (Northbound)				15. N King St (Southbound)				Palama St (Eastbound)				Palama St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	43	10	0	7	51	0	0	0	0	0	0	22	0	24	0	157	
6:15 AM	0	39	11	0	13	41	0	0	0	0	0	0	20	0	25	0	149	
6:30 AM	0	47	11	0	12	77	0	0	0	0	0	0	35	0	31	0	213	
6:45 AM	0	54	15	0	21	115	0	0	0	0	0	0	30	0	23	0	258	777
7:00 AM	0	65	17	0	8	138	0	0	0	0	0	0	22	0	18	0	268	888
7:15 AM	0	87	20	0	19	204	0	0	0	0	0	0	32	0	31	0	393	1132
7:30 AM	0	88	18	0	14	152	0	0	0	0	0	0	34	0	32	0	338	1257
7:45 AM	0	101	30	0	25	138	0	0	0	0	0	0	41	0	43	0	378	1377
8:00 AM	0	85	17	0	18	87	0	0	0	0	0	0	34	0	30	0	271	1380
8:15 AM	0	97	18	0	16	101	0	0	0	0	0	0	29	0	46	0	307	1294
8:30 AM	0	69	19	0	25	84	0	0	0	0	0	0	30	0	48	0	275	1231
8:45 AM	0	97	16	0	18	75	0	0	0	0	0	0	35	0	49	0	290	1143

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	348	80	0	76	816	0	0	0	0	0	0	128	0	124	0	1572
Heavy Trucks	0	20	0		12	68	0		0	0	0		8	0	0		108
Buses																	
Pedestrians		0				0				0				28			28
Bicycles	0	8	0		0	8	0		0	0	0		0	0	0		16
Scooters																	

Comments:

Report generated on 10/22/2021 10:01 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

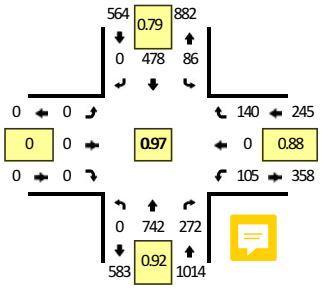
Type of peak hour being reported: Intersection Peak

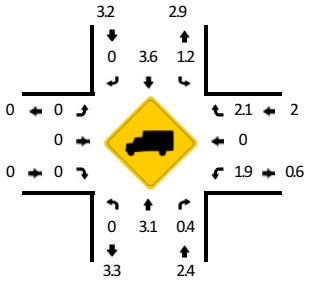
Method for determining peak hour: Total Entering Volume

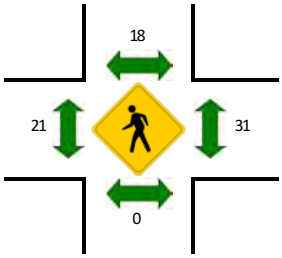
LOCATION: 15. N King St -- Palama St
CITY/STATE: Urban Honolulu, HI

QC JOB #: 15596010
DATE: Wed, Oct 13 2021

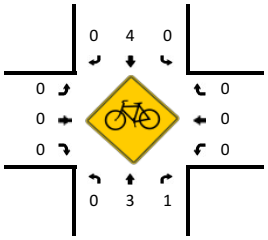
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 4:45 PM -- 5:00 PM

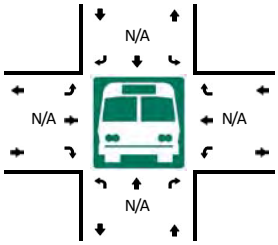




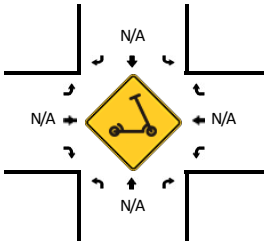












15-Min Count Period Beginning At	15. N King St (Northbound)				15. N King St (Southbound)				Palama St (Eastbound)				Palama St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	0	116	42	0	27	111	0	0	0	0	0	0	33	0	31	0	360	
3:15 PM	0	100	47	0	30	104	0	0	0	0	0	0	30	0	50	0	361	
3:30 PM	0	139	45	0	32	134	0	0	0	0	0	0	29	0	44	0	423	
3:45 PM	0	137	48	0	29	134	0	0	0	0	0	0	32	0	38	0	418	1562
4:00 PM	0	150	37	0	31	128	0	0	0	0	0	0	22	0	30	0	398	1600
4:15 PM	0	147	61	0	20	116	0	0	0	0	0	0	20	0	23	0	387	1626
4:30 PM	0	163	65	0	23	156	0	0	0	0	0	0	22	0	23	0	452	1655
4:45 PM	0	181	70	0	25	122	0	0	0	0	0	0	31	0	39	0	468	1705
5:00 PM	0	205	72	0	17	102	0	0	0	0	0	0	30	0	34	0	460	1767
5:15 PM	0	193	65	0	21	98	0	0	0	0	0	0	22	0	44	0	443	1823
5:30 PM	0	111	54	0	18	91	0	0	0	0	0	0	29	0	36	0	339	1710
5:45 PM	0	109	36	0	22	46	0	0	0	0	0	0	19	0	37	0	269	1511

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	724	280	0	100	488	0	0	0	0	0	0	124	0	156	0	1872
Heavy Trucks	0	32	4		4	20	0		0	0	0		4	0	12		76
Buses																	
Pedestrians		0				24				40				48			112
Bicycles	0	4	4		0	0	0		0	0	0		0	0	0		8
Scooters																	

Comments:

Report generated on 10/22/2021 10:01 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 16. Olomea St/Halona St/N Vineyard Blvd -- Palama St

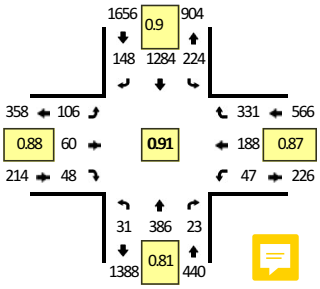
QC JOB #: 15596011

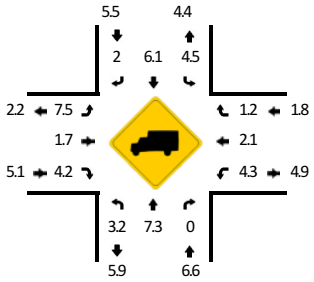
CITY/STATE: Urban Honolulu, HI

DATE: Wed, Oct 13 2021

Peak-Hour: 7:15 AM -- 8:15 AM

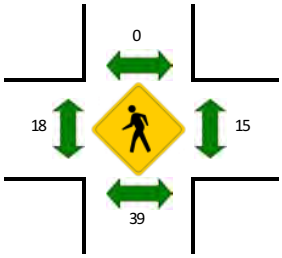
Peak 15-Min: 7:30 AM -- 7:45 AM

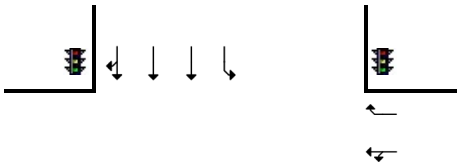


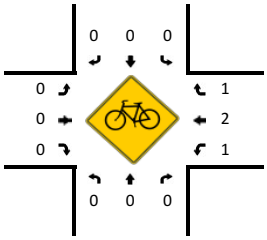


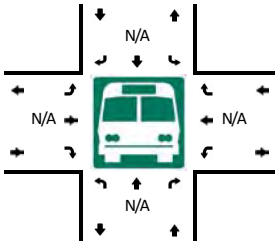
Quality Counts

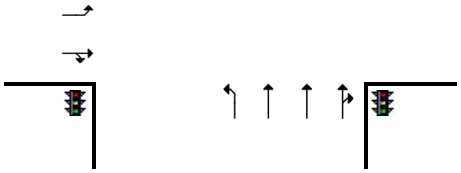
DATA THAT DRIVES COMMUNITIES

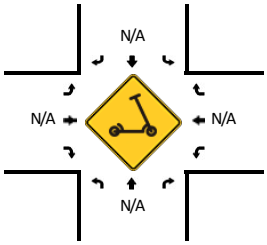












15-Min Count Period Beginning At	16. Olomea St/Halona St/N Vineyard Blvd (Northbound)				16. Olomea St/Halona St/N Vineyard Blvd (Southbound)				Palama St (Eastbound)				Palama St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	3	48	4	0	32	170	32	6	19	4	4	0	8	18	70	0	418	
6:15 AM	1	51	4	1	30	193	34	11	14	6	8	0	8	21	44	0	426	
6:30 AM	6	50	1	2	32	223	37	9	24	6	7	0	6	33	65	0	501	
6:45 AM	1	59	5	1	20	243	31	9	28	16	8	0	8	42	81	0	552	1897
7:00 AM	2	83	2	3	35	290	16	13	21	7	10	0	8	26	84	0	600	2079
7:15 AM	9	85	6	2	24	336	39	17	29	19	13	0	6	43	96	0	724	2377
7:30 AM	3	105	3	2	37	373	34	18	24	15	10	0	10	57	96	0	787	2663
7:45 AM	6	120	6	4	43	341	39	28	31	10	14	0	10	41	71	0	764	2875
8:00 AM	4	76	8	1	39	234	36	18	22	16	11	0	21	47	68	0	601	2876
8:15 AM	8	76	9	0	39	223	54	19	23	6	11	0	13	51	68	0	600	2752
8:30 AM	7	101	5	1	31	198	45	25	29	11	9	0	8	50	76	0	596	2561
8:45 AM	8	74	7	6	37	228	50	18	33	11	15	0	13	44	52	0	596	2393

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	420	12	8	148	1492	136	72	96	60	40	0	40	228	384	0	3148
Heavy Trucks	0	16	0		4	68	0		8	0	4		0	4	4		108
Buses																	
Pedestrians		64				0				8				12			84
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 10/22/2021 10:01 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

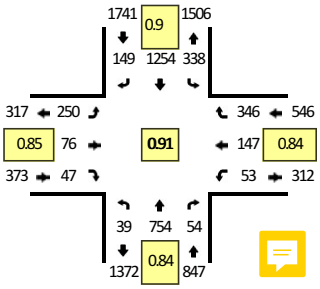
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

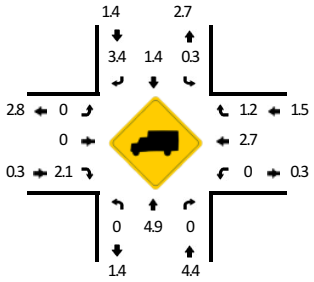
LOCATION: 16. Olomea St/Halona St/N Vineyard Blvd -- Palama St
CITY/STATE: Urban Honolulu, HI

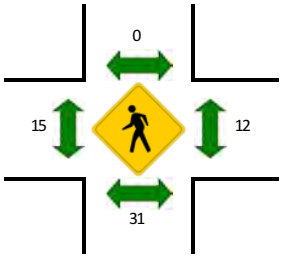
QC JOB #: 15596012
DATE: Wed, Oct 13 2021

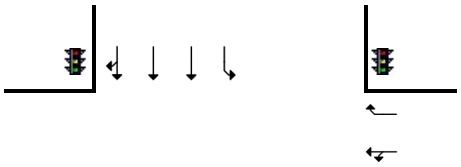
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 4:45 PM -- 5:00 PM

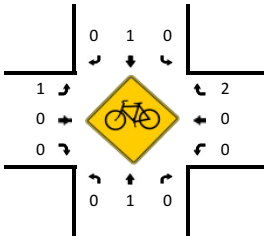


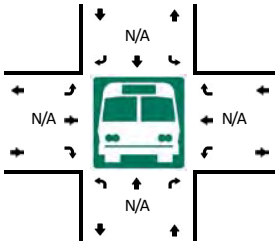


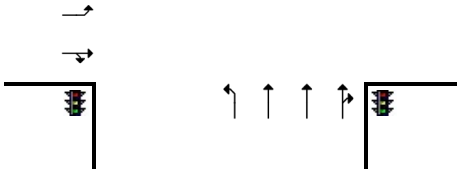


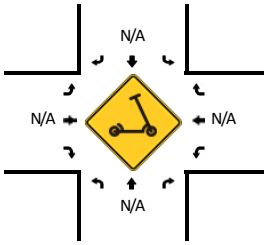












15-Min Count Period Beginning At	16. Olomea St/Halona St/N Vineyard Blvd (Northbound)				16. Olomea St/Halona St/N Vineyard Blvd (Southbound)				Palama St (Eastbound)				Palama St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	3	84	12	2	60	219	31	40	50	22	14	0	15	50	82	0	684	
3:15 PM	5	162	17	3	31	245	40	33	52	20	10	0	10	53	94	0	775	
3:30 PM	13	130	14	2	44	261	37	37	49	21	12	0	16	46	86	0	768	
3:45 PM	9	110	13	1	45	266	36	33	47	22	12	0	6	36	97	0	733	2960
4:00 PM	5	132	7	0	57	326	30	34	42	22	10	0	14	31	83	0	793	3069
4:15 PM	5	146	11	6	53	330	34	40	64	18	10	0	15	31	64	0	827	3121
4:30 PM	7	190	15	4	35	317	25	43	58	20	7	0	15	34	113	0	883	3236
4:45 PM	3	227	17	4	42	356	45	42	67	25	18	0	11	30	81	0	968	3471
5:00 PM	6	191	11	4	52	251	45	31	61	13	12	0	12	52	88	0	829	3507
5:15 PM	7	198	13	5	48	242	30	27	61	24	11	0	6	43	92	0	807	3487
5:30 PM	3	172	10	2	37	198	31	31	49	34	13	0	9	39	79	0	707	3311
5:45 PM	7	120	9	4	34	184	28	36	47	14	12	0	10	43	79	0	627	2970

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	908	68	16	168	1424	180	168	268	100	72	0	44	120	324	0	3872
Heavy Trucks	0	36	0		0	28	4		0	0	4		0	4	4		80
Buses																	
Pedestrians		24				0				16				0			40
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

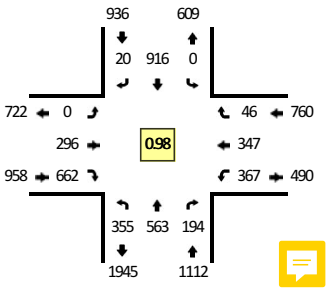
Report generated on 10/22/2021 10:01 AM

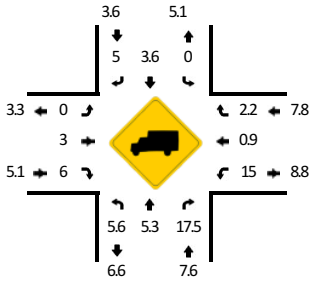
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

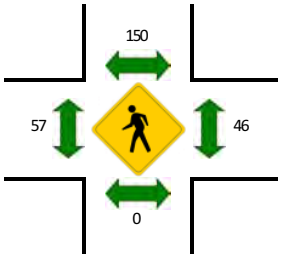
Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

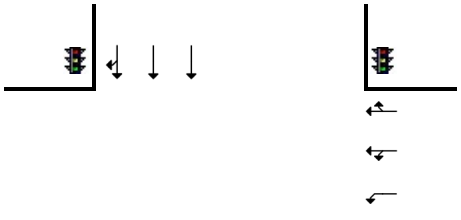
LOCATION: N King St -- Liliha St | **QC JOB #:** 14979801
CITY/STATE: Honolulu, HI | **DATE:** Wed, May 22 2019

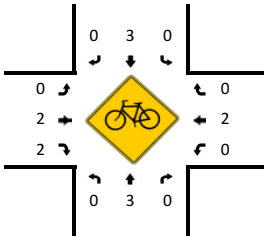
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

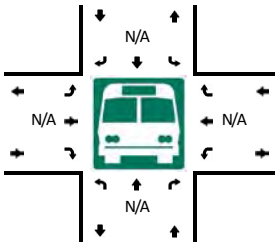


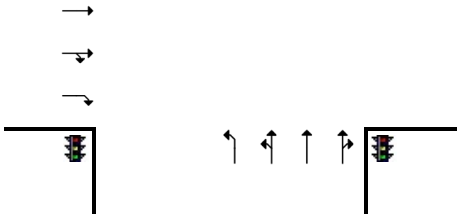


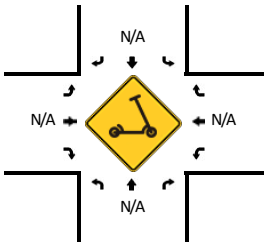












15-Min Count Period Beginning At	N King St (Northbound)				N King St (Southbound)				Liliha St (Eastbound)				Liliha St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	32	65	29	0	0	65	3	0	0	47	57	0	36	62	7	0	403	
6:15 AM	57	44	19	0	0	78	3	0	0	58	62	0	51	82	4	0	458	
6:30 AM	55	88	31	0	0	111	3	0	0	56	122	0	52	77	11	0	606	
6:45 AM	60	79	26	0	0	165	5	0	0	54	126	0	64	79	8	0	666	2133
7:00 AM	71	104	29	0	0	207	5	0	0	67	161	0	64	82	4	0	794	2524
7:15 AM	84	114	46	0	0	249	7	0	0	82	170	0	95	78	12	0	937	3003
7:30 AM	87	160	47	0	0	237	3	0	0	72	170	0	89	87	6	0	958	3355
7:45 AM	96	147	48	0	0	233	3	0	0	67	162	0	92	76	17	0	941	3630
8:00 AM	88	142	53	0	0	197	7	0	0	75	160	0	91	106	11	0	930	3766
8:15 AM	113	133	46	0	0	163	8	0	1	64	125	0	79	118	10	0	860	3689
8:30 AM	94	136	44	0	0	125	8	0	0	84	120	0	71	100	8	0	790	3521
8:45 AM	101	123	52	0	0	120	5	0	0	68	124	0	76	112	8	0	789	3369

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	348	640	188	0	0	948	12	0	0	288	680	0	356	348	24	0	3832
Heavy Trucks	16	36	20		0	32	0		0	12	24		44	0	0		184
Buses																	
Pedestrians		0				156				60				68			284
Bicycles	0	0	0		0	0	0		0	0	0		0	8	0		8
Scooters																	

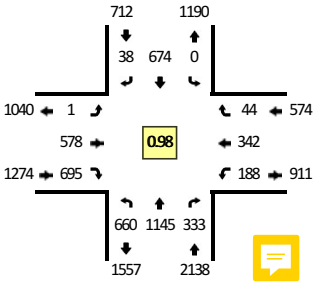
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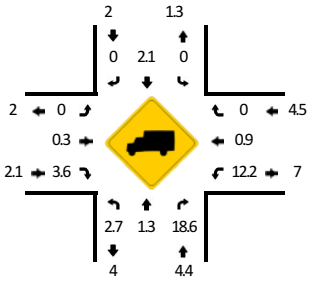
Report generated on 10/20/2021 8:47 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

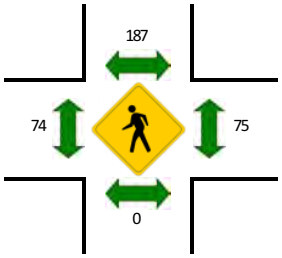
Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

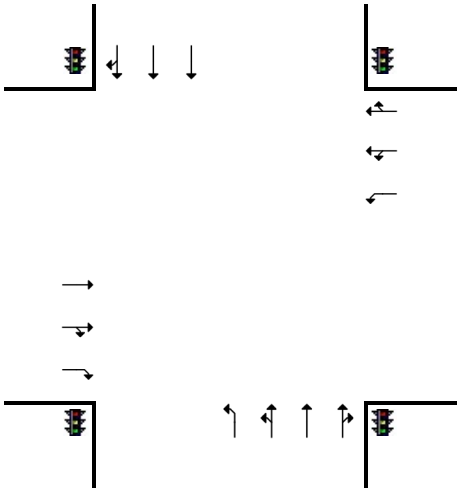
LOCATION: N King St -- Liliha St | **QC JOB #:** 14979802
CITY/STATE: Honolulu, HI | **DATE:** Wed, May 22 2019

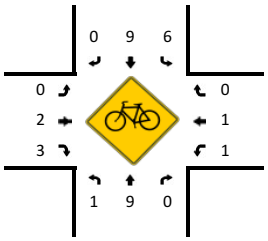
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 4:30 PM -- 4:45 PM

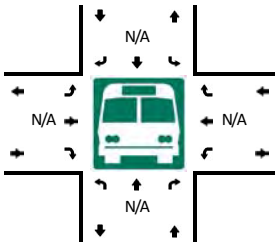


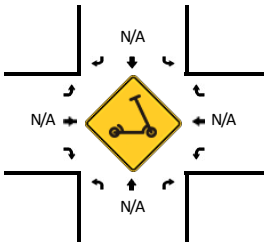












15-Min Count Period Beginning At	N King St (Northbound)				N King St (Southbound)				Liliha St (Eastbound)				Liliha St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	130	170	70	0	0	125	16	0	0	138	140	0	31	73	8	0	901	
3:15 PM	120	186	64	0	0	132	5	0	0	165	160	0	42	98	12	0	984	
3:30 PM	144	266	63	0	0	146	7	0	0	130	162	0	47	76	12	0	1053	
3:45 PM	110	235	61	0	0	161	8	0	0	147	182	0	44	70	12	0	1030	3968
4:00 PM	166	230	64	0	0	154	8	0	0	149	187	0	33	77	15	0	1083	4150
4:15 PM	158	282	89	0	0	175	10	0	0	124	153	0	54	77	15	0	1137	4303
4:30 PM	150	273	89	0	0	173	9	0	0	138	198	0	59	96	9	0	1194	4444
4:45 PM	194	274	88	0	0	178	11	0	0	140	167	0	43	76	12	0	1183	4597
5:00 PM	139	283	74	0	0	180	8	0	1	145	169	0	51	80	17	0	1147	4661
5:15 PM	177	315	82	0	0	143	10	0	0	155	161	0	35	90	6	0	1174	4698
5:30 PM	174	317	66	0	0	146	8	0	0	119	160	0	50	76	11	0	1127	4631
5:45 PM	175	244	76	0	0	122	9	0	0	119	116	0	48	71	4	0	984	4432

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	600	1092	356	0	0	692	36	0	0	552	792	0	236	384	36	0	4776
Heavy Trucks	12	20	60		0	24	0		0	4	40		28	4	0		192
Buses																	
Pedestrians		0				188				64				76			328
Bicycles	0	4	0		8	8	0		0	8	0		4	0	0		32
Scooters																	

Comments:

Report generated on 10/20/2021 8:48 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

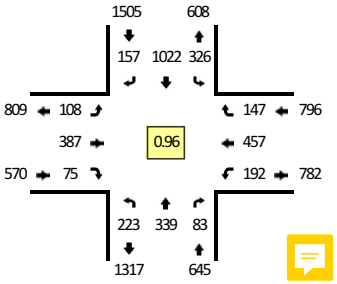
Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

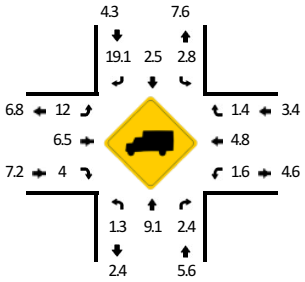
LOCATION: Vineyard Blvd -- Liliha St
CITY/STATE: Honolulu, HI

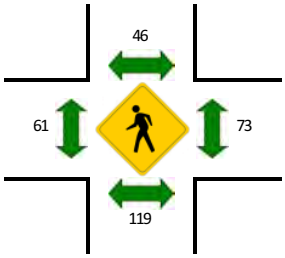
QC JOB #: 15084420
DATE: Tue, Oct 1 2019

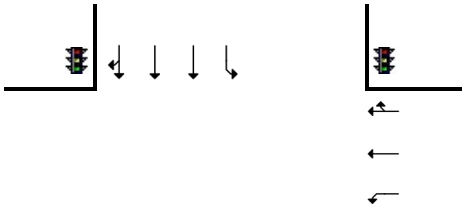
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

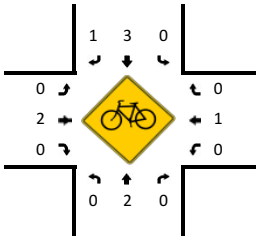


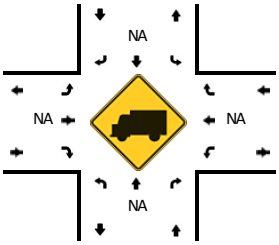
Quality Counts
DATA THAT DRIVES COMMUNITIES

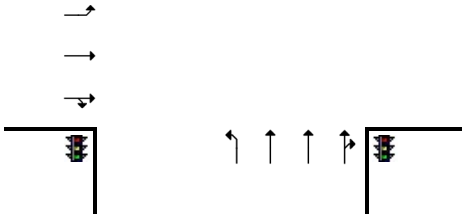


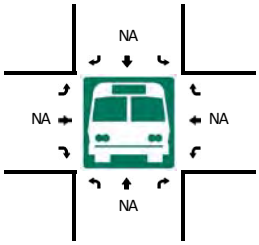












15-Min Count Period Beginning At	Vineyard Blvd (Northbound)				Vineyard Blvd (Southbound)				Liliha St (Eastbound)				Liliha St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	19	58	10	0	69	106	32	1	18	32	3	0	17	49	16	0	430	
6:15 AM	37	39	8	5	58	140	45	2	14	46	10	0	18	57	11	0	490	
6:30 AM	28	50	8	3	60	189	35	2	7	66	12	0	16	67	8	0	551	
6:45 AM	30	65	15	4	60	253	28	3	25	50	15	0	33	75	16	0	672	2143
7:00 AM	35	52	8	3	80	248	24	2	13	69	34	0	51	107	28	0	754	2467
7:15 AM	35	69	20	3	71	284	36	2	31	117	21	0	54	109	37	0	889	2866
7:30 AM	64	99	18	9	90	301	36	2	17	83	21	0	48	91	37	0	916	3231
7:45 AM	52	75	22	4	76	166	41	4	29	110	17	0	42	131	36	0	805	3364
8:00 AM	44	96	23	12	75	271	44	6	31	77	16	0	48	126	37	0	906	3516
8:15 AM	69	72	21	3	86	265	43	8	22	88	12	0	44	122	22	0	877	3504
8:30 AM	54	69	20	8	73	253	33	4	23	98	21	0	35	88	21	0	800	3388
8:45 AM	40	74	19	7	75	246	47	6	20	87	12	0	34	83	17	0	767	3350

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	256	396	72	36	360	1204	144	8	68	332	84	0	192	364	148	0	3664
Heavy Trucks	4	44	0		12	8	28		0	12	0		8	20	8		144
Pedestrians		80				52				52				64			248
Bicycles	0	1	0		0	0	1		0	0	0		0	1	0		3
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/14/2019 2:33 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

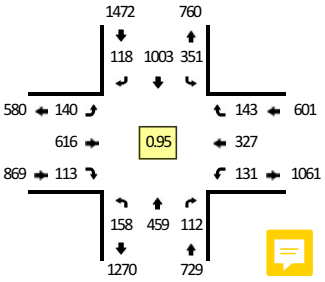
Type of peak hour being reported: System Peak

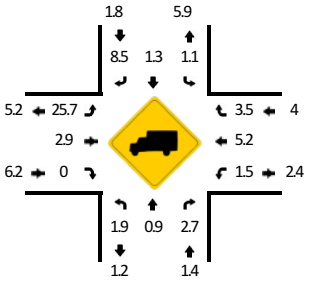
Method for determining peak hour: Total Entering Volume

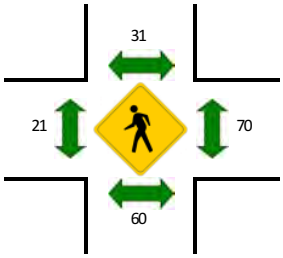
LOCATION: Vineyard Blvd -- Liliha St
CITY/STATE: Honolulu, HI

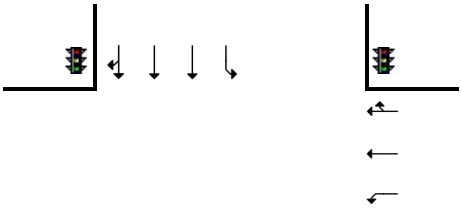
QC JOB #: 15084419
DATE: Tue, Oct 1 2019

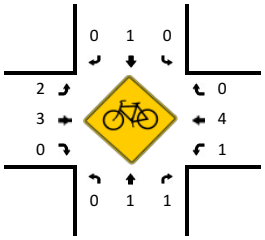
Peak-Hour: 3:30 PM -- 4:30 PM
Peak 15-Min: 3:45 PM -- 4:00 PM

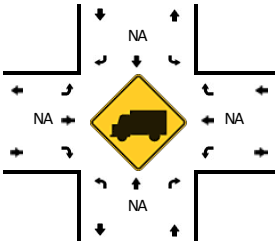


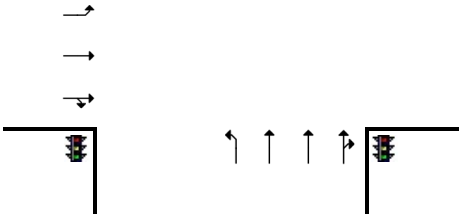


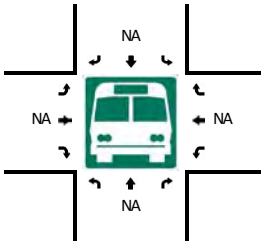












15-Min Count Period Beginning At	Vineyard Blvd (Northbound)				Vineyard Blvd (Southbound)				Liliha St (Eastbound)				Liliha St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	17	121	28	5	79	201	45	0	27	136	31	0	37	72	44	0	843	
3:15 PM	35	122	22	9	96	223	43	3	22	143	36	0	22	71	31	0	878	
3:30 PM	26	108	28	6	79	220	40	5	44	147	27	0	33	95	32	0	890	
3:45 PM	46	141	26	9	83	284	25	5	33	158	23	0	21	73	41	0	968	3579
4:00 PM	32	91	28	4	88	244	23	5	26	158	37	0	40	83	33	0	892	3628
4:15 PM	31	119	30	4	83	255	30	3	37	153	26	0	37	76	37	0	921	3671
4:30 PM	37	125	26	7	83	250	34	2	25	138	22	0	26	71	27	0	873	3654
4:45 PM	42	122	21	8	70	170	37	3	50	161	25	0	41	81	35	0	866	3552
5:00 PM	32	120	34	4	87	196	35	9	32	120	6	0	46	76	26	0	823	3483
5:15 PM	37	135	24	7	79	183	29	7	25	152	23	0	35	69	30	0	835	3397
5:30 PM	26	135	23	7	65	180	30	10	47	147	27	0	32	70	33	0	832	3356
5:45 PM	34	125	22	3	65	197	33	6	32	137	19	0	32	69	23	0	797	3287

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	184	564	104	36	332	1136	100	20	132	632	92	0	84	292	164	0	3872
Heavy Trucks	4	4	0		0	16	4		40	16	0		0	12	4		100
Pedestrians		60				20				12				68			160
Bicycles	0	0	1		0	0	0		0	0	0		1	2	0		4
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/14/2019 2:33 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

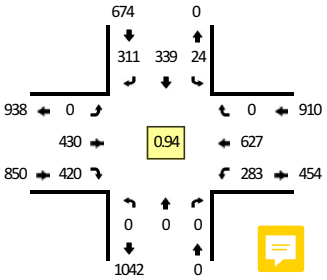
Type of peak hour being reported: System Peak

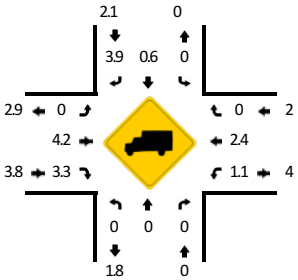
Method for determining peak hour: Total Entering Volume

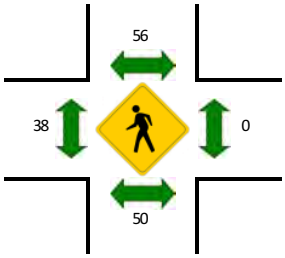
LOCATION: H-1 On Ramp/Kiapu Pl -- Liliha St
CITY/STATE: Honolulu, HI

QC JOB #: 15084414
DATE: Tue, Oct 1 2019

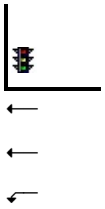
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:15 AM -- 7:30 AM

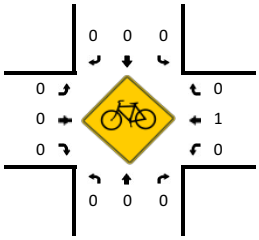


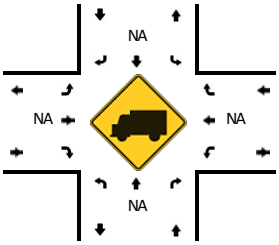


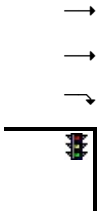




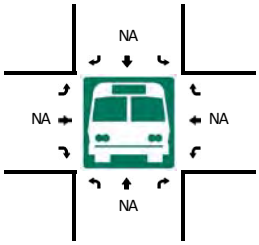












15-Min Count Period Beginning At	H-1 On Ramp/Kiapu Pl (Northbound)				H-1 On Ramp/Kiapu Pl (Southbound)				Liliha St (Eastbound)				Liliha St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	0	0	0	0	60	11	0	0	59	43	0	48	79	0	0	300	
6:15 AM	0	0	0	0	7	86	15	0	0	57	55	0	39	72	0	0	331	
6:30 AM	0	0	0	0	5	125	14	0	0	70	66	0	63	84	0	0	427	
6:45 AM	0	0	0	0	8	147	28	0	0	70	65	0	83	124	0	0	525	1583
7:00 AM	0	0	0	0	2	115	64	0	0	81	93	0	86	144	0	0	585	1868
7:15 AM	0	0	0	0	5	88	98	0	0	119	117	0	72	150	0	0	649	2186
7:30 AM	0	0	0	0	6	74	91	0	0	113	122	0	71	127	0	0	604	2363
7:45 AM	0	0	0	0	3	69	53	0	0	116	96	0	78	200	0	0	615	2453
8:00 AM	0	0	0	0	10	108	69	0	0	82	85	0	62	150	0	0	566	2434
8:15 AM	0	0	0	0	5	122	52	0	0	100	88	0	73	142	0	0	582	2367
8:30 AM	0	0	0	0	7	84	23	0	0	109	81	0	59	121	0	0	484	2247
8:45 AM	0	0	0	0	6	79	31	0	0	90	89	0	58	122	0	0	475	2107

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	20	352	392	0	0	476	468	0	288	600	0	0	2596
Heavy Trucks	0	0	0		0	0	16		0	16	12		0	16	0		60
Pedestrians		60				80				28				0			168
Bicycles	0	0	0		0	0	0		0	0	0		0	1	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/14/2019 2:33 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

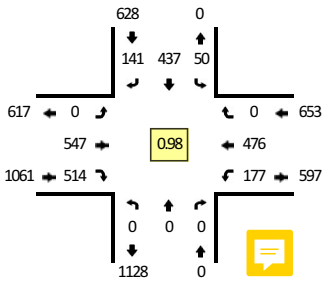
Type of peak hour being reported: System Peak

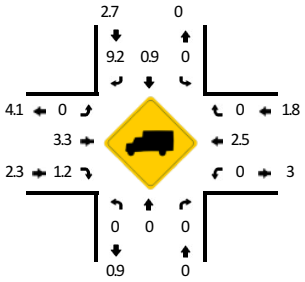
Method for determining peak hour: Total Entering Volume

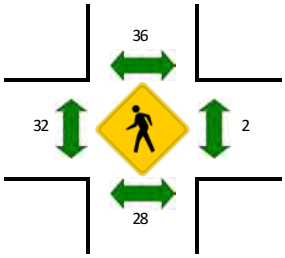
LOCATION: H-1 On Ramp/Kiapu Pl -- Liliha St
CITY/STATE: Honolulu, HI

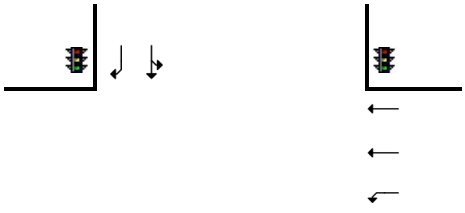
QC JOB #: 15084413
DATE: Tue, Oct 1 2019

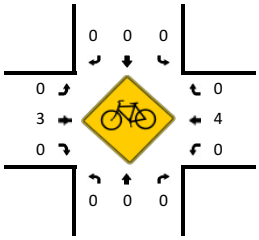
Peak-Hour: 3:30 PM -- 4:30 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

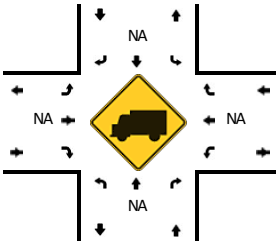




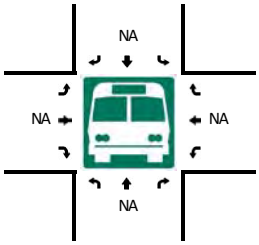












15-Min Count Period Beginning At	H-1 On Ramp/Kiapu Pl (Northbound)				H-1 On Ramp/Kiapu Pl (Southbound)				Liliha St (Eastbound)				Liliha St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	0	0	0	0	17	93	37	0	0	142	131	0	38	119	0	0	577	
3:15 PM	0	0	0	0	16	91	24	0	0	130	118	0	60	115	0	0	554	
3:30 PM	0	0	0	0	13	115	30	0	0	127	130	0	51	119	0	0	585	
3:45 PM	0	0	0	0	18	110	45	0	0	133	133	0	33	114	0	0	586	2302
4:00 PM	0	0	0	0	13	109	34	0	0	141	118	0	51	132	0	0	598	2323
4:15 PM	0	0	0	0	6	103	32	0	0	146	133	0	42	111	0	0	573	2342
4:30 PM	0	0	0	0	6	111	44	0	0	138	110	0	48	90	0	0	547	2304
4:45 PM	0	0	0	0	9	103	67	0	0	143	115	0	52	101	0	0	590	2308
5:00 PM	0	0	0	0	12	103	46	0	0	134	101	0	46	94	0	0	536	2246
5:15 PM	0	0	0	0	11	101	39	0	0	145	110	0	37	92	0	0	535	2208
5:30 PM	0	0	0	0	13	83	38	0	0	136	104	0	43	92	0	0	509	2170
5:45 PM	0	0	0	0	16	89	33	0	0	140	105	0	34	90	0	0	507	2087

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	52	436	136	0	0	564	472	0	204	528	0	0	2392
Heavy Trucks	0	0	0		0	4	24		0	28	8		0	8	0		72
Pedestrians		40				60				44				0			144
Bicycles	0	0	0		0	0	0		0	1	0		0	2	0		3
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/14/2019 2:33 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

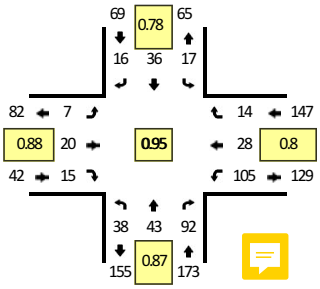
Type of peak hour being reported: Intersection Peak

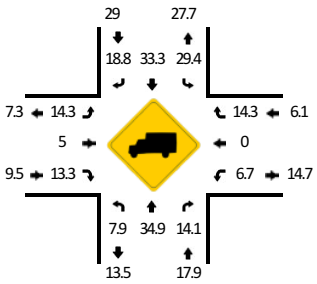
Method for determining peak hour: Total Entering Volume

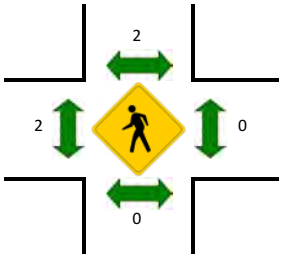
LOCATION: 20. Pacific St -- Iwilei Rd
CITY/STATE: Urban Honolulu, HI

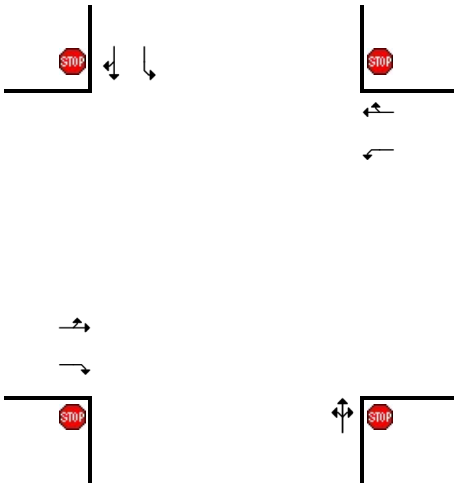
QC JOB #: 15596013
DATE: Wed, Oct 13 2021

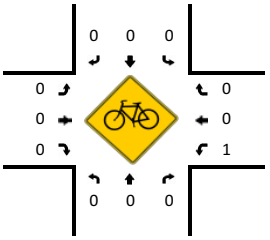
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

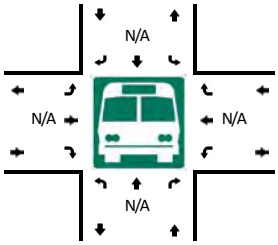


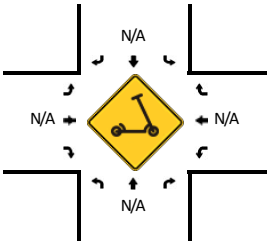












15-Min Count Period Beginning At	20. Pacific St (Northbound)				20. Pacific St (Southbound)				Iwilei Rd (Eastbound)				Iwilei Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	9	3	11	0	0	3	1	0	1	2	2	0	9	5	4	0	50	
6:15 AM	3	3	12	0	1	7	1	0	2	2	2	0	12	4	2	0	51	
6:30 AM	7	6	21	0	0	5	2	0	1	3	1	0	12	4	1	1	64	
6:45 AM	11	3	27	0	1	9	2	0	1	4	5	0	20	4	3	0	90	255
7:00 AM	12	5	19	0	4	7	5	0	1	5	5	0	19	7	6	0	95	300
7:15 AM	5	8	31	0	7	9	4	0	3	4	5	0	15	6	1	1	99	348
7:30 AM	10	14	21	0	1	15	6	0	1	5	4	0	27	7	2	0	113	397
7:45 AM	12	15	23	0	5	4	2	0	1	8	2	0	32	5	5	0	114	421
8:00 AM	11	6	17	0	3	8	4	1	2	3	4	0	30	10	6	0	105	431
8:15 AM	10	16	16	1	4	7	0	0	1	2	3	0	22	9	3	0	94	426
8:30 AM	10	9	17	0	2	6	6	0	2	4	8	0	14	5	4	0	87	400
8:45 AM	15	7	26	0	5	13	4	0	1	6	1	0	23	9	4	0	114	400

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	48	60	92	0	20	16	8	0	4	32	8	0	128	20	20	0	456
Heavy Trucks	0	20	8		4	4	4		0	4	4		8	0	4		60
Buses																	
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

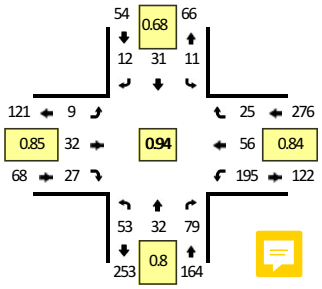
Report generated on 10/22/2021 10:01 AM

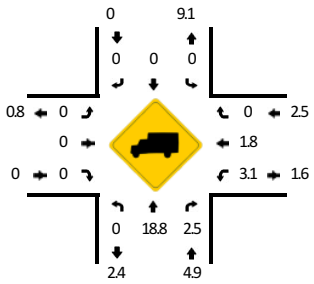
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

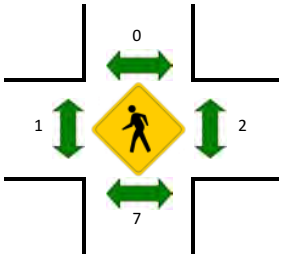
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

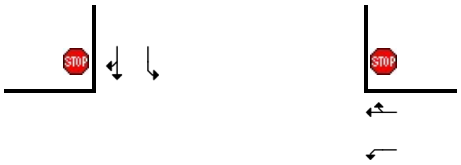
LOCATION: 20. Pacific St -- Iwilei Rd | **QC JOB #:** 15596014
CITY/STATE: Urban Honolulu, HI | **DATE:** Wed, Oct 13 2021

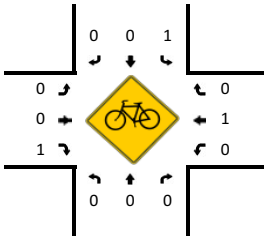
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 4:30 PM -- 4:45 PM

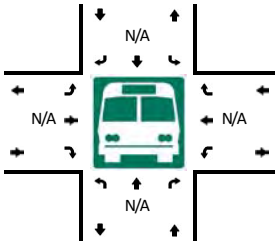




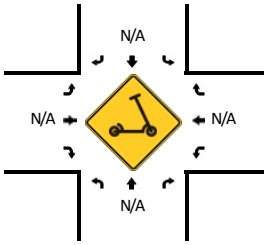












15-Min Count Period Beginning At	20. Pacific St (Northbound)				20. Pacific St (Southbound)				Iwilei Rd (Eastbound)				Iwilei Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	13	3	24	0	6	5	4	0	4	11	3	0	22	11	7	0	113	
3:15 PM	9	2	21	0	3	6	3	0	4	9	8	0	30	12	2	0	109	
3:30 PM	17	4	27	0	4	6	6	0	0	13	10	0	33	11	8	0	139	
3:45 PM	5	9	31	0	2	3	1	0	0	9	7	0	20	16	4	0	107	468
4:00 PM	6	9	26	0	5	2	6	0	0	13	9	0	37	13	7	0	133	488
4:15 PM	12	8	20	0	0	7	1	0	2	13	5	0	37	12	7	0	124	503
4:30 PM	9	8	20	0	3	10	4	0	2	8	3	0	66	12	4	0	149	513
4:45 PM	17	11	23	0	3	4	2	0	1	6	9	0	46	15	10	0	147	553
5:00 PM	15	5	16	0	5	10	5	0	4	5	10	0	46	17	4	0	142	562
5:15 PM	9	0	13	0	3	5	2	0	2	8	5	0	32	7	5	0	91	529
5:30 PM	9	2	13	0	2	2	3	0	1	8	7	0	38	10	5	0	100	480
5:45 PM	9	0	11	0	0	1	1	0	2	2	5	0	16	6	0	0	53	386

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	36	32	80	0	12	40	16	0	8	32	12	0	264	48	16	0	596
Heavy Trucks	0	8	0		0	0	0		0	0	0		4	0	0		12
Buses																	
Pedestrians		4				0				4				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	4	0		4
Scooters																	

Comments:

Report generated on 10/22/2021 10:01 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

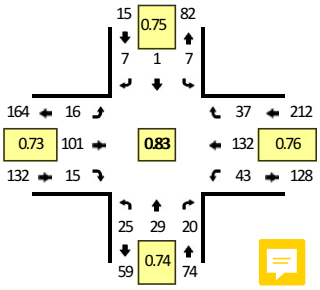
Type of peak hour being reported: Intersection Peak

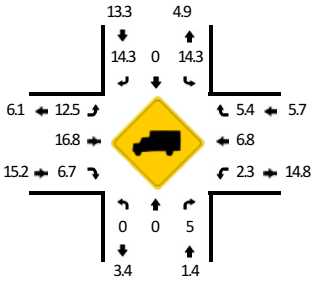
Method for determining peak hour: Total Entering Volume

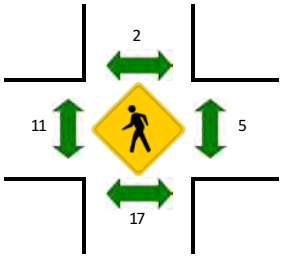
LOCATION: 21. Sumner St -- Iwilei Rd
CITY/STATE: Urban Honolulu, HI

QC JOB #: 15596015
DATE: Wed, Oct 13 2021

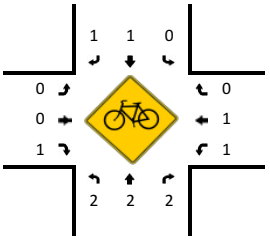
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

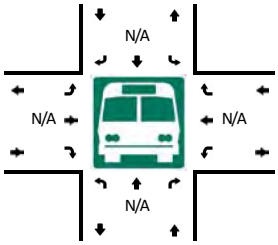




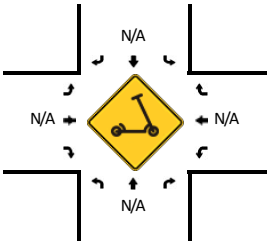












15-Min Count Period Beginning At	21. Sumner St (Northbound)				21. Sumner St (Southbound)				Iwilei Rd (Eastbound)				Iwilei Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	2	2	2	0	3	0	1	0	4	5	4	0	4	18	1	0	46	
6:15 AM	4	3	1	0	1	2	1	0	7	8	2	0	6	16	4	0	55	
6:30 AM	2	6	4	0	3	0	1	0	8	16	1	0	7	18	7	0	73	
6:45 AM	3	9	8	0	2	0	1	0	5	20	4	0	7	36	4	0	99	273
7:00 AM	8	4	7	0	1	0	0	0	8	26	2	0	13	30	5	0	104	331
7:15 AM	10	7	1	0	2	0	1	0	5	36	4	0	5	21	5	0	97	373
7:30 AM	2	8	3	0	1	0	2	0	4	17	4	0	9	34	6	0	90	390
7:45 AM	5	9	11	0	2	1	2	0	6	28	5	0	14	31	17	0	131	422
8:00 AM	8	5	5	0	2	0	2	0	1	20	2	0	15	46	9	0	115	433
8:15 AM	5	5	6	0	2	0	2	0	7	18	2	0	13	25	6	0	91	427
8:30 AM	5	4	8	0	2	1	1	0	5	20	5	0	10	18	5	1	85	422
8:45 AM	5	2	2	0	5	1	4	0	4	23	6	0	22	26	9	0	109	400

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	36	44	0	8	4	8	0	24	112	20	0	56	124	68	0	524
Heavy Trucks	0	0	0		0	0	0		0	12	0		0	12	4		28
Buses																	
Pedestrians		12				8				8				12			40
Bicycles	4	4	0		0	0	4		0	0	0		0	4	0		16
Scooters																	

Comments:

Report generated on 10/22/2021 10:01 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

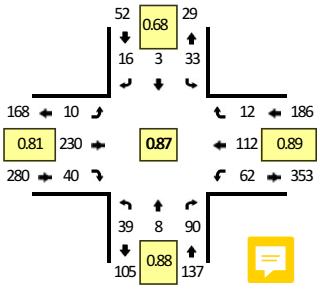
Type of peak hour being reported: Intersection Peak

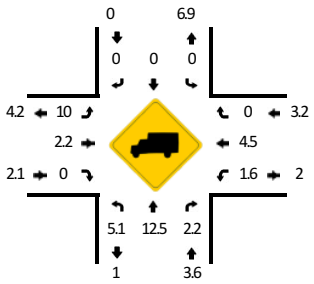
Method for determining peak hour: Total Entering Volume

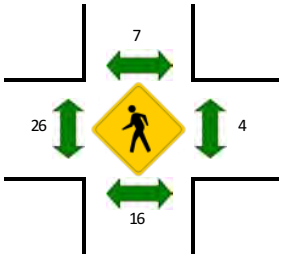
LOCATION: 21. Sumner St -- Iwilei Rd
CITY/STATE: Urban Honolulu, HI

QC JOB #: 15596016
DATE: Wed, Oct 13 2021

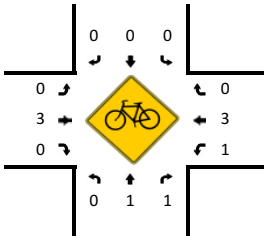
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

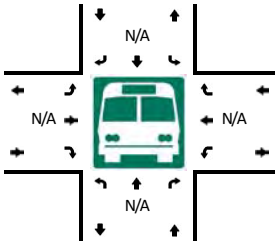




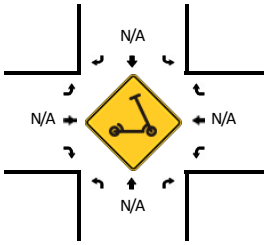












15-Min Count Period Beginning At	21. Sumner St (Northbound)				21. Sumner St (Southbound)				Iwilei Rd (Eastbound)				Iwilei Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	11	4	17	0	7	3	4	0	3	42	12	0	21	21	1	0	146	
3:15 PM	8	3	23	0	2	3	0	0	1	35	10	0	22	32	4	0	143	
3:30 PM	10	6	21	0	4	4	6	0	4	47	8	0	17	30	2	1	160	
3:45 PM	7	5	15	0	3	3	5	0	2	29	12	1	15	21	5	0	123	572
4:00 PM	9	1	22	0	14	1	4	0	4	69	13	0	20	29	3	0	189	615
4:15 PM	7	3	22	0	7	1	6	0	3	52	6	0	17	29	6	0	159	631
4:30 PM	11	1	22	0	8	1	5	0	0	67	10	0	9	35	0	0	169	640
4:45 PM	12	3	24	0	4	0	1	0	2	42	11	1	16	19	3	0	138	655
5:00 PM	7	2	20	0	6	1	5	0	2	45	12	0	12	24	2	0	138	604
5:15 PM	5	2	23	0	6	1	4	0	0	49	10	0	13	16	2	0	131	576
5:30 PM	10	0	13	0	10	1	3	0	2	37	8	1	14	14	0	0	113	520
5:45 PM	1	3	7	0	11	4	2	0	0	22	3	0	13	7	0	0	73	455

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	36	4	88	0	56	4	16	0	16	276	52	0	80	116	12	0	756
Heavy Trucks	4	0	4		0	0	0		4	8	0		4	4	0		28
Buses																	
Pedestrians		24				28				44				12			108
Bicycles	0	0	0		0	0	0		0	0	0		0	8	0		8
Scooters																	

Comments:

Report generated on 10/22/2021 10:01 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

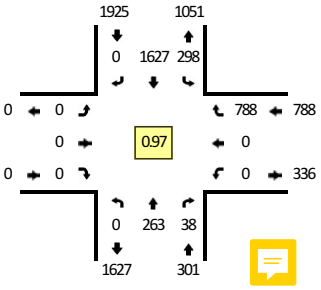
Type of peak hour being reported: System Peak

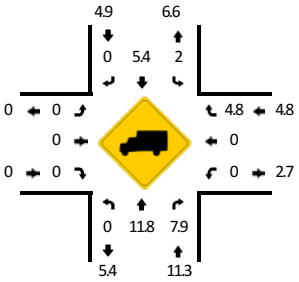
Method for determining peak hour: Total Entering Volume

LOCATION: King St -- Beretania St
CITY/STATE: Honolulu, HI

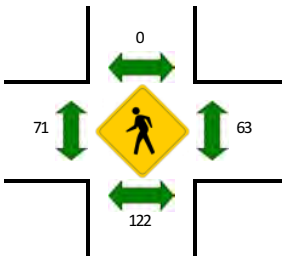
QC JOB #: 15084450
DATE: Tue, Oct 1 2019

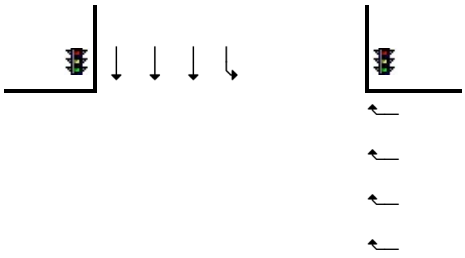
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

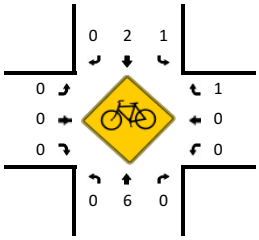


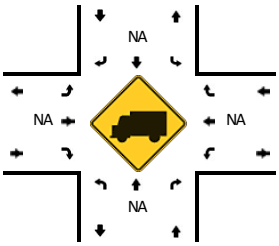


Quality Counts
DATA THAT DRIVES COMMUNITIES

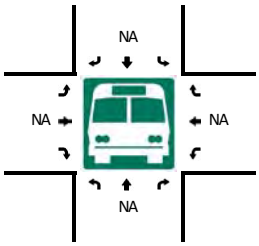












15-Min Count Period Beginning At	King St (Northbound)				King St (Southbound)				Beretania St (Eastbound)				Beretania St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	33	7	0	13	117	0	0	0	0	0	0	0	0	68	0	238	
6:15 AM	0	29	2	0	13	188	0	0	0	0	0	0	0	0	115	0	347	
6:30 AM	0	42	2	0	30	251	0	0	0	0	0	0	0	0	93	0	418	
6:45 AM	0	53	11	0	46	329	0	0	0	0	0	0	0	0	121	0	560	1563
7:00 AM	0	44	6	0	56	392	0	0	0	0	0	0	0	0	158	0	656	1981
7:15 AM	0	57	7	0	61	412	0	0	0	0	0	0	0	0	207	0	744	2378
7:30 AM	0	69	8	0	84	441	0	0	0	0	0	0	0	0	176	0	778	2738
7:45 AM	0	66	12	0	89	400	0	0	0	0	0	0	0	0	212	0	779	2957
8:00 AM	0	71	11	0	64	374	0	0	0	0	0	0	0	0	193	0	713	3014
8:15 AM	0	61	10	0	62	382	0	0	0	0	0	0	0	0	196	0	711	2981
8:30 AM	0	83	12	0	47	327	0	0	0	0	0	0	0	0	165	0	634	2837
8:45 AM	0	61	13	0	37	307	0	0	0	0	0	0	0	0	156	0	574	2632

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	264	48	0	356	1600	0	0	0	0	0	0	0	0	848	0	3116
Heavy Trucks	0	40	0		8	84	0		0	0	0		0	0	36		168
Pedestrians		132				0				76				60			268
Bicycles	0	1	0		0	1	0		0	0	0		0	0	0		2
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/14/2019 2:33 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

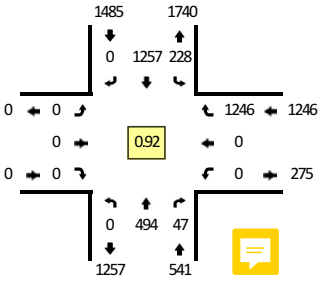
Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

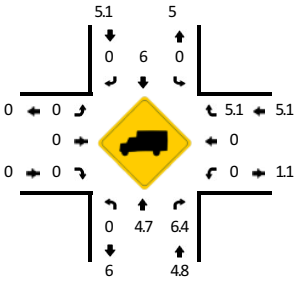
LOCATION: King St -- Beretania St
CITY/STATE: Honolulu, HI

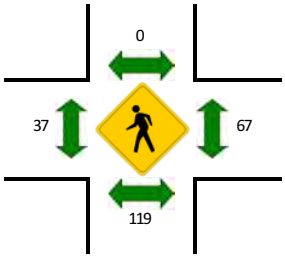
QC JOB #: 15084449
DATE: Tue, Oct 1 2019

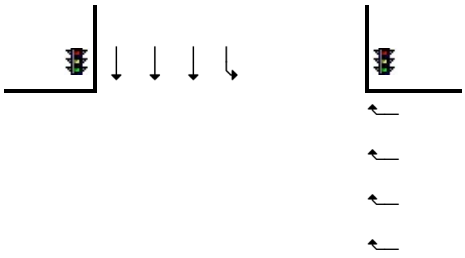
Peak-Hour: 3:30 PM -- 4:30 PM
Peak 15-Min: 4:15 PM -- 4:30 PM

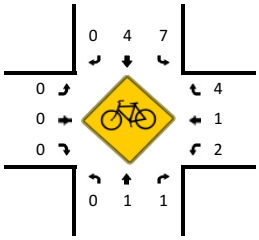


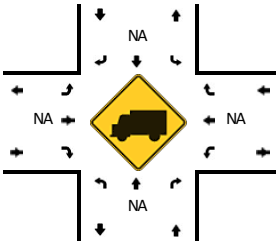
Quality Counts
DATA THAT DRIVES COMMUNITIES



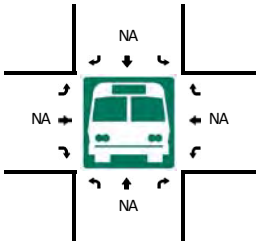












15-Min Count Period Beginning At	King St (Northbound)				King St (Southbound)				Beretania St (Eastbound)				Beretania St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	0	110	19	0	45	254	0	0	0	0	0	0	0	0	254	0	682	
3:15 PM	0	116	10	0	58	269	0	0	0	0	0	0	0	0	283	0	736	
3:30 PM	0	128	14	0	51	309	0	0	0	0	0	0	0	0	300	0	802	
3:45 PM	0	122	17	0	55	312	0	0	0	0	0	0	0	0	302	0	808	3028
4:00 PM	0	112	9	0	57	292	0	0	0	0	0	0	0	0	300	0	770	3116
4:15 PM	0	132	7	0	65	344	0	0	0	0	0	0	0	0	344	0	892	3272
4:30 PM	0	127	23	0	82	352	0	0	0	0	0	0	0	0	337	0	921	3391
4:45 PM	0	110	22	0	67	336	0	0	0	0	0	0	0	0	355	0	890	3473
5:00 PM	0	147	7	0	60	325	0	0	0	0	0	0	0	0	377	0	916	3619
5:15 PM	0	125	13	0	79	316	0	0	0	0	0	0	0	0	329	0	862	3589
5:30 PM	0	124	9	0	55	290	0	0	0	0	0	0	0	0	350	0	828	3496
5:45 PM	0	115	15	0	50	272	0	0	0	0	0	0	0	0	269	0	721	3327

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	528	28	0	260	1376	0	0	0	0	0	0	0	0	1376	0	3568
Heavy Trucks	0	24	0		0	92	0		0	0	0		0	0	72		188
Pedestrians		96				0				44				40			180
Bicycles	0	1	0		0	0	0		0	0	0		1	1	1		4
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/14/2019 2:33 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

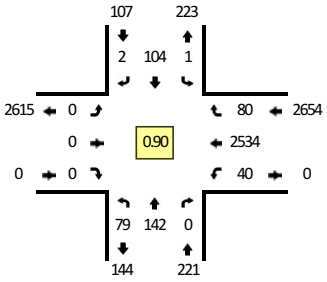
Type of peak hour being reported: System Peak

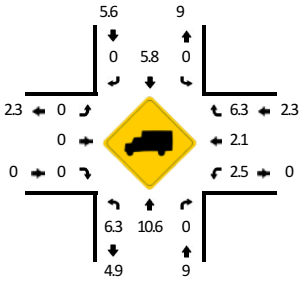
Method for determining peak hour: Total Entering Volume

LOCATION: Pacific St -- N Nimitz Hwy WB
CITY/STATE: Honolulu, HI

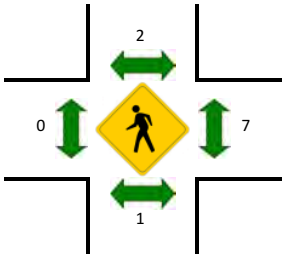
QC JOB #: 15084479
DATE: Tue, Oct 8 2019

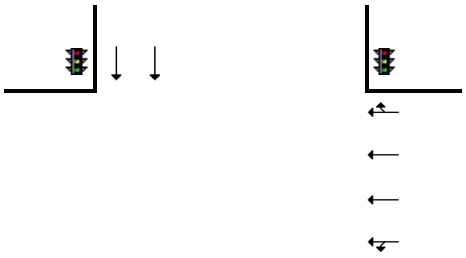
Peak-Hour: 3:45 PM -- 4:45 PM
Peak 15-Min: 4:15 PM -- 4:30 PM

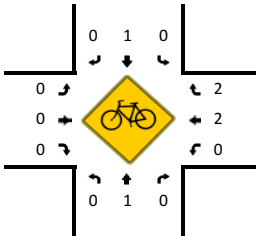


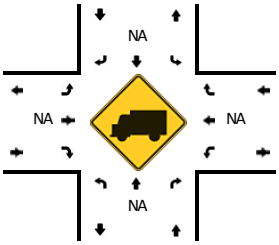


Quality Counts
DATA THAT DRIVES COMMUNITIES

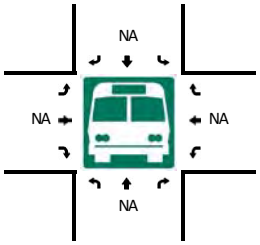












15-Min Count Period Beginning At	Pacific St (Northbound)				Pacific St (Southbound)				N Nimitz Hwy WB (Eastbound)				N Nimitz Hwy WB (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	33	35	0	0	0	28	0	1	0	0	0	0	7	602	24	0	730	
3:15 PM	25	34	0	0	0	24	0	0	0	0	0	0	7	610	24	0	724	
3:30 PM	41	41	0	0	0	17	0	0	0	0	0	0	9	597	25	0	730	
3:45 PM	14	42	0	0	0	24	0	1	0	0	0	0	10	613	29	0	733	2917
4:00 PM	22	42	0	0	0	31	1	0	0	0	0	0	12	554	19	0	681	2868
4:15 PM	25	39	0	0	0	21	1	0	0	0	0	0	9	717	16	0	828	2972
4:30 PM	18	19	0	0	0	28	0	0	0	0	0	0	9	650	16	0	740	2982
4:45 PM	14	30	0	0	0	27	0	0	0	0	0	0	7	680	16	0	774	3023
5:00 PM	20	24	0	0	0	31	0	0	0	0	0	0	9	620	17	0	721	3063
5:15 PM	14	32	0	0	0	25	0	0	0	0	0	0	6	598	12	0	687	2922
5:30 PM	11	19	0	0	0	16	0	0	0	0	0	0	8	682	14	0	750	2932
5:45 PM	11	23	0	0	0	20	0	0	0	0	0	0	5	513	14	0	586	2744

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	100	156	0	0	0	84	4	0	0	0	0	0	36	2868	64	0	3312
Heavy Trucks	12	8	0		0	4	0		0	0	0		0	40	0		64
Pedestrians		0				0				0				8			8
Bicycles	0	1	0		0	1	0		0	0	0		0	0	1		3
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2019 2:32 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

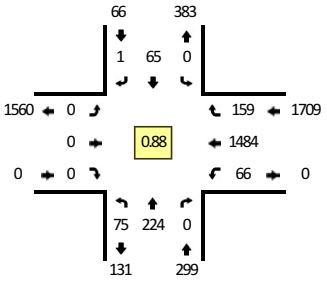
Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

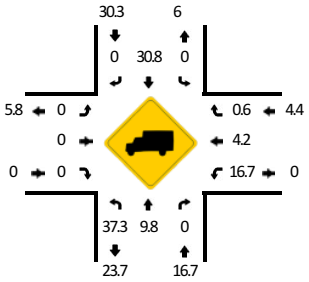
LOCATION: Pacific St -- N Nimitz Hwy WB
CITY/STATE: Honolulu, HI

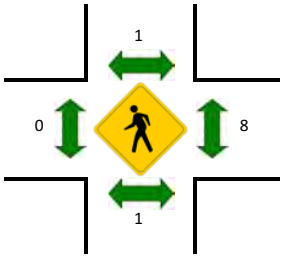
QC JOB #: 15084480
DATE: Tue, Oct 8 2019

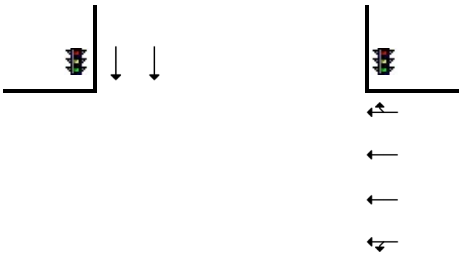
Peak-Hour: 6:45 AM -- 7:45 AM
Peak 15-Min: 7:15 AM -- 7:30 AM

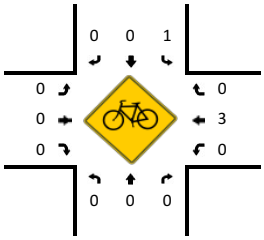


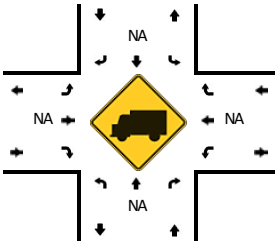
Quality Counts
DATA THAT DRIVES COMMUNITIES



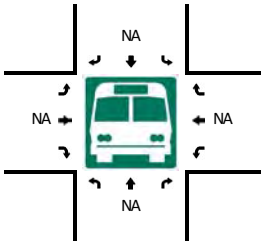












15-Min Count Period Beginning At	Pacific St (Northbound)				Pacific St (Southbound)				N Nimitz Hwy WB (Eastbound)				N Nimitz Hwy WB (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	16	27	0	0	0	4	0	0	0	0	0	0	11	230	10	0	298	
6:15 AM	8	39	0	0	0	9	0	0	0	0	0	0	15	246	13	0	330	
6:30 AM	14	46	0	0	0	12	1	0	0	0	0	0	28	271	19	0	391	
6:45 AM	9	45	0	0	0	17	0	0	0	0	0	0	22	345	30	0	468	1487
7:00 AM	21	50	0	0	0	9	0	0	0	0	0	0	16	316	40	0	452	1641
7:15 AM	24	57	0	0	0	14	0	0	0	0	0	0	21	428	43	0	587	1898
7:30 AM	21	72	0	0	0	25	1	0	0	0	0	0	7	395	46	0	567	2074
7:45 AM	19	64	0	0	0	11	0	0	0	0	0	0	17	385	42	0	538	2144
8:00 AM	28	60	0	0	0	21	0	0	0	0	0	0	7	387	35	0	538	2230
8:15 AM	26	45	0	0	0	18	0	0	0	0	0	0	9	343	40	0	481	2124
8:30 AM	17	42	0	0	0	19	0	0	0	0	0	0	13	300	31	0	422	1979
8:45 AM	34	51	0	0	0	15	0	1	0	0	0	0	11	360	27	0	499	1940

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	96	228	0	0	0	56	0	0	0	0	0	0	84	1712	172	0	2348
Heavy Trucks	40	16	0		0	16	0		0	0	0		12	76	0		160
Pedestrians		0				0				0				12			12
Bicycles	0	0	0		0	0	0		0	0	0		0	1	0		1
Railroad																	
Stopped Buses																	

Comments:

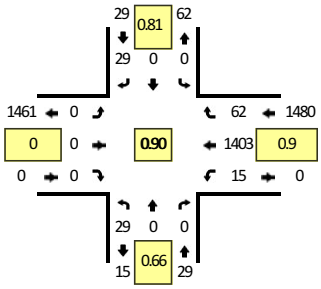
Report generated on 10/28/2019 2:35 PM

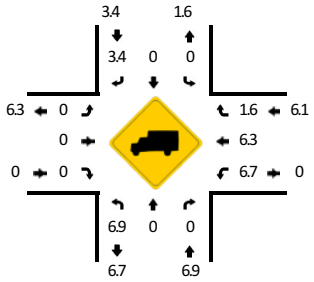
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

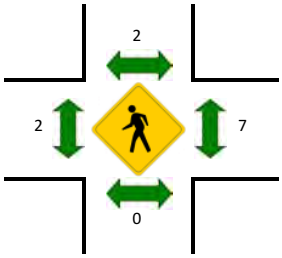
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: 24. Sumner St -- N Nimitz Hwy WB | **QC JOB #:** 15596017
CITY/STATE: Urban Honolulu, HI | **DATE:** Wed, Oct 13 2021

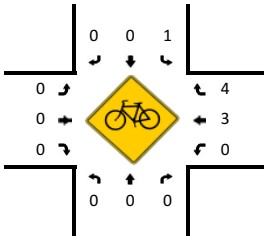
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

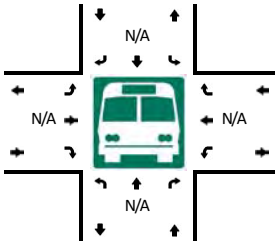




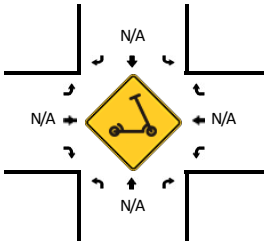












15-Min Count Period Beginning At	24. Sumner St (Northbound)				24. Sumner St (Southbound)				N Nimitz Hwy WB (Eastbound)				N Nimitz Hwy WB (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	1	0	0	0	0	0	1	0	0	0	0	0	0	204	9	0	215	
6:15 AM	4	0	0	0	0	0	9	0	0	0	0	0	0	211	4	0	228	
6:30 AM	3	0	0	0	0	0	4	0	0	0	0	0	2	239	14	0	262	
6:45 AM	5	0	0	0	0	0	7	0	0	0	0	0	3	283	18	0	316	1021
7:00 AM	3	0	0	0	0	0	7	0	0	0	0	0	1	273	17	0	301	1107
7:15 AM	4	0	0	0	0	0	6	0	0	0	0	0	2	366	12	0	390	1269
7:30 AM	8	0	0	0	0	0	7	0	0	0	0	0	6	362	18	0	401	1408
7:45 AM	11	0	0	0	0	0	9	0	0	0	0	0	3	387	19	0	429	1521
8:00 AM	6	0	0	0	0	0	7	0	0	0	0	0	4	288	13	0	318	1538
8:15 AM	9	0	0	0	0	0	13	0	0	0	0	0	2	331	14	0	369	1517
8:30 AM	14	0	0	0	0	0	11	0	0	0	0	0	2	272	20	0	319	1435
8:45 AM	17	0	0	0	0	0	25	0	0	0	0	0	3	377	27	0	449	1455

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	44	0	0	0	0	0	36	0	0	0	0	0	12	1548	76	0	1716
Heavy Trucks	4	0	0		0	0	0		0	0	0		0	96	0		100
Buses																	
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	8		8
Scooters																	

Comments:

Report generated on 10/22/2021 10:01 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

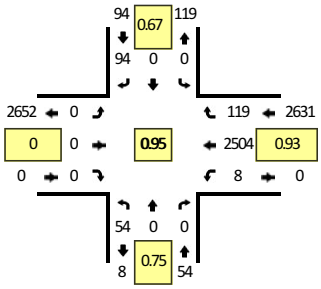
Type of peak hour being reported: Intersection Peak

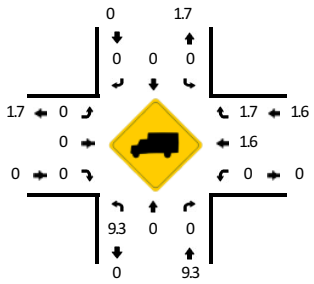
Method for determining peak hour: Total Entering Volume

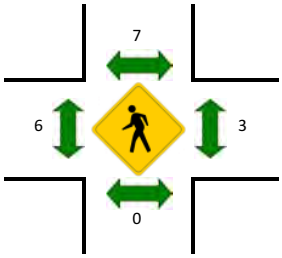
LOCATION: 24. Sumner St -- N Nimitz Hwy WB
CITY/STATE: Urban Honolulu, HI

QC JOB #: 15596018
DATE: Wed, Oct 13 2021

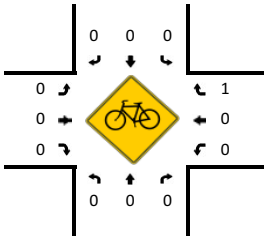
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:45 PM -- 5:00 PM

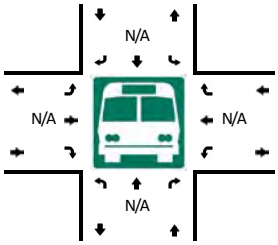




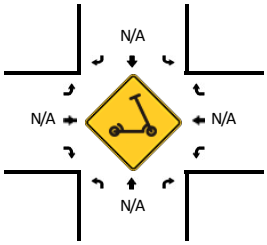












15-Min Count Period Beginning At	24. Sumner St (Northbound)				24. Sumner St (Southbound)				N Nimitz Hwy WB (Eastbound)				N Nimitz Hwy WB (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	20	0	0	0	0	0	36	0	0	0	0	0	1	523	26	0	606	
3:15 PM	16	0	0	0	0	0	30	0	0	0	0	0	3	564	32	0	645	
3:30 PM	21	0	0	0	0	0	23	0	0	0	0	0	1	577	30	0	652	
3:45 PM	31	0	0	0	0	0	36	0	0	0	0	0	2	514	34	0	617	2520
4:00 PM	14	0	0	0	0	0	35	0	0	0	0	0	1	588	28	0	666	2580
4:15 PM	18	0	0	0	0	0	27	0	0	0	0	0	2	580	27	0	654	2589
4:30 PM	6	0	0	0	0	0	14	0	0	0	0	0	1	681	24	0	726	2663
4:45 PM	16	0	0	0	0	0	18	0	0	0	0	0	4	655	40	0	733	2779
5:00 PM	17	0	0	0	0	0	34	0	0	0	0	0	1	501	19	0	572	2685
5:15 PM	6	0	0	0	0	0	19	0	0	0	0	0	3	622	30	0	680	2711
5:30 PM	8	0	0	0	0	0	29	0	0	0	0	0	1	447	19	0	504	2489
5:45 PM	5	0	0	0	0	0	27	0	0	0	0	0	2	458	11	0	503	2259

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	64	0	0	0	0	0	72	0	0	0	0	0	16	2620	160	0	2932
Heavy Trucks	20	0	0		0	0	0		0	0	0		0	40	4		64
Buses																	
Pedestrians		0				4				4				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	4		4
Scooters																	

Comments:

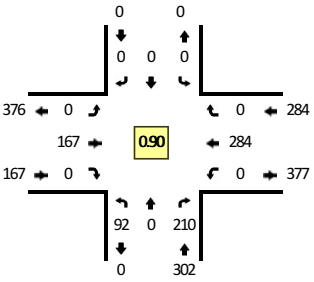
Report generated on 10/22/2021 10:01 AM

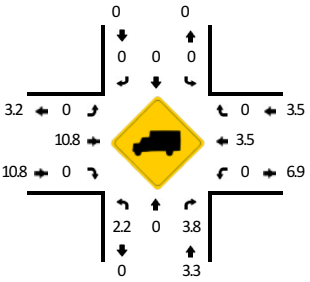
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

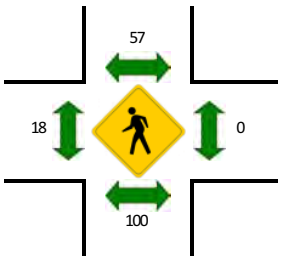
LOCATION: Ka'aahi St -- Iwilei Rd | **QC JOB #:** 14979815
CITY/STATE: Honolulu, HI | **DATE:** Thu, May 23 2019

Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

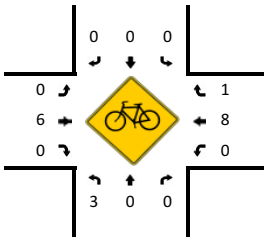


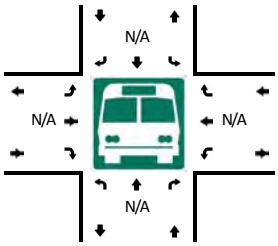


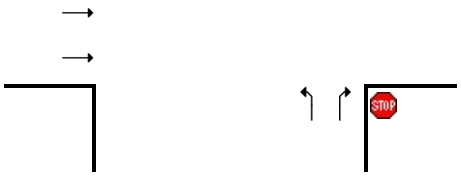
Quality Counts
DATA THAT DRIVES COMMUNITIES

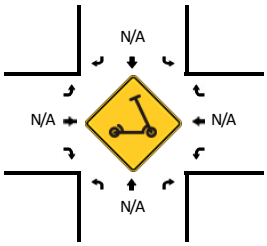












15-Min Count Period Beginning At	Ka'aahi St (Northbound)				Ka'aahi St (Southbound)				Iwilei Rd (Eastbound)				Iwilei Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	4	0	29	0	0	0	0	0	0	10	0	0	0	27	0	0	70	
6:15 AM	13	0	34	0	0	0	0	0	0	21	0	0	0	41	0	0	109	
6:30 AM	11	0	31	0	0	0	0	0	0	35	0	0	0	51	0	0	128	
6:45 AM	11	0	33	0	0	0	0	0	0	27	0	0	0	52	0	0	123	430
7:00 AM	15	0	54	0	0	0	0	0	0	30	0	1	0	54	0	0	154	514
7:15 AM	21	0	52	0	0	0	0	0	0	28	0	0	0	70	0	0	171	576
7:30 AM	23	0	54	0	0	0	0	0	0	43	0	0	0	68	0	0	188	636
7:45 AM	28	0	54	0	0	0	0	0	0	47	0	0	0	80	0	0	209	722
8:00 AM	20	0	50	0	0	0	0	0	0	49	0	0	0	66	0	0	185	753
8:15 AM	29	0	50	0	0	0	0	0	0	47	0	0	0	75	0	0	201	783
8:30 AM	18	0	64	0	0	0	0	0	0	56	0	0	0	62	0	0	200	795
8:45 AM	19	0	58	0	0	0	0	0	0	61	0	0	0	58	0	0	196	782

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	112	0	216	0	0	0	0	0	0	188	0	0	0	320	0	0	836
Heavy Trucks	0	0	20		0	0	0		0	20	0		0	20	0		60
Buses																	
Pedestrians		140				56				4				0			200
Bicycles	0	0	0		0	0	0		0	8	0		0	4	0		12
Scooters																	

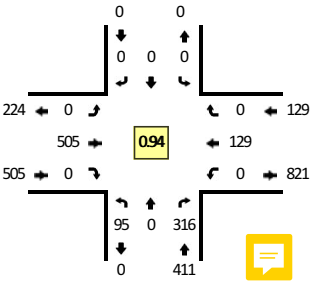
Comments:

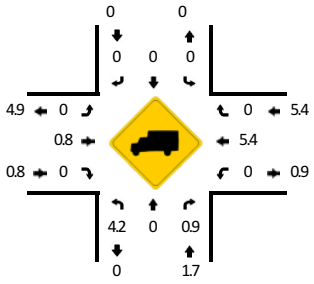
Report generated on 10/20/2021 8:47 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

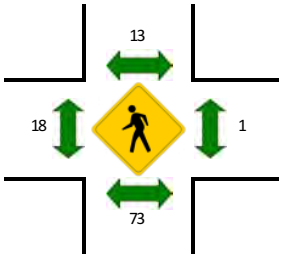
Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Ka'aahi St -- Iwilei Rd | **QC JOB #:** 14979816
CITY/STATE: Honolulu, HI | **DATE:** Thu, May 23 2019

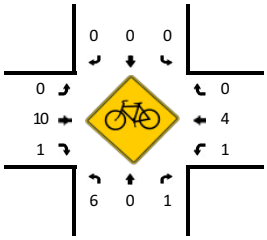
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

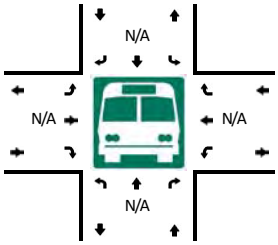


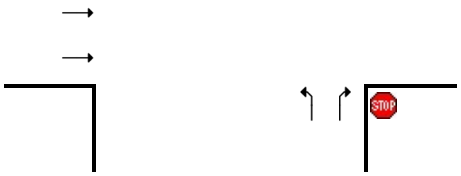


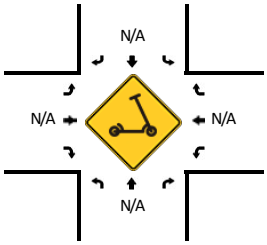












15-Min Count Period Beginning At	Ka'aahi St (Northbound)				Ka'aahi St (Southbound)				Iwilei Rd (Eastbound)				Iwilei Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	14	0	84	0	0	0	0	0	0	74	0	0	0	40	0	0	212	
3:15 PM	10	0	82	0	0	0	0	0	0	108	0	0	0	38	0	0	238	
3:30 PM	18	0	89	0	0	0	0	0	0	100	0	0	0	34	0	0	241	
3:45 PM	17	0	79	0	0	0	0	0	0	92	0	0	0	38	0	0	226	917
4:00 PM	8	0	78	0	0	0	0	0	0	99	0	0	0	33	0	0	218	923
4:15 PM	15	0	71	0	0	0	0	0	0	99	0	0	0	36	0	0	221	906
4:30 PM	14	0	74	0	0	0	0	0	0	134	0	0	0	41	0	0	263	928
4:45 PM	32	0	89	0	0	0	0	0	0	123	0	0	0	32	0	0	276	978
5:00 PM	29	0	65	0	0	0	0	0	0	154	0	0	0	29	0	0	277	1037
5:15 PM	20	0	88	0	0	0	0	0	0	94	0	0	0	27	0	0	229	1045
5:30 PM	45	0	98	0	0	0	0	0	0	104	0	0	0	39	0	0	286	1068
5:45 PM	18	0	72	0	0	0	0	0	0	77	0	0	0	27	0	0	194	986

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	116	0	260	0	0	0	0	0	0	616	0	0	0	116	0	0	1108
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	4	0		4
Buses																	
Pedestrians		64				4				8				0			76
Bicycles	0	0	0		0	0	0		0	12	0		0	4	0		16
Scooters																	

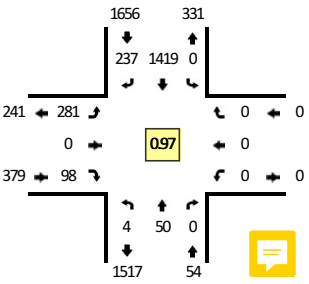
Comments:

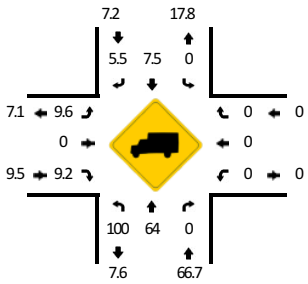
Report generated on 10/20/2021 8:48 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

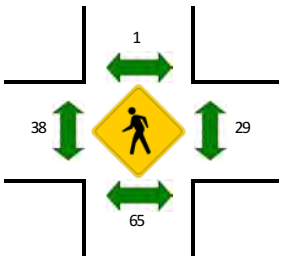
LOCATION: N King St -- Iwilei Rd | **QC JOB #:** 14979813
CITY/STATE: Honolulu, HI | **DATE:** Thu, May 23 2019

Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

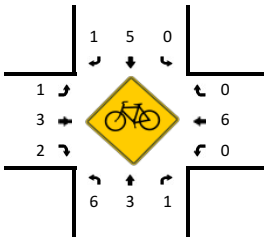


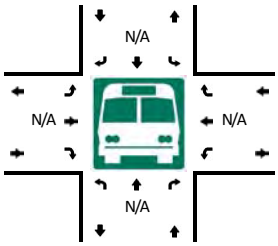


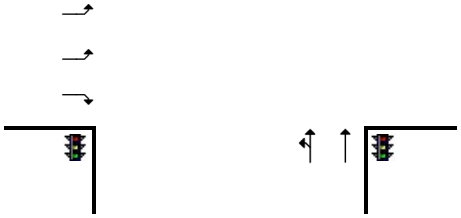
Quality Counts
DATA THAT DRIVES COMMUNITIES

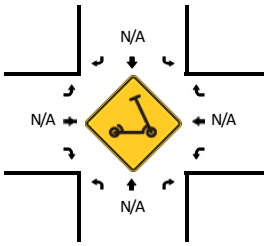












15-Min Count Period Beginning At	N King St (Northbound)				N King St (Southbound)				Iwilei Rd (Eastbound)				Iwilei Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	2	5	0	0	0	108	30	0	36	0	5	0	0	0	0	0	186	
6:15 AM	1	8	0	0	0	137	40	0	22	0	12	0	0	0	0	0	220	
6:30 AM	1	10	0	0	0	222	35	0	52	0	16	0	0	0	0	0	336	
6:45 AM	1	8	0	0	0	268	45	0	28	0	17	0	0	0	0	0	367	1109
7:00 AM	0	8	0	0	0	324	55	0	48	0	22	0	0	0	0	0	457	1380
7:15 AM	1	7	0	0	0	369	65	0	65	0	22	0	0	0	0	0	529	1689
7:30 AM	0	12	0	0	0	375	49	0	72	0	21	0	0	0	0	0	529	1882
7:45 AM	1	19	0	0	0	362	62	0	65	0	28	0	0	0	0	0	537	2052
8:00 AM	2	12	0	0	0	313	61	0	79	0	27	0	0	0	0	0	494	2089
8:15 AM	0	8	0	0	0	250	56	0	62	0	24	0	0	0	0	0	400	1960
8:30 AM	1	11	0	0	0	210	53	0	60	0	21	0	0	0	0	0	356	1787
8:45 AM	2	10	0	0	0	205	65	0	66	0	24	0	0	0	0	0	372	1622

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	76	0	0	0	1448	248	0	260	0	112	0	0	0	0	0	2148
Heavy Trucks	4	40	0		0	132	20		12	0	16		0	0	0		224
Buses																	
Pedestrians		76				0				64				40			180
Bicycles	12	4	0		0	0	0		4	8	0		0	0	0		28
Scooters																	

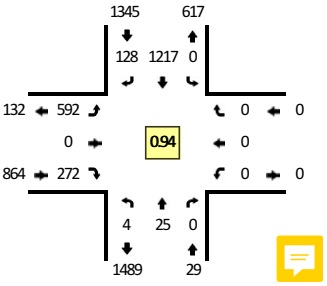
Comments:

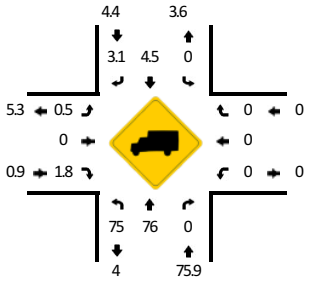
Report generated on 10/20/2021 8:47 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

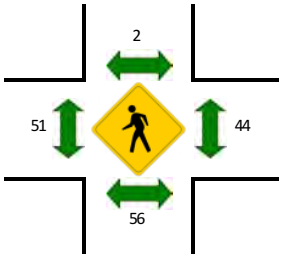
Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

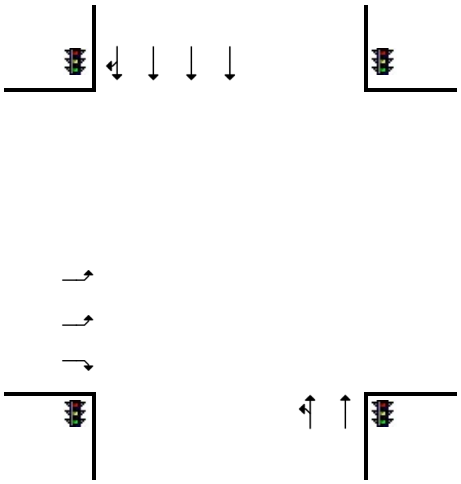
LOCATION: N King St -- Iwilei Rd | **QC JOB #:** 14979814
CITY/STATE: Honolulu, HI | **DATE:** Thu, May 23 2019

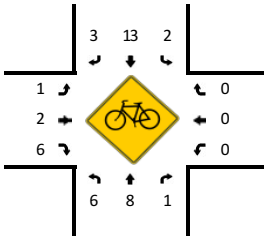
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 4:30 PM -- 4:45 PM

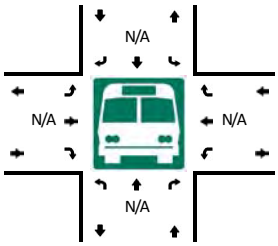


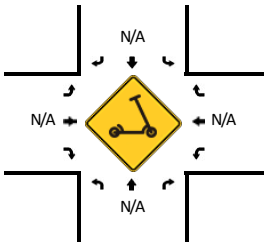












15-Min Count Period Beginning At	N King St (Northbound)				N King St (Southbound)				Iwilei Rd (Eastbound)				Iwilei Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	0	11	0	0	0	212	37	0	103	0	41	0	0	0	0	0	404	
3:15 PM	2	5	0	0	0	270	37	0	91	0	49	0	0	0	0	0	454	
3:30 PM	2	12	0	0	0	249	35	0	119	0	46	0	0	0	0	0	463	
3:45 PM	1	6	0	0	0	314	40	0	110	0	43	0	0	0	0	0	514	1835
4:00 PM	1	8	0	0	0	293	27	0	129	0	57	0	0	0	0	0	515	1946
4:15 PM	1	4	0	0	0	298	38	0	147	0	69	0	0	0	0	0	557	2049
4:30 PM	1	3	0	0	0	329	48	0	143	0	70	0	0	0	0	0	594	2180
4:45 PM	1	5	0	0	0	298	26	0	146	0	76	0	0	0	0	0	552	2218
5:00 PM	1	11	0	0	0	326	30	0	131	0	64	0	0	0	0	0	563	2266
5:15 PM	1	6	0	0	0	264	24	0	172	0	62	0	0	0	0	0	529	2238
5:30 PM	1	7	0	0	0	271	37	0	141	0	38	0	0	0	0	0	495	2139
5:45 PM	0	8	0	0	0	205	36	0	143	0	53	0	0	0	0	0	445	2032

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	12	0	0	0	1316	192	0	572	0	280	0	0	0	0	0	2376
Heavy Trucks	4	12	0		0	76	12		0	0	4		0	0	0		108
Buses																	
Pedestrians		84				4				44				44			176
Bicycles	8	0	4		0	16	0		0	0	8		0	0	0		36
Scooters																	

Comments:

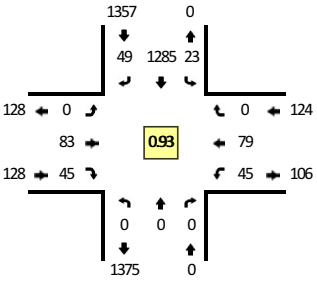
Report generated on 10/20/2021 8:48 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

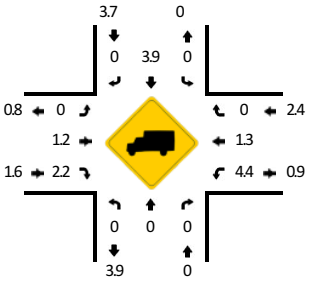
Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

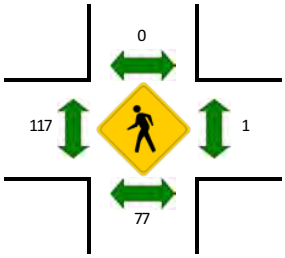
LOCATION: N King St -- River St
CITY/STATE: Honolulu, HI

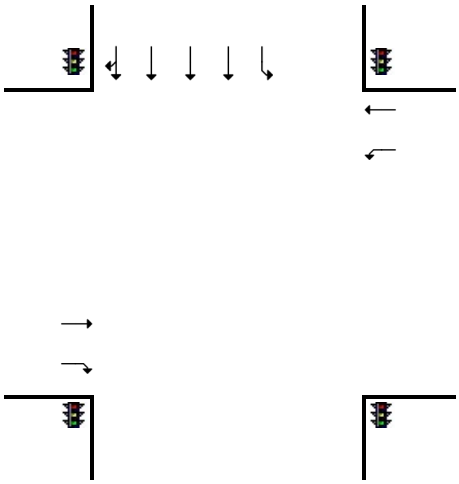
QC JOB #: 14979823
DATE: Thu, May 23 2019

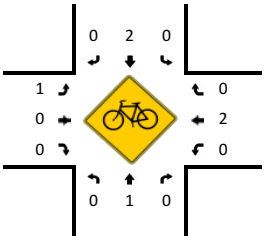
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

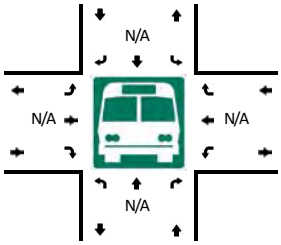


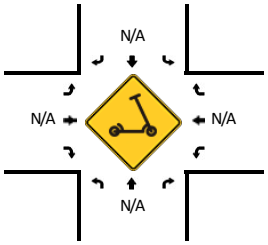












15-Min Count Period Beginning At	N King St (Northbound)				N King St (Southbound)				River St (Eastbound)				River St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	0	0	0	1	101	3	0	0	12	7	0	5	8	0	0	137	
6:15 AM	0	0	0	0	2	151	2	0	0	8	10	0	5	14	0	0	192	
6:30 AM	0	0	0	0	3	183	2	0	0	10	6	0	6	15	0	0	225	
6:45 AM	0	0	0	0	7	279	4	0	0	13	10	0	6	10	0	0	329	883
7:00 AM	0	0	0	0	8	251	9	0	0	22	10	0	4	20	0	0	324	1070
7:15 AM	0	0	0	0	6	372	14	0	0	8	9	0	7	12	0	0	428	1306
7:30 AM	0	0	0	0	4	351	5	0	0	27	12	0	16	16	0	0	431	1512
7:45 AM	0	0	0	0	7	321	19	0	0	22	13	0	10	23	0	0	415	1598
8:00 AM	0	0	0	0	6	241	11	0	0	26	11	0	12	28	0	0	335	1609
8:15 AM	0	0	0	0	11	221	13	0	0	25	25	0	21	29	0	0	345	1526
8:30 AM	0	0	0	0	4	217	8	0	0	27	21	0	19	20	0	0	316	1411
8:45 AM	0	0	0	0	11	179	6	0	0	30	23	0	14	16	0	0	279	1275

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	16	1404	20	0	0	108	48	0	64	64	0	0	1724
Heavy Trucks	0	0	0		0	48	0		0	4	0		8	0	0		60
Buses																	
Pedestrians		48				0				160				0			208
Bicycles	0	0	0		0	4	0		0	0	0		0	0	0		4
Scooters																	

Comments:

Report generated on 10/20/2021 8:47 AM

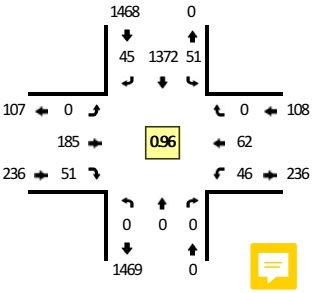
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

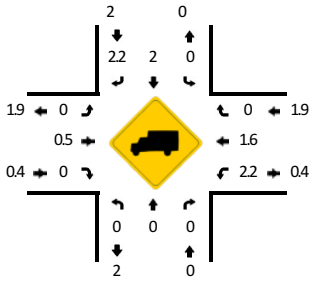
LOCATION: N King St -- River St
CITY/STATE: Honolulu, HI

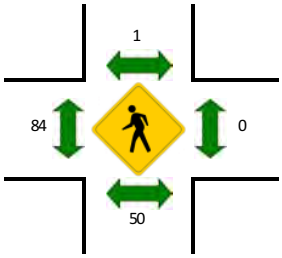
QC JOB #: 14979824
DATE: Thu, May 23 2019

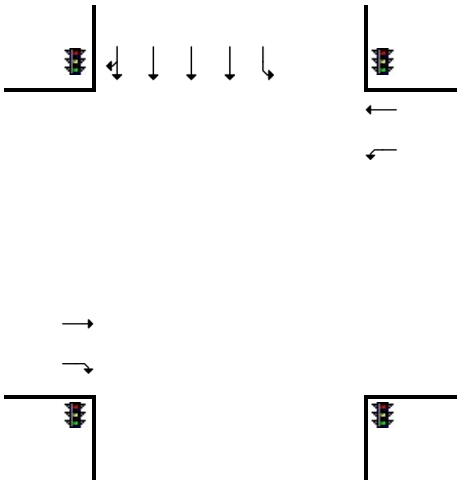
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 4:30 PM -- 4:45 PM

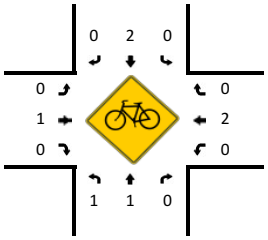


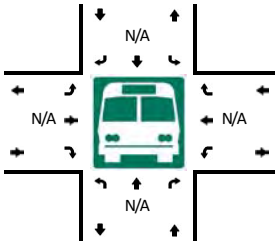


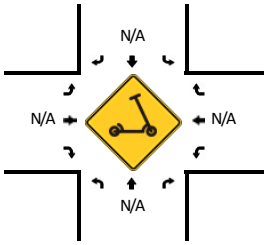












15-Min Count Period Beginning At	N King St (Northbound)				N King St (Southbound)				River St (Eastbound)				River St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	0	0	0	0	8	233	7	0	0	30	20	0	5	10	0	0	313	
3:15 PM	0	0	0	0	9	301	7	0	0	21	16	0	17	10	0	0	381	
3:30 PM	0	0	0	0	15	270	6	0	0	27	21	0	15	15	0	0	369	
3:45 PM	0	0	0	0	7	365	7	0	0	20	11	0	12	13	0	0	435	1498
4:00 PM	0	0	0	0	11	337	8	0	0	31	19	0	8	18	0	0	432	1617
4:15 PM	0	0	0	0	13	342	7	0	0	32	7	0	11	15	0	0	427	1663
4:30 PM	0	0	0	0	12	387	8	0	0	31	9	0	11	13	0	0	471	1765
4:45 PM	0	0	0	0	14	358	10	0	0	55	10	0	9	15	0	0	471	1801
5:00 PM	0	0	0	0	12	320	12	0	0	49	14	0	8	18	0	0	433	1802
5:15 PM	0	0	0	0	13	307	15	0	0	50	18	0	18	16	0	0	437	1812
5:30 PM	0	0	0	0	9	348	12	0	0	35	17	0	9	18	0	0	448	1789
5:45 PM	0	0	0	0	12	343	12	0	0	28	19	0	15	19	0	0	448	1766

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	48	1548	32	0	0	124	36	0	44	52	0	0	1884
Heavy Trucks	0	0	0		0	36	0		0	0	0		0	0	0		36
Buses																	
Pedestrians		32				0				44				0			76
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

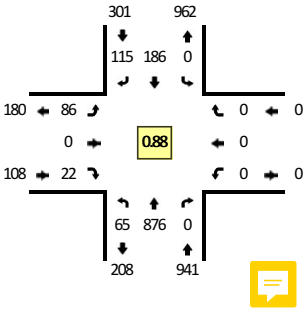
Report generated on 10/20/2021 8:48 AM

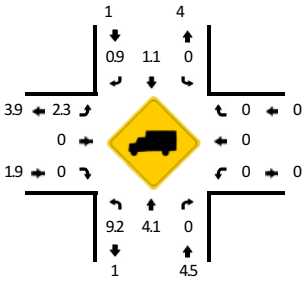
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

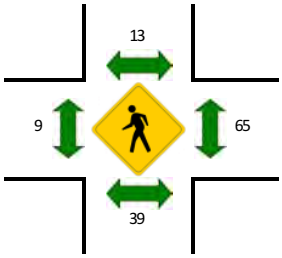
Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

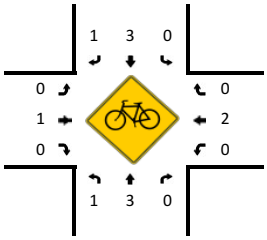
LOCATION: N Beretania St -- River St | **QC JOB #:** 14979825
CITY/STATE: Honolulu, HI | **DATE:** Wed, May 22 2019

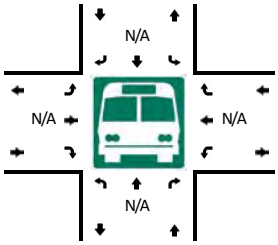
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

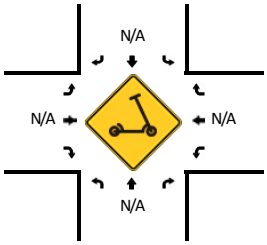


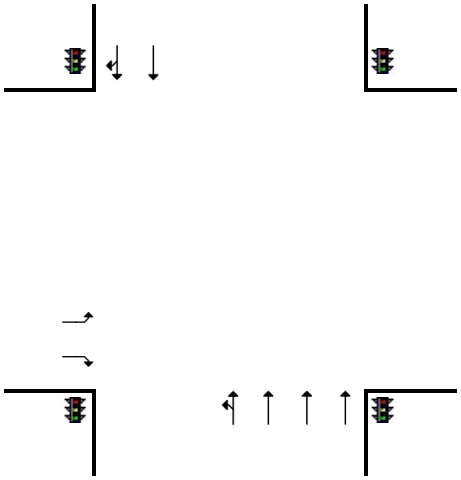












15-Min Count Period Beginning At	N Beretania St (Northbound)				N Beretania St (Southbound)				River St (Eastbound)				River St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	7	71	0	0	0	18	12	0	15	0	1	0	0	0	0	0	124	
6:15 AM	15	89	0	0	0	11	15	0	9	0	5	0	0	0	0	0	144	
6:30 AM	10	121	0	0	0	19	19	0	12	0	6	0	0	0	0	0	187	
6:45 AM	12	136	0	0	0	30	16	0	30	0	1	0	0	0	0	0	225	680
7:00 AM	10	177	0	0	0	38	16	0	16	0	3	0	0	0	0	0	260	816
7:15 AM	16	175	0	0	0	40	25	0	20	0	3	0	0	0	0	0	279	951
7:30 AM	13	231	0	0	0	55	25	0	14	0	10	0	0	0	0	0	348	1112
7:45 AM	20	244	0	0	0	52	40	0	23	0	3	0	0	0	0	0	382	1269
8:00 AM	16	226	0	0	0	39	25	0	29	0	6	0	0	0	0	0	341	1350
8:15 AM	18	231	0	0	0	60	33	0	29	0	7	0	0	0	0	0	378	1449
8:30 AM	13	196	0	0	0	35	17	0	23	0	16	0	0	0	0	0	300	1401
8:45 AM	21	207	0	0	0	29	27	0	26	0	11	0	0	0	0	0	321	1340

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	80	976	0	0	0	208	160	0	92	0	12	0	0	0	0	0	1528
Heavy Trucks	8	36	0		0	0	0		0	0	0		0	0	0		44
Buses																	
Pedestrians		36				20				12				52			120
Bicycles	4	12	0		0	0	0		0	4	0		0	0	0		20
Scooters																	

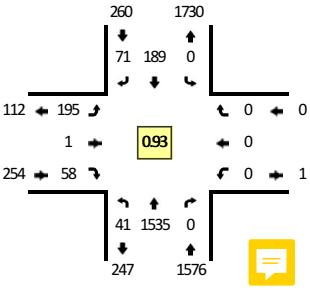
Comments:

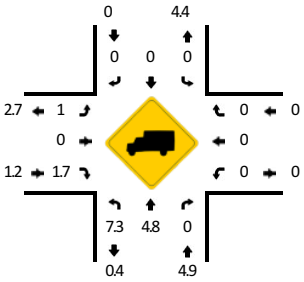
Report generated on 10/20/2021 8:47 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

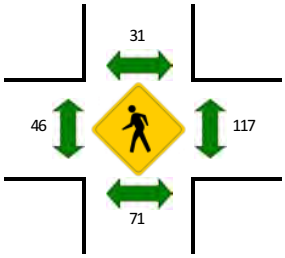
LOCATION: N Beretania St -- River St | **QC JOB #:** 14979826
CITY/STATE: Honolulu, HI | **DATE:** Wed, May 22 2019

Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

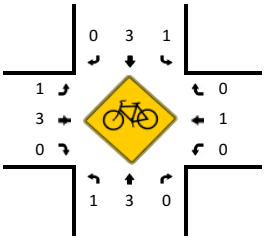


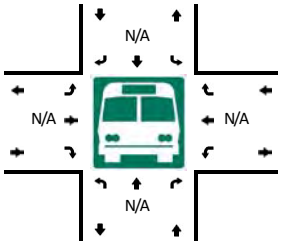


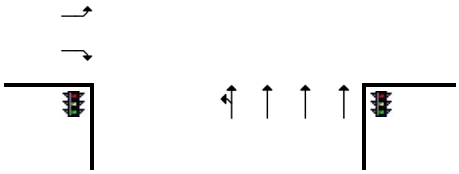
Quality Counts
DATA THAT DRIVES COMMUNITIES

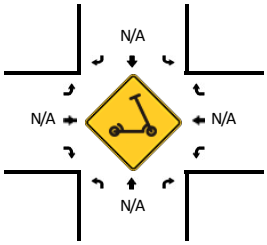












15-Min Count Period Beginning At	N Beretania St (Northbound)				N Beretania St (Southbound)				River St (Eastbound)				River St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	13	275	0	0	0	33	17	0	14	0	12	0	0	0	0	0	364	
3:15 PM	13	291	0	0	0	27	26	0	24	0	12	0	0	0	0	0	393	
3:30 PM	9	326	0	0	0	41	21	0	34	0	6	0	0	0	0	0	437	
3:45 PM	10	338	0	0	0	35	12	0	26	0	9	0	0	0	0	0	430	1624
4:00 PM	9	361	0	0	0	40	10	0	32	0	7	0	0	0	0	0	459	1719
4:15 PM	13	369	1	0	0	35	18	0	39	0	11	0	0	0	0	0	486	1812
4:30 PM	12	361	0	0	0	42	14	0	36	0	8	0	0	0	0	0	473	1848
4:45 PM	12	394	0	0	0	55	13	0	55	0	16	0	0	0	0	0	545	1963
5:00 PM	7	368	0	0	0	49	19	0	49	0	20	0	0	0	0	0	512	2016
5:15 PM	10	412	0	0	0	43	25	0	55	1	14	0	0	0	0	0	560	2090
5:30 PM	11	364	0	0	0	46	15	0	43	0	6	0	0	0	0	0	485	2102
5:45 PM	13	348	0	0	0	29	25	0	46	0	10	0	0	0	0	0	471	2028

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	40	1648	0	0	0	172	100	0	220	4	56	0	0	0	0	0	2240
Heavy Trucks	4	80	0		0	0	0		4	0	0		0	0	0		88
Buses																	
Pedestrians		104				16				44				120			284
Bicycles	0	4	0		0	0	0		0	4	0		0	4	0		12
Scooters																	

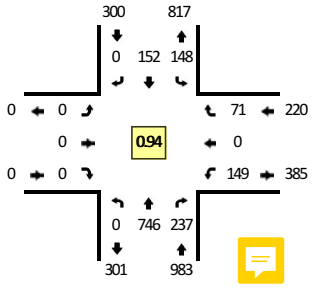
Comments:

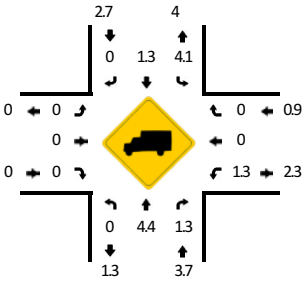
Report generated on 10/20/2021 8:48 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

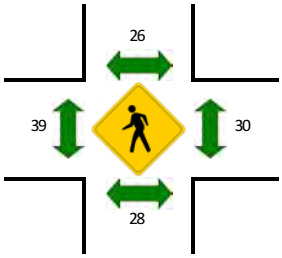
Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

LOCATION: N Beretania St -- 'A'ala St | **QC JOB #:** 14979809
CITY/STATE: Honolulu, HI | **DATE:** Wed, May 22 2019

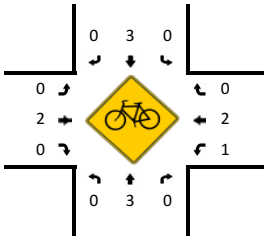
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

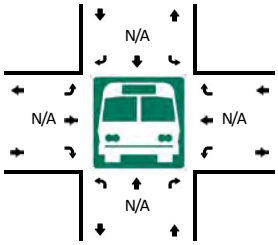




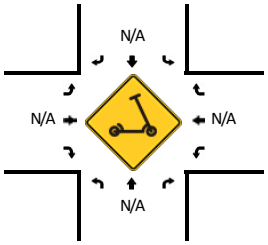












15-Min Count Period Beginning At	N Beretania St (Northbound)				N Beretania St (Southbound)				'A'ala St (Eastbound)				'A'ala St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	67	19	0	8	13	0	0	0	0	0	0	19	0	7	0	133	
6:15 AM	0	84	19	0	18	9	0	0	0	0	0	0	15	0	7	0	152	
6:30 AM	0	115	22	1	20	23	0	0	0	0	0	0	23	0	12	0	216	
6:45 AM	0	117	49	0	21	27	0	0	0	0	0	0	19	0	10	0	243	744
7:00 AM	0	157	43	0	27	33	0	0	0	0	0	0	29	0	10	0	299	910
7:15 AM	0	164	45	0	39	42	0	0	0	0	0	0	29	0	23	0	342	1100
7:30 AM	0	197	54	0	34	32	0	0	0	0	0	0	42	0	14	0	373	1257
7:45 AM	0	198	69	0	42	41	0	0	0	0	0	0	34	0	17	0	401	1415
8:00 AM	0	187	69	0	33	37	0	0	0	0	0	0	44	0	17	0	387	1503
8:15 AM	0	193	81	0	22	41	0	0	0	0	0	0	37	0	24	0	398	1559
8:30 AM	0	187	50	0	26	28	0	0	0	0	0	0	26	0	20	0	337	1523
8:45 AM	0	178	56	0	26	20	0	0	0	0	0	0	36	0	25	0	341	1463

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	792	276	0	168	164	0	0	0	0	0	0	136	0	68	0	1604
Heavy Trucks	0	36	4		12	0	0		0	0	0		0	0	0		52
Buses																	
Pedestrians		24				12				32				24			92
Bicycles	0	8	0		0	0	0		0	8	0		0	4	0		20
Scooters																	

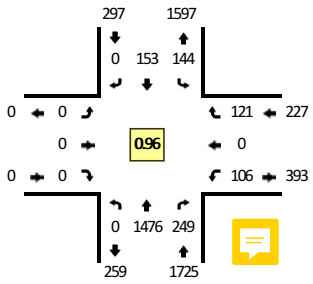
Comments:

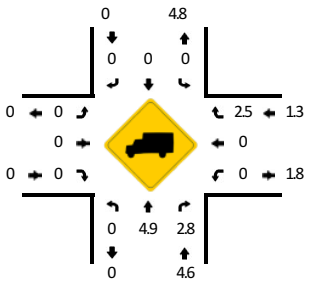
Report generated on 10/20/2021 8:47 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

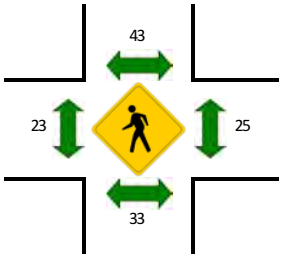
LOCATION: N Beretania St -- 'A'ala St | **QC JOB #:** 14979810
CITY/STATE: Honolulu, HI | **DATE:** Wed, May 22 2019

Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

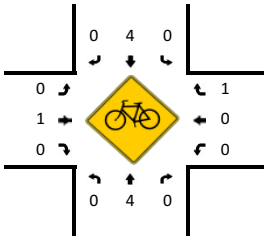


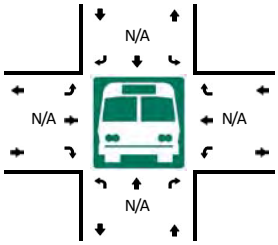


Quality Counts
DATA THAT DRIVES COMMUNITIES

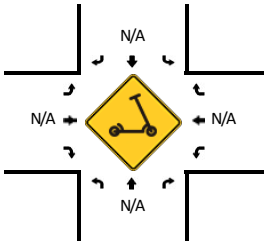












15-Min Count Period Beginning At	N Beretania St (Northbound)				N Beretania St (Southbound)				'A'ala St (Eastbound)				'A'ala St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	0	246	44	0	36	27	0	0	0	0	0	0	26	0	16	0	395	
3:15 PM	0	273	44	0	35	24	0	0	0	0	0	0	23	0	18	0	417	
3:30 PM	0	296	76	0	25	41	0	0	0	0	0	0	23	0	23	0	484	
3:45 PM	0	300	50	0	46	31	0	0	0	0	0	0	17	0	14	0	458	1754
4:00 PM	0	340	63	0	37	35	0	0	0	0	0	0	22	0	19	0	516	1875
4:15 PM	0	367	57	0	28	34	0	0	0	0	0	0	20	0	20	0	526	1984
4:30 PM	0	338	49	0	43	37	0	0	0	0	0	0	28	0	36	0	531	2031
4:45 PM	0	380	65	0	40	42	0	0	0	0	0	0	24	0	33	0	584	2157
5:00 PM	0	364	63	0	27	32	0	0	0	0	0	0	31	0	30	0	547	2188
5:15 PM	0	394	72	0	34	42	0	0	0	0	0	0	23	0	22	0	587	2249
5:30 PM	0	345	55	0	24	41	0	0	0	0	0	0	23	0	24	0	512	2230
5:45 PM	1	316	57	0	23	30	0	0	0	0	0	0	24	2	26	0	479	2125

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	1576	288	0	136	168	0	0	0	0	0	0	92	0	88	0	2348
Heavy Trucks	0	72	12		0	0	0		0	0	0		0	0	0		84
Buses																	
Pedestrians		52				80				16				16			164
Bicycles	0	8	0		0	0	0		0	0	0		0	0	0		8
Scooters																	

Comments:

Report generated on 10/20/2021 8:48 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

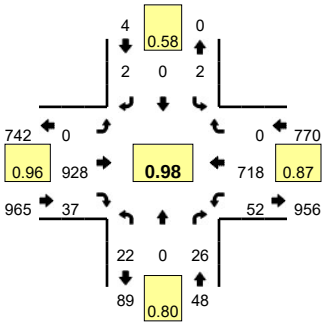
Method for determining peak hour: Total Entering Volume

LOCATION: Kaaahi St -- Dillingham Blvd

QC JOB #: 14792301

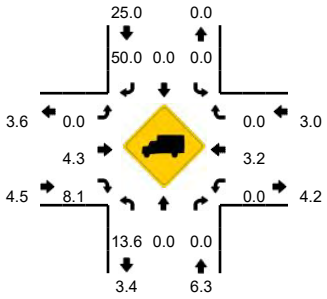
CITY/STATE: Honolulu, HI

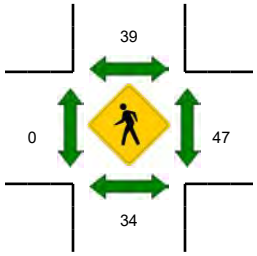
DATE: Wed, Sep 26 2018

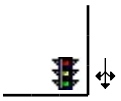


Peak-Hour: 7:30 AM -- 8:30 AM

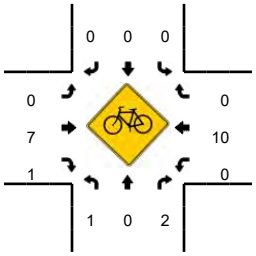
Peak 15-Min: 7:30 AM -- 7:45 AM

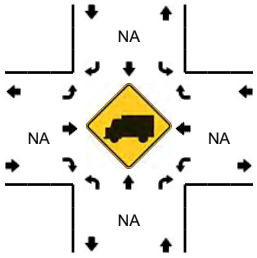


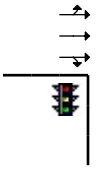




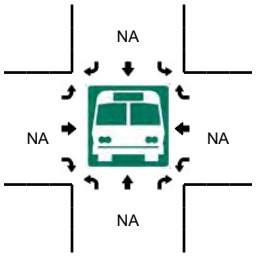












15-Min Count Period Beginning At	Kaaahi St (Northbound)				Kaaahi St (Southbound)				Dillingham Blvd (Eastbound)				Dillingham Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	2	0	1	0	0	0	0	0	0	103	5	0	8	84	0	0	203	
6:15 AM	1	0	4	0	0	0	0	0	0	112	3	0	5	116	3	0	244	
6:30 AM	3	0	7	1	0	0	0	0	0	167	6	0	11	105	2	0	302	
6:45 AM	2	0	5	0	1	0	0	0	1	189	5	0	6	119	2	0	330	1079
7:00 AM	2	0	2	0	0	0	0	0	1	257	8	0	5	145	2	0	422	1298
7:15 AM	3	0	3	0	1	0	2	0	0	252	6	0	9	134	1	0	411	1465
7:30 AM	5	0	5	0	0	0	0	0	0	258	10	0	8	171	0	0	457	1620
7:45 AM	7	0	5	0	2	0	1	0	0	234	5	0	11	176	0	0	441	1731
8:00 AM	4	0	2	0	0	0	1	0	0	227	14	0	17	178	0	0	443	1752
8:15 AM	6	0	14	0	0	0	0	0	0	209	8	0	16	193	0	0	446	1787
8:30 AM	11	0	10	0	1	0	1	0	1	220	10	0	17	169	1	0	441	1771
8:45 AM	7	1	12	0	0	0	1	0	0	175	10	0	17	222	0	0	445	1775

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	0	20	0	0	0	0	0	0	1032	40	0	32	684	0	0	1828
Heavy Trucks	0	0	0		0	0	0		0	36	4		0	4	0		44
Pedestrians		32				32				0				52			116
Bicycles	0	0	1		0	0	0		0	2	0		0	2	0		5
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/12/2018 2:54 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

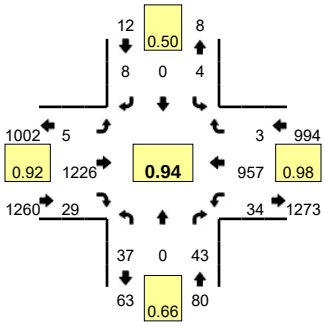
Method for determining peak hour: Total Entering Volume

LOCATION: Kaaahi St -- Dillingham Blvd

QC JOB #: 14792302

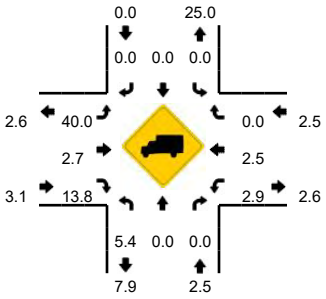
CITY/STATE: Honolulu, HI

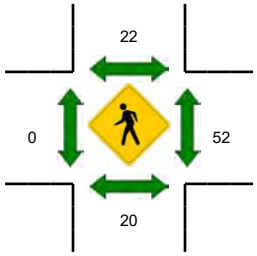
DATE: Wed, Sep 26 2018

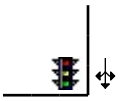


Peak-Hour: 4:00 PM -- 5:00 PM

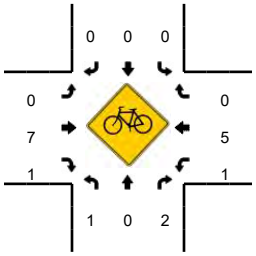
Peak 15-Min: 4:00 PM -- 4:15 PM

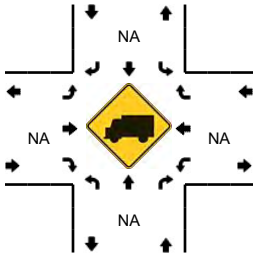


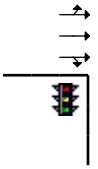


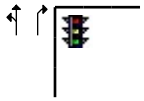


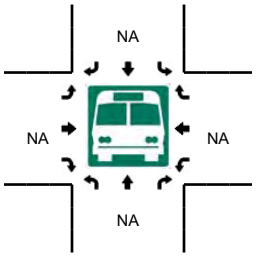












15-Min Count Period Beginning At	Kaaahi St (Northbound)				Kaaahi St (Southbound)				Dillingham Blvd (Eastbound)				Dillingham Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	10	0	12	0	0	0	1	0	0	274	9	0	12	189	0	0	507	
3:15 PM	12	0	13	0	0	0	0	0	0	267	8	0	12	231	0	0	543	
3:30 PM	5	0	8	0	0	0	0	0	0	287	5	0	18	213	0	0	536	
3:45 PM	23	0	18	0	0	0	1	0	0	268	12	0	2	208	1	0	533	2119
4:00 PM	12	0	14	0	1	0	0	0	2	332	8	0	10	247	0	0	626	2238
4:15 PM	5	0	14	0	1	0	1	0	1	308	8	0	9	241	0	0	588	2283
4:30 PM	11	0	11	0	1	0	5	0	2	299	6	0	3	244	2	0	584	2331
4:45 PM	9	0	4	0	1	0	2	0	0	287	7	0	12	225	1	0	548	2346
5:00 PM	8	0	6	0	0	0	0	0	0	276	5	0	9	252	0	0	556	2276
5:15 PM	5	0	8	0	1	0	0	0	0	289	2	0	6	254	1	0	566	2254
5:30 PM	6	0	4	0	0	0	0	0	0	256	6	0	4	248	0	0	524	2194
5:45 PM	6	0	9	0	0	0	0	0	0	256	4	0	4	243	0	0	522	2168

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	48	0	56	0	4	0	0	0	8	1328	32	0	40	988	0	0	2504
Heavy Trucks	0	0	0		0	0	0		8	28	0		0	32	0		68
Pedestrians		36				24				0				68			128
Bicycles	0	0	0		0	0	0		0	2	0		0	1	0		3
Railroad																	
Stopped Buses																	

Comments:

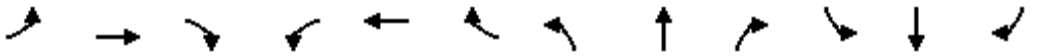
Report generated on 10/12/2018 2:54 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Appendix B: Existing Intersection Analysis Worksheets

HCM 6th Signalized Intersection Summary
1: Waiakamilo Rd & N. Nimitz Hwy

06/24/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	3814	31	0	1343	221	30	8	0	312	44	103
Future Volume (veh/h)	76	3814	31	0	1343	221	30	8	0	312	44	103
Initial Q (Qb), veh	0	0	0	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	0.98	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	79	3973	0	0	1399	0	31	8	0	358	0	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	96	4993		0	2477		43	46		426	0	
Arrive On Green	0.05	0.78	0.00	0.00	0.47	0.00	0.02	0.02	0.00	0.12	0.00	0.00
Sat Flow, veh/h	1781	6696	0	0	3741	0	1781	1870	1560	3563	0	1585
Grp Volume(v), veh/h	79	3973	0	0	1399	0	31	8	0	358	0	0
Grp Sat Flow(s),veh/h/ln	1781	1609	0	0	1777	0	1781	1870	1560	1781	0	1585
Q Serve(g_s), s	8.8	72.3	0.0	0.0	57.0	0.0	3.5	0.8	0.0	19.7	0.0	0.0
Cycle Q Clear(g_c), s	8.8	72.3	0.0	0.0	57.0	0.0	3.5	0.8	0.0	19.7	0.0	0.0
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	96	4993		0	2477		43	46		426	0	
V/C Ratio(X)	0.82	0.80		0.00	0.56		0.71	0.18		0.84	0.00	
Avail Cap(c_a), veh/h	223	4993		0	2477		178	187		713	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.77	0.00	1.00	1.00	0.00	0.65	0.00	0.00
Uniform Delay (d), s/veh	93.7	13.1	0.0	0.0	31.3	0.0	96.9	95.6	0.0	86.2	0.0	0.0
Incr Delay (d2), s/veh	15.8	1.4	0.0	0.0	0.7	0.0	19.4	1.8	0.0	3.0	0.0	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	4.5	23.6	0.0	0.0	26.1	0.0	1.9	0.4	0.0	9.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	109.5	14.5	0.0	0.0	32.0	0.0	116.2	97.4	0.0	89.2	0.0	0.0
LnGrp LOS	F	B		A	C		F	F		F	A	
Approach Vol, veh/h		4052	A		1399	A		39	A		358	A
Approach Delay, s/veh		16.4			32.0			112.4			89.2	
Approach LOS		B			C			F			F	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		161.2		28.9	15.8	145.4		9.9				
Change Period (Y+Rc), s		6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s		124.0		40.0	25.0	94.0		20.0				
Max Q Clear Time (g_c+I1), s		74.3		21.7	10.8	59.0		5.5				
Green Ext Time (p_c), s		49.5		1.2	0.1	22.4		0.1				

Intersection Summary		
HCM 6th Ctrl Delay	25.2	
HCM 6th LOS	C	

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	163	1123	87	66	377	54	44	148	152	139	418	138
Future Volume (veh/h)	163	1123	87	66	377	54	44	148	152	139	418	138
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		0.97	1.00		1.00	1.00		0.92
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	166	1146	85	67	385	47	45	151	0	142	427	115
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	137	1771	131	86	1591	193	58	613		137	590	157
Arrive On Green	0.08	0.53	0.53	0.02	0.17	0.17	0.03	0.17	0.00	0.08	0.22	0.22
Sat Flow, veh/h	1781	3321	246	1781	3154	382	1781	3647	0	1781	2721	723
Grp Volume(v), veh/h	166	613	618	67	216	216	45	151	0	142	277	265
Grp Sat Flow(s),veh/h/ln	1781	1777	1791	1781	1777	1760	1781	1777	0	1781	1777	1667
Q Serve(g_s), s	10.0	31.9	32.0	4.9	13.7	13.9	3.3	4.8	0.0	10.0	18.8	19.3
Cycle Q Clear(g_c), s	10.0	31.9	32.0	4.9	13.7	13.9	3.3	4.8	0.0	10.0	18.8	19.3
Prop In Lane	1.00		0.14	1.00		0.22	1.00		0.00	1.00		0.43
Lane Grp Cap(c), veh/h	137	947	955	86	896	888	58	613		137	385	361
V/C Ratio(X)	1.21	0.65	0.65	0.78	0.24	0.24	0.77	0.25		1.04	0.72	0.73
Avail Cap(c_a), veh/h	137	947	955	137	896	888	137	929		137	465	436
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.99	0.99	0.99	0.80	0.80	0.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	60.0	21.6	21.6	63.3	32.6	32.6	62.4	46.5	0.0	60.0	47.2	47.4
Incr Delay (d2), s/veh	144.7	3.4	3.4	13.7	0.6	0.6	15.9	0.2	0.0	84.1	3.9	4.8
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	10.0	13.9	14.1	2.6	6.7	6.7	1.7	2.1	0.0	7.7	8.7	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	204.7	25.0	25.0	77.0	33.2	33.3	78.3	46.7	0.0	144.1	51.2	52.2
LnGrp LOS	F	C	C	E	C	C	E	D		F	D	D
Approach Vol, veh/h		1397			499			196	A		684	
Approach Delay, s/veh		46.4			39.1			53.9			70.9	
Approach LOS		D			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.3	75.3	9.2	34.2	15.0	71.6	15.0	28.4
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	10.0	54.0	10.0	34.0	10.0	54.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	6.9	34.0	5.3	21.3	12.0	15.9	12.0	6.8
Green Ext Time (p_c), s	0.0	8.7	0.0	2.7	0.0	2.8	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	51.6
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	52	18	12	48	17	2	183	44	27	510	71
Future Volume (veh/h)	42	52	18	12	48	17	2	183	44	27	510	71
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		0.99	1.00		0.97	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	49	61	15	14	56	11	2	215	23	32	600	68
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	284	112	27	202	173	32	151	1608	712	188	1417	157
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	613	839	198	237	1294	240	7	3471	1537	66	3060	339
Grp Volume(v), veh/h	125	0	0	81	0	0	116	101	23	372	0	328
Grp Sat Flow(s),veh/h/ln	1650	0	0	1771	0	0	1861	1617	1537	1828	0	1637
Q Serve(g_s), s	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.2	0.0	0.0	3.3
Cycle Q Clear(g_c), s	1.7	0.0	0.0	1.0	0.0	0.0	0.9	0.9	0.2	3.3	0.0	3.3
Prop In Lane	0.39		0.12	0.17		0.14	0.02		1.00	0.09		0.21
Lane Grp Cap(c), veh/h	423	0	0	407	0	0	1009	749	712	1004	0	758
V/C Ratio(X)	0.30	0.00	0.00	0.20	0.00	0.00	0.12	0.13	0.03	0.37	0.00	0.43
Avail Cap(c_a), veh/h	1797	0	0	1892	0	0	7146	6185	5880	6960	0	6262
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.00	1.00
Uniform Delay (d), s/veh	10.0	0.0	0.0	9.7	0.0	0.0	3.8	3.8	3.6	4.5	0.0	4.5
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	0.1	0.1	0.0	0.2	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.3	0.0	0.0	0.1	0.1	0.0	0.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.4	0.0	0.0	10.0	0.0	0.0	3.9	3.9	3.7	4.7	0.0	4.9
LnGrp LOS	B	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		125			81			240			700	
Approach Delay, s/veh		10.4			10.0			3.9			4.8	
Approach LOS		B			A			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	8.3	16.5	8.3	16.5
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	95.0	25.0	95.0
Max Q Clear Time (g_c+I1), s	3.7	5.3	3.0	2.9
Green Ext Time (p_c), s	0.6	5.2	0.4	1.4

Intersection Summary	
HCM 6th Ctrl Delay	5.6
HCM 6th LOS	A

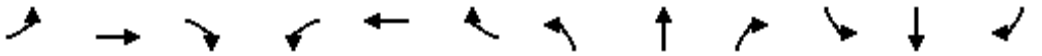
Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	2	9	10	3	23	6	222	21	52	573	12
Future Vol, veh/h	10	2	9	10	3	23	6	222	21	52	573	12
Conflicting Peds, #/hr	10	0	11	8	0	7	11	0	8	7	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	2	10	11	3	24	6	236	22	55	610	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	880	1016	334	694	1011	147	634	0	0	266	0	0
Stage 1	738	738	-	267	267	-	-	-	-	-	-	-
Stage 2	142	278	-	427	744	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	241	236	662	329	238	873	945	-	-	1295	-	-
Stage 1	376	422	-	715	687	-	-	-	-	-	-	-
Stage 2	846	679	-	576	420	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	214	215	648	298	217	858	935	-	-	1285	-	-
Mov Cap-2 Maneuver	214	215	-	298	217	-	-	-	-	-	-	-
Stage 1	369	390	-	704	676	-	-	-	-	-	-	-
Stage 2	804	668	-	522	389	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18	13.1	0.2	0.8
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	935	-	-	300	485	1285	-	-
HCM Lane V/C Ratio	0.007	-	-	0.074	0.079	0.043	-	-
HCM Control Delay (s)	8.9	0	-	18	13.1	7.9	0.2	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.3	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	172	896	125	37	321	81	130	290	73	184	830	497
Future Volume (veh/h)	172	896	125	37	321	81	130	290	73	184	830	497
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		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	179	933	125	39	334	0	135	302	64	192	865	348
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	200	1575	211	50	1474		154	706	147	212	977	421
Arrive On Green	0.11	0.50	0.50	0.06	0.84	0.00	0.09	0.24	0.24	0.12	0.27	0.27
Sat Flow, veh/h	1781	3136	420	1781	3618	0	1781	2911	607	1781	3554	1532
Grp Volume(v), veh/h	179	529	529	39	334	0	135	182	184	192	865	348
Grp Sat Flow(s),veh/h/ln	1781	1777	1779	1781	1763	0	1781	1777	1740	1781	1777	1532
Q Serve(g_s), s	17.9	37.9	38.0	3.9	3.4	0.0	13.5	15.6	16.1	19.2	42.0	38.4
Cycle Q Clear(g_c), s	17.9	37.9	38.0	3.9	3.4	0.0	13.5	15.6	16.1	19.2	42.0	38.4
Prop In Lane	1.00		0.24	1.00		0.00	1.00		0.35	1.00		1.00
Lane Grp Cap(c), veh/h	200	892	893	50	1474		154	431	422	212	977	421
V/C Ratio(X)	0.90	0.59	0.59	0.78	0.23		0.88	0.42	0.44	0.91	0.89	0.83
Avail Cap(c_a), veh/h	302	892	893	84	1474		247	431	422	396	1086	468
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.99	0.99	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	78.9	31.7	31.7	84.4	8.9	0.0	81.3	57.6	57.7	78.3	62.6	61.2
Incr Delay (d2), s/veh	19.7	2.9	2.9	22.1	0.4	0.0	11.3	0.7	0.7	5.8	8.4	10.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	17.3	17.3	2.1	1.3	0.0	6.7	7.2	7.3	9.2	20.2	16.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	98.6	34.6	34.6	106.5	9.2	0.0	92.5	58.2	58.5	84.1	70.9	72.0
LnGrp LOS	F	C	C	F	A		F	E	E	F	E	E
Approach Vol, veh/h		1237			373	A		501			1405	
Approach Delay, s/veh		43.9			19.4			67.5			73.0	
Approach LOS		D			B			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	95.4	26.4	48.6	24.7	80.3	20.6	54.5
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Max Green Setting (Gmax), s	8.5	72.0	40.0	40.0	30.5	50.0	25.0	55.0
Max Q Clear Time (g_c+I1), s	5.9	40.0	21.2	18.1	19.9	5.4	15.5	44.0
Green Ext Time (p_c), s	0.0	8.5	0.2	2.1	0.3	2.4	0.1	5.5

Intersection Summary	
HCM 6th Ctrl Delay	56.3
HCM 6th LOS	E

Notes

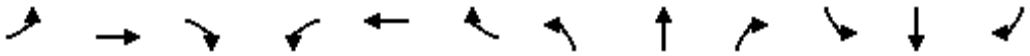
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	879	228	346	0	0	1051
Future Volume (veh/h)	879	228	346	0	0	1051
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	0	0	1870
Adj Flow Rate, veh/h	916	73	360	0	0	1095
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	1059	486	2070	0	0	2070
Arrive On Green	0.31	0.31	0.58	0.00	0.00	0.58
Sat Flow, veh/h	3456	1585	3741	0	0	3741
Grp Volume(v), veh/h	916	73	360	0	0	1095
Grp Sat Flow(s),veh/h/ln	1728	1585	1777	0	0	1777
Q Serve(g_s), s	22.5	3.0	4.2	0.0	0.0	16.7
Cycle Q Clear(g_c), s	22.5	3.0	4.2	0.0	0.0	16.7
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	1059	486	2070	0	0	2070
V/C Ratio(X)	0.86	0.15	0.17	0.00	0.00	0.53
Avail Cap(c_a), veh/h	1344	616	2070	0	0	2070
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	29.4	22.7	8.7	0.0	0.0	11.3
Incr Delay (d2), s/veh	5.0	0.1	0.2	0.0	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.7	1.1	1.6	0.0	0.0	6.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	34.5	22.8	8.9	0.0	0.0	12.3
LnGrp LOS	C	C	A	A	A	B
Approach Vol, veh/h	989		360			1095
Approach Delay, s/veh	33.6		8.9			12.3
Approach LOS	C		A			B

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	57.4			57.4	32.6
Change Period (Y+Rc), s	5.0			5.0	5.0
Max Green Setting (Gmax), s	45.0			45.0	35.0
Max Q Clear Time (g_c+I1), s	6.2			18.7	24.5
Green Ext Time (p_c), s	2.6			9.2	3.1

Intersection Summary	
HCM 6th Ctrl Delay	20.4
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	1201	33	72	419	66	31	64	95	67	85	31
Future Volume (vph)	59	1201	33	72	419	66	31	64	95	67	85	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.0	6.0			5.0			5.0	
Lane Util. Factor		0.91		1.00	0.95			1.00			1.00	
Frpb, ped/bikes		1.00		1.00	0.99			1.00			0.99	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		1.00		1.00	0.98			0.93			0.98	
Flt Protected		1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)		5044		1770	3429			1718			1774	
Flt Permitted		0.87		0.15	1.00			0.89			0.61	
Satd. Flow (perm)		4422		286	3429			1537			1103	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	62	1264	35	76	441	69	33	67	100	71	89	33
RTOR Reduction (vph)	0	2	0	0	6	0	0	28	0	0	6	0
Lane Group Flow (vph)	0	1359	0	76	504	0	0	172	0	0	187	0
Confl. Peds. (#/hr)			23			24	20					20
Confl. Bikes (#/hr)			1									
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		84.5		95.4	95.4			23.6			23.6	
Effective Green, g (s)		84.5		95.4	95.4			23.6			23.6	
Actuated g/C Ratio		0.65		0.73	0.73			0.18			0.18	
Clearance Time (s)		6.0		5.0	6.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		2874		277	2516			279			200	
v/s Ratio Prot				c0.01	0.15							
v/s Ratio Perm		c0.31		0.19				0.11			c0.17	
v/c Ratio		0.47		0.27	0.20			0.62			0.94	
Uniform Delay, d1		11.5		6.1	5.4			49.0			52.5	
Progression Factor		1.30		1.08	0.47			1.00			1.00	
Incremental Delay, d2		0.1		0.5	0.2			4.0			45.5	
Delay (s)		15.0		7.1	2.7			53.1			97.9	
Level of Service		B		A	A			D			F	
Approach Delay (s)		15.0			3.3			53.1			97.9	
Approach LOS		B			A			D			F	

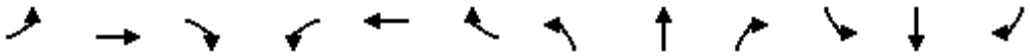
Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	990	66	107	408	9	60	58	119	17	62	36
Future Volume (veh/h)	35	990	66	107	408	9	60	58	119	17	62	36
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	0.99		0.94	0.94		0.90	0.96		0.85
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	37	1042	62	113	429	8	63	61	79	18	65	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	121	3244	191	398	2542	47	115	92	99	75	209	48
Arrive On Green	0.71	0.71	0.71	1.00	1.00	1.00	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	109	4548	268	508	3564	66	383	558	600	166	1269	294
Grp Volume(v), veh/h	409	358	374	113	214	223	203	0	0	100	0	0
Grp Sat Flow(s),veh/h/ln	1761	1549	1614	508	1777	1854	1541	0	0	1729	0	0
Q Serve(g_s), s	0.0	7.8	7.8	3.5	0.0	0.0	6.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	7.2	7.8	7.8	11.3	0.0	0.0	11.2	0.0	0.0	4.5	0.0	0.0
Prop In Lane	0.09		0.17	1.00		0.04	0.31		0.39	0.18		0.17
Lane Grp Cap(c), veh/h	1300	1105	1152	398	1267	1322	306	0	0	332	0	0
V/C Ratio(X)	0.31	0.32	0.32	0.28	0.17	0.17	0.66	0.00	0.00	0.30	0.00	0.00
Avail Cap(c_a), veh/h	1300	1105	1152	398	1267	1322	471	0	0	513	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.67	0.67	0.67	0.98	0.98	0.98	0.71	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.7	4.8	4.8	0.7	0.0	0.0	35.9	0.0	0.0	33.3	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.5	0.5	1.7	0.3	0.3	1.8	0.0	0.0	0.5	0.0	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	2.4	2.2	2.2	0.2	0.1	0.1	4.4	0.0	0.0	2.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.2	5.3	5.3	2.4	0.3	0.3	37.7	0.0	0.0	33.8	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	A	C	A	A
Approach Vol, veh/h		1141			550			203			100	
Approach Delay, s/veh		5.3			0.7			37.7			33.8	
Approach LOS		A			A			D			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	70.2	19.8	70.2	19.8
Change Period (Y+Rc), s	6.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	54.0	25.0	54.0	25.0
Max Q Clear Time (g_c+I1), s	9.8	6.5	13.3	13.2
Green Ext Time (p_c), s	19.3	0.5	8.7	0.9

Intersection Summary	
HCM 6th Ctrl Delay	8.7
HCM 6th LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	1125	39	11	500	154	31	13	13	149	21	26
Future Volume (vph)	199	1125	39	11	500	154	31	13	13	149	21	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0			6.0			5.0			5.0	
Lane Util. Factor	1.00	0.95			0.91			1.00			1.00	
Frpb, ped/bikes	1.00	1.00			0.98			0.98			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			0.96	
Frt	1.00	0.99			0.97			0.97			0.98	
Flt Protected	0.95	1.00			1.00			0.97			0.96	
Satd. Flow (prot)	1770	3482			4824			1727			1689	
Flt Permitted	0.35	1.00			0.91			0.83			0.76	
Satd. Flow (perm)	646	3482			4403			1465			1330	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	207	1172	41	11	521	160	32	14	14	155	22	27
RTOR Reduction (vph)	0	1	0	0	48	0	0	8	0	0	4	0
Lane Group Flow (vph)	207	1212	0	0	644	0	0	52	0	0	200	0
Confl. Peds. (#/hr)			30			20			40	40		
Confl. Bikes (#/hr)			3			1						
Bus Blockages (#/hr)	0	4	0	0	0	4	0	0	4	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	95.7	95.7			81.4			23.3			23.3	
Effective Green, g (s)	95.7	95.7			81.4			23.3			23.3	
Actuated g/C Ratio	0.74	0.74			0.63			0.18			0.18	
Clearance Time (s)	5.0	6.0			6.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	555	2563			2756			262			238	
v/s Ratio Prot	0.03	c0.35										
v/s Ratio Perm	0.25				0.15			0.04			c0.15	
v/c Ratio	0.37	0.47			0.23			0.20			0.84	
Uniform Delay, d1	5.4	6.9			10.6			45.4			51.5	
Progression Factor	0.53	0.31			1.02			1.00			1.00	
Incremental Delay, d2	0.4	0.6			0.0			0.4			22.1	
Delay (s)	3.3	2.7			10.9			45.8			73.7	
Level of Service	A	A			B			D			E	
Approach Delay (s)		2.8			10.9			45.8			73.7	
Approach LOS		A			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	927	167	69	479	13	34	56	86	53	120	11
Future Volume (veh/h)	32	927	167	69	479	13	34	56	86	53	120	11
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	0.99		0.95	0.97		0.95	0.97		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	34	976	162	73	504	12	36	59	46	56	126	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	715	2210	367	336	2581	63	93	122	80	111	185	12
Arrive On Green	1.00	1.00	1.00	1.00	1.00	1.00	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	873	3036	503	379	3546	86	286	812	532	394	1233	80
Grp Volume(v), veh/h	34	571	567	145	214	230	141	0	0	191	0	0
Grp Sat Flow(s),veh/h/ln	873	1777	1763	808	1549	1654	1630	0	0	1708	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	0.0	9.4	0.0	0.0
Prop In Lane	1.00		0.29	0.50		0.05	0.26		0.33	0.29		0.05
Lane Grp Cap(c), veh/h	715	1294	1283	648	1128	1204	294	0	0	307	0	0
V/C Ratio(X)	0.05	0.44	0.44	0.22	0.19	0.19	0.48	0.00	0.00	0.62	0.00	0.00
Avail Cap(c_a), veh/h	715	1294	1283	648	1128	1204	488	0	0	514	0	0
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.93	0.93	0.93	0.99	0.99	0.99	0.95	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	35.5	0.0	0.0	36.4	0.0	0.0
Incr Delay (d2), s/veh	0.1	1.0	1.0	0.8	0.4	0.3	1.1	0.0	0.0	2.0	0.0	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	0.0	0.4	0.4	0.1	0.1	0.1	2.9	0.0	0.0	4.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.1	1.0	1.0	0.8	0.4	0.3	36.6	0.0	0.0	38.5	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	A	D	A	A
Approach Vol, veh/h		1172			589			141			191	
Approach Delay, s/veh		1.0			0.5			36.6			38.5	
Approach LOS		A			A			D			D	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	71.5	18.5	71.5	18.5
Change Period (Y+Rc), s	6.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	54.0	25.0	54.0	25.0
Max Q Clear Time (g_c+I1), s	2.0	11.4	2.0	9.0
Green Ext Time (p_c), s	23.0	0.8	9.8	0.6

Intersection Summary	
HCM 6th Ctrl Delay	6.7
HCM 6th LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	3787	37	0	1328	189	16	30	8	227	48	124
Future Volume (veh/h)	116	3787	37	0	1328	189	16	30	8	227	48	124
Initial Q (Qb), veh	0	0	0	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	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	125	4072	0	0	1428	0	17	32	0	281	0	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	164	5033		0	2522		27	56		425	0	
Arrive On Green	0.05	0.78	0.00	0.00	0.71	0.00	0.02	0.02	0.00	0.12	0.00	0.00
Sat Flow, veh/h	3456	6696	0	0	3647	1585	1174	2508	0	3563	0	1560
Grp Volume(v), veh/h	125	4072	0	0	1428	0	26	23	0	281	0	0
Grp Sat Flow(s),veh/h/ln	1728	1609	0	0	1777	1585	1812	1777	0	1781	0	1560
Q Serve(g_s), s	7.1	75.1	0.0	0.0	39.0	0.0	2.9	2.5	0.0	15.1	0.0	0.0
Cycle Q Clear(g_c), s	7.1	75.1	0.0	0.0	39.0	0.0	2.9	2.5	0.0	15.1	0.0	0.0
Prop In Lane	1.00		0.00	0.00		1.00	0.65		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	164	5033		0	2522		42	42		425	0	
V/C Ratio(X)	0.76	0.81		0.00	0.57		0.62	0.55		0.66	0.00	
Avail Cap(c_a), veh/h	605	5033		0	2522		136	133		623	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.43	0.43	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	94.1	12.9	0.0	0.0	14.1	0.0	96.8	96.6	0.0	84.2	0.0	0.0
Incr Delay (d2), s/veh	3.2	0.6	0.0	0.0	0.9	0.0	13.9	10.8	0.0	1.8	0.0	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	8.3	23.9	0.0	0.0	15.3	0.0	1.5	1.3	0.0	7.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	97.3	13.6	0.0	0.0	15.0	0.0	110.7	107.4	0.0	86.0	0.0	0.0
LnGrp LOS	F	B		A	B		F	F		F	A	
Approach Vol, veh/h		4197	A		1428	A		49	A		281	A
Approach Delay, s/veh		16.0			15.0			109.2			86.0	
Approach LOS		B			B			F			F	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		161.5		28.9	14.5	147.0		9.7				
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s		135.0		35.0	35.0	95.0		15.0				
Max Q Clear Time (g_c+I1), s		77.1		17.1	9.1	41.0		4.9				
Green Ext Time (p_c), s		57.1		0.9	0.4	14.4		0.1				

Intersection Summary		
HCM 6th Ctrl Delay	19.9	
HCM 6th LOS	B	

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

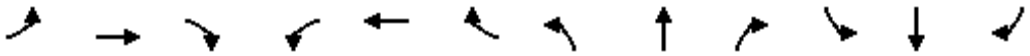
Intersection	
Int Delay, s/veh	3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	42	90	327	139	84	338
Future Vol, veh/h	42	90	327	139	84	338
Conflicting Peds, #/hr	7	0	0	7	7	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	103	376	160	97	389

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	859	275	0	0	543	0
Stage 1	463	-	-	-	-	-
Stage 2	396	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	296	722	-	-	1022	-
Stage 1	600	-	-	-	-	-
Stage 2	649	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	256	717	-	-	1015	-
Mov Cap-2 Maneuver	256	-	-	-	-	-
Stage 1	596	-	-	-	-	-
Stage 2	566	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.8	0	2.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	456	1015	-
HCM Lane V/C Ratio	-	-	0.333	0.095	-
HCM Control Delay (s)	-	-	16.8	8.9	0.4
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.4	0.3	-



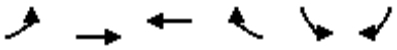
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	690	493	344	381	7	251	3	219	0	0	0
Future Volume (veh/h)	17	690	493	344	381	7	251	3	219	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.97	1.00		0.89			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	17	704	365	351	389	6	258	0	34			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	31	1850	770	374	2532	39	548	0	215			
Arrive On Green	0.02	0.52	0.52	0.21	0.71	0.71	0.15	0.00	0.15			
Sat Flow, veh/h	1781	3554	1479	1781	3550	55	3563	0	1396			
Grp Volume(v), veh/h	17	704	365	351	194	201	258	0	34			
Grp Sat Flow(s),veh/h/ln	1781	1777	1479	1781	1777	1828	1781	0	1396			
Q Serve(g_s), s	1.2	15.4	20.4	25.2	4.6	4.6	8.6	0.0	2.7			
Cycle Q Clear(g_c), s	1.2	15.4	20.4	25.2	4.6	4.6	8.6	0.0	2.7			
Prop In Lane	1.00		1.00	1.00		0.03	1.00		1.00			
Lane Grp Cap(c), veh/h	31	1850	770	374	1267	1304	548	0	215			
V/C Ratio(X)	0.54	0.38	0.47	0.94	0.15	0.15	0.47	0.00	0.16			
Avail Cap(c_a), veh/h	137	1850	770	397	1267	1304	767	0	301			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.88	0.88	0.88	1.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	63.3	18.6	19.8	50.5	6.0	6.0	50.2	0.0	47.7			
Incr Delay (d2), s/veh	4.7	0.5	1.8	28.2	0.3	0.3	0.6	0.0	0.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.6	6.5	7.4	14.1	1.7	1.8	3.9	0.0	2.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.0	19.2	21.7	78.7	6.3	6.3	50.8	0.0	48.0			
LnGrp LOS	E	B	C	E	A	A	D	A	D			
Approach Vol, veh/h		1086			746			292				
Approach Delay, s/veh		20.8			40.4			50.5				
Approach LOS		C			D			D				

Timer - Assigned Phs	1	2		4	5	6			
Phs Duration (G+Y+Rc), s	32.3	72.7		25.0	7.3	97.7			
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0			
Max Green Setting (Gmax), s	29.0	58.0		28.0	10.0	77.0			
Max Q Clear Time (g_c+I1), s	27.2	22.4		10.6	3.2	6.6			
Green Ext Time (p_c), s	0.1	15.2		0.9	0.0	5.4			

Intersection Summary		
HCM 6th Ctrl Delay		31.7
HCM 6th LOS		C

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	84	639	397	94	155	150
Future Volume (veh/h)	84	639	397	94	155	150
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99			0.95	1.00	0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	95	726	451	72	176	122
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	361	2724	2430	1029	199	138
Arrive On Green	1.00	1.00	0.68	0.68	0.21	0.21
Sat Flow, veh/h	449	4137	3647	1505	968	671
Grp Volume(v), veh/h	260	561	451	72	299	0
Grp Sat Flow(s),veh/h/ln	1334	1549	1777	1505	1644	0
Q Serve(g_s), s	0.3	0.0	4.1	1.4	15.9	0.0
Cycle Q Clear(g_c), s	4.4	0.0	4.1	1.4	15.9	0.0
Prop In Lane	0.37			1.00	0.59	0.41
Lane Grp Cap(c), veh/h	967	2118	2430	1029	337	0
V/C Ratio(X)	0.27	0.26	0.19	0.07	0.89	0.00
Avail Cap(c_a), veh/h	967	2118	2430	1029	457	0
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	1.00	1.00	0.52	0.00
Uniform Delay (d), s/veh	0.0	0.0	5.2	4.7	34.8	0.0
Incr Delay (d2), s/veh	0.6	0.3	0.2	0.1	8.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.1	1.4	0.4	7.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.6	0.3	5.3	4.9	43.3	0.0
LnGrp LOS	A	A	A	A	D	A
Approach Vol, veh/h		821	523		299	
Approach Delay, s/veh		0.4	5.3		43.3	
Approach LOS		A	A		D	

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	66.5			66.5	23.5
Change Period (Y+Rc), s	5.0			5.0	5.0
Max Green Setting (Gmax), s	55.0			55.0	25.0
Max Q Clear Time (g_c+I1), s	6.1			6.4	17.9
Green Ext Time (p_c), s	3.7			7.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	9.7
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	1390	162	49	490	57	144	90	47	109	196	438
Future Volume (veh/h)	207	1390	162	49	490	57	144	90	47	109	196	438
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		0.91	0.95		0.85	0.90		0.86
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	216	1448	162	51	510	51	150	94	35	114	204	202
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	240	2426	271	66	2000	196	151	424	158	189	297	470
Arrive On Green	0.13	0.53	0.53	0.04	0.43	0.43	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	1781	4616	516	1781	4677	458	928	1235	460	460	865	1368
Grp Volume(v), veh/h	216	1068	542	51	368	193	150	0	129	318	0	202
Grp Sat Flow(s),veh/h/ln	1781	1702	1728	1781	1702	1731	928	0	1694	1325	0	1368
Q Serve(g_s), s	19.1	34.7	34.7	4.5	11.1	11.5	18.3	0.0	8.7	28.1	0.0	18.2
Cycle Q Clear(g_c), s	19.1	34.7	34.7	4.5	11.1	11.5	55.0	0.0	8.7	36.7	0.0	18.2
Prop In Lane	1.00		0.30	1.00		0.26	1.00		0.27	0.36		1.00
Lane Grp Cap(c), veh/h	240	1789	908	66	1455	740	151	0	582	486	0	470
V/C Ratio(X)	0.90	0.60	0.60	0.78	0.25	0.26	0.99	0.00	0.22	0.65	0.00	0.43
Avail Cap(c_a), veh/h	390	1789	908	167	1455	740	151	0	582	486	0	470
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	68.1	26.2	26.2	76.4	29.4	29.5	73.5	0.0	37.3	49.3	0.0	40.4
Incr Delay (d2), s/veh	15.0	1.5	2.9	16.7	0.4	0.8	71.0	0.0	0.2	3.1	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.7	14.5	15.1	2.4	4.7	5.1	9.2	0.0	3.7	11.8	0.0	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	83.1	27.7	29.1	93.1	29.8	30.3	144.5	0.0	37.5	52.5	0.0	41.0
LnGrp LOS	F	C	C	F	C	C	F	A	D	D	A	D
Approach Vol, veh/h		1826			612			279			520	
Approach Delay, s/veh		34.7			35.2			95.0			48.0	
Approach LOS		C			D			F			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	26.6	73.4		60.0	10.9	89.1		60.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	35.6	55.0		55.0	15.0	75.0		55.0				
Max Q Clear Time (g_c+I1), s	21.1	13.5		57.0	6.5	36.7		38.7				
Green Ext Time (p_c), s	0.5	4.1		0.0	0.0	16.4		2.6				

Intersection Summary	
HCM 6th Ctrl Delay	42.1
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	916	20	355	563	194	0	296	662	367	347	46
Future Volume (veh/h)	0	916	20	355	563	194	0	296	662	367	347	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		1.00	1.00		0.98	1.00		0.86
Parking Bus, Adj	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	935	19	276	695	0	0	302	526	257	517	44
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	2	2	2	2	2	0	2	2	2	2	2
Cap, veh/h	0	1428	29	513	3312		0	312	1428	279	1167	99
Arrive On Green	0.00	0.28	0.28	0.58	1.00	0.00	0.00	0.17	0.17	0.16	0.35	0.35
Sat Flow, veh/h	0	5310	104	1781	5581	0	0	1870	3093	1781	3325	281
Grp Volume(v), veh/h	0	619	335	276	695	0	0	302	526	257	289	272
Grp Sat Flow(s),veh/h/ln	0	1702	1842	1781	1860	0	0	1870	1546	1781	1870	1736
Q Serve(g_s), s	0.0	28.9	28.9	17.1	0.0	0.0	0.0	28.9	0.0	25.6	21.4	21.7
Cycle Q Clear(g_c), s	0.0	28.9	28.9	17.1	0.0	0.0	0.0	28.9	0.0	25.6	21.4	21.7
Prop In Lane	0.00		0.06	1.00		0.00	0.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	0	946	512	513	3312		0	312	1428	279	657	610
V/C Ratio(X)	0.00	0.65	0.66	0.54	0.21		0.00	0.97	0.37	0.92	0.44	0.45
Avail Cap(c_a), veh/h	0	946	512	513	3312		0	312	1428	396	779	723
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.97	0.97	0.00	0.00	0.99	0.99	0.54	0.54	0.54
Uniform Delay (d), s/veh	0.0	57.4	57.4	30.8	0.0	0.0	0.0	74.5	32.1	74.8	44.8	44.9
Incr Delay (d2), s/veh	0.0	3.5	6.4	1.1	0.1	0.0	0.0	42.2	0.2	13.3	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	13.0	14.5	6.3	0.0	0.0	0.0	17.4	13.2	12.8	10.2	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	60.9	63.8	31.9	0.1	0.0	0.0	116.7	32.3	88.1	45.1	45.2
LnGrp LOS	A	E	E	C	A		A	F	C	F	D	D
Approach Vol, veh/h		954			971	A		828			818	
Approach Delay, s/veh		61.9			9.2			63.1			58.7	
Approach LOS		E			A			E			E	

Timer - Assigned Phs	2	4	5	6	7	8
Phs Duration (G+Y+Rc), s	111.8	68.2	56.8	55.0	33.2	35.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	95.0	75.0	40.0	50.0	40.0	30.0
Max Q Clear Time (g_c+I1), s	2.0	23.7	19.1	30.9	27.6	30.9
Green Ext Time (p_c), s	12.1	3.9	0.8	10.3	0.6	0.0

Intersection Summary	
HCM 6th Ctrl Delay	47.1
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.
User approved changes to right turn type.
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	326	1022	157	223	339	83	108	387	75	192	457	147
Future Volume (veh/h)	326	1022	157	223	339	83	108	387	75	192	457	147
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.93	1.00		0.82	1.00		0.93
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	340	1065	153	232	353	60	112	403	68	200	476	132
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	278	1878	269	257	1795	293	133	627	104	167	627	172
Arrive On Green	0.16	0.42	0.42	0.14	0.41	0.41	0.07	0.21	0.21	0.09	0.23	0.23
Sat Flow, veh/h	1781	4447	638	1781	4374	714	1781	2923	484	1781	2682	736
Grp Volume(v), veh/h	340	815	403	232	271	142	112	242	229	200	314	294
Grp Sat Flow(s),veh/h/ln	1781	1702	1681	1781	1702	1683	1781	1777	1631	1781	1777	1642
Q Serve(g_s), s	25.0	29.1	29.2	20.5	8.2	8.7	9.9	19.8	20.5	15.0	26.3	26.8
Cycle Q Clear(g_c), s	25.0	29.1	29.2	20.5	8.2	8.7	9.9	19.8	20.5	15.0	26.3	26.8
Prop In Lane	1.00		0.38	1.00		0.42	1.00		0.30	1.00		0.45
Lane Grp Cap(c), veh/h	278	1437	710	257	1397	691	133	381	350	167	416	384
V/C Ratio(X)	1.22	0.57	0.57	0.90	0.19	0.20	0.84	0.63	0.65	1.20	0.75	0.77
Avail Cap(c_a), veh/h	278	1437	710	445	1397	691	167	444	408	167	444	410
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.79	0.79	1.00	1.00	1.00	0.09	0.09	0.09	0.93	0.93	0.93
Uniform Delay (d), s/veh	67.5	35.1	35.1	67.3	30.2	30.4	73.1	57.1	57.4	72.5	57.0	57.2
Incr Delay (d2), s/veh	122.6	1.3	2.6	12.5	0.3	0.7	3.1	0.2	0.3	130.4	6.3	7.4
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	20.9	12.5	12.6	10.3	3.5	3.7	4.7	9.0	8.6	12.9	12.6	12.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	190.1	36.4	37.7	79.9	30.5	31.0	76.2	57.3	57.7	202.9	63.3	64.6
LnGrp LOS	F	D	D	E	C	C	E	E	E	F	E	E
Approach Vol, veh/h		1558			645			583			808	
Approach Delay, s/veh		70.3			48.4			61.1			98.4	
Approach LOS		E			D			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.1	72.6	16.9	42.4	30.0	70.7	20.0	39.3
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	40.0	45.0	15.0	40.0	25.0	60.0	15.0	40.0
Max Q Clear Time (g_c+I1), s	22.5	31.2	11.9	28.8	27.0	10.7	17.0	22.5
Green Ext Time (p_c), s	0.6	7.0	0.1	2.9	0.0	3.0	0.0	2.7

Intersection Summary	
HCM 6th Ctrl Delay	71.2
HCM 6th LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	339	311	0	0	0	0	430	420	283	627	0
Future Volume (veh/h)	24	339	311	0	0	0	0	430	420	283	627	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.95	0.99		1.00
Parking Bus, Adj	1.00	1.00	0.98				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	26	361	0				0	457	326	301	667	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	29	407					0	1960	835	553	2426	0
Arrive On Green	0.23	0.23	0.00				0.00	0.55	0.55	0.09	0.68	0.00
Sat Flow, veh/h	125	1739	1560				0	3647	1513	1781	3647	0
Grp Volume(v), veh/h	387	0	0				0	457	326	301	667	0
Grp Sat Flow(s),veh/h/ln	1864	0	1560				0	1777	1513	1781	1777	0
Q Serve(g_s), s	24.1	0.0	0.0				0.0	7.9	14.8	8.4	8.8	0.0
Cycle Q Clear(g_c), s	24.1	0.0	0.0				0.0	7.9	14.8	8.4	8.8	0.0
Prop In Lane	0.07		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	436	0					0	1960	835	553	2426	0
V/C Ratio(X)	0.89	0.00					0.00	0.23	0.39	0.54	0.27	0.00
Avail Cap(c_a), veh/h	621	0					0	1960	835	616	2426	0
HCM Platoon Ratio	1.00	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				0.00	0.37	0.37	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.4	0.0	0.0				0.0	13.8	15.4	9.2	7.4	0.0
Incr Delay (d2), s/veh	10.9	0.0	0.0				0.0	0.1	0.5	0.8	0.3	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
%ile BackOfQ(50%),veh/ln	12.4	0.0	0.0				0.0	3.2	5.1	3.2	3.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.4	0.0	0.0				0.0	14.0	15.9	10.0	7.7	0.0
LnGrp LOS	E	A					A	B	B	B	A	A
Approach Vol, veh/h		387	A					783			968	
Approach Delay, s/veh		55.4						14.8			8.4	
Approach LOS		E						B			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	15.7	71.2		33.1		86.9
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	15.0	50.0		40.0		70.0
Max Q Clear Time (g_c+I1), s	10.4	16.8		26.1		10.8
Green Ext Time (p_c), s	0.4	4.7		2.0		5.5

Intersection Summary	
HCM 6th Ctrl Delay	19.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	40	18	42	47	101	8	22	17	116	31	15
Future Vol, veh/h	19	40	18	42	47	101	8	22	17	116	31	15
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	42	19	44	49	106	8	23	18	122	33	16
Number of Lanes	1	1	0	0	1	0	0	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	2
HCM Control Delay	8.4	9.9	8.2	9.5
HCM LOS	A	A	A	A

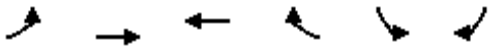
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	27%	0%	100%	0%	22%	100%	0%
Vol Thru, %	73%	0%	0%	69%	25%	0%	67%
Vol Right, %	0%	100%	0%	31%	53%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	30	17	19	58	190	116	46
LT Vol	8	0	19	0	42	116	0
Through Vol	22	0	0	40	47	0	31
RT Vol	0	17	0	18	101	0	15
Lane Flow Rate	32	18	20	61	200	122	48
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.049	0.024	0.032	0.087	0.275	0.197	0.068
Departure Headway (Hd)	5.58	4.74	5.827	5.105	4.95	5.798	5.065
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	639	751	613	700	726	618	705
Service Time	3.334	2.494	3.572	2.85	2.986	3.544	2.811
HCM Lane V/C Ratio	0.05	0.024	0.033	0.087	0.275	0.197	0.068
HCM Control Delay	8.6	7.6	8.8	8.3	9.9	10	8.2
HCM Lane LOS	A	A	A	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.1	0.3	1.1	0.7	0.2

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	1	8	28	32	22	18	111	17	47	145	41
Future Vol, veh/h	8	1	8	28	32	22	18	111	17	47	145	41
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	1	10	34	39	27	22	134	20	57	175	49
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	8.7	8.8	9.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	12%	47%	34%	20%
Vol Thru, %	76%	6%	39%	62%
Vol Right, %	12%	47%	27%	18%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	146	17	82	233
LT Vol	18	8	28	47
Through Vol	111	1	32	145
RT Vol	17	8	22	41
Lane Flow Rate	176	20	99	281
Geometry Grp	1	1	1	1
Degree of Util (X)	0.219	0.028	0.134	0.34
Departure Headway (Hd)	4.483	4.899	4.881	4.357
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	800	729	734	825
Service Time	2.512	2.942	2.917	2.382
HCM Lane V/C Ratio	0.22	0.027	0.135	0.341
HCM Control Delay	8.8	8.1	8.7	9.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.1	0.5	1.5



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	298	1627	263	38	0	788
Future Volume (vph)	298	1627	263	38	0	788
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	1.00	0.91	0.95			0.64
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	1.00	0.98			0.85
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	5085	3466			4053
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	5085	3466			4053
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	307	1677	271	39	0	812
RTOR Reduction (vph)	0	0	18	0	0	441
Lane Group Flow (vph)	307	1677	292	0	0	371
Confl. Peds. (#/hr)						63
Confl. Bikes (#/hr)				6		
Turn Type	Prot	NA	NA			Over
Protected Phases	6	6 4	4			6
Permitted Phases						
Actuated Green, G (s)	41.1	90.0	38.9			41.1
Effective Green, g (s)	41.1	90.0	38.9			41.1
Actuated g/C Ratio	0.46	1.00	0.43			0.46
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	808	5085	1498			1850
v/s Ratio Prot	c0.17	c0.33	0.08			0.09
v/s Ratio Perm						
v/c Ratio	0.38	0.33	0.19			0.20
Uniform Delay, d1	16.1	0.0	15.8			14.6
Progression Factor	0.89	1.00	0.19			1.00
Incremental Delay, d2	0.9	0.0	0.1			0.2
Delay (s)	15.3	0.0	3.1			14.9
Level of Service	B	A	A			B
Approach Delay (s)		2.4	3.1		14.9	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	40	2534	80	79	142	0	0	104	2
Future Volume (veh/h)	0	0	0	40	2534	80	79	142	0	0	104	2
Initial Q (Qb), veh				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
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1870	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				44	2816	86	88	158	0	0	116	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				69	4718	147	175	296	0	0	503	
Arrive On Green				0.71	0.71	0.71	0.14	0.14	0.00	0.00	0.14	0.00
Sat Flow, veh/h				97	6607	206	762	2175	0	0	3741	0
Grp Volume(v), veh/h				850	1333	762	131	115	0	0	116	0
Grp Sat Flow(s),veh/h/ln				1866	1609	1828	1235	1617	0	0	1777	0
Q Serve(g_s), s				21.6	18.2	18.4	7.1	5.9	0.0	0.0	2.6	0.0
Cycle Q Clear(g_c), s				21.6	18.2	18.4	9.7	5.9	0.0	0.0	2.6	0.0
Prop In Lane				0.05		0.11	0.67		0.00	0.00		0.00
Lane Grp Cap(c), veh/h				1332	2297	1305	242	229	0	0	503	
V/C Ratio(X)				0.64	0.58	0.58	0.54	0.50	0.00	0.00	0.23	
Avail Cap(c_a), veh/h				1332	2297	1305	420	431	0	0	948	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				6.8	6.3	6.3	37.9	35.7	0.0	0.0	34.3	0.0
Incr Delay (d2), s/veh				2.4	1.1	1.9	1.9	1.7	0.0	0.0	0.2	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
%ile BackOfQ(50%),veh/ln				7.5	5.2	6.3	2.9	2.4	0.0	0.0	1.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				9.1	7.4	8.2	39.8	37.4	0.0	0.0	34.5	0.0
LnGrp LOS				A	A	A	D	D	A	A	C	
Approach Vol, veh/h					2946			246			116	A
Approach Delay, s/veh					8.1			38.7			34.5	
Approach LOS					A			D			C	

Timer - Assigned Phs	2	4	8
Phs Duration (G+Y+Rc), s	71.3	18.7	18.7
Change Period (Y+Rc), s	7.0	6.0	6.0
Max Green Setting (Gmax), s	53.0	24.0	24.0
Max Q Clear Time (g_c+I1), s	23.6	11.7	4.6
Green Ext Time (p_c), s	28.8	1.1	0.6

Intersection Summary	
HCM 6th Ctrl Delay	11.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	1543	68	0	32
Future Vol, veh/h	0	0	1543	68	0	32
Conflicting Peds, #/hr	0	0	0	9	9	4
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	1	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	1714	76	0	36

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	-	908
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	239
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	237
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	SB
HCM Control Delay, s	0	22.9
HCM LOS		C

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	237
HCM Lane V/C Ratio	-	-	0.15
HCM Control Delay (s)	-	-	22.9
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	0.5

Intersection	
Int Delay, s/veh	5.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	92	210	167	0	0	284
Future Vol, veh/h	92	210	167	0	0	284
Conflicting Peds, #/hr	118	100	0	118	100	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	102	233	186	0	0	316

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	620	286	0	-	-	-
Stage 1	186	-	-	-	-	-
Stage 2	434	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	452	753	-	0	0	-
Stage 1	846	-	-	0	0	-
Stage 2	653	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	401	681	-	-	-	-
Mov Cap-2 Maneuver	401	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	580	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	401	681	-
HCM Lane V/C Ratio	-	0.255	0.343	-
HCM Control Delay (s)	-	17	13	-
HCM Lane LOS	-	C	B	-
HCM 95th %tile Q(veh)	-	1	1.5	-



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1419	237	4	50	281	98
Future Volume (veh/h)	1419	237	4	50	281	98
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.95	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1463	213	4	52	290	72
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	3948	1169	128	1974	400	180
Arrive On Green	0.26	0.26	0.77	0.77	0.12	0.12
Sat Flow, veh/h	5274	1511	107	2638	3456	1560
Grp Volume(v), veh/h	1463	213	27	29	290	72
Grp Sat Flow(s),veh/h/ln	1702	1511	1043	1617	1728	1560
Q Serve(g_s), s	21.2	9.9	0.3	0.4	7.3	3.9
Cycle Q Clear(g_c), s	21.2	9.9	21.5	0.4	7.3	3.9
Prop In Lane		1.00	0.15		1.00	1.00
Lane Grp Cap(c), veh/h	3948	1169	852	1250	400	180
V/C Ratio(X)	0.37	0.18	0.03	0.02	0.73	0.40
Avail Cap(c_a), veh/h	3948	1169	852	1250	960	433
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.95	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.5	11.3	2.9	2.4	38.4	36.9
Incr Delay (d2), s/veh	0.3	0.3	0.1	0.0	2.5	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.7	3.8	0.1	0.1	3.2	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.8	11.6	2.9	2.4	40.9	38.3
LnGrp LOS	B	B	A	A	D	D
Approach Vol, veh/h	1676			56	362	
Approach Delay, s/veh	15.2			2.7	40.4	
Approach LOS	B			A	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		74.6		15.4		74.6
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		55.0		25.0		55.0
Max Q Clear Time (g_c+I1), s		23.5		9.3		23.2
Green Ext Time (p_c), s		0.6		1.1		23.9

Intersection Summary		
HCM 6th Ctrl Delay		19.2
HCM 6th LOS		B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	1285	49	0	0	0	0	83	45	45	79	0
Future Volume (veh/h)	23	1285	49	0	0	0	0	83	45	45	79	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.90				1.00		0.87	0.90		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	25	1382	48				0	89	21	48	85	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	1268	3636	1014				0	331	244	237	331	0
Arrive On Green	1.00	1.00	1.00				0.00	0.18	0.18	0.18	0.18	0.00
Sat Flow, veh/h	1781	5106	1424				0	1870	1378	1156	1870	0
Grp Volume(v), veh/h	25	1382	48				0	89	21	48	85	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1424				0	1870	1378	1156	1870	0
Q Serve(g_s), s	0.0	0.0	0.0				0.0	3.7	1.1	3.4	3.5	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0				0.0	3.7	1.1	7.1	3.5	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1268	3636	1014				0	331	244	237	331	0
V/C Ratio(X)	0.02	0.38	0.05				0.00	0.27	0.09	0.20	0.26	0.00
Avail Cap(c_a), veh/h	1268	3636	1014				0	520	383	354	520	0
HCM Platoon Ratio	2.00	2.00	2.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0				0.0	32.0	31.0	35.1	31.9	0.0
Incr Delay (d2), s/veh	0.0	0.3	0.1				0.0	0.4	0.2	0.4	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
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.0				0.0	1.7	0.4	1.0	1.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.3	0.1				0.0	32.5	31.1	35.5	32.4	0.0
LnGrp LOS	A	A	A				A	C	C	D	C	A
Approach Vol, veh/h		1455						110			133	
Approach Delay, s/veh		0.3						32.2			33.5	
Approach LOS		A						C			C	

Timer - Assigned Phs		4		6		8
Phs Duration (G+Y+Rc), s		20.9		69.1		20.9
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		25.0		55.0		25.0
Max Q Clear Time (g_c+I1), s		5.7		2.0		9.1
Green Ext Time (p_c), s		0.4		15.5		0.5

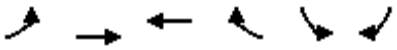
Intersection Summary	
HCM 6th Ctrl Delay	4.9
HCM 6th LOS	A



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	186	115	65	876	86	22
Future Volume (veh/h)	186	115	65	876	86	22
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.97	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	211	82	74	995	98	2
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2049	767	349	4599	128	114
Arrive On Green	0.82	0.82	0.82	0.82	0.07	0.07
Sat Flow, veh/h	2602	939	366	5868	1781	1585
Grp Volume(v), veh/h	147	146	294	775	98	2
Grp Sat Flow(s),veh/h/ln	1777	1671	1604	1464	1781	1585
Q Serve(g_s), s	1.5	1.6	0.0	3.5	4.9	0.1
Cycle Q Clear(g_c), s	1.5	1.6	3.1	3.5	4.9	0.1
Prop In Lane		0.56	0.25		1.00	1.00
Lane Grp Cap(c), veh/h	1451	1365	1360	3587	128	114
V/C Ratio(X)	0.10	0.11	0.22	0.22	0.76	0.02
Avail Cap(c_a), veh/h	1451	1365	1360	3587	495	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	1.00	1.00	0.99	0.99
Uniform Delay (d), s/veh	1.6	1.7	1.8	1.8	41.0	38.8
Incr Delay (d2), s/veh	0.1	0.2	0.4	0.1	8.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.3	0.7	0.6	2.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	1.8	1.8	2.2	2.0	49.9	38.9
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h	293			1069	100	
Approach Delay, s/veh	1.8			2.0	49.7	
Approach LOS	A			A	D	

Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	78.5				78.5	11.5
Change Period (Y+Rc), s	5.0				5.0	5.0
Max Green Setting (Gmax), s	55.0				55.0	25.0
Max Q Clear Time (g_c+I1), s	3.6				5.5	6.9
Green Ext Time (p_c), s	3.9				19.2	0.2

Intersection Summary						
HCM 6th Ctrl Delay			5.2			
HCM 6th LOS			A			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	107	125	553	159	100	55
Future Volume (veh/h)	107	125	553	159	100	55
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.96	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	114	133	588	114	106	-7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	144	1520	3688	682	136	121
Arrive On Green	0.08	0.81	0.68	0.68	0.08	0.00
Sat Flow, veh/h	1781	1870	5713	1009	1781	1585
Grp Volume(v), veh/h	114	133	517	185	106	-7
Grp Sat Flow(s),veh/h/ln	1781	1870	1609	1635	1781	1585
Q Serve(g_s), s	5.7	1.3	3.5	3.7	5.3	0.0
Cycle Q Clear(g_c), s	5.7	1.3	3.5	3.7	5.3	0.0
Prop In Lane	1.00			0.62	1.00	1.00
Lane Grp Cap(c), veh/h	144	1520	3264	1106	136	121
V/C Ratio(X)	0.79	0.09	0.16	0.17	0.78	-0.06
Avail Cap(c_a), veh/h	198	1520	3264	1106	495	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.97	0.97	1.00	0.00
Uniform Delay (d), s/veh	40.6	1.7	5.3	5.3	40.8	0.0
Incr Delay (d2), s/veh	14.0	0.1	0.1	0.3	9.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.3	1.0	1.2	2.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	54.6	1.8	5.4	5.6	50.2	0.0
LnGrp LOS	D	A	A	A	D	A
Approach Vol, veh/h		247	702		99	
Approach Delay, s/veh		26.2	5.4		53.7	
Approach LOS		C	A		D	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.3	65.9			78.1	11.9
Change Period (Y+Rc), s	5.0	5.0			5.0	5.0
Max Green Setting (Gmax), s	10.3	40.0			55.0	25.0
Max Q Clear Time (g_c+I1), s	7.7	5.7			3.3	7.3
Green Ext Time (p_c), s	0.1	10.1			1.6	0.2

Intersection Summary		
HCM 6th Ctrl Delay	14.9	
HCM 6th LOS	B	



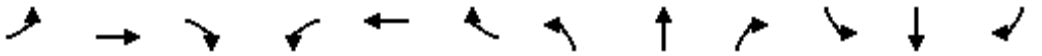
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	829	29	33	553	17	22
Future Volume (veh/h)	829	29	33	553	17	22
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	873	31	35	582	18	23
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	4523	160	165	2709	53	47
Arrive On Green	0.89	0.89	0.89	0.89	0.03	0.03
Sat Flow, veh/h	5231	179	150	3118	1781	1585
Grp Volume(v), veh/h	587	317	307	310	18	23
Grp Sat Flow(s),veh/h/ln	1702	1838	1566	1617	1781	1585
Q Serve(g_s), s	2.9	2.9	0.0	3.3	1.3	1.9
Cycle Q Clear(g_c), s	2.9	2.9	2.7	3.3	1.3	1.9
Prop In Lane		0.10	0.11		1.00	1.00
Lane Grp Cap(c), veh/h	3041	1642	1430	1445	53	47
V/C Ratio(X)	0.19	0.19	0.21	0.21	0.34	0.49
Avail Cap(c_a), veh/h	3041	1642	1430	1445	356	317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.56	0.56	1.00	1.00
Uniform Delay (d), s/veh	0.9	0.9	0.9	0.9	61.8	62.1
Incr Delay (d2), s/veh	0.1	0.3	0.2	0.2	3.7	7.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.3	0.4	0.4	0.6	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	1.0	1.2	1.1	1.1	65.6	69.7
LnGrp LOS	A	A	A	A	E	E
Approach Vol, veh/h	904			617	41	
Approach Delay, s/veh	1.1			1.1	67.9	
Approach LOS	A			A	E	

Timer - Assigned Phs	2		4		6
Phs Duration (G+Y+Rc), s	121.1		8.9		121.1
Change Period (Y+Rc), s	5.0		5.0		5.0
Max Green Setting (Gmax), s	94.0		26.0		94.0
Max Q Clear Time (g_c+I1), s	4.9		3.9		5.3
Green Ext Time (p_c), s	15.4		0.1		10.0

Intersection Summary		
HCM 6th Ctrl Delay		2.8
HCM 6th LOS		A

HCM 6th Signalized Intersection Summary
1: Waiakamilo Rd & N. Nimitz Hwy

06/24/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	2486	314	136	2945	5	14	11	0	295	3	111
Future Volume (veh/h)	3	2486	314	136	2945	5	14	11	0	295	3	111
Initial Q (Qb), veh	0	0	0	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	0.98	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	2590	0	142	3068	0	15	11	0	309	0	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	14	3565		134	3909		34	36		366	0	
Arrive On Green	0.01	0.70	0.00	0.10	1.00	0.00	0.02	0.02	0.00	0.10	0.00	0.00
Sat Flow, veh/h	1781	5274	0	1781	5274	0	1781	1870	1560	3563	0	1585
Grp Volume(v), veh/h	3	2590	0	142	3068	0	15	11	0	309	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	0	1781	1702	0	1781	1870	1560	1781	0	1585
Q Serve(g_s), s	0.3	62.1	0.0	15.0	0.0	0.0	1.7	1.2	0.0	17.0	0.0	0.0
Cycle Q Clear(g_c), s	0.3	62.1	0.0	15.0	0.0	0.0	1.7	1.2	0.0	17.0	0.0	0.0
Prop In Lane	1.00		0.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	14	3565		134	3909		34	36		366	0	
V/C Ratio(X)	0.22	0.73		1.06	0.78		0.44	0.31		0.85	0.00	
Avail Cap(c_a), veh/h	223	3565		134	3909		89	94		713	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.55	0.55	0.00	1.00	1.00	0.00	0.59	0.00	0.00
Uniform Delay (d), s/veh	98.6	18.5	0.0	90.0	0.0	0.0	97.0	96.8	0.0	88.2	0.0	0.0
Incr Delay (d2), s/veh	7.8	1.3	0.0	75.3	0.9	0.0	8.7	4.8	0.0	3.3	0.0	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	0.2	23.6	0.0	9.5	0.3	0.0	0.9	0.6	0.0	8.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	106.5	19.8	0.0	165.4	0.9	0.0	105.7	101.6	0.0	91.4	0.0	0.0
LnGrp LOS	F	B		F	A		F	F		F	A	
Approach Vol, veh/h		2593			3210			26			309	
Approach Delay, s/veh		19.9			8.2			104.0			91.4	
Approach LOS		B			A			F			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.0	145.7		25.5	6.5	159.1		8.8				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	114.0		40.0	25.0	104.0		10.0				
Max Q Clear Time (g_c+I1), s	17.0	64.1		19.0	2.3	2.0		3.7				
Green Ext Time (p_c), s	0.0	46.7		1.0	0.0	98.3		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		17.7
HCM 6th LOS		B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	889	89	178	753	133	43	379	158	128	371	125
Future Volume (veh/h)	190	889	89	178	753	133	43	379	158	128	371	125
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		0.96	1.00		1.00	1.00		0.91
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	194	907	85	182	768	125	44	387	0	131	379	98
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	148	1528	143	148	1420	231	57	635		148	631	160
Arrive On Green	0.08	0.47	0.47	0.03	0.16	0.16	0.03	0.18	0.00	0.08	0.23	0.23
Sat Flow, veh/h	1781	3243	304	1781	3014	490	1781	3647	0	1781	2743	696
Grp Volume(v), veh/h	194	497	495	182	453	440	44	387	0	131	243	234
Grp Sat Flow(s),veh/h/ln	1781	1777	1770	1781	1777	1727	1781	1777	0	1781	1777	1663
Q Serve(g_s), s	10.0	24.6	24.6	10.0	28.2	28.2	2.9	12.0	0.0	8.7	14.6	15.1
Cycle Q Clear(g_c), s	10.0	24.6	24.6	10.0	28.2	28.2	2.9	12.0	0.0	8.7	14.6	15.1
Prop In Lane	1.00		0.17	1.00		0.28	1.00		0.00	1.00		0.42
Lane Grp Cap(c), veh/h	148	837	834	148	837	814	57	635		148	409	382
V/C Ratio(X)	1.31	0.59	0.59	1.23	0.54	0.54	0.77	0.61		0.88	0.59	0.61
Avail Cap(c_a), veh/h	148	837	834	148	837	814	148	1007		148	503	471
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	0.00	0.88	0.88	0.88
Uniform Delay (d), s/veh	55.0	23.3	23.3	58.3	38.7	38.7	57.6	45.4	0.0	54.4	41.2	41.4
Incr Delay (d2), s/veh	178.1	3.1	3.1	144.0	2.3	2.3	19.3	0.9	0.0	38.0	1.2	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	11.8	10.9	10.9	10.7	14.0	13.6	1.6	5.4	0.0	5.5	6.5	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	233.1	26.4	26.4	202.4	41.0	41.0	76.9	46.4	0.0	92.4	42.4	42.8
LnGrp LOS	F	C	C	F	D	D	E	D		F	D	D
Approach Vol, veh/h		1186			1075			431			608	
Approach Delay, s/veh		60.2			68.3			49.5			53.3	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	62.6	8.8	33.6	15.0	62.6	15.0	27.4
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	10.0	44.0	10.0	34.0	10.0	44.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	12.0	26.6	4.9	17.1	12.0	30.2	10.7	14.0
Green Ext Time (p_c), s	0.0	6.2	0.0	2.7	0.0	5.0	0.0	2.4

Intersection Summary	
HCM 6th Ctrl Delay	60.2
HCM 6th LOS	E

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	59	12	38	71	55	13	458	64	34	402	59
Future Volume (veh/h)	76	59	12	38	71	55	13	458	64	34	402	59
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	0.99		0.95	0.99		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	89	69	12	45	84	50	15	539	22	40	473	48
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	346	123	20	230	149	80	158	1537	678	203	1337	132
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.45	0.45	0.45	0.45	0.45	0.45
Sat Flow, veh/h	808	734	117	343	891	478	30	3423	1509	104	2978	293
Grp Volume(v), veh/h	170	0	0	179	0	0	296	258	22	294	0	267
Grp Sat Flow(s),veh/h/ln	1660	0	0	1712	0	0	1836	1617	1509	1743	0	1632
Q Serve(g_s), s	0.0	0.0	0.0	0.2	0.0	0.0	0.0	2.7	0.2	0.0	0.0	2.8
Cycle Q Clear(g_c), s	2.2	0.0	0.0	2.4	0.0	0.0	2.7	2.7	0.2	2.7	0.0	2.8
Prop In Lane	0.52		0.07	0.25		0.28	0.05		1.00	0.14		0.18
Lane Grp Cap(c), veh/h	488	0	0	460	0	0	969	726	678	940	0	733
V/C Ratio(X)	0.35	0.00	0.00	0.39	0.00	0.00	0.31	0.36	0.03	0.31	0.00	0.36
Avail Cap(c_a), veh/h	1648	0	0	1728	0	0	5936	5269	4919	5443	0	5318
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.00	1.00
Uniform Delay (d), s/veh	10.0	0.0	0.0	10.0	0.0	0.0	4.7	4.7	4.0	4.7	0.0	4.7
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.5	0.0	0.0	0.2	0.3	0.0	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.7	0.0	0.0	0.4	0.4	0.0	0.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.4	0.0	0.0	10.6	0.0	0.0	4.9	5.0	4.0	4.9	0.0	5.0
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		170			179			576			561	
Approach Delay, s/veh		10.4			10.6			4.9			5.0	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	9.4	16.7	9.4	16.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	85.0	25.0	85.0
Max Q Clear Time (g_c+I1), s	4.2	4.8	4.4	4.7
Green Ext Time (p_c), s	1.0	4.1	1.0	3.9

Intersection Summary	
HCM 6th Ctrl Delay	6.2
HCM 6th LOS	A

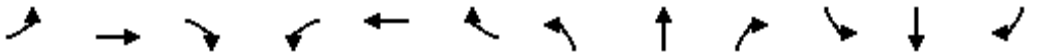
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	2	15	9	4	40	12	513	26	42	527	13
Future Vol, veh/h	15	2	15	9	4	40	12	513	26	42	527	13
Conflicting Peds, #/hr	4	0	1	1	0	4	29	0	7	7	0	29
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	2	16	10	4	43	13	546	28	45	561	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	992	1294	318	966	1287	298	604	0	0	581	0	0
Stage 1	687	687	-	593	593	-	-	-	-	-	-	-
Stage 2	305	607	-	373	694	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	200	161	678	209	163	698	970	-	-	989	-	-
Stage 1	403	446	-	459	492	-	-	-	-	-	-	-
Stage 2	680	485	-	620	442	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	166	142	659	187	144	691	943	-	-	982	-	-
Mov Cap-2 Maneuver	166	142	-	187	144	-	-	-	-	-	-	-
Stage 1	384	405	-	447	479	-	-	-	-	-	-	-
Stage 2	617	472	-	561	401	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.5	15.6	0.3	0.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	943	-	-	252	396	982	-	-
HCM Lane V/C Ratio	0.014	-	-	0.135	0.142	0.045	-	-
HCM Control Delay (s)	8.9	0.1	-	21.5	15.6	8.8	0.3	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.5	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	611	149	48	613	288	193	725	63	116	496	320
Future Volume (veh/h)	116	611	149	48	613	288	193	725	63	116	496	320
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		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	121	636	138	50	639	0	201	755	60	121	517	228
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	138	1235	268	64	1357		211	922	73	149	861	373
Arrive On Green	0.08	0.43	0.43	0.04	0.38	0.00	0.12	0.28	0.28	0.08	0.24	0.24
Sat Flow, veh/h	1781	2898	628	1781	3618	0	1781	3327	264	1781	3554	1540
Grp Volume(v), veh/h	121	390	384	50	639	0	201	403	412	121	517	228
Grp Sat Flow(s),veh/h/ln	1781	1777	1749	1781	1763	0	1781	1777	1814	1781	1777	1540
Q Serve(g_s), s	7.4	17.7	17.8	3.1	15.0	0.0	12.3	23.3	23.4	7.3	14.2	14.5
Cycle Q Clear(g_c), s	7.4	17.7	17.8	3.1	15.0	0.0	12.3	23.3	23.4	7.3	14.2	14.5
Prop In Lane	1.00		0.36	1.00		0.00	1.00		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	138	757	745	64	1357		211	492	503	149	861	373
V/C Ratio(X)	0.88	0.51	0.52	0.78	0.47		0.95	0.82	0.82	0.81	0.60	0.61
Avail Cap(c_a), veh/h	138	757	745	94	1357		211	549	561	243	1163	504
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.93	0.93	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.2	23.2	23.2	52.6	25.4	0.0	48.2	37.2	37.2	49.6	37.0	37.1
Incr Delay (d2), s/veh	43.0	2.5	2.5	20.3	1.1	0.0	48.7	8.7	8.6	4.1	0.7	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	4.9	7.8	7.7	1.7	6.4	0.0	8.3	11.2	11.4	3.4	6.2	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	93.3	25.7	25.8	72.9	26.5	0.0	97.0	45.9	45.8	53.6	37.6	38.7
LnGrp LOS	F	C	C	E	C		F	D	D	D	D	D
Approach Vol, veh/h		895			689			1016			866	
Approach Delay, s/veh		34.9			29.9			55.9			40.1	
Approach LOS		C			C			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	51.9	14.2	35.5	13.0	47.3	18.0	31.7
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.8	35.7	15.0	34.0	8.5	33.0	13.0	36.0
Max Q Clear Time (g_c+I1), s	5.1	19.8	9.3	25.4	9.4	17.0	14.3	16.5
Green Ext Time (p_c), s	0.0	4.5	0.1	3.4	0.0	4.0	0.0	4.2

Intersection Summary	
HCM 6th Ctrl Delay	41.4
HCM 6th LOS	D

Notes

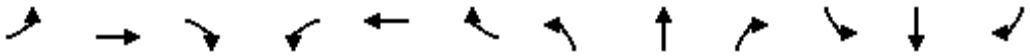
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	501	406	894	0	0	510
Future Volume (veh/h)	501	406	894	0	0	510
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	0	0	1870
Adj Flow Rate, veh/h	522	362	931	0	0	531
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	925	424	2247	0	0	2247
Arrive On Green	0.27	0.27	0.63	0.00	0.00	0.63
Sat Flow, veh/h	3456	1585	3741	0	0	3741
Grp Volume(v), veh/h	522	362	931	0	0	531
Grp Sat Flow(s),veh/h/ln	1728	1585	1777	0	0	1777
Q Serve(g_s), s	13.0	21.7	13.1	0.0	0.0	6.5
Cycle Q Clear(g_c), s	13.0	21.7	13.1	0.0	0.0	6.5
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	925	424	2247	0	0	2247
V/C Ratio(X)	0.56	0.85	0.41	0.00	0.00	0.24
Avail Cap(c_a), veh/h	1382	634	2247	0	0	2247
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	31.6	34.7	9.2	0.0	0.0	8.0
Incr Delay (d2), s/veh	0.5	7.3	0.6	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	9.1	4.8	0.0	0.0	2.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.1	42.0	9.7	0.0	0.0	8.2
LnGrp LOS	C	D	A	A	A	A
Approach Vol, veh/h	884		931			531
Approach Delay, s/veh	36.2		9.7			8.2
Approach LOS	D		A			A

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	68.2			68.2	31.8
Change Period (Y+Rc), s	5.0			5.0	5.0
Max Green Setting (Gmax), s	50.0			50.0	40.0
Max Q Clear Time (g_c+I1), s	15.1			8.5	23.7
Green Ext Time (p_c), s	8.0			4.1	3.1

Intersection Summary		
HCM 6th Ctrl Delay	19.3	
HCM 6th LOS	B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	875	53	112	811	143	54	105	131	56	103	70
Future Volume (vph)	94	875	53	112	811	143	54	105	131	56	103	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.0	6.0			5.0			5.0	
Lane Util. Factor		0.91		1.00	0.95			1.00			1.00	
Frpb, ped/bikes		1.00		1.00	0.99			0.99			0.99	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.99		1.00	0.98			0.94			0.96	
Flt Protected		1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)		4997		1767	3420			1717			1738	
Flt Permitted		0.73		0.21	1.00			0.80			0.66	
Satd. Flow (perm)		3678		392	3420			1385			1162	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	99	921	56	118	854	151	57	111	138	59	108	74
RTOR Reduction (vph)	0	6	0	0	8	0	0	25	0	0	13	0
Lane Group Flow (vph)	0	1070	0	118	997	0	0	281	0	0	228	0
Confl. Peds. (#/hr)	23		21	21		23	26					26
Confl. Bikes (#/hr)			6			5			1			
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		71.0		84.0	84.0			25.0			25.0	
Effective Green, g (s)		71.0		84.0	84.0			25.0			25.0	
Actuated g/C Ratio		0.59		0.70	0.70			0.21			0.21	
Clearance Time (s)		6.0		5.0	6.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		2176		366	2394			288			242	
v/s Ratio Prot				0.02	c0.29							
v/s Ratio Perm		c0.29		0.20				c0.20			0.20	
v/c Ratio		0.49		0.32	0.42			0.98			0.94	
Uniform Delay, d1		14.1		6.7	7.6			47.2			46.8	
Progression Factor		0.92		0.73	0.48			1.00			1.00	
Incremental Delay, d2		0.1		0.5	0.5			46.3			41.6	
Delay (s)		13.1		5.3	4.1			93.5			88.3	
Level of Service		B		A	A			F			F	
Approach Delay (s)		13.1			4.3			93.5			88.3	
Approach LOS		B			A			F			F	

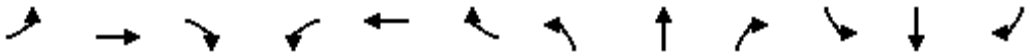
Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	808	95	114	797	8	137	146	140	13	31	35
Future Volume (veh/h)	40	808	95	114	797	8	137	146	140	13	31	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.95	1.00		0.95	0.98		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	851	85	120	839	7	144	154	128	14	33	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	2657	263	397	2310	19	174	150	118	110	241	52
Arrive On Green	0.64	0.64	0.64	0.85	0.85	0.85	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	150	4152	411	596	3610	30	505	598	474	259	966	209
Grp Volume(v), veh/h	333	319	326	120	413	433	426	0	0	55	0	0
Grp Sat Flow(s),veh/h/ln	1587	1549	1576	596	1777	1863	1577	0	0	1434	0	0
Q Serve(g_s), s	0.0	9.3	9.4	7.5	5.0	5.0	22.7	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	7.8	9.3	9.4	16.9	5.0	5.0	25.0	0.0	0.0	2.3	0.0	0.0
Prop In Lane	0.13		0.26	1.00		0.02	0.34		0.30	0.25		0.15
Lane Grp Cap(c), veh/h	1056	991	1009	397	1137	1192	442	0	0	404	0	0
V/C Ratio(X)	0.32	0.32	0.32	0.30	0.36	0.36	0.96	0.00	0.00	0.14	0.00	0.00
Avail Cap(c_a), veh/h	1056	991	1009	397	1137	1192	442	0	0	404	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.78	0.78	0.94	0.94	0.94	0.14	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.9	8.2	8.2	5.7	3.1	3.1	38.3	0.0	0.0	29.0	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.7	0.7	1.8	0.8	0.8	9.1	0.0	0.0	0.2	0.0	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	3.1	3.0	3.1	0.8	1.6	1.7	11.7	0.0	0.0	1.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.5	8.8	8.8	7.5	3.9	3.9	47.3	0.0	0.0	29.2	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	A	C	A	A
Approach Vol, veh/h		978			966			426			55	
Approach Delay, s/veh		8.7			4.3			47.3			29.2	
Approach LOS		A			A			D			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	70.0	30.0	70.0	30.0
Change Period (Y+Rc), s	6.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	64.0	25.0	64.0	25.0
Max Q Clear Time (g_c+I1), s	11.4	4.3	18.9	27.0
Green Ext Time (p_c), s	17.0	0.2	16.7	0.0

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	153	875	34	22	971	241	44	36	22	137	13	51
Future Volume (vph)	153	875	34	22	971	241	44	36	22	137	13	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0			6.0			5.0			5.0	
Lane Util. Factor	1.00	0.95			0.91			1.00			1.00	
Frpb, ped/bikes	1.00	1.00			0.98			0.99			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			0.97	
Frt	1.00	0.99			0.97			0.97			0.97	
Flt Protected	0.95	1.00			1.00			0.98			0.97	
Satd. Flow (prot)	1768	3481			4841			1745			1689	
Flt Permitted	0.16	1.00			0.91			0.82			0.71	
Satd. Flow (perm)	303	3481			4389			1462			1237	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	159	911	35	23	1011	251	46	38	23	143	14	53
RTOR Reduction (vph)	0	1	0	0	38	0	0	8	0	0	11	0
Lane Group Flow (vph)	159	945	0	0	1247	0	0	99	0	0	199	0
Confl. Peds. (#/hr)	30		23	23		30			39	39		
Confl. Bikes (#/hr)			11			5						
Bus Blockages (#/hr)	0	4	0	0	0	4	0	0	4	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	86.7	86.7			73.1			22.3			22.3	
Effective Green, g (s)	86.7	86.7			73.1			22.3			22.3	
Actuated g/C Ratio	0.72	0.72			0.61			0.19			0.19	
Clearance Time (s)	5.0	6.0			6.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	323	2515			2673			271			229	
v/s Ratio Prot	c0.04	0.27										
v/s Ratio Perm	c0.32				0.28			0.07			c0.16	
v/c Ratio	0.49	0.38			0.47			0.36			0.87	
Uniform Delay, d1	6.8	6.3			12.8			42.7			47.5	
Progression Factor	2.24	0.43			0.86			1.00			1.00	
Incremental Delay, d2	1.0	0.4			0.1			0.8			28.2	
Delay (s)	16.2	3.1			11.1			43.5			75.7	
Level of Service	B	A			B			D			E	
Approach Delay (s)		5.0			11.1			43.5			75.7	
Approach LOS		A			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	781	129	55	832	40	71	178	129	17	43	16
Future Volume (veh/h)	51	781	129	55	832	40	71	178	129	17	43	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	1.00		0.96	0.97		0.96	0.99		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	822	122	58	876	37	75	187	116	18	45	6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	462	1976	293	184	2680	113	108	214	124	106	245	29
Arrive On Green	0.85	0.85	0.85	1.00	1.00	1.00	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	608	3083	457	220	4182	176	261	860	496	244	982	117
Grp Volume(v), veh/h	54	474	470	303	325	343	378	0	0	69	0	0
Grp Sat Flow(s),veh/h/ln	608	1777	1763	1395	1549	1633	1617	0	0	1343	0	0
Q Serve(g_s), s	1.5	6.1	6.1	0.0	0.0	0.0	18.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.5	6.1	6.1	0.0	0.0	0.0	22.9	0.0	0.0	2.9	0.0	0.0
Prop In Lane	1.00		0.26	0.19		0.11	0.20		0.31	0.26		0.09
Lane Grp Cap(c), veh/h	462	1139	1130	937	993	1047	446	0	0	380	0	0
V/C Ratio(X)	0.12	0.42	0.42	0.32	0.33	0.33	0.85	0.00	0.00	0.18	0.00	0.00
Avail Cap(c_a), veh/h	462	1139	1130	937	993	1047	447	0	0	381	0	0
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.94	0.94	0.93	0.93	0.93	0.89	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	2.8	3.1	3.1	0.0	0.0	0.0	36.6	0.0	0.0	29.3	0.0	0.0
Incr Delay (d2), s/veh	0.5	1.1	1.1	0.9	0.8	0.8	12.8	0.0	0.0	0.2	0.0	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	0.2	1.9	1.9	0.2	0.2	0.2	10.4	0.0	0.0	1.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.2	4.2	4.2	0.9	0.8	0.8	49.4	0.0	0.0	29.5	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	A	C	A	A
Approach Vol, veh/h		998			971			378			69	
Approach Delay, s/veh		4.1			0.8			49.4			29.5	
Approach LOS		A			A			D			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	70.1	29.9	70.1	29.9
Change Period (Y+Rc), s	6.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	64.0	25.0	64.0	25.0
Max Q Clear Time (g_c+I1), s	8.1	4.9	2.0	24.9
Green Ext Time (p_c), s	18.7	0.3	17.9	0.0

Intersection Summary	
HCM 6th Ctrl Delay	10.6
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	2828	21	34	2243	346	27	30	48	321	18	264
Future Volume (veh/h)	250	2828	21	34	2243	346	27	30	48	321	18	264
Initial Q (Qb), veh	0	0	0	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	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	269	3041	0	37	2412	0	29	32	0	359	0	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	312	3657		48	3333		44	54		461	0	
Arrive On Green	0.09	0.72	0.00	0.03	0.65	0.00	0.03	0.03	0.00	0.13	0.00	0.00
Sat Flow, veh/h	3456	5274	0	1781	5106	1585	1591	2070	0	3563	0	1560
Grp Volume(v), veh/h	269	3041	0	37	2412	0	33	28	0	359	0	0
Grp Sat Flow(s),veh/h/ln	1728	1702	0	1781	1702	1585	1791	1777	0	1781	0	1560
Q Serve(g_s), s	15.4	83.6	0.0	4.1	62.2	0.0	3.6	3.2	0.0	19.5	0.0	0.0
Cycle Q Clear(g_c), s	15.4	83.6	0.0	4.1	62.2	0.0	3.6	3.2	0.0	19.5	0.0	0.0
Prop In Lane	1.00		0.00	1.00		1.00	0.89		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	312	3657		48	3333		49	49		461	0	
V/C Ratio(X)	0.86	0.83		0.77	0.72		0.66	0.58		0.78	0.00	
Avail Cap(c_a), veh/h	518	3657		134	3333		90	89		623	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.28	0.28	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	89.7	19.9	0.0	96.7	22.8	0.0	96.3	96.1	0.0	84.3	0.0	0.0
Incr Delay (d2), s/veh	2.4	0.7	0.0	22.8	1.4	0.0	14.3	10.5	0.0	4.4	0.0	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	7.0	30.8	0.0	2.2	24.4	0.0	1.9	1.6	0.0	9.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.1	20.6	0.0	119.5	24.2	0.0	110.7	106.7	0.0	88.7	0.0	0.0
LnGrp LOS	F	C		F	C		F	F		F	A	
Approach Vol, veh/h		3310			2449			61			359	
Approach Delay, s/veh		26.4			25.7			108.8			88.7	
Approach LOS		C			C			F			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.4	148.2		30.9	23.1	135.6		10.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	15.0	120.0		35.0	30.0	105.0		10.0				
Max Q Clear Time (g_c+I1), s	6.1	85.6		21.5	17.4	64.2		5.6				
Green Ext Time (p_c), s	0.0	30.7		1.1	0.7	28.1		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	30.5
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

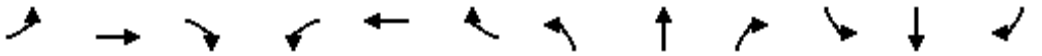
Intersection	
Int Delay, s/veh	6.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	42	122	672	165	91	628
Future Vol, veh/h	42	122	672	165	91	628
Conflicting Peds, #/hr	10	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	140	772	190	105	722

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1450	483	0	0	964	0
Stage 1	869	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	122	530	-	-	710	-
Stage 1	371	-	-	-	-	-
Stage 2	522	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	91	529	-	-	709	-
Mov Cap-2 Maneuver	91	-	-	-	-	-
Stage 1	370	-	-	-	-	-
Stage 2	389	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	61.1	0	2.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	237	709	-
HCM Lane V/C Ratio	-	-	0.795	0.148	-
HCM Control Delay (s)	-	-	61.1	11	1
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	5.9	0.5	-



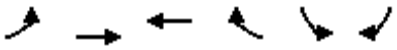
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	378	407	236	773	6	562	0	683	0	0	0
Future Volume (veh/h)	7	378	407	236	773	6	562	0	683	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.95	1.00		0.96			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	7	386	193	241	789	6	573	0	303			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	15	1770	747	269	2296	17	804	0	338			
Arrive On Green	0.01	0.83	0.83	0.15	0.64	0.64	0.23	0.00	0.23			
Sat Flow, veh/h	1781	3554	1500	1781	3584	27	3563	0	1500			
Grp Volume(v), veh/h	7	386	193	241	391	404	573	0	303			
Grp Sat Flow(s),veh/h/ln	1781	1777	1500	1781	1777	1834	1781	0	1500			
Q Serve(g_s), s	0.5	2.7	3.3	15.9	12.2	12.2	17.8	0.0	23.5			
Cycle Q Clear(g_c), s	0.5	2.7	3.3	15.9	12.2	12.2	17.8	0.0	23.5			
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00			
Lane Grp Cap(c), veh/h	15	1770	747	269	1138	1175	804	0	338			
V/C Ratio(X)	0.45	0.22	0.26	0.89	0.34	0.34	0.71	0.00	0.90			
Avail Cap(c_a), veh/h	74	1770	747	371	1138	1175	891	0	375			
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.93	0.93	0.93	1.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	58.8	5.3	5.3	50.0	9.9	9.9	42.9	0.0	45.1			
Incr Delay (d2), s/veh	7.0	0.3	0.8	15.3	0.8	0.8	2.4	0.0	21.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.2	1.0	1.1	8.2	4.8	5.0	8.1	0.0	20.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.9	5.5	6.1	65.3	10.8	10.7	45.3	0.0	66.9			
LnGrp LOS	E	A	A	E	B	B	D	A	E			
Approach Vol, veh/h		586			1036			876				
Approach Delay, s/veh		6.5			23.4			52.8				
Approach LOS		A			C			D				

Timer - Assigned Phs	1	2		4	5	6			
Phs Duration (G+Y+Rc), s	23.1	64.8		32.1	6.0	81.9			
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0			
Max Green Setting (Gmax), s	25.0	50.0		30.0	5.0	70.0			
Max Q Clear Time (g_c+I1), s	17.9	5.3		25.5	2.5	14.2			
Green Ext Time (p_c), s	0.2	7.6		1.5	0.0	13.0			

Intersection Summary			
HCM 6th Ctrl Delay		29.7	
HCM 6th LOS		C	

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	526	816	299	116	154
Future Volume (veh/h)	95	526	816	299	116	154
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.96	1.00	0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	108	598	927	225	132	117
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	361	2297	2575	1100	151	134
Arrive On Green	1.00	1.00	0.72	0.72	0.18	0.18
Sat Flow, veh/h	405	3323	3647	1518	861	763
Grp Volume(v), veh/h	125	581	927	225	250	0
Grp Sat Flow(s),veh/h/ln	477	1549	1777	1518	1631	0
Q Serve(g_s), s	4.4	0.0	9.7	4.8	14.9	0.0
Cycle Q Clear(g_c), s	14.1	0.0	9.7	4.8	14.9	0.0
Prop In Lane	0.86			1.00	0.53	0.47
Lane Grp Cap(c), veh/h	413	2245	2575	1100	286	0
V/C Ratio(X)	0.30	0.26	0.36	0.20	0.87	0.00
Avail Cap(c_a), veh/h	413	2245	2575	1100	408	0
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	1.00	1.00	0.75	0.00
Uniform Delay (d), s/veh	0.9	0.0	5.1	4.4	40.2	0.0
Incr Delay (d2), s/veh	1.7	0.3	0.4	0.4	10.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.1	3.1	1.4	6.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	2.6	0.3	5.5	4.9	51.0	0.0
LnGrp LOS	A	A	A	A	D	A
Approach Vol, veh/h		706	1152		250	
Approach Delay, s/veh		0.7	5.4		51.0	
Approach LOS		A	A		D	

Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	77.5				77.5	22.5
Change Period (Y+Rc), s	5.0				5.0	5.0
Max Green Setting (Gmax), s	65.0				65.0	25.0
Max Q Clear Time (g_c+I1), s	11.7				16.1	16.9
Green Ext Time (p_c), s	9.7				7.3	0.5

Intersection Summary		
HCM 6th Ctrl Delay	9.2	
HCM 6th LOS	A	

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	298	1348	124	43	683	54	246	95	56	58	213	457
Future Volume (veh/h)	298	1348	124	43	683	54	246	95	56	58	213	457
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.98	0.97		0.93	0.95		0.93
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	310	1404	123	45	711	50	256	99	44	60	222	243
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	223	2806	246	58	2432	170	139	336	149	104	349	414
Arrive On Green	0.13	0.59	0.59	0.03	0.50	0.50	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1781	4736	415	1781	4864	340	904	1195	531	272	1240	1472
Grp Volume(v), veh/h	310	1009	518	45	496	265	256	0	143	282	0	243
Grp Sat Flow(s),veh/h/ln	1781	1702	1747	1781	1702	1800	904	0	1726	1512	0	1472
Q Serve(g_s), s	20.0	27.5	27.5	4.0	13.7	13.8	16.6	0.0	10.4	18.0	0.0	22.7
Cycle Q Clear(g_c), s	20.0	27.5	27.5	4.0	13.7	13.8	45.0	0.0	10.4	28.4	0.0	22.7
Prop In Lane	1.00		0.24	1.00		0.19	1.00		0.31	0.21		1.00
Lane Grp Cap(c), veh/h	223	2017	1035	58	1702	900	139	0	486	453	0	414
V/C Ratio(X)	1.39	0.50	0.50	0.78	0.29	0.29	1.85	0.00	0.29	0.62	0.00	0.59
Avail Cap(c_a), veh/h	223	2017	1035	111	1702	900	139	0	486	453	0	414
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.81	0.81	0.81	0.96	0.00	0.96	1.00	0.00	1.00
Uniform Delay (d), s/veh	70.0	18.9	18.9	76.8	23.4	23.4	74.4	0.0	45.1	52.4	0.0	49.5
Incr Delay (d2), s/veh	201.6	0.9	1.7	16.1	0.4	0.7	406.2	0.0	0.3	2.6	0.0	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.7	11.3	11.9	2.1	5.8	6.2	21.4	0.0	4.6	10.7	0.0	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	271.6	19.8	20.6	92.9	23.8	24.1	480.6	0.0	45.4	55.0	0.0	51.7
LnGrp LOS	F	B	C	F	C	C	F	A	D	E	A	D
Approach Vol, veh/h		1837			806			399			525	
Approach Delay, s/veh		62.5			27.7			324.6			53.5	
Approach LOS		E			C			F			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	35.0	85.0		50.0	10.2	99.8		50.0
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	30.0	80.0		45.0	10.0	90.0		45.0
Max Q Clear Time (g_c+I1), s	22.0	15.8		47.0	6.0	29.5		30.4
Green Ext Time (p_c), s	0.0	6.4		0.0	0.0	18.2		2.4

Intersection Summary	
HCM 6th Ctrl Delay	82.6
HCM 6th LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	674	38	660	1145	333	0	578	695	188	342	44
Future Volume (veh/h)	0	674	38	660	1145	333	0	578	695	188	342	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.88	1.00		1.00	1.00		0.98	1.00		0.85
Parking Bus, Adj	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	688	35	538	1357	0	0	527	685	192	349	39
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	2	2	2	2	2	0	2	2	2	2	2
Cap, veh/h	0	1087	55	523	3051		0	449	1673	202	1244	137
Arrive On Green	0.00	0.22	0.22	0.29	0.55	0.00	0.00	0.24	0.24	0.11	0.39	0.39
Sat Flow, veh/h	0	5109	249	1781	5581	0	0	1870	3097	1781	3217	354
Grp Volume(v), veh/h	0	472	251	538	1357	0	0	527	685	192	201	187
Grp Sat Flow(s),veh/h/ln	0	1702	1786	1781	1860	0	0	1870	1548	1781	1870	1700
Q Serve(g_s), s	0.0	18.8	19.1	44.0	21.8	0.0	0.0	36.0	0.0	16.1	11.0	11.4
Cycle Q Clear(g_c), s	0.0	18.8	19.1	44.0	21.8	0.0	0.0	36.0	0.0	16.1	11.0	11.4
Prop In Lane	0.00		0.14	1.00		0.00	0.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	0	749	393	523	3051		0	449	1673	202	723	657
V/C Ratio(X)	0.00	0.63	0.64	1.03	0.44		0.00	1.17	0.41	0.95	0.28	0.29
Avail Cap(c_a), veh/h	0	749	393	523	3051		0	449	1673	202	723	657
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.84	0.84	0.00	0.00	0.96	0.96	0.82	0.82	0.82
Uniform Delay (d), s/veh	0.0	53.0	53.1	53.0	20.4	0.0	0.0	57.0	20.8	66.1	31.6	31.7
Incr Delay (d2), s/veh	0.0	4.0	7.7	43.9	0.4	0.0	0.0	98.9	0.2	43.9	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	8.5	9.5	26.0	9.7	0.0	0.0	29.1	14.3	9.8	5.1	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	57.0	60.8	96.9	20.8	0.0	0.0	155.9	21.0	109.9	31.8	31.9
LnGrp LOS	A	E	E	F	C		A	F	C	F	C	C
Approach Vol, veh/h		723			1895			1212			580	
Approach Delay, s/veh		58.3			42.4			79.6			57.7	
Approach LOS		E			D			E			E	

Timer - Assigned Phs	2	4	5	6	7	8
Phs Duration (G+Y+Rc), s	87.0	63.0	49.0	38.0	22.0	41.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	82.0	58.0	44.0	33.0	17.0	36.0
Max Q Clear Time (g_c+I1), s	23.8	13.4	46.0	21.1	18.1	38.0
Green Ext Time (p_c), s	29.6	2.6	0.0	5.8	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	57.2
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.
User approved changes to right turn type.
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	351	1003	118	158	459	112	140	616	113	131	327	143
Future Volume (veh/h)	351	1003	118	158	459	112	140	616	113	131	327	143
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.93	1.00		0.91	1.00		0.92
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	366	1045	116	165	478	92	146	642	108	136	341	115
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	334	1997	221	189	1505	280	111	734	123	157	693	228
Arrive On Green	0.19	0.43	0.43	0.11	0.35	0.35	0.06	0.25	0.25	0.09	0.27	0.27
Sat Flow, veh/h	1781	4604	510	1781	4267	793	1781	2973	499	1781	2545	837
Grp Volume(v), veh/h	366	772	389	165	378	192	146	383	367	136	235	221
Grp Sat Flow(s),veh/h/ln	1781	1702	1710	1781	1702	1656	1781	1777	1695	1781	1777	1604
Q Serve(g_s), s	30.0	26.6	26.7	14.6	12.9	13.6	10.0	33.1	33.3	12.1	17.8	18.6
Cycle Q Clear(g_c), s	30.0	26.6	26.7	14.6	12.9	13.6	10.0	33.1	33.3	12.1	17.8	18.6
Prop In Lane	1.00		0.30	1.00		0.48	1.00		0.29	1.00		0.52
Lane Grp Cap(c), veh/h	334	1477	742	189	1201	584	111	439	419	157	484	437
V/C Ratio(X)	1.10	0.52	0.52	0.87	0.31	0.33	1.31	0.87	0.88	0.87	0.49	0.50
Avail Cap(c_a), veh/h	334	1477	742	445	1201	584	111	555	530	167	611	552
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	1.00	1.00	1.00	0.09	0.09	0.09	0.98	0.98	0.98
Uniform Delay (d), s/veh	65.0	33.2	33.2	70.4	37.7	37.9	75.0	57.8	57.9	72.1	48.8	49.1
Incr Delay (d2), s/veh	73.5	1.1	2.2	11.5	0.7	1.5	146.0	1.3	1.4	33.7	0.7	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	20.5	11.3	11.7	7.3	5.6	5.9	9.1	15.1	14.5	7.0	8.1	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	138.5	34.3	35.4	82.0	38.4	39.4	221.0	59.1	59.3	105.8	49.6	50.0
LnGrp LOS	F	C	D	F	D	D	F	E	E	F	D	D
Approach Vol, veh/h		1527			735			896			592	
Approach Delay, s/veh		59.6			48.4			85.6			62.6	
Approach LOS		E			D			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.0	74.4	15.0	48.6	35.0	61.4	19.1	44.5
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	40.0	35.0	10.0	55.0	30.0	45.0	15.0	50.0
Max Q Clear Time (g_c+I1), s	16.6	28.7	12.0	20.6	32.0	15.6	14.1	35.3
Green Ext Time (p_c), s	0.4	3.8	0.0	3.1	0.0	4.1	0.0	4.2

Intersection Summary	
HCM 6th Ctrl Delay	64.1
HCM 6th LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	437	141	0	0	0	0	547	514	177	476	0
Future Volume (veh/h)	50	437	141	0	0	0	0	547	514	177	476	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.95	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.98				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	53	465	0				0	582	436	188	506	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	59	514					0	1782	755	386	2137	0
Arrive On Green	0.31	0.31	0.00				0.00	0.50	0.50	0.05	0.60	0.00
Sat Flow, veh/h	190	1670	1560				0	3647	1507	1781	3647	0
Grp Volume(v), veh/h	518	0	0				0	582	436	188	506	0
Grp Sat Flow(s),veh/h/ln	1861	0	1560				0	1777	1507	1781	1777	0
Q Serve(g_s), s	29.4	0.0	0.0				0.0	10.7	22.3	5.5	7.3	0.0
Cycle Q Clear(g_c), s	29.4	0.0	0.0				0.0	10.7	22.3	5.5	7.3	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	573	0					0	1782	755	386	2137	0
V/C Ratio(X)	0.90	0.00					0.00	0.33	0.58	0.49	0.24	0.00
Avail Cap(c_a), veh/h	711	0					0	1782	755	386	2137	0
HCM Platoon Ratio	1.00	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				0.00	0.26	0.26	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.5	0.0	0.0				0.0	16.4	19.2	12.3	10.2	0.0
Incr Delay (d2), s/veh	13.1	0.0	0.0				0.0	0.1	0.8	1.0	0.3	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
%ile BackOfQ(50%),veh/ln	15.2	0.0	0.0				0.0	4.3	7.8	2.2	2.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.7	0.0	0.0				0.0	16.5	20.1	13.2	10.5	0.0
LnGrp LOS	D	A					A	B	C	B	B	A
Approach Vol, veh/h		518						1018			694	
Approach Delay, s/veh		49.7						18.0			11.2	
Approach LOS		D						B			B	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	11.0	60.2	38.8	71.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	47.0	42.0	58.0
Max Q Clear Time (g_c+I1), s	7.5	24.3	31.4	9.3
Green Ext Time (p_c), s	0.0	6.0	2.5	3.9

Intersection Summary	
HCM 6th Ctrl Delay	23.2
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	34	13	58	35	87	10	35	30	215	62	28
Future Vol, veh/h	12	34	13	58	35	87	10	35	30	215	62	28
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	36	14	61	37	92	11	37	32	226	65	29
Number of Lanes	1	1	0	0	1	0	0	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	2
HCM Control Delay	9	10.6	8.6	10.9
HCM LOS	A	B	A	B

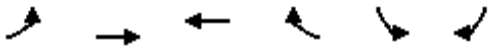
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	22%	0%	100%	0%	32%	100%	0%
Vol Thru, %	78%	0%	0%	72%	19%	0%	69%
Vol Right, %	0%	100%	0%	28%	48%	0%	31%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	45	30	12	47	180	215	90
LT Vol	10	0	12	0	58	215	0
Through Vol	35	0	0	34	35	0	62
RT Vol	0	30	0	13	87	0	28
Lane Flow Rate	47	32	13	49	189	226	95
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.075	0.043	0.022	0.077	0.285	0.364	0.134
Departure Headway (Hd)	5.7	4.881	6.314	5.614	5.409	5.797	5.075
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	623	725	563	633	661	618	701
Service Time	3.487	2.667	4.097	3.396	3.473	3.566	2.843
HCM Lane V/C Ratio	0.075	0.044	0.023	0.077	0.286	0.366	0.136
HCM Control Delay	9	7.9	9.2	8.9	10.6	11.9	8.6
HCM Lane LOS	A	A	A	A	B	B	A
HCM 95th-tile Q	0.2	0.1	0.1	0.2	1.2	1.7	0.5

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	3	18	43	9	99	11	253	44	68	123	13
Future Vol, veh/h	36	3	18	43	9	99	11	253	44	68	123	13
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	4	22	52	11	119	13	305	53	82	148	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.5	10.2	12.9	11
HCM LOS	A	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	63%	28%	33%
Vol Thru, %	82%	5%	6%	60%
Vol Right, %	14%	32%	66%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	308	57	151	204
LT Vol	11	36	43	68
Through Vol	253	3	9	123
RT Vol	44	18	99	13
Lane Flow Rate	371	69	182	246
Geometry Grp	1	1	1	1
Degree of Util (X)	0.508	0.11	0.266	0.353
Departure Headway (Hd)	4.933	5.758	5.271	5.171
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	735	622	680	696
Service Time	2.933	3.801	3.308	3.201
HCM Lane V/C Ratio	0.505	0.111	0.268	0.353
HCM Control Delay	12.9	9.5	10.2	11
HCM Lane LOS	B	A	B	B
HCM 95th-tile Q	2.9	0.4	1.1	1.6



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	228	1257	494	47	0	1246
Future Volume (vph)	228	1257	494	47	0	1246
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	1.00	0.91	0.95			0.64
Frpb, ped/bikes	1.00	1.00	0.99			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	1.00	0.99			0.85
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	5085	3468			4053
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	5085	3468			4053
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	235	1296	509	48	0	1285
RTOR Reduction (vph)	0	0	8	0	0	48
Lane Group Flow (vph)	235	1296	549	0	0	1237
Confl. Peds. (#/hr)	67			67	119	
Confl. Bikes (#/hr)				1		4
Turn Type	Prot	NA	NA			Over
Protected Phases	6	6 4	4			6
Permitted Phases						
Actuated Green, G (s)	55.3	90.0	24.7			55.3
Effective Green, g (s)	55.3	90.0	24.7			55.3
Actuated g/C Ratio	0.61	1.00	0.27			0.61
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	1087	5085	951			2490
v/s Ratio Prot	0.13	0.25	c0.16			c0.31
v/s Ratio Perm						
v/c Ratio	0.22	0.25	0.58			0.50
Uniform Delay, d1	7.7	0.0	28.1			9.6
Progression Factor	1.00	1.00	1.00			1.64
Incremental Delay, d2	0.5	0.0	0.9			0.7
Delay (s)	8.2	0.0	29.0			16.5
Level of Service	A	A	C			B
Approach Delay (s)		1.3	29.0		16.5	
Approach LOS		A	C		B	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	66	1484	159	75	224	0	0	65	1
Future Volume (veh/h)	0	0	0	66	1484	159	75	224	0	0	65	1
Initial Q (Qb), veh				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
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1870	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				73	1649	161	83	249	0	0	72	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				178	4313	432	149	366	0	0	527	
Arrive On Green				0.72	0.72	0.72	0.15	0.15	0.00	0.00	0.15	0.00
Sat Flow, veh/h				247	5975	599	651	2556	0	0	3741	0
Grp Volume(v), veh/h				549	865	469	176	156	0	0	72	0
Grp Sat Flow(s),veh/h/ln				1858	1609	1746	1505	1617	0	0	1777	0
Q Serve(g_s), s				11.7	10.2	10.2	9.7	9.1	0.0	0.0	1.8	0.0
Cycle Q Clear(g_c), s				11.7	10.2	10.2	11.5	9.1	0.0	0.0	1.8	0.0
Prop In Lane				0.13		0.34	0.47		0.00	0.00		0.00
Lane Grp Cap(c), veh/h				1341	2322	1261	276	240	0	0	527	
V/C Ratio(X)				0.41	0.37	0.37	0.64	0.65	0.00	0.00	0.14	
Avail Cap(c_a), veh/h				1341	2322	1261	420	388	0	0	853	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				5.5	5.3	5.3	41.4	40.1	0.0	0.0	37.0	0.0
Incr Delay (d2), s/veh				0.9	0.5	0.8	2.5	3.0	0.0	0.0	0.1	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
%ile BackOfQ(50%),veh/ln				4.1	3.0	3.4	4.3	3.8	0.0	0.0	0.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				6.4	5.8	6.1	43.8	43.1	0.0	0.0	37.1	0.0
LnGrp LOS				A	A	A	D	D	A	A	D	
Approach Vol, veh/h					1883			332			72	
Approach Delay, s/veh					6.0			43.5			37.1	
Approach LOS					A			D			D	

Timer - Assigned Phs	2	4			8			
Phs Duration (G+Y+Rc), s	79.2	20.8			20.8			
Change Period (Y+Rc), s	7.0	6.0			6.0			
Max Green Setting (Gmax), s	63.0	24.0			24.0			
Max Q Clear Time (g_c+I1), s	13.7	13.5			3.8			
Green Ext Time (p_c), s	37.0	1.4			0.3			

Intersection Summary		
HCM 6th Ctrl Delay	12.5	
HCM 6th LOS	B	

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	12.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	2754	131	0	103
Future Vol, veh/h	0	0	2754	131	0	103
Conflicting Peds, #/hr	7	0	0	7	3	6
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	1	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	3060	146	0	114

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	-	1616
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	~ 79
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	~ 78
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	SB
HCM Control Delay, s	0	$ 360.1
HCM LOS		F

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	78
HCM Lane V/C Ratio	-	-	1.467
HCM Control Delay (s)	-	-	$ 360.1
HCM Lane LOS	-	-	F
HCM 95th %tile Q(veh)	-	-	9.2

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

Intersection	
Int Delay, s/veh	9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	95	316	505	0	0	129
Future Vol, veh/h	95	316	505	0	0	129
Conflicting Peds, #/hr	18	1	0	73	73	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	106	351	561	0	0	143

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	722	562	0	-	-	-
Stage 1	561	-	-	-	-	-
Stage 2	161	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	394	526	-	0	0	-
Stage 1	571	-	-	0	0	-
Stage 2	868	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	387	525	-	-	-	-
Mov Cap-2 Maneuver	387	-	-	-	-	-
Stage 1	571	-	-	-	-	-
Stage 2	853	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	387	525	-
HCM Lane V/C Ratio	-	0.273	0.669	-
HCM Control Delay (s)	-	17.8	24.6	-
HCM Lane LOS	-	C	C	-
HCM 95th %tile Q(veh)	-	1.1	4.9	-



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1217	128	4	25	592	272
Future Volume (veh/h)	1217	128	4	25	592	272
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.94	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1255	117	4	26	610	235
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	3539	1030	190	1635	731	330
Arrive On Green	0.69	0.69	0.69	0.69	0.21	0.21
Sat Flow, veh/h	5274	1486	212	2444	3456	1560
Grp Volume(v), veh/h	1255	117	15	15	610	235
Grp Sat Flow(s),veh/h/ln	1702	1486	953	1617	1728	1560
Q Serve(g_s), s	10.5	2.8	0.1	0.3	17.7	14.7
Cycle Q Clear(g_c), s	10.5	2.8	10.6	0.3	17.7	14.7
Prop In Lane		1.00	0.26		1.00	1.00
Lane Grp Cap(c), veh/h	3539	1030	704	1121	731	330
V/C Ratio(X)	0.35	0.11	0.02	0.01	0.83	0.71
Avail Cap(c_a), veh/h	3539	1030	704	1121	987	446
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.98	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.6	5.4	5.1	5.0	39.6	38.4
Incr Delay (d2), s/veh	0.3	0.2	0.1	0.0	4.7	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.8	0.1	0.1	7.9	5.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.8	5.6	5.2	5.0	44.3	41.8
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h	1372			30	845	
Approach Delay, s/veh	6.7			5.1	43.6	
Approach LOS	A			A	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		77.8		27.2		77.8
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		65.0		30.0		65.0
Max Q Clear Time (g_c+I1), s		12.6		19.7		12.5
Green Ext Time (p_c), s		0.3		2.5		27.2

Intersection Summary		
HCM 6th Ctrl Delay		20.6
HCM 6th LOS		C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	1372	45	0	0	0	0	185	51	46	62	0
Future Volume (veh/h)	51	1372	45	0	0	0	0	185	51	46	62	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.92				1.00		0.90	0.95		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	55	1475	45				0	199	29	49	67	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	1308	3748	1074				0	319	244	148	319	0
Arrive On Green	1.00	1.00	1.00				0.00	0.17	0.17	0.17	0.17	0.00
Sat Flow, veh/h	1781	5106	1463				0	1870	1428	1100	1870	0
Grp Volume(v), veh/h	55	1475	45				0	199	29	49	67	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1463				0	1870	1428	1100	1870	0
Q Serve(g_s), s	0.0	0.0	0.0				0.0	10.4	1.8	4.5	3.2	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0				0.0	10.4	1.8	14.9	3.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1308	3748	1074				0	319	244	148	319	0
V/C Ratio(X)	0.04	0.39	0.04				0.00	0.62	0.12	0.33	0.21	0.00
Avail Cap(c_a), veh/h	1308	3748	1074				0	534	408	274	534	0
HCM Platoon Ratio	2.00	2.00	2.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0				0.0	40.4	36.9	47.3	37.4	0.0
Incr Delay (d2), s/veh	0.1	0.3	0.1				0.0	2.0	0.2	1.3	0.3	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
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.0				0.0	4.9	0.6	1.3	1.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.1	0.3	0.1				0.0	42.4	37.1	48.6	37.8	0.0
LnGrp LOS	A	A	A				A	D	D	D	D	A
Approach Vol, veh/h		1575						228			116	
Approach Delay, s/veh		0.3						41.7			42.4	
Approach LOS		A						D			D	

Timer - Assigned Phs	4	6	8
Phs Duration (G+Y+Rc), s	22.9	82.1	22.9
Change Period (Y+Rc), s	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	65.0	30.0
Max Q Clear Time (g_c+I1), s	12.4	2.0	16.9
Green Ext Time (p_c), s	1.1	18.0	0.4

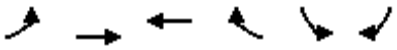
Intersection Summary	
HCM 6th Ctrl Delay	7.7
HCM 6th LOS	A



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	189	71	41	1535	195	58
Future Volume (veh/h)	189	71	41	1535	195	58
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.95	0.98		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	215	49	47	1744	222	9
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2116	469	127	4492	265	236
Arrive On Green	0.74	0.74	0.74	0.74	0.15	0.15
Sat Flow, veh/h	2952	634	113	6307	1781	1585
Grp Volume(v), veh/h	131	133	520	1271	222	9
Grp Sat Flow(s),veh/h/ln	1777	1715	1790	1464	1781	1585
Q Serve(g_s), s	1.9	2.0	0.0	9.5	10.9	0.4
Cycle Q Clear(g_c), s	1.9	2.0	9.0	9.5	10.9	0.4
Prop In Lane		0.37	0.09		1.00	1.00
Lane Grp Cap(c), veh/h	1315	1270	1369	3251	265	236
V/C Ratio(X)	0.10	0.10	0.38	0.39	0.84	0.04
Avail Cap(c_a), veh/h	1315	1270	1369	3251	495	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	1.00	1.00	0.89	0.89
Uniform Delay (d), s/veh	3.3	3.3	4.2	4.3	37.3	32.8
Incr Delay (d2), s/veh	0.2	0.2	0.8	0.4	6.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.6	2.9	2.2	5.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	3.4	3.5	5.0	4.6	43.5	32.9
LnGrp LOS	A	A	A	A	D	C
Approach Vol, veh/h	264			1791	231	
Approach Delay, s/veh	3.4			4.7	43.1	
Approach LOS	A			A	D	

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	71.6			71.6	18.4
Change Period (Y+Rc), s	5.0			5.0	5.0
Max Green Setting (Gmax), s	55.0			55.0	25.0
Max Q Clear Time (g_c+I1), s	4.0			11.5	12.9
Green Ext Time (p_c), s	3.4			32.5	0.5

Intersection Summary		
HCM 6th Ctrl Delay	8.5	
HCM 6th LOS	A	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	136	141	1303	246	82	76
Future Volume (veh/h)	136	141	1303	246	82	76
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.96	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	145	150	1386	234	87	-35
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	177	1563	3777	636	94	84
Arrive On Green	0.10	0.84	0.68	0.68	0.05	0.00
Sat Flow, veh/h	1781	1870	5810	934	1781	1585
Grp Volume(v), veh/h	145	150	1205	415	87	-35
Grp Sat Flow(s),veh/h/ln	1781	1870	1609	1656	1781	1585
Q Serve(g_s), s	7.2	1.3	9.6	9.6	4.4	0.0
Cycle Q Clear(g_c), s	7.2	1.3	9.6	9.6	4.4	0.0
Prop In Lane	1.00			0.56	1.00	1.00
Lane Grp Cap(c), veh/h	177	1563	3285	1127	94	84
V/C Ratio(X)	0.82	0.10	0.37	0.37	0.92	-0.42
Avail Cap(c_a), veh/h	198	1563	3285	1127	495	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.87	0.87	1.00	0.00
Uniform Delay (d), s/veh	39.7	1.3	6.1	6.1	42.4	0.0
Incr Delay (d2), s/veh	21.0	0.1	0.3	0.8	27.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.2	2.8	3.1	2.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	60.7	1.4	6.4	6.9	69.9	0.0
LnGrp LOS	E	A	A	A	E	A
Approach Vol, veh/h		295	1620		52	
Approach Delay, s/veh		30.6	6.5		116.9	
Approach LOS		C	A		F	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	14.0	66.3			80.2	9.8
Change Period (Y+Rc), s	5.0	5.0			5.0	5.0
Max Green Setting (Gmax), s	10.0	40.0			55.0	25.0
Max Q Clear Time (g_c+I1), s	9.2	11.6			3.3	6.4
Green Ext Time (p_c), s	0.0	21.7			1.8	0.2

Intersection Summary	
HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1225	31	34	875	35	46
Future Volume (veh/h)	1225	31	34	875	35	46
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1289	33	36	921	37	48
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	4459	114	108	2696	81	72
Arrive On Green	0.87	0.87	0.87	0.87	0.05	0.05
Sat Flow, veh/h	5288	131	87	3180	1781	1585
Grp Volume(v), veh/h	857	465	471	486	37	48
Grp Sat Flow(s),veh/h/ln	1702	1847	1565	1617	1781	1585
Q Serve(g_s), s	5.2	5.2	0.0	6.7	2.4	3.6
Cycle Q Clear(g_c), s	5.2	5.2	5.2	6.7	2.4	3.6
Prop In Lane		0.07	0.08		1.00	1.00
Lane Grp Cap(c), veh/h	2965	1608	1395	1408	81	72
V/C Ratio(X)	0.29	0.29	0.34	0.35	0.45	0.66
Avail Cap(c_a), veh/h	2965	1608	1395	1408	824	733
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.09	0.09	1.00	1.00
Uniform Delay (d), s/veh	1.3	1.3	1.3	1.4	55.8	56.3
Incr Delay (d2), s/veh	0.2	0.5	0.1	0.1	3.9	9.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.8	0.9	1.0	1.2	1.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	1.6	1.8	1.4	1.5	59.7	66.2
LnGrp LOS	A	A	A	A	E	E
Approach Vol, veh/h	1322			957	85	
Approach Delay, s/veh	1.7			1.4	63.4	
Approach LOS	A			A	E	

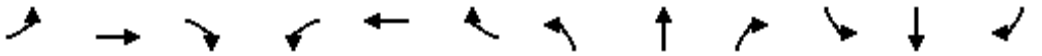
Timer - Assigned Phs	2		4		6
Phs Duration (G+Y+Rc), s	109.5		10.5		109.5
Change Period (Y+Rc), s	5.0		5.0		5.0
Max Green Setting (Gmax), s	54.5		55.5		54.5
Max Q Clear Time (g_c+I1), s	7.2		5.6		8.7
Green Ext Time (p_c), s	23.5		0.3		17.2

Intersection Summary		
HCM 6th Ctrl Delay		3.8
HCM 6th LOS		A

Appendix C: Baseline 2035 Intersection Analysis Worksheets

HCM 6th Signalized Intersection Summary
1: Waiakamilo Rd & N. Nimitz Hwy

06/24/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	4090	33	0	1440	237	32	9	0	335	47	110
Future Volume (veh/h)	81	4090	33	0	1440	237	32	9	0	335	47	110
Initial Q (Qb), veh	0	0	0	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	0.98	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	84	4260	0	0	1500	0	33	9	0	384	0	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	101	4939		0	2437		46	48		451	0	
Arrive On Green	0.06	0.77	0.00	0.00	0.46	0.00	0.03	0.03	0.00	0.13	0.00	0.00
Sat Flow, veh/h	1781	6696	0	0	3741	0	1781	1870	1560	3563	0	1585
Grp Volume(v), veh/h	84	4260	0	0	1500	0	33	9	0	384	0	0
Grp Sat Flow(s),veh/h/ln	1781	1609	0	0	1777	0	1781	1870	1560	1781	0	1585
Q Serve(g_s), s	9.3	91.1	0.0	0.0	63.6	0.0	3.7	0.9	0.0	21.1	0.0	0.0
Cycle Q Clear(g_c), s	9.3	91.1	0.0	0.0	63.6	0.0	3.7	0.9	0.0	21.1	0.0	0.0
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	101	4939		0	2437		46	48		451	0	
V/C Ratio(X)	0.83	0.86		0.00	0.62		0.72	0.19		0.85	0.00	
Avail Cap(c_a), veh/h	223	4939		0	2437		178	187		713	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.72	0.00	1.00	1.00	0.00	0.59	0.00	0.00
Uniform Delay (d), s/veh	93.4	16.0	0.0	0.0	34.2	0.0	96.7	95.3	0.0	85.5	0.0	0.0
Incr Delay (d2), s/veh	15.6	2.2	0.0	0.0	0.8	0.0	18.5	1.8	0.0	3.6	0.0	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	4.7	30.2	0.0	0.0	29.2	0.0	2.0	0.5	0.0	10.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	109.0	18.2	0.0	0.0	35.0	0.0	115.2	97.2	0.0	89.1	0.0	0.0
LnGrp LOS	F	B		A	D		F	F		F	A	
Approach Vol, veh/h		4344			1500			42			384	
Approach Delay, s/veh		20.0			35.0			111.3			89.1	
Approach LOS		B			D			F			F	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		159.5		30.3	16.4	143.2		10.2				
Change Period (Y+Rc), s		6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s		124.0		40.0	25.0	94.0		20.0				
Max Q Clear Time (g_c+I1), s		93.1		23.1	11.3	65.6		5.7				
Green Ext Time (p_c), s		30.8		1.3	0.1	20.7		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	28.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	1204	93	71	404	58	47	159	163	149	448	148
Future Volume (veh/h)	175	1204	93	71	404	58	47	159	163	149	448	148
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		0.97	1.00		1.00	1.00		0.92
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	179	1229	91	72	412	51	48	162	0	152	457	125
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	137	1736	128	92	1566	193	62	638		137	600	162
Arrive On Green	0.08	0.52	0.52	0.02	0.16	0.16	0.03	0.18	0.00	0.08	0.22	0.22
Sat Flow, veh/h	1781	3322	246	1781	3148	387	1781	3647	0	1781	2710	733
Grp Volume(v), veh/h	179	656	664	72	231	232	48	162	0	152	298	284
Grp Sat Flow(s),veh/h/ln	1781	1777	1791	1781	1777	1759	1781	1777	0	1781	1777	1665
Q Serve(g_s), s	10.0	36.4	36.5	5.2	14.8	15.0	3.5	5.1	0.0	10.0	20.4	20.8
Cycle Q Clear(g_c), s	10.0	36.4	36.5	5.2	14.8	15.0	3.5	5.1	0.0	10.0	20.4	20.8
Prop In Lane	1.00		0.14	1.00		0.22	1.00		0.00	1.00		0.44
Lane Grp Cap(c), veh/h	137	929	936	92	884	875	62	638		137	394	369
V/C Ratio(X)	1.31	0.71	0.71	0.78	0.26	0.26	0.77	0.25		1.11	0.76	0.77
Avail Cap(c_a), veh/h	137	929	936	137	884	875	137	929		137	465	436
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.98	0.98	0.98	0.78	0.78	0.00	0.87	0.87	0.87
Uniform Delay (d), s/veh	60.0	23.5	23.5	63.2	33.5	33.6	62.2	45.8	0.0	60.0	47.3	47.5
Incr Delay (d2), s/veh	180.6	4.5	4.5	15.2	0.7	0.7	14.6	0.2	0.0	104.0	5.2	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	11.4	16.1	16.3	2.8	7.2	7.3	1.8	2.3	0.0	8.5	9.6	9.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	240.6	28.0	28.1	78.3	34.2	34.3	76.9	46.0	0.0	164.0	52.5	53.6
LnGrp LOS	F	C	C	E	C	C	E	D		F	D	D
Approach Vol, veh/h		1499			535			210			734	
Approach Delay, s/veh		53.4			40.2			53.1			76.0	
Approach LOS		D			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.7	73.9	9.5	34.8	15.0	70.7	15.0	29.3
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	10.0	54.0	10.0	34.0	10.0	54.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	7.2	38.5	5.5	22.8	12.0	17.0	12.0	7.1
Green Ext Time (p_c), s	0.0	8.2	0.0	2.8	0.0	3.0	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	56.6
HCM 6th LOS	E

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	56	19	13	51	18	2	196	47	29	547	76
Future Volume (veh/h)	45	56	19	13	51	18	2	196	47	29	547	76
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		0.99	1.00		0.97	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	53	66	16	15	60	12	2	231	26	34	644	73
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	276	117	27	194	179	34	144	1657	734	182	1459	162
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.48	0.48	0.48	0.48	0.48	0.48
Sat Flow, veh/h	602	854	196	228	1301	245	6	3472	1537	66	3058	339
Grp Volume(v), veh/h	135	0	0	87	0	0	125	108	26	399	0	352
Grp Sat Flow(s),veh/h/ln	1651	0	0	1773	0	0	1861	1617	1537	1826	0	1637
Q Serve(g_s), s	0.8	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.2	0.0	0.0	3.7
Cycle Q Clear(g_c), s	1.9	0.0	0.0	1.1	0.0	0.0	1.0	1.0	0.2	3.7	0.0	3.7
Prop In Lane	0.39		0.12	0.17		0.14	0.02		1.00	0.09		0.21
Lane Grp Cap(c), veh/h	420	0	0	406	0	0	1029	772	734	1022	0	781
V/C Ratio(X)	0.32	0.00	0.00	0.21	0.00	0.00	0.12	0.14	0.04	0.39	0.00	0.45
Avail Cap(c_a), veh/h	1718	0	0	1810	0	0	6840	5920	5629	6652	0	5994
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.00	1.00
Uniform Delay (d), s/veh	10.4	0.0	0.0	10.1	0.0	0.0	3.8	3.8	3.6	4.5	0.0	4.5
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.3	0.0	0.0	0.1	0.1	0.0	0.2	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.4	0.0	0.0	0.1	0.1	0.0	0.5	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.9	0.0	0.0	10.4	0.0	0.0	3.9	3.9	3.6	4.7	0.0	4.9
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		135			87			259			751	
Approach Delay, s/veh		10.9			10.4			3.8			4.8	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	8.6	17.4	8.6	17.4
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	95.0	25.0	95.0
Max Q Clear Time (g_c+I1), s	3.9	5.7	3.1	3.0
Green Ext Time (p_c), s	0.7	5.7	0.4	1.5

Intersection Summary	
HCM 6th Ctrl Delay	5.7
HCM 6th LOS	A

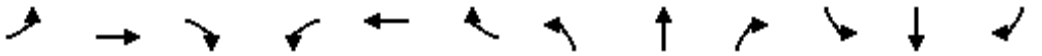
Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	2	10	11	3	25	6	238	23	56	614	13
Future Vol, veh/h	11	2	10	11	3	25	6	238	23	56	614	13
Conflicting Peds, #/hr	10	0	11	8	0	7	11	0	8	7	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	2	11	12	3	27	6	253	24	60	653	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	941	1088	356	744	1083	157	678	0	0	285	0	0
Stage 1	791	791	-	285	285	-	-	-	-	-	-	-
Stage 2	150	297	-	459	798	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	218	214	640	303	216	861	910	-	-	1274	-	-
Stage 1	349	399	-	698	674	-	-	-	-	-	-	-
Stage 2	837	666	-	551	396	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	191	193	627	271	194	846	900	-	-	1264	-	-
Mov Cap-2 Maneuver	191	193	-	271	194	-	-	-	-	-	-	-
Stage 1	343	365	-	687	663	-	-	-	-	-	-	-
Stage 2	793	655	-	492	362	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.4	13.7	0.2	0.9
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	900	-	-	274	456	1264	-	-
HCM Lane V/C Ratio	0.007	-	-	0.089	0.091	0.047	-	-
HCM Control Delay (s)	9	0	-	19.4	13.7	8	0.3	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.3	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	184	961	134	40	344	87	139	311	78	197	890	533
Future Volume (veh/h)	184	961	134	40	344	87	139	311	78	197	890	533
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		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	192	1001	135	42	358	0	145	324	69	205	927	385
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	1508	203	54	1383		164	738	155	225	1023	441
Arrive On Green	0.12	0.48	0.48	0.06	0.78	0.00	0.09	0.25	0.25	0.13	0.29	0.29
Sat Flow, veh/h	1781	3133	422	1781	3618	0	1781	2907	610	1781	3554	1533
Grp Volume(v), veh/h	192	567	569	42	358	0	145	196	197	205	927	385
Grp Sat Flow(s),veh/h/ln	1781	1777	1778	1781	1763	0	1781	1777	1740	1781	1777	1533
Q Serve(g_s), s	19.1	43.8	43.9	4.2	4.9	0.0	14.5	16.7	17.1	20.5	45.2	43.0
Cycle Q Clear(g_c), s	19.1	43.8	43.9	4.2	4.9	0.0	14.5	16.7	17.1	20.5	45.2	43.0
Prop In Lane	1.00		0.24	1.00		0.00	1.00		0.35	1.00		1.00
Lane Grp Cap(c), veh/h	213	856	856	54	1383		164	451	442	225	1023	441
V/C Ratio(X)	0.90	0.66	0.66	0.78	0.26		0.88	0.43	0.45	0.91	0.91	0.87
Avail Cap(c_a), veh/h	302	856	856	84	1383		247	451	442	396	1086	469
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.99	0.99	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	78.2	35.6	35.6	84.0	12.3	0.0	80.8	56.3	56.5	77.7	61.8	60.9
Incr Delay (d2), s/veh	22.3	4.0	4.1	21.0	0.4	0.0	15.3	0.7	0.7	7.8	10.5	15.8
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	10.2	20.2	20.2	2.2	1.9	0.0	7.4	7.7	7.7	9.9	22.0	18.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	100.5	39.6	39.6	105.0	12.8	0.0	96.1	57.0	57.2	85.5	72.3	76.7
LnGrp LOS	F	D	D	F	B		F	E	E	F	E	E
Approach Vol, veh/h		1328			400			538			1517	
Approach Delay, s/veh		48.4			22.4			67.6			75.2	
Approach LOS		D			C			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.9	91.7	27.7	50.7	26.0	75.6	21.6	56.8
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Max Green Setting (Gmax), s	8.5	72.0	40.0	40.0	30.5	50.0	25.0	55.0
Max Q Clear Time (g_c+I1), s	6.2	45.9	22.5	19.1	21.1	6.9	16.5	47.2
Green Ext Time (p_c), s	0.0	8.8	0.3	2.3	0.3	2.6	0.1	4.6

Intersection Summary	
HCM 6th Ctrl Delay	59.1
HCM 6th LOS	E

Notes

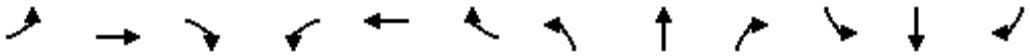
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	943	244	371	0	0	1127
Future Volume (veh/h)	943	244	371	0	0	1127
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	0	0	1870
Adj Flow Rate, veh/h	982	89	386	0	0	1174
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	1121	514	2006	0	0	2006
Arrive On Green	0.32	0.32	0.56	0.00	0.00	0.56
Sat Flow, veh/h	3456	1585	3741	0	0	3741
Grp Volume(v), veh/h	982	89	386	0	0	1174
Grp Sat Flow(s),veh/h/ln	1728	1585	1777	0	0	1777
Q Serve(g_s), s	24.1	3.6	4.8	0.0	0.0	19.3
Cycle Q Clear(g_c), s	24.1	3.6	4.8	0.0	0.0	19.3
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	1121	514	2006	0	0	2006
V/C Ratio(X)	0.88	0.17	0.19	0.00	0.00	0.59
Avail Cap(c_a), veh/h	1344	616	2006	0	0	2006
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	28.7	21.8	9.6	0.0	0.0	12.7
Incr Delay (d2), s/veh	5.9	0.2	0.2	0.0	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.5	1.3	1.8	0.0	0.0	7.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	34.6	21.9	9.8	0.0	0.0	14.0
LnGrp LOS	C	C	A	A	A	B
Approach Vol, veh/h	1071		386			1174
Approach Delay, s/veh	33.5		9.8			14.0
Approach LOS	C		A			B

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	55.8			55.8	34.2
Change Period (Y+Rc), s	5.0			5.0	5.0
Max Green Setting (Gmax), s	45.0			45.0	35.0
Max Q Clear Time (g_c+I1), s	6.8			21.3	26.1
Green Ext Time (p_c), s	2.8			9.6	3.1

Intersection Summary	
HCM 6th Ctrl Delay	21.3
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	1288	35	77	449	71	33	69	102	72	91	33
Future Volume (vph)	63	1288	35	77	449	71	33	69	102	72	91	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.0	6.0			5.0			5.0	
Lane Util. Factor		0.91		1.00	0.95			1.00			1.00	
Frpb, ped/bikes		1.00		1.00	0.99			1.00			0.99	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		1.00		1.00	0.98			0.93			0.98	
Flt Protected		1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)		5044		1770	3428			1719			1775	
Flt Permitted		0.87		0.13	1.00			0.89			0.60	
Satd. Flow (perm)		4392		245	3428			1534			1088	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	66	1356	37	81	473	75	35	73	107	76	96	35
RTOR Reduction (vph)	0	2	0	0	7	0	0	27	0	0	6	0
Lane Group Flow (vph)	0	1457	0	81	541	0	0	188	0	0	201	0
Confl. Peds. (#/hr)			23			24	20					20
Confl. Bikes (#/hr)			1									
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		81.8		94.0	94.0			25.0			25.0	
Effective Green, g (s)		81.8		94.0	94.0			25.0			25.0	
Actuated g/C Ratio		0.63		0.72	0.72			0.19			0.19	
Clearance Time (s)		6.0		5.0	6.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		2763		261	2478			295			209	
v/s Ratio Prot				c0.02	0.16							
v/s Ratio Perm		c0.33		0.21				0.12			c0.19	
v/c Ratio		0.53		0.31	0.22			0.64			0.96	
Uniform Delay, d1		13.4		7.2	5.9			48.3			52.0	
Progression Factor		1.23		1.45	0.45			1.00			1.00	
Incremental Delay, d2		0.1		0.7	0.2			4.4			51.4	
Delay (s)		16.6		11.0	2.8			52.7			103.5	
Level of Service		B		B	A			D			F	
Approach Delay (s)		16.6			3.9			52.7			103.5	
Approach LOS		B			A			D			F	

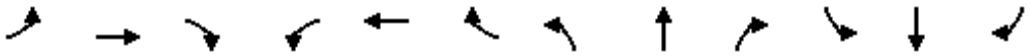
Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	1062	71	115	438	10	64	62	128	18	66	39
Future Volume (veh/h)	38	1062	71	115	438	10	64	62	128	18	66	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.96	1.00		0.94	0.94		0.90	0.96		0.85
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	40	1118	68	121	461	10	67	65	89	19	69	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	121	3214	193	368	2517	55	117	92	105	75	208	54
Arrive On Green	0.71	0.71	0.71	1.00	1.00	1.00	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	109	4534	273	470	3551	77	382	542	623	163	1234	317
Grp Volume(v), veh/h	439	386	402	121	230	241	221	0	0	108	0	0
Grp Sat Flow(s),veh/h/ln	1754	1549	1613	470	1777	1851	1547	0	0	1714	0	0
Q Serve(g_s), s	0.0	8.7	8.7	5.0	0.0	0.0	7.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.0	8.7	8.7	13.6	0.0	0.0	12.3	0.0	0.0	4.9	0.0	0.0
Prop In Lane	0.09		0.17	1.00		0.04	0.30		0.40	0.18		0.19
Lane Grp Cap(c), veh/h	1287	1098	1143	368	1260	1312	313	0	0	337	0	0
V/C Ratio(X)	0.34	0.35	0.35	0.33	0.18	0.18	0.70	0.00	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	1287	1098	1143	368	1260	1312	472	0	0	510	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.59	0.59	0.59	0.98	0.98	0.98	0.69	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.0	5.1	5.1	0.9	0.0	0.0	36.0	0.0	0.0	33.1	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.5	0.5	2.3	0.3	0.3	2.0	0.0	0.0	0.5	0.0	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	2.7	2.4	2.5	0.2	0.1	0.1	4.8	0.0	0.0	2.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.4	5.6	5.6	3.3	0.3	0.3	38.0	0.0	0.0	33.7	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	A	C	A	A
Approach Vol, veh/h		1226			592			221			108	
Approach Delay, s/veh		5.5			0.9			38.0			33.7	
Approach LOS		A			A			D			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	69.8	20.2	69.8	20.2
Change Period (Y+Rc), s	6.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	54.0	25.0	54.0	25.0
Max Q Clear Time (g_c+I1), s	10.7	6.9	15.6	14.3
Green Ext Time (p_c), s	21.1	0.5	9.6	1.0

Intersection Summary	
HCM 6th Ctrl Delay	9.0
HCM 6th LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	213	1206	42	12	536	165	33	14	14	160	23	28
Future Volume (vph)	213	1206	42	12	536	165	33	14	14	160	23	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0			6.0			5.0			5.0	
Lane Util. Factor	1.00	0.95			0.91			1.00			1.00	
Frpb, ped/bikes	1.00	1.00			0.98			0.98			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			0.96	
Frt	1.00	0.99			0.97			0.97			0.98	
Flt Protected	0.95	1.00			1.00			0.97			0.96	
Satd. Flow (prot)	1770	3482			4823			1727			1690	
Flt Permitted	0.33	1.00			0.90			0.83			0.75	
Satd. Flow (perm)	606	3482			4361			1464			1320	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	222	1256	44	12	558	172	34	15	15	167	24	29
RTOR Reduction (vph)	0	1	0	0	49	0	0	8	0	0	4	0
Lane Group Flow (vph)	222	1299	0	0	694	0	0	56	0	0	216	0
Confl. Peds. (#/hr)			30			20			40	40		
Confl. Bikes (#/hr)			3			1						
Bus Blockages (#/hr)	0	4	0	0	0	4	0	0	4	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	95.2	95.2			80.8			23.8			23.8	
Effective Green, g (s)	95.2	95.2			80.8			23.8			23.8	
Actuated g/C Ratio	0.73	0.73			0.62			0.18			0.18	
Clearance Time (s)	5.0	6.0			6.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	527	2549			2710			268			241	
v/s Ratio Prot	0.03	c0.37										
v/s Ratio Perm	0.28				0.16			0.04			c0.16	
v/c Ratio	0.42	0.51			0.26			0.21			0.90	
Uniform Delay, d1	5.7	7.4			11.1			45.1			51.9	
Progression Factor	0.66	0.29			1.04			1.00			1.00	
Incremental Delay, d2	0.5	0.6			0.0			0.4			31.6	
Delay (s)	4.2	2.8			11.5			45.5			83.5	
Level of Service	A	A			B			D			F	
Approach Delay (s)		3.0			11.5			45.5			83.5	
Approach LOS		A			B			D			F	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	994	179	74	514	14	36	60	92	57	129	12
Future Volume (veh/h)	34	994	179	74	514	14	36	60	92	57	129	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	0.99		0.95	0.97		0.95	0.97		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	36	1046	174	78	541	13	38	63	52	60	136	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	688	2189	363	327	2507	61	93	123	86	113	190	13
Arrive On Green	1.00	1.00	1.00	1.00	1.00	1.00	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	843	3035	504	368	3476	85	276	786	547	389	1211	82
Grp Volume(v), veh/h	36	611	609	144	236	253	153	0	0	206	0	0
Grp Sat Flow(s),veh/h/ln	843	1777	1762	726	1549	1654	1608	0	0	1682	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	7.7	0.0	0.0	10.4	0.0	0.0
Prop In Lane	1.00		0.29	0.54		0.05	0.25		0.34	0.29		0.05
Lane Grp Cap(c), veh/h	688	1281	1271	585	1117	1193	302	0	0	315	0	0
V/C Ratio(X)	0.05	0.48	0.48	0.25	0.21	0.21	0.51	0.00	0.00	0.65	0.00	0.00
Avail Cap(c_a), veh/h	688	1281	1271	585	1117	1193	485	0	0	510	0	0
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.92	0.92	0.99	0.99	0.99	0.93	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	35.2	0.0	0.0	36.3	0.0	0.0
Incr Delay (d2), s/veh	0.1	1.2	1.2	1.0	0.4	0.4	1.2	0.0	0.0	2.3	0.0	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	0.0	0.4	0.4	0.2	0.1	0.1	3.2	0.0	0.0	4.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.1	1.2	1.2	1.0	0.4	0.4	36.4	0.0	0.0	38.6	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	A	D	A	A
Approach Vol, veh/h		1256			632			153			206	
Approach Delay, s/veh		1.2			0.5			36.4			38.6	
Approach LOS		A			A			D			D	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	70.9	19.1	70.9	19.1
Change Period (Y+Rc), s	6.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	54.0	25.0	54.0	25.0
Max Q Clear Time (g_c+I1), s	2.0	12.4	2.0	9.7
Green Ext Time (p_c), s	25.5	0.9	10.9	0.7

Intersection Summary	
HCM 6th Ctrl Delay	6.8
HCM 6th LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	4061	40	0	1424	203	17	32	9	243	51	133
Future Volume (veh/h)	124	4061	40	0	1424	203	17	32	9	243	51	133
Initial Q (Qb), veh	0	0	0	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	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	133	4367	0	0	1531	0	18	34	0	300	0	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	173	5004		0	2498		28	59		438	0	
Arrive On Green	0.05	0.78	0.00	0.00	0.70	0.00	0.02	0.02	0.00	0.12	0.00	0.00
Sat Flow, veh/h	3456	6696	0	0	3647	1585	1171	2511	0	3563	0	1560
Grp Volume(v), veh/h	133	4367	0	0	1531	0	28	24	0	300	0	0
Grp Sat Flow(s),veh/h/ln	1728	1609	0	0	1777	1585	1812	1777	0	1781	0	1560
Q Serve(g_s), s	7.6	93.9	0.0	0.0	45.0	0.0	3.0	2.7	0.0	16.1	0.0	0.0
Cycle Q Clear(g_c), s	7.6	93.9	0.0	0.0	45.0	0.0	3.0	2.7	0.0	16.1	0.0	0.0
Prop In Lane	1.00		0.00	0.00		1.00	0.65		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	173	5004		0	2498		44	43		438	0	
V/C Ratio(X)	0.77	0.87		0.00	0.61		0.63	0.56		0.69	0.00	
Avail Cap(c_a), veh/h	605	5004		0	2498		136	133		623	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.30	0.30	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	93.9	15.4	0.0	0.0	15.5	0.0	96.7	96.5	0.0	84.0	0.0	0.0
Incr Delay (d2), s/veh	2.2	0.7	0.0	0.0	1.1	0.0	14.0	10.8	0.0	1.9	0.0	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	8.5	30.2	0.0	0.0	17.8	0.0	1.6	1.4	0.0	7.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	96.1	16.1	0.0	0.0	16.6	0.0	110.7	107.3	0.0	85.9	0.0	0.0
LnGrp LOS	F	B		A	B		F	F		F	A	
Approach Vol, veh/h		4500			1531			52			300	
Approach Delay, s/veh		18.5			16.6			109.1			85.9	
Approach LOS		B			B			F			F	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		160.6		29.6	15.0	145.6		9.9				
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s		135.0		35.0	35.0	95.0		15.0				
Max Q Clear Time (g_c+I1), s		95.9		18.1	9.6	47.0		5.0				
Green Ext Time (p_c), s		39.0		0.9	0.4	15.9		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		21.9
HCM 6th LOS		C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

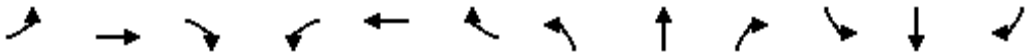
Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	45	97	351	149	90	362
Future Vol, veh/h	45	97	351	149	90	362
Conflicting Peds, #/hr	7	0	0	7	7	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	111	403	171	103	416

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	917	294	0	0	581	0
Stage 1	496	-	-	-	-	-
Stage 2	421	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	271	702	-	-	989	-
Stage 1	577	-	-	-	-	-
Stage 2	630	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	231	697	-	-	982	-
Mov Cap-2 Maneuver	231	-	-	-	-	-
Stage 1	573	-	-	-	-	-
Stage 2	541	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.7	0	2.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	425	982	-
HCM Lane V/C Ratio	-	-	0.384	0.105	-
HCM Control Delay (s)	-	-	18.7	9.1	0.4
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.8	0.4	-



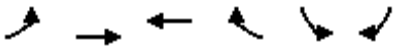
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	740	529	369	409	8	269	3	235	0	0	0
Future Volume (veh/h)	18	740	529	369	409	8	269	3	235	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.97	1.00		0.90			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	18	755	402	377	417	7	276	0	51			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	33	1796	746	397	2517	42	556	0	218			
Arrive On Green	0.02	0.51	0.51	0.22	0.71	0.71	0.16	0.00	0.16			
Sat Flow, veh/h	1781	3554	1477	1781	3545	59	3563	0	1398			
Grp Volume(v), veh/h	18	755	402	377	209	215	276	0	51			
Grp Sat Flow(s),veh/h/ln	1781	1777	1477	1781	1777	1827	1781	0	1398			
Q Serve(g_s), s	1.3	17.3	24.0	27.1	5.0	5.0	9.2	0.0	4.2			
Cycle Q Clear(g_c), s	1.3	17.3	24.0	27.1	5.0	5.0	9.2	0.0	4.2			
Prop In Lane	1.00		1.00	1.00		0.03	1.00		1.00			
Lane Grp Cap(c), veh/h	33	1796	746	397	1262	1298	556	0	218			
V/C Ratio(X)	0.55	0.42	0.54	0.95	0.17	0.17	0.50	0.00	0.23			
Avail Cap(c_a), veh/h	137	1796	746	397	1262	1298	767	0	301			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.85	0.85	0.85	1.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	63.3	20.2	21.8	49.8	6.2	6.2	50.2	0.0	48.1			
Incr Delay (d2), s/veh	4.5	0.6	2.4	31.9	0.3	0.3	0.7	0.0	0.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.6	7.3	8.8	15.6	1.9	1.9	4.2	0.0	3.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.7	20.8	24.2	81.6	6.5	6.5	50.9	0.0	48.6			
LnGrp LOS	E	C	C	F	A	A	D	A	D			
Approach Vol, veh/h		1175			801			327				
Approach Delay, s/veh		22.7			41.9			50.5				
Approach LOS		C			D			D				

Timer - Assigned Phs	1	2		4	5	6			
Phs Duration (G+Y+Rc), s	34.0	70.7		25.3	7.4	97.3			
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0			
Max Green Setting (Gmax), s	29.0	58.0		28.0	10.0	77.0			
Max Q Clear Time (g_c+I1), s	29.1	26.0		11.2	3.3	7.0			
Green Ext Time (p_c), s	0.0	15.8		1.0	0.0	5.8			

Intersection Summary			
HCM 6th Ctrl Delay		33.3	
HCM 6th LOS		C	

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	90	685	426	101	166	161
Future Volume (veh/h)	90	685	426	101	166	161
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99			0.95	1.00	0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	102	778	484	80	189	135
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	352	2629	2376	1005	211	150
Arrive On Green	1.00	1.00	0.67	0.67	0.22	0.22
Sat Flow, veh/h	444	4086	3647	1504	956	683
Grp Volume(v), veh/h	270	610	484	80	325	0
Grp Sat Flow(s),veh/h/ln	1280	1549	1777	1504	1644	0
Q Serve(g_s), s	0.7	0.0	4.7	1.7	17.3	0.0
Cycle Q Clear(g_c), s	5.4	0.0	4.7	1.7	17.3	0.0
Prop In Lane	0.38			1.00	0.58	0.42
Lane Grp Cap(c), veh/h	911	2071	2376	1005	362	0
V/C Ratio(X)	0.30	0.29	0.20	0.08	0.90	0.00
Avail Cap(c_a), veh/h	911	2071	2376	1005	457	0
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.83	1.00	1.00	0.46	0.00
Uniform Delay (d), s/veh	0.0	0.0	5.7	5.2	34.1	0.0
Incr Delay (d2), s/veh	0.7	0.3	0.2	0.2	9.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.1	1.6	0.5	7.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.7	0.3	5.9	5.4	43.2	0.0
LnGrp LOS	A	A	A	A	D	A
Approach Vol, veh/h		880	564		325	
Approach Delay, s/veh		0.4	5.8		43.2	
Approach LOS		A	A		D	

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	65.2			65.2	24.8
Change Period (Y+Rc), s	5.0			5.0	5.0
Max Green Setting (Gmax), s	55.0			55.0	25.0
Max Q Clear Time (g_c+I1), s	6.7			7.4	19.3
Green Ext Time (p_c), s	4.0			7.7	0.5

Intersection Summary	
HCM 6th Ctrl Delay	10.0
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	222	1491	174	53	525	61	154	97	50	117	210	470
Future Volume (veh/h)	222	1491	174	53	525	61	154	97	50	117	210	470
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		0.90	0.95		0.85	0.91		0.86
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	231	1553	174	55	547	56	160	101	38	122	219	236
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	255	2413	270	71	1954	196	122	423	159	185	288	470
Arrive On Green	0.14	0.52	0.52	0.04	0.42	0.42	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	1781	4616	516	1781	4663	468	893	1230	463	450	837	1368
Grp Volume(v), veh/h	231	1145	582	55	396	207	160	0	139	341	0	236
Grp Sat Flow(s),veh/h/ln	1781	1702	1728	1781	1702	1727	893	0	1693	1287	0	1368
Q Serve(g_s), s	20.4	38.7	38.8	4.9	12.3	12.6	13.8	0.0	9.4	31.8	0.0	21.9
Cycle Q Clear(g_c), s	20.4	38.7	38.8	4.9	12.3	12.6	55.0	0.0	9.4	41.2	0.0	21.9
Prop In Lane	1.00		0.30	1.00		0.27	1.00		0.27	0.36		1.00
Lane Grp Cap(c), veh/h	255	1780	904	71	1427	724	122	0	582	473	0	470
V/C Ratio(X)	0.90	0.64	0.64	0.78	0.28	0.29	1.31	0.00	0.24	0.72	0.00	0.50
Avail Cap(c_a), veh/h	390	1780	904	167	1427	724	122	0	582	473	0	470
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.94	0.94	0.94	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	67.5	27.4	27.5	76.1	30.6	30.7	75.6	0.0	37.5	51.6	0.0	41.6
Incr Delay (d2), s/veh	17.2	1.8	3.5	15.7	0.5	0.9	186.8	0.0	0.2	5.3	0.0	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	10.6	16.2	17.0	2.6	5.2	5.6	11.4	0.0	4.0	13.3	0.0	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	84.7	29.2	31.0	91.9	31.0	31.6	262.5	0.0	37.7	56.9	0.0	42.5
LnGrp LOS	F	C	C	F	C	C	F	A	D	E	A	D
Approach Vol, veh/h		1958			658			299			577	
Approach Delay, s/veh		36.3			36.3			158.0			51.0	
Approach LOS		D			D			F			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	27.9	72.1		60.0	11.3	88.7		60.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	35.0	55.0		55.0	15.0	75.0		55.0				
Max Q Clear Time (g_c+I1), s	22.4	14.6		57.0	6.9	40.8		43.2				
Green Ext Time (p_c), s	0.5	4.5		0.0	0.0	17.2		2.6				

Intersection Summary	
HCM 6th Ctrl Delay	49.1
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	982	21	381	604	208	0	317	710	394	372	49
Future Volume (veh/h)	0	982	21	381	604	208	0	317	710	394	372	49
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		1.00	1.00		0.98	1.00		0.87
Parking Bus, Adj	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	1002	20	297	745	0	0	323	574	276	556	47
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	2	2	2	2	2	0	2	2	2	2	2
Cap, veh/h	0	1429	28	494	3253		0	312	1395	298	1204	101
Arrive On Green	0.00	0.28	0.28	0.55	1.00	0.00	0.00	0.17	0.17	0.17	0.36	0.36
Sat Flow, veh/h	0	5312	103	1781	5581	0	0	1870	3093	1781	3329	280
Grp Volume(v), veh/h	0	663	359	297	745	0	0	323	574	276	311	292
Grp Sat Flow(s),veh/h/ln	0	1702	1842	1781	1860	0	0	1870	1546	1781	1870	1738
Q Serve(g_s), s	0.0	31.4	31.5	20.1	0.0	0.0	0.0	30.0	0.0	27.5	22.9	23.2
Cycle Q Clear(g_c), s	0.0	31.4	31.5	20.1	0.0	0.0	0.0	30.0	0.0	27.5	22.9	23.2
Prop In Lane	0.00		0.06	1.00		0.00	0.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	0	946	512	494	3253		0	312	1395	298	676	629
V/C Ratio(X)	0.00	0.70	0.70	0.60	0.23		0.00	1.04	0.41	0.93	0.46	0.46
Avail Cap(c_a), veh/h	0	946	512	494	3253		0	312	1395	396	779	724
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.96	0.96	0.00	0.00	0.98	0.98	0.47	0.47	0.47
Uniform Delay (d), s/veh	0.0	58.3	58.3	33.4	0.0	0.0	0.0	75.0	34.0	73.9	44.0	44.1
Incr Delay (d2), s/veh	0.0	4.3	7.8	2.0	0.2	0.0	0.0	60.1	0.2	13.4	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	14.2	15.9	7.6	0.0	0.0	0.0	19.5	14.4	13.8	10.9	10.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	62.6	66.1	35.4	0.2	0.0	0.0	135.1	34.2	87.3	44.2	44.3
LnGrp LOS	A	E	E	D	A		A	F	C	F	D	D
Approach Vol, veh/h		1022			1042			897			879	
Approach Delay, s/veh		63.9			10.2			70.5			57.8	
Approach LOS		E			B			E			E	

Timer - Assigned Phs	2	4	5	6	7	8
Phs Duration (G+Y+Rc), s	109.9	70.1	54.9	55.0	35.1	35.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	95.0	75.0	40.0	50.0	40.0	30.0
Max Q Clear Time (g_c+I1), s	2.0	25.2	22.1	33.5	29.5	32.0
Green Ext Time (p_c), s	13.3	4.3	0.8	9.9	0.6	0.0

Intersection Summary	
HCM 6th Ctrl Delay	49.5
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.
User approved changes to right turn type.
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	350	1096	168	239	364	89	116	415	80	206	490	158
Future Volume (veh/h)	350	1096	168	239	364	89	116	415	80	206	490	158
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.93	1.00		0.82	1.00		0.93
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	365	1142	164	249	379	67	121	432	73	215	510	144
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	278	1831	263	274	1779	302	142	629	105	167	612	172
Arrive On Green	0.16	0.41	0.41	0.15	0.41	0.41	0.08	0.22	0.22	0.09	0.23	0.23
Sat Flow, veh/h	1781	4446	638	1781	4343	738	1781	2922	486	1781	2667	747
Grp Volume(v), veh/h	365	874	432	249	294	152	121	260	245	215	338	316
Grp Sat Flow(s),veh/h/ln	1781	1702	1680	1781	1702	1677	1781	1777	1631	1781	1777	1638
Q Serve(g_s), s	25.0	32.5	32.6	22.0	8.9	9.4	10.7	21.5	22.2	15.0	29.0	29.4
Cycle Q Clear(g_c), s	25.0	32.5	32.6	22.0	8.9	9.4	10.7	21.5	22.2	15.0	29.0	29.4
Prop In Lane	1.00		0.38	1.00		0.44	1.00		0.30	1.00		0.46
Lane Grp Cap(c), veh/h	278	1402	692	274	1394	687	142	383	351	167	408	376
V/C Ratio(X)	1.31	0.62	0.62	0.91	0.21	0.22	0.85	0.68	0.70	1.29	0.83	0.84
Avail Cap(c_a), veh/h	278	1402	692	445	1394	687	167	444	408	167	444	409
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.73	0.73	0.73	1.00	1.00	1.00	0.09	0.09	0.09	0.91	0.91	0.91
Uniform Delay (d), s/veh	67.5	37.2	37.2	66.6	30.5	30.7	72.7	57.7	58.0	72.5	58.7	58.8
Incr Delay (d2), s/veh	157.8	1.5	3.1	14.8	0.3	0.7	3.6	0.3	0.4	164.0	10.7	12.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	28.6	14.0	14.1	11.2	3.8	4.1	5.1	9.8	9.3	14.5	14.3	13.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	225.3	38.8	40.3	81.3	30.9	31.4	76.3	58.0	58.4	236.5	69.4	71.3
LnGrp LOS	F	D	D	F	C	C	E	E	E	F	E	E
Approach Vol, veh/h		1671			695			626			869	
Approach Delay, s/veh		79.9			49.1			61.7			111.4	
Approach LOS		E			D			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	29.6	70.9	17.7	41.7	30.0	70.5	20.0	39.5
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	40.0	45.0	15.0	40.0	25.0	60.0	15.0	40.0
Max Q Clear Time (g_c+I1), s	24.0	34.6	12.7	31.4	27.0	11.4	17.0	24.2
Green Ext Time (p_c), s	0.6	6.2	0.1	2.7	0.0	3.2	0.0	2.8

Intersection Summary	
HCM 6th Ctrl Delay	78.5
HCM 6th LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	364	333	0	0	0	0	461	450	303	672	0
Future Volume (veh/h)	26	364	333	0	0	0	0	461	450	303	672	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.95	0.99		1.00
Parking Bus, Adj	1.00	1.00	0.98				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	28	387	0				0	490	358	322	715	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	31	432					0	1876	797	528	2374	0
Arrive On Green	0.25	0.25	0.00				0.00	0.53	0.53	0.10	0.67	0.00
Sat Flow, veh/h	126	1738	1560				0	3647	1510	1781	3647	0
Grp Volume(v), veh/h	415	0	0				0	490	358	322	715	0
Grp Sat Flow(s),veh/h/ln	1864	0	1560				0	1777	1510	1781	1777	0
Q Serve(g_s), s	25.8	0.0	0.0				0.0	9.1	17.6	9.5	10.0	0.0
Cycle Q Clear(g_c), s	25.8	0.0	0.0				0.0	9.1	17.6	9.5	10.0	0.0
Prop In Lane	0.07		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	464	0					0	1876	797	528	2374	0
V/C Ratio(X)	0.90	0.00					0.00	0.26	0.45	0.61	0.30	0.00
Avail Cap(c_a), veh/h	621	0					0	1876	797	575	2374	0
HCM Platoon Ratio	1.00	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				0.00	0.26	0.26	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.6	0.0	0.0				0.0	15.5	17.5	10.4	8.3	0.0
Incr Delay (d2), s/veh	12.6	0.0	0.0				0.0	0.1	0.5	1.6	0.3	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
%ile BackOfQ(50%),veh/ln	18.4	0.0	0.0				0.0	3.7	6.1	3.8	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.1	0.0	0.0				0.0	15.6	18.0	12.0	8.6	0.0
LnGrp LOS	E	A					A	B	B	B	A	A
Approach Vol, veh/h		415						848			1037	
Approach Delay, s/veh		56.1						16.6			9.7	
Approach LOS		E						B			A	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	16.8	68.4	34.8	85.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.8	50.0	40.0	70.0
Max Q Clear Time (g_c+I1), s	11.5	19.6	27.8	12.0
Green Ext Time (p_c), s	0.4	5.1	2.0	6.0

Intersection Summary	
HCM 6th Ctrl Delay	20.6
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	43	19	45	50	108	9	24	18	124	33	16
Future Vol, veh/h	20	43	19	45	50	108	9	24	18	124	33	16
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	45	20	47	53	114	9	25	19	131	35	17
Number of Lanes	1	1	0	0	1	0	0	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	2
HCM Control Delay	8.6	10.2	8.3	9.7
HCM LOS	A	B	A	A

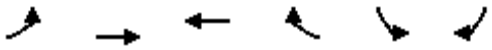
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	27%	0%	100%	0%	22%	100%	0%
Vol Thru, %	73%	0%	0%	69%	25%	0%	67%
Vol Right, %	0%	100%	0%	31%	53%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	33	18	20	62	203	124	49
LT Vol	9	0	20	0	45	124	0
Through Vol	24	0	0	43	50	0	33
RT Vol	0	18	0	19	108	0	16
Lane Flow Rate	35	19	21	65	214	131	52
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.055	0.025	0.034	0.094	0.297	0.212	0.073
Departure Headway (Hd)	5.657	4.813	5.891	5.172	5.002	5.858	5.125
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	630	739	606	690	718	611	696
Service Time	3.417	2.573	3.642	2.922	3.042	3.609	2.875
HCM Lane V/C Ratio	0.056	0.026	0.035	0.094	0.298	0.214	0.075
HCM Control Delay	8.7	7.7	8.9	8.5	10.2	10.2	8.3
HCM Lane LOS	A	A	A	A	B	B	A
HCM 95th-tile Q	0.2	0.1	0.1	0.3	1.2	0.8	0.2

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	1	9	30	34	24	19	119	18	50	155	44
Future Vol, veh/h	9	1	9	30	34	24	19	119	18	50	155	44
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	1	11	36	41	29	23	143	22	60	187	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8.9	9	10
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	12%	47%	34%	20%
Vol Thru, %	76%	5%	39%	62%
Vol Right, %	12%	47%	27%	18%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	156	19	88	249
LT Vol	19	9	30	50
Through Vol	119	1	34	155
RT Vol	18	9	24	44
Lane Flow Rate	188	23	106	300
Geometry Grp	1	1	1	1
Degree of Util (X)	0.237	0.032	0.146	0.367
Departure Headway (Hd)	4.537	4.985	4.954	4.401
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	791	715	722	816
Service Time	2.57	3.039	2.999	2.43
HCM Lane V/C Ratio	0.238	0.032	0.147	0.368
HCM Control Delay	9	8.2	8.9	10
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.9	0.1	0.5	1.7



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	320	1745	282	41	0	845
Future Volume (vph)	320	1745	282	41	0	845
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	1.00	0.91	0.95			0.64
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	1.00	0.98			0.85
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	5085	3466			4053
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	5085	3466			4053
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	330	1799	291	42	0	871
RTOR Reduction (vph)	0	0	17	0	0	511
Lane Group Flow (vph)	330	1799	316	0	0	360
Confl. Peds. (#/hr)						63
Confl. Bikes (#/hr)				6		
Turn Type	Prot	NA	NA			Over
Protected Phases	6	6 4	4			6
Permitted Phases						
Actuated Green, G (s)	37.2	90.0	42.8			37.2
Effective Green, g (s)	37.2	90.0	42.8			37.2
Actuated g/C Ratio	0.41	1.00	0.48			0.41
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	731	5085	1648			1675
v/s Ratio Prot	c0.19	c0.35	0.09			0.09
v/s Ratio Perm						
v/c Ratio	0.45	0.35	0.19			0.21
Uniform Delay, d1	19.0	0.0	13.6			17.0
Progression Factor	0.93	1.00	0.16			1.00
Incremental Delay, d2	1.2	0.0	0.1			0.3
Delay (s)	18.9	0.0	2.3			17.3
Level of Service	B	A	A			B
Approach Delay (s)		3.0	2.3		17.3	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	43	2717	86	85	152	0	0	112	2
Future Volume (veh/h)	0	0	0	43	2717	86	85	152	0	0	112	2
Initial Q (Qb), veh				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
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1870	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				48	3019	93	94	169	0	0	124	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				69	4658	146	182	311	0	0	534	
Arrive On Green				0.71	0.71	0.71	0.15	0.15	0.00	0.00	0.15	0.00
Sat Flow, veh/h				98	6604	207	762	2156	0	0	3741	0
Grp Volume(v), veh/h				912	1429	819	139	124	0	0	124	0
Grp Sat Flow(s),veh/h/ln				1865	1609	1827	1216	1617	0	0	1777	0
Q Serve(g_s), s				25.4	21.2	21.6	7.7	6.4	0.0	0.0	2.8	0.0
Cycle Q Clear(g_c), s				25.4	21.2	21.6	10.4	6.4	0.0	0.0	2.8	0.0
Prop In Lane				0.05		0.11	0.68		0.00	0.00		0.00
Lane Grp Cap(c), veh/h				1316	2269	1289	250	243	0	0	534	
V/C Ratio(X)				0.69	0.63	0.64	0.56	0.51	0.00	0.00	0.23	
Avail Cap(c_a), veh/h				1316	2269	1289	414	431	0	0	948	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				7.6	7.0	7.1	37.6	35.2	0.0	0.0	33.7	0.0
Incr Delay (d2), s/veh				3.0	1.3	2.4	1.9	1.7	0.0	0.0	0.2	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
%ile BackOfQ(50%),veh/ln				9.1	6.2	7.5	3.0	2.6	0.0	0.0	1.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				10.7	8.4	9.5	39.6	36.9	0.0	0.0	33.9	0.0
LnGrp LOS				B	A	A	D	D	A	A	C	
Approach Vol, veh/h					3160			263			124	
Approach Delay, s/veh					9.3			38.3			33.9	
Approach LOS					A			D			C	

Timer - Assigned Phs	2	4			8			
Phs Duration (G+Y+Rc), s	70.5	19.5			19.5			
Change Period (Y+Rc), s	7.0	6.0			6.0			
Max Green Setting (Gmax), s	53.0	24.0			24.0			
Max Q Clear Time (g_c+I1), s	27.4	12.4			4.8			
Green Ext Time (p_c), s	25.4	1.1			0.6			

Intersection Summary		
HCM 6th Ctrl Delay	12.3	
HCM 6th LOS	B	

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	1655	73	0	34
Future Vol, veh/h	0	0	1655	73	0	34
Conflicting Peds, #/hr	0	0	0	9	9	4
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	1	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	1839	81	0	38

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	-	973
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	216
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	214
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	SB
HCM Control Delay, s	0	25.4
HCM LOS		D

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	214
HCM Lane V/C Ratio	-	-	0.177
HCM Control Delay (s)	-	-	25.4
HCM Lane LOS	-	-	D
HCM 95th %tile Q(veh)	-	-	0.6

Intersection	
Int Delay, s/veh	6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	99	225	179	0	0	305
Future Vol, veh/h	99	225	179	0	0	305
Conflicting Peds, #/hr	118	100	0	118	100	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	110	250	199	0	0	339

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	656	299	0	-	-	-
Stage 1	199	-	-	-	-	-
Stage 2	457	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	430	741	-	0	0	-
Stage 1	835	-	-	0	0	-
Stage 2	638	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	382	670	-	-	-	-
Mov Cap-2 Maneuver	382	-	-	-	-	-
Stage 1	835	-	-	-	-	-
Stage 2	567	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	382	670	-
HCM Lane V/C Ratio	-	0.288	0.373	-
HCM Control Delay (s)	-	18.2	13.5	-
HCM Lane LOS	-	C	B	-
HCM 95th %tile Q(veh)	-	1.2	1.7	-



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1522	254	4	54	301	105
Future Volume (veh/h)	1522	254	4	54	301	105
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.95	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1569	231	4	56	310	79
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	3915	1159	117	1943	422	190
Arrive On Green	0.25	0.25	0.77	0.77	0.12	0.12
Sat Flow, veh/h	5274	1511	93	2619	3456	1560
Grp Volume(v), veh/h	1569	231	29	31	310	79
Grp Sat Flow(s),veh/h/ln	1702	1511	1011	1617	1728	1560
Q Serve(g_s), s	23.0	10.8	0.3	0.4	7.8	4.2
Cycle Q Clear(g_c), s	23.0	10.8	23.3	0.4	7.8	4.2
Prop In Lane		1.00	0.14		1.00	1.00
Lane Grp Cap(c), veh/h	3915	1159	820	1240	422	190
V/C Ratio(X)	0.40	0.20	0.04	0.03	0.73	0.41
Avail Cap(c_a), veh/h	3915	1159	820	1240	960	433
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.94	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.4	11.9	3.1	2.5	38.1	36.5
Incr Delay (d2), s/veh	0.3	0.4	0.1	0.0	2.5	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.4	4.4	0.1	0.1	3.4	1.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.7	12.2	3.2	2.5	40.6	38.0
LnGrp LOS	B	B	A	A	D	D
Approach Vol, veh/h	1800			60	389	
Approach Delay, s/veh	16.1			2.9	40.1	
Approach LOS	B			A	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		74.0		16.0		74.0
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		55.0		25.0		55.0
Max Q Clear Time (g_c+I1), s		25.3		9.8		25.0
Green Ext Time (p_c), s		0.6		1.2		24.1

Intersection Summary		
HCM 6th Ctrl Delay		19.9
HCM 6th LOS		B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	1378	53	0	0	0	0	89	48	48	85	0
Future Volume (veh/h)	25	1378	53	0	0	0	0	89	48	48	85	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.90				1.00		0.87	0.90		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	27	1482	52				0	96	25	52	91	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	1265	3627	1011				0	334	246	234	334	0
Arrive On Green	1.00	1.00	1.00				0.00	0.18	0.18	0.18	0.18	0.00
Sat Flow, veh/h	1781	5106	1424				0	1870	1380	1149	1870	0
Grp Volume(v), veh/h	27	1482	52				0	96	25	52	91	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1424				0	1870	1380	1149	1870	0
Q Serve(g_s), s	0.0	0.0	0.0				0.0	4.0	1.4	3.7	3.8	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0				0.0	4.0	1.4	7.7	3.8	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1265	3627	1011				0	334	246	234	334	0
V/C Ratio(X)	0.02	0.41	0.05				0.00	0.29	0.10	0.22	0.27	0.00
Avail Cap(c_a), veh/h	1265	3627	1011				0	520	383	348	520	0
HCM Platoon Ratio	2.00	2.00	2.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0				0.0	32.0	30.9	35.3	31.9	0.0
Incr Delay (d2), s/veh	0.0	0.3	0.1				0.0	0.5	0.2	0.5	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
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.0				0.0	1.8	0.5	1.1	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.3	0.1				0.0	32.5	31.1	35.8	32.4	0.0
LnGrp LOS	A	A	A				A	C	C	D	C	A
Approach Vol, veh/h		1561						121			143	
Approach Delay, s/veh		0.3						32.2			33.6	
Approach LOS		A						C			C	

Timer - Assigned Phs	4	6	8
Phs Duration (G+Y+Rc), s	21.1	68.9	21.1
Change Period (Y+Rc), s	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	55.0	25.0
Max Q Clear Time (g_c+I1), s	6.0	2.0	9.7
Green Ext Time (p_c), s	0.5	17.4	0.5

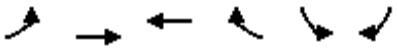
Intersection Summary	
HCM 6th Ctrl Delay	5.0
HCM 6th LOS	A



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	199	123	70	939	92	24
Future Volume (veh/h)	199	123	70	939	92	24
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.97	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	226	91	80	1067	105	4
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2013	782	349	4555	137	122
Arrive On Green	0.81	0.81	0.81	0.81	0.08	0.08
Sat Flow, veh/h	2573	963	368	5849	1781	1585
Grp Volume(v), veh/h	160	157	313	834	105	4
Grp Sat Flow(s),veh/h/ln	1777	1666	1588	1464	1781	1585
Q Serve(g_s), s	1.7	1.8	0.0	4.0	5.2	0.2
Cycle Q Clear(g_c), s	1.7	1.8	3.4	4.0	5.2	0.2
Prop In Lane		0.58	0.26		1.00	1.00
Lane Grp Cap(c), veh/h	1442	1352	1339	3564	137	122
V/C Ratio(X)	0.11	0.12	0.23	0.23	0.76	0.03
Avail Cap(c_a), veh/h	1442	1352	1339	3564	495	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.98	1.00	1.00	0.99	0.99
Uniform Delay (d), s/veh	1.8	1.8	1.9	2.0	40.7	38.4
Incr Delay (d2), s/veh	0.2	0.2	0.4	0.2	8.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.4	0.8	0.7	2.6	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	1.9	1.9	2.3	2.1	49.1	38.5
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h	317			1147	109	
Approach Delay, s/veh	1.9			2.2	48.7	
Approach LOS	A			A	D	

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	78.1			78.1	11.9
Change Period (Y+Rc), s	5.0			5.0	5.0
Max Green Setting (Gmax), s	55.0			55.0	25.0
Max Q Clear Time (g_c+I1), s	3.8			6.0	7.2
Green Ext Time (p_c), s	4.2			21.0	0.2

Intersection Summary		
HCM 6th Ctrl Delay	5.4	
HCM 6th LOS	A	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	115	134	593	170	107	59
Future Volume (veh/h)	115	134	593	170	107	59
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.96	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	122	143	631	126	114	-3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	153	1509	3605	689	146	130
Arrive On Green	0.09	0.81	0.67	0.67	0.08	0.00
Sat Flow, veh/h	1781	1870	5680	1035	1781	1585
Grp Volume(v), veh/h	122	143	559	198	114	-3
Grp Sat Flow(s),veh/h/ln	1781	1870	1609	1628	1781	1585
Q Serve(g_s), s	6.0	1.4	3.9	4.2	5.6	0.0
Cycle Q Clear(g_c), s	6.0	1.4	3.9	4.2	5.6	0.0
Prop In Lane	1.00			0.64	1.00	1.00
Lane Grp Cap(c), veh/h	153	1509	3211	1083	146	130
V/C Ratio(X)	0.80	0.09	0.17	0.18	0.78	-0.02
Avail Cap(c_a), veh/h	198	1509	3211	1083	495	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.97	0.97	1.00	0.00
Uniform Delay (d), s/veh	40.4	1.8	5.7	5.7	40.5	0.0
Incr Delay (d2), s/veh	15.9	0.1	0.1	0.4	8.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.4	1.2	1.3	2.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	56.3	1.9	5.8	6.1	49.1	0.0
LnGrp LOS	E	A	A	A	D	A
Approach Vol, veh/h		265	757		111	
Approach Delay, s/veh		26.9	5.9		50.4	
Approach LOS		C	A		D	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.7	64.9			77.6	12.4
Change Period (Y+Rc), s	5.0	5.0			5.0	5.0
Max Green Setting (Gmax), s	10.0	40.0			55.0	25.0
Max Q Clear Time (g_c+I1), s	8.0	6.2			3.4	7.6
Green Ext Time (p_c), s	0.0	11.0			1.7	0.2

Intersection Summary		
HCM 6th Ctrl Delay	15.2	
HCM 6th LOS	B	



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	889	31	35	593	18	24
Future Volume (veh/h)	889	31	35	593	18	24
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	936	33	37	624	19	25
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	4519	159	162	2690	55	49
Arrive On Green	0.89	0.89	0.89	0.89	0.03	0.03
Sat Flow, veh/h	5232	178	147	3100	1781	1585
Grp Volume(v), veh/h	629	340	326	335	19	25
Grp Sat Flow(s),veh/h/ln	1702	1838	1544	1617	1781	1585
Q Serve(g_s), s	3.2	3.2	0.0	3.7	1.4	2.0
Cycle Q Clear(g_c), s	3.2	3.2	3.0	3.7	1.4	2.0
Prop In Lane		0.10	0.11		1.00	1.00
Lane Grp Cap(c), veh/h	3038	1641	1409	1443	55	49
V/C Ratio(X)	0.21	0.21	0.23	0.23	0.35	0.52
Avail Cap(c_a), veh/h	3038	1641	1409	1443	356	317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.47	0.47	1.00	1.00
Uniform Delay (d), s/veh	0.9	0.9	0.9	0.9	61.7	62.1
Incr Delay (d2), s/veh	0.2	0.3	0.2	0.2	3.8	8.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.3	0.5	0.5	0.7	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	1.1	1.2	1.1	1.1	65.5	70.3
LnGrp LOS	A	A	A	A	E	E
Approach Vol, veh/h	969			661	44	
Approach Delay, s/veh	1.1			1.1	68.2	
Approach LOS	A			A	E	

Timer - Assigned Phs	2		4		6
Phs Duration (G+Y+Rc), s	121.0		9.0		121.0
Change Period (Y+Rc), s	5.0		5.0		5.0
Max Green Setting (Gmax), s	94.0		26.0		94.0
Max Q Clear Time (g_c+I1), s	5.2		4.0		5.7
Green Ext Time (p_c), s	17.2		0.1		11.1

Intersection Summary		
HCM 6th Ctrl Delay		2.9
HCM 6th LOS		A

HCM 6th Signalized Intersection Summary
1: Waiakamilo Rd & N. Nimitz Hwy

06/24/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	2666	337	146	3158	5	15	12	0	316	3	119
Future Volume (veh/h)	3	2666	337	146	3158	5	15	12	0	316	3	119
Initial Q (Qb), veh	0	0	0	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	0.98	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	2777	0	152	3290	0	16	12	0	331	0	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	14	3531		134	3874		35	37		388	0	
Arrive On Green	0.01	0.69	0.00	0.10	1.00	0.00	0.02	0.02	0.00	0.11	0.00	0.00
Sat Flow, veh/h	1781	5274	0	1781	5274	0	1781	1870	1560	3563	0	1585
Grp Volume(v), veh/h	3	2777	0	152	3290	0	16	12	0	331	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	0	1781	1702	0	1781	1870	1560	1781	0	1585
Q Serve(g_s), s	0.3	73.6	0.0	15.0	0.0	0.0	1.8	1.3	0.0	18.3	0.0	0.0
Cycle Q Clear(g_c), s	0.3	73.6	0.0	15.0	0.0	0.0	1.8	1.3	0.0	18.3	0.0	0.0
Prop In Lane	1.00		0.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	14	3531		134	3874		35	37		388	0	
V/C Ratio(X)	0.22	0.79		1.14	0.85		0.46	0.33		0.85	0.00	
Avail Cap(c_a), veh/h	223	3531		134	3874		89	94		713	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.44	0.44	0.00	1.00	1.00	0.00	0.51	0.00	0.00
Uniform Delay (d), s/veh	98.6	20.9	0.0	90.0	0.0	0.0	97.0	96.7	0.0	87.6	0.0	0.0
Incr Delay (d2), s/veh	7.8	1.8	0.0	94.2	1.1	0.0	8.9	5.0	0.0	2.9	0.0	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	0.2	28.2	0.0	10.2	0.4	0.0	0.9	0.7	0.0	8.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	106.5	22.7	0.0	184.2	1.1	0.0	105.9	101.7	0.0	90.4	0.0	0.0
LnGrp LOS	F	C		F	A		F	F		F	A	
Approach Vol, veh/h		2780			3442			28			331	
Approach Delay, s/veh		22.8			9.2			104.1			90.4	
Approach LOS		C			A			F			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.0	144.3		26.8	6.5	157.8		8.9				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	114.0		40.0	25.0	104.0		10.0				
Max Q Clear Time (g_c+I1), s	17.0	75.6		20.3	2.3	2.0		3.8				
Green Ext Time (p_c), s	0.0	37.2		1.1	0.0	100.1		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	19.4
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	204	953	95	191	807	143	46	406	169	137	398	134
Future Volume (veh/h)	204	953	95	191	807	143	46	406	169	137	398	134
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		0.96	1.00		1.00	1.00		0.91
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	208	972	91	195	823	135	47	414	0	140	406	107
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	148	1511	141	148	1402	230	61	655		148	638	165
Arrive On Green	0.08	0.47	0.47	0.03	0.15	0.15	0.03	0.18	0.00	0.08	0.23	0.23
Sat Flow, veh/h	1781	3243	304	1781	3010	494	1781	3647	0	1781	2730	708
Grp Volume(v), veh/h	208	532	531	195	486	472	47	414	0	140	262	251
Grp Sat Flow(s),veh/h/ln	1781	1777	1770	1781	1777	1726	1781	1777	0	1781	1777	1660
Q Serve(g_s), s	10.0	27.4	27.4	10.0	30.5	30.5	3.1	12.9	0.0	9.4	15.9	16.4
Cycle Q Clear(g_c), s	10.0	27.4	27.4	10.0	30.5	30.5	3.1	12.9	0.0	9.4	15.9	16.4
Prop In Lane	1.00		0.17	1.00		0.29	1.00		0.00	1.00		0.43
Lane Grp Cap(c), veh/h	148	828	824	148	828	804	61	655		148	415	388
V/C Ratio(X)	1.40	0.64	0.64	1.31	0.59	0.59	0.77	0.63		0.94	0.63	0.65
Avail Cap(c_a), veh/h	148	828	824	148	828	804	148	1007		148	503	470
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.89	0.89	0.89	0.99	0.99	0.00	0.86	0.86	0.86
Uniform Delay (d), s/veh	55.0	24.5	24.5	58.3	40.0	40.0	57.5	45.2	0.0	54.7	41.3	41.5
Incr Delay (d2), s/veh	216.0	3.8	3.9	177.2	2.7	2.8	18.4	1.0	0.0	52.0	1.6	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	18.4	12.2	12.2	12.1	15.2	14.8	1.7	5.8	0.0	6.3	7.1	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	271.0	28.3	28.3	235.5	42.8	42.8	75.9	46.2	0.0	106.7	42.9	43.5
LnGrp LOS	F	C	C	F	D	D	E	D		F	D	D
Approach Vol, veh/h		1271			1153			461			653	
Approach Delay, s/veh		68.0			75.4			49.2			56.8	
Approach LOS		E			E			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	61.9	9.1	34.0	15.0	61.9	15.0	28.1
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	10.0	44.0	10.0	34.0	10.0	44.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	12.0	29.4	5.1	18.4	12.0	32.5	11.4	14.9
Green Ext Time (p_c), s	0.0	6.2	0.0	2.8	0.0	4.8	0.0	2.6

Intersection Summary	
HCM 6th Ctrl Delay	65.9
HCM 6th LOS	E

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	63	13	41	76	59	14	491	69	36	431	63
Future Volume (veh/h)	81	63	13	41	76	59	14	491	69	36	431	63
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	0.99		0.95	0.99		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	95	74	13	48	89	54	16	578	28	42	507	53
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	340	135	21	224	159	86	152	1560	689	196	1351	137
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	784	756	118	330	895	483	30	3421	1510	102	2962	301
Grp Volume(v), veh/h	182	0	0	191	0	0	317	277	28	315	0	287
Grp Sat Flow(s),veh/h/ln	1658	0	0	1708	0	0	1834	1617	1510	1735	0	1630
Q Serve(g_s), s	0.0	0.0	0.0	0.2	0.0	0.0	0.0	3.1	0.3	0.0	0.0	3.2
Cycle Q Clear(g_c), s	2.5	0.0	0.0	2.7	0.0	0.0	3.0	3.1	0.3	3.0	0.0	3.2
Prop In Lane	0.52		0.07	0.25		0.28	0.05		1.00	0.13		0.18
Lane Grp Cap(c), veh/h	496	0	0	469	0	0	975	738	689	941	0	744
V/C Ratio(X)	0.37	0.00	0.00	0.41	0.00	0.00	0.33	0.38	0.04	0.33	0.00	0.39
Avail Cap(c_a), veh/h	1571	0	0	1648	0	0	5650	5029	4697	5161	0	5071
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.00	1.00
Uniform Delay (d), s/veh	10.3	0.0	0.0	10.3	0.0	0.0	4.9	4.9	4.1	4.9	0.0	4.9
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.6	0.0	0.0	0.2	0.3	0.0	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	0.8	0.0	0.0	0.5	0.5	0.0	0.5	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.7	0.0	0.0	10.9	0.0	0.0	5.1	5.2	4.1	5.1	0.0	5.2
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		182			191			622			602	
Approach Delay, s/veh		10.7			10.9			5.1			5.1	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	9.9	17.5	9.9	17.5
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	85.0	25.0	85.0
Max Q Clear Time (g_c+I1), s	4.5	5.2	4.7	5.1
Green Ext Time (p_c), s	1.1	4.5	1.1	4.3

Intersection Summary	
HCM 6th Ctrl Delay	6.4
HCM 6th LOS	A

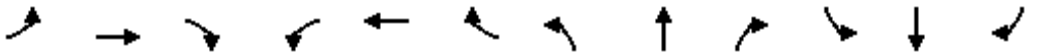
Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Traffic Vol, veh/h	16	2	16	10	4	43	13	550	28	45	565	14
Future Vol, veh/h	16	2	16	10	4	43	13	550	28	45	565	14
Conflicting Peds, #/hr	4	0	1	1	0	4	29	0	7	7	0	29
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	2	17	11	4	46	14	585	30	48	601	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1061	1384	338	1034	1376	319	645	0	0	622	0	0
Stage 1	734	734	-	635	635	-	-	-	-	-	-	-
Stage 2	327	650	-	399	741	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	178	142	658	186	144	677	936	-	-	955	-	-
Stage 1	378	424	-	433	471	-	-	-	-	-	-	-
Stage 2	660	463	-	598	421	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	145	124	639	164	125	670	910	-	-	949	-	-
Mov Cap-2 Maneuver	145	124	-	164	125	-	-	-	-	-	-	-
Stage 1	359	380	-	420	457	-	-	-	-	-	-	-
Stage 2	593	449	-	534	378	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.1	16.9	0.3	0.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	910	-	-	224	363	949	-	-
HCM Lane V/C Ratio	0.015	-	-	0.161	0.167	0.05	-	-
HCM Control Delay (s)	9	0.1	-	24.1	16.9	9	0.3	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.6	0.2	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	655	160	51	657	309	207	777	68	124	532	343
Future Volume (veh/h)	124	655	160	51	657	309	207	777	68	124	532	343
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		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	129	682	150	53	684	0	216	809	65	129	554	252
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	138	1184	260	68	1307		211	952	77	157	912	395
Arrive On Green	0.08	0.41	0.41	0.04	0.37	0.00	0.12	0.29	0.29	0.09	0.26	0.26
Sat Flow, veh/h	1781	2889	635	1781	3618	0	1781	3324	267	1781	3554	1541
Grp Volume(v), veh/h	129	419	413	53	684	0	216	432	442	129	554	252
Grp Sat Flow(s),veh/h/ln	1781	1777	1747	1781	1763	0	1781	1777	1814	1781	1777	1541
Q Serve(g_s), s	7.9	20.1	20.1	3.2	16.7	0.0	13.0	25.2	25.3	7.8	15.1	16.0
Cycle Q Clear(g_c), s	7.9	20.1	20.1	3.2	16.7	0.0	13.0	25.2	25.3	7.8	15.1	16.0
Prop In Lane	1.00		0.36	1.00		0.00	1.00		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	138	728	716	68	1307		211	509	520	157	912	395
V/C Ratio(X)	0.94	0.58	0.58	0.78	0.52		1.03	0.85	0.85	0.82	0.61	0.64
Avail Cap(c_a), veh/h	138	728	716	94	1307		211	549	561	243	1163	504
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.92	0.92	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.5	25.1	25.1	52.4	27.0	0.0	48.5	37.0	37.0	49.3	36.0	36.3
Incr Delay (d2), s/veh	57.8	3.3	3.4	22.1	1.4	0.0	69.0	11.4	11.2	6.7	0.7	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	9.0	8.9	1.9	7.2	0.0	9.8	12.4	12.7	3.8	6.6	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	108.3	28.4	28.5	74.5	28.4	0.0	117.5	48.4	48.2	55.9	36.7	38.0
LnGrp LOS	F	C	C	E	C		F	D	D	E	D	D
Approach Vol, veh/h		961			737			1090			935	
Approach Delay, s/veh		39.1			31.7			62.0			39.7	
Approach LOS		D			C			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	50.1	14.7	36.5	13.0	45.8	18.0	33.2
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.8	35.7	15.0	34.0	8.5	33.0	13.0	36.0
Max Q Clear Time (g_c+I1), s	5.2	22.1	9.8	27.3	9.9	18.7	15.0	18.0
Green Ext Time (p_c), s	0.0	4.6	0.1	3.0	0.0	4.1	0.0	4.5

Intersection Summary	
HCM 6th Ctrl Delay	44.5
HCM 6th LOS	D

Notes

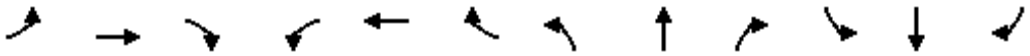
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	537	435	959	0	0	547
Future Volume (veh/h)	537	435	959	0	0	547
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	0	0	1870
Adj Flow Rate, veh/h	559	392	999	0	0	570
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	991	455	2179	0	0	2179
Arrive On Green	0.29	0.29	0.61	0.00	0.00	0.61
Sat Flow, veh/h	3456	1585	3741	0	0	3741
Grp Volume(v), veh/h	559	392	999	0	0	570
Grp Sat Flow(s),veh/h/ln	1728	1585	1777	0	0	1777
Q Serve(g_s), s	13.8	23.4	15.1	0.0	0.0	7.4
Cycle Q Clear(g_c), s	13.8	23.4	15.1	0.0	0.0	7.4
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	991	455	2179	0	0	2179
V/C Ratio(X)	0.56	0.86	0.46	0.00	0.00	0.26
Avail Cap(c_a), veh/h	1382	634	2179	0	0	2179
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	30.3	33.8	10.4	0.0	0.0	8.9
Incr Delay (d2), s/veh	0.5	8.7	0.7	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	9.9	5.7	0.0	0.0	2.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	30.8	42.5	11.1	0.0	0.0	9.2
LnGrp LOS	C	D	B	A	A	A
Approach Vol, veh/h	951		999			570
Approach Delay, s/veh	35.6		11.1			9.2
Approach LOS	D		B			A

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	66.3			66.3	33.7
Change Period (Y+Rc), s	5.0			5.0	5.0
Max Green Setting (Gmax), s	50.0			50.0	40.0
Max Q Clear Time (g_c+I1), s	17.1			9.4	25.4
Green Ext Time (p_c), s	8.7			4.4	3.3

Intersection Summary			
HCM 6th Ctrl Delay		19.9	
HCM 6th LOS		B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	938	57	120	870	153	58	113	140	60	110	75
Future Volume (vph)	101	938	57	120	870	153	58	113	140	60	110	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.0	6.0			5.0			5.0	
Lane Util. Factor		0.91		1.00	0.95			1.00			1.00	
Frpb, ped/bikes		1.00		1.00	0.99			0.99			0.99	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.99		1.00	0.98			0.94			0.96	
Flt Protected		1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)		4998		1768	3420			1717			1738	
Flt Permitted		0.72		0.19	1.00			0.78			0.63	
Satd. Flow (perm)		3606		354	3420			1350			1114	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	106	987	60	126	916	161	61	119	147	63	116	79
RTOR Reduction (vph)	0	6	0	0	8	0	0	25	0	0	13	0
Lane Group Flow (vph)	0	1147	0	126	1069	0	0	302	0	0	245	0
Confl. Peds. (#/hr)	23		21	21		23	26					26
Confl. Bikes (#/hr)			6			5			1			
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		70.8		84.0	84.0			25.0			25.0	
Effective Green, g (s)		70.8		84.0	84.0			25.0			25.0	
Actuated g/C Ratio		0.59		0.70	0.70			0.21			0.21	
Clearance Time (s)		6.0		5.0	6.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		2127		344	2394			281			232	
v/s Ratio Prot				0.03	c0.31							
v/s Ratio Perm		c0.32		0.23				c0.22			0.22	
v/c Ratio		0.54		0.37	0.45			1.08			1.05	
Uniform Delay, d1		14.8		7.0	7.9			47.5			47.5	
Progression Factor		0.90		0.93	0.44			1.00			1.00	
Incremental Delay, d2		0.2		0.6	0.5			75.5			74.0	
Delay (s)		13.4		7.1	4.0			123.0			121.5	
Level of Service		B		A	A			F			F	
Approach Delay (s)		13.4			4.3			123.0			121.5	
Approach LOS		B			A			F			F	

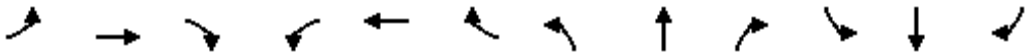
Intersection Summary			
HCM 2000 Control Delay	31.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	866	102	122	855	9	147	157	150	14	33	38
Future Volume (veh/h)	43	866	102	122	855	9	147	157	150	14	33	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.95	1.00		0.95	0.98		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	45	912	92	128	900	8	155	165	139	15	35	11
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	2641	264	372	2309	21	176	147	119	107	234	65
Arrive On Green	0.64	0.64	0.64	1.00	1.00	1.00	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	149	4126	412	559	3607	32	512	589	478	250	936	261
Grp Volume(v), veh/h	353	344	352	128	443	465	459	0	0	61	0	0
Grp Sat Flow(s),veh/h/ln	1563	1549	1576	559	1777	1863	1578	0	0	1447	0	0
Q Serve(g_s), s	0.0	10.3	10.3	5.8	0.0	0.0	22.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.4	10.3	10.3	16.1	0.0	0.0	25.0	0.0	0.0	2.6	0.0	0.0
Prop In Lane	0.13		0.26	1.00		0.02	0.34		0.30	0.25		0.18
Lane Grp Cap(c), veh/h	1041	991	1009	372	1137	1192	443	0	0	407	0	0
V/C Ratio(X)	0.34	0.35	0.35	0.34	0.39	0.39	1.04	0.00	0.00	0.15	0.00	0.00
Avail Cap(c_a), veh/h	1041	991	1009	372	1137	1192	443	0	0	407	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.71	0.71	0.71	0.92	0.92	0.92	0.09	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.0	8.3	8.3	1.3	0.0	0.0	38.7	0.0	0.0	29.1	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.7	0.7	2.3	0.9	0.9	23.8	0.0	0.0	0.2	0.0	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	3.3	3.3	3.4	0.2	0.3	0.3	14.0	0.0	0.0	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.6	9.0	9.0	3.6	0.9	0.9	62.5	0.0	0.0	29.3	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	F	A	A	C	A	A
Approach Vol, veh/h		1049			1036			459			61	
Approach Delay, s/veh		8.9			1.2			62.5			29.3	
Approach LOS		A			A			E			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	70.0	30.0	70.0	30.0
Change Period (Y+Rc), s	6.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	64.0	25.0	64.0	25.0
Max Q Clear Time (g_c+I1), s	12.3	4.6	18.1	27.0
Green Ext Time (p_c), s	18.8	0.3	18.8	0.0

Intersection Summary	
HCM 6th Ctrl Delay	15.8
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	164	938	36	24	1041	258	47	39	24	147	14	55
Future Volume (vph)	164	938	36	24	1041	258	47	39	24	147	14	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0			6.0			5.0			5.0	
Lane Util. Factor	1.00	0.95			0.91			1.00			1.00	
Frpb, ped/bikes	1.00	1.00			0.98			0.99			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			0.97	
Frt	1.00	0.99			0.97			0.97			0.97	
Flt Protected	0.95	1.00			1.00			0.98			0.97	
Satd. Flow (prot)	1768	3481			4841			1745			1690	
Flt Permitted	0.14	1.00			0.90			0.82			0.70	
Satd. Flow (perm)	264	3481			4362			1457			1223	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	171	977	38	25	1084	269	49	41	25	153	15	57
RTOR Reduction (vph)	0	1	0	0	39	0	0	9	0	0	10	0
Lane Group Flow (vph)	171	1014	0	0	1339	0	0	106	0	0	215	0
Confl. Peds. (#/hr)	30		23	23		30			39	39		
Confl. Bikes (#/hr)			11			5						
Bus Blockages (#/hr)	0	4	0	0	0	4	0	0	4	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	85.6	85.6			71.8			23.4			23.4	
Effective Green, g (s)	85.6	85.6			71.8			23.4			23.4	
Actuated g/C Ratio	0.71	0.71			0.60			0.19			0.19	
Clearance Time (s)	5.0	6.0			6.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	298	2483			2609			284			238	
v/s Ratio Prot	c0.04	0.29										
v/s Ratio Perm	c0.37				0.31			0.07			c0.18	
v/c Ratio	0.57	0.41			0.51			0.37			0.90	
Uniform Delay, d1	8.1	7.0			14.0			41.9			47.2	
Progression Factor	3.16	0.42			0.90			1.00			1.00	
Incremental Delay, d2	2.1	0.4			0.1			0.8			33.2	
Delay (s)	27.6	3.3			12.8			42.8			80.4	
Level of Service	C	A			B			D			F	
Approach Delay (s)		6.8			12.8			42.8			80.4	
Approach LOS		A			B			D			F	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	837	138	59	892	43	76	191	138	18	46	17
Future Volume (veh/h)	55	837	138	59	892	43	76	191	138	18	46	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	0.99		0.96	0.97		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	58	881	131	62	939	40	80	201	125	19	48	7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	438	1972	293	182	2651	112	109	213	124	102	236	31
Arrive On Green	1.00	1.00	1.00	1.00	1.00	1.00	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	571	3082	458	218	4143	176	263	854	497	226	945	122
Grp Volume(v), veh/h	58	508	504	317	352	372	406	0	0	74	0	0
Grp Sat Flow(s),veh/h/ln	571	1777	1763	1354	1549	1633	1614	0	0	1293	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	21.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0.0	0.0	3.2	0.0	0.0
Prop In Lane	1.00		0.26	0.20		0.11	0.20		0.31	0.26		0.09
Lane Grp Cap(c), veh/h	438	1137	1128	909	991	1045	447	0	0	369	0	0
V/C Ratio(X)	0.13	0.45	0.45	0.35	0.35	0.36	0.91	0.00	0.00	0.20	0.00	0.00
Avail Cap(c_a), veh/h	438	1137	1128	909	991	1045	447	0	0	369	0	0
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.93	0.93	0.93	0.92	0.92	0.92	0.86	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	37.4	0.0	0.0	29.3	0.0	0.0
Incr Delay (d2), s/veh	0.6	1.2	1.2	1.0	0.9	0.9	19.9	0.0	0.0	0.3	0.0	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	0.1	0.4	0.4	0.2	0.3	0.3	12.2	0.0	0.0	1.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.6	1.2	1.2	1.0	0.9	0.9	57.4	0.0	0.0	29.6	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	E	A	A	C	A	A
Approach Vol, veh/h		1070			1041			406			74	
Approach Delay, s/veh		1.2			0.9			57.4			29.6	
Approach LOS		A			A			E			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	70.0	30.0	70.0	30.0
Change Period (Y+Rc), s	6.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	64.0	25.0	64.0	25.0
Max Q Clear Time (g_c+I1), s	2.0	5.2	2.0	27.0
Green Ext Time (p_c), s	21.6	0.3	20.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	10.7
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	268	3033	23	36	2405	371	29	32	51	344	19	283
Future Volume (veh/h)	268	3033	23	36	2405	371	29	32	51	344	19	283
Initial Q (Qb), veh	0	0	0	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	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	288	3261	0	39	2586	0	31	34	0	384	0	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	331	3616		50	3271		46	57		480	0	
Arrive On Green	0.10	0.71	0.00	0.03	0.64	0.00	0.03	0.03	0.00	0.13	0.00	0.00
Sat Flow, veh/h	3456	5274	0	1781	5106	1585	1596	2064	0	3563	0	1560
Grp Volume(v), veh/h	288	3261	0	39	2586	0	35	30	0	384	0	0
Grp Sat Flow(s),veh/h/ln	1728	1702	0	1781	1702	1585	1791	1777	0	1781	0	1560
Q Serve(g_s), s	16.4	103.1	0.0	4.4	73.8	0.0	3.8	3.4	0.0	20.9	0.0	0.0
Cycle Q Clear(g_c), s	16.4	103.1	0.0	4.4	73.8	0.0	3.8	3.4	0.0	20.9	0.0	0.0
Prop In Lane	1.00		0.00	1.00		1.00	0.89		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	331	3616		50	3271		52	51		480	0	
V/C Ratio(X)	0.87	0.90		0.78	0.79		0.67	0.59		0.80	0.00	
Avail Cap(c_a), veh/h	518	3616		134	3271		90	89		623	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	89.2	23.6	0.0	96.5	26.2	0.0	96.2	96.0	0.0	83.9	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.4	0.0	21.9	2.0	0.0	14.3	10.4	0.0	5.6	0.0	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	7.4	38.2	0.0	2.3	29.3	0.0	2.0	1.7	0.0	10.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	90.2	24.0	0.0	118.5	28.2	0.0	110.5	106.4	0.0	89.5	0.0	0.0
LnGrp LOS	F	C		F	C		F	F		F	A	
Approach Vol, veh/h		3549			2625			65			384	
Approach Delay, s/veh		29.3			29.5			108.6			89.5	
Approach LOS		C			C			F			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.6	146.6		32.0	24.2	133.1		10.8				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	15.6	120.0		35.0	30.0	105.0		10.0				
Max Q Clear Time (g_c+I1), s	18.4	105.1		22.9	18.4	75.8		5.8				
Green Ext Time (p_c), s	0.0	14.3		1.1	0.7	23.5		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	33.7
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

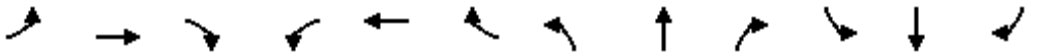
Intersection	
Int Delay, s/veh	12.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	45	131	721	177	98	673
Future Vol, veh/h	45	131	721	177	98	673
Conflicting Peds, #/hr	10	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	151	829	203	113	774

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1556	518	0	0	1034	0
Stage 1	933	-	-	-	-	-
Stage 2	623	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	104	502	-	-	668	-
Stage 1	343	-	-	-	-	-
Stage 2	497	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	72	501	-	-	667	-
Mov Cap-2 Maneuver	72	-	-	-	-	-
Stage 1	342	-	-	-	-	-
Stage 2	346	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	117.9	0	2.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	199	667	-
HCM Lane V/C Ratio	-	-	1.017	0.169	-
HCM Control Delay (s)	-	-	117.9	11.5	1.3
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	8.9	0.6	-



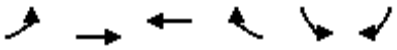
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	405	436	253	829	6	603	0	732	0	0	0
Future Volume (veh/h)	8	405	436	253	829	6	603	0	732	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.95	1.00		0.96			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	8	413	223	258	846	6	615	0	353			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	17	1656	697	286	2212	16	885	0	374			
Arrive On Green	0.02	0.78	0.78	0.16	0.62	0.62	0.25	0.00	0.25			
Sat Flow, veh/h	1781	3554	1496	1781	3586	25	3563	0	1505			
Grp Volume(v), veh/h	8	413	223	258	419	433	615	0	353			
Grp Sat Flow(s),veh/h/ln	1781	1777	1496	1781	1777	1834	1781	0	1505			
Q Serve(g_s), s	0.5	3.8	5.3	17.1	14.2	14.2	18.8	0.0	27.6			
Cycle Q Clear(g_c), s	0.5	3.8	5.3	17.1	14.2	14.2	18.8	0.0	27.6			
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00			
Lane Grp Cap(c), veh/h	17	1656	697	286	1096	1131	885	0	374			
V/C Ratio(X)	0.46	0.25	0.32	0.90	0.38	0.38	0.69	0.00	0.94			
Avail Cap(c_a), veh/h	74	1656	697	371	1096	1131	891	0	376			
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.92	0.92	0.92	1.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	58.7	7.5	7.7	49.4	11.5	11.5	41.0	0.0	44.3			
Incr Delay (d2), s/veh	6.4	0.3	1.1	18.1	1.0	1.0	2.3	0.0	32.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.3	1.4	1.7	9.0	5.7	5.9	8.5	0.0	23.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	7.9	8.8	67.5	12.5	12.5	43.3	0.0	76.5			
LnGrp LOS	E	A	A	E	B	B	D	A	E			
Approach Vol, veh/h		644			1110			968				
Approach Delay, s/veh		8.9			25.3			55.4				
Approach LOS		A			C			E				

Timer - Assigned Phs	1	2		4	5	6			
Phs Duration (G+Y+Rc), s	24.3	60.9		34.8	6.2	79.0			
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0			
Max Green Setting (Gmax), s	25.0	50.0		30.0	5.0	70.0			
Max Q Clear Time (g_c+I1), s	19.1	7.3		29.6	2.5	16.2			
Green Ext Time (p_c), s	0.2	8.3		0.2	0.0	14.2			

Intersection Summary	
HCM 6th Ctrl Delay	32.1
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	102	564	875	321	124	165
Future Volume (veh/h)	102	564	875	321	124	165
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.96	1.00	0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	116	641	994	250	141	130
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	340	2207	2532	1081	158	146
Arrive On Green	1.00	1.00	0.71	0.71	0.19	0.19
Sat Flow, veh/h	377	3251	3647	1517	845	779
Grp Volume(v), veh/h	116	641	994	250	272	0
Grp Sat Flow(s),veh/h/ln	377	1549	1777	1517	1631	0
Q Serve(g_s), s	6.4	0.0	11.2	5.7	16.3	0.0
Cycle Q Clear(g_c), s	17.6	0.0	11.2	5.7	16.3	0.0
Prop In Lane	1.00			1.00	0.52	0.48
Lane Grp Cap(c), veh/h	340	2207	2532	1081	306	0
V/C Ratio(X)	0.34	0.29	0.39	0.23	0.89	0.00
Avail Cap(c_a), veh/h	340	2207	2532	1081	408	0
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	1.00	1.00	0.67	0.00
Uniform Delay (d), s/veh	1.4	0.0	5.7	4.9	39.6	0.0
Incr Delay (d2), s/veh	2.4	0.3	0.5	0.5	12.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.1	3.7	1.7	7.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	3.8	0.3	6.2	5.4	51.8	0.0
LnGrp LOS	A	A	A	A	D	A
Approach Vol, veh/h		757	1244		272	
Approach Delay, s/veh		0.8	6.0		51.8	
Approach LOS		A	A		D	

Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	76.3				76.3	23.7
Change Period (Y+Rc), s	5.0				5.0	5.0
Max Green Setting (Gmax), s	65.0				65.0	25.0
Max Q Clear Time (g_c+I1), s	13.2				19.6	18.3
Green Ext Time (p_c), s	10.9				8.3	0.5

Intersection Summary	
HCM 6th Ctrl Delay	9.8
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	1445	133	46	732	58	264	102	60	62	228	490
Future Volume (veh/h)	320	1445	133	46	732	58	264	102	60	62	228	490
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.98	0.98		0.93	0.95		0.93
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	333	1505	133	48	762	54	275	106	48	65	238	277
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	223	2793	247	62	2430	171	111	334	151	102	331	414
Arrive On Green	0.13	0.59	0.59	0.03	0.50	0.50	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1781	4732	418	1781	4861	343	866	1187	538	267	1177	1472
Grp Volume(v), veh/h	333	1082	556	48	532	284	275	0	154	303	0	277
Grp Sat Flow(s),veh/h/ln	1781	1702	1746	1781	1702	1799	866	0	1725	1444	0	1472
Q Serve(g_s), s	20.0	30.6	30.6	4.3	14.8	15.0	12.2	0.0	11.3	21.6	0.0	26.7
Cycle Q Clear(g_c), s	20.0	30.6	30.6	4.3	14.8	15.0	45.0	0.0	11.3	32.8	0.0	26.7
Prop In Lane	1.00		0.24	1.00		0.19	1.00		0.31	0.21		1.00
Lane Grp Cap(c), veh/h	223	2009	1031	62	1702	900	111	0	485	433	0	414
V/C Ratio(X)	1.50	0.54	0.54	0.78	0.31	0.32	2.48	0.00	0.32	0.70	0.00	0.67
Avail Cap(c_a), veh/h	223	2009	1031	111	1702	900	111	0	485	433	0	414
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.76	0.76	0.76	0.95	0.00	0.95	1.00	0.00	1.00
Uniform Delay (d), s/veh	70.0	19.7	19.7	76.6	23.7	23.7	76.4	0.0	45.4	54.7	0.0	50.9
Incr Delay (d2), s/veh	245.2	1.0	2.0	14.5	0.4	0.7	691.9	0.0	0.4	4.9	0.0	4.1
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	24.4	12.6	13.3	2.2	6.3	6.8	25.9	0.0	5.0	12.0	0.0	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	315.2	20.7	21.7	91.1	24.1	24.4	768.3	0.0	45.7	59.6	0.0	55.0
LnGrp LOS	F	C	C	F	C	C	F	A	D	E	A	E
Approach Vol, veh/h		1971			864			429			580	
Approach Delay, s/veh		70.8			27.9			508.9			57.4	
Approach LOS		E			C			F			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	35.0	85.0		50.0	10.6	99.4		50.0
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	30.0	80.0		45.0	10.0	90.0		45.0
Max Q Clear Time (g_c+I1), s	22.0	17.0		47.0	6.3	32.6		34.8
Green Ext Time (p_c), s	0.0	7.0		0.0	0.0	20.4		2.3

Intersection Summary		
HCM 6th Ctrl Delay	108.0	
HCM 6th LOS	F	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	723	41	708	1228	357	0	620	745	202	367	47
Future Volume (veh/h)	0	723	41	708	1228	357	0	620	745	202	367	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.88	1.00		1.00	1.00		0.98	1.00		0.85
Parking Bus, Adj	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	738	38	578	1455	0	0	569	738	206	374	42
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	2	2	2	2	2	0	2	2	2	2	2
Cap, veh/h	0	1086	56	523	3051		0	449	1673	202	1243	138
Arrive On Green	0.00	0.22	0.22	0.29	0.55	0.00	0.00	0.24	0.24	0.11	0.39	0.39
Sat Flow, veh/h	0	5105	252	1781	5581	0	0	1870	3097	1781	3214	356
Grp Volume(v), veh/h	0	507	269	578	1455	0	0	569	738	206	215	201
Grp Sat Flow(s),veh/h/ln	0	1702	1785	1781	1860	0	0	1870	1548	1781	1870	1700
Q Serve(g_s), s	0.0	20.5	20.7	44.0	24.0	0.0	0.0	36.0	0.0	17.0	12.0	12.3
Cycle Q Clear(g_c), s	0.0	20.5	20.7	44.0	24.0	0.0	0.0	36.0	0.0	17.0	12.0	12.3
Prop In Lane	0.00		0.14	1.00		0.00	0.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	0	749	393	523	3051		0	449	1673	202	723	657
V/C Ratio(X)	0.00	0.68	0.68	1.11	0.48		0.00	1.27	0.44	1.02	0.30	0.31
Avail Cap(c_a), veh/h	0	749	393	523	3051		0	449	1673	202	723	657
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.80	0.80	0.00	0.00	0.95	0.95	0.81	0.81	0.81
Uniform Delay (d), s/veh	0.0	53.6	53.7	53.0	20.8	0.0	0.0	57.0	21.3	66.5	31.9	32.0
Incr Delay (d2), s/veh	0.0	4.9	9.3	68.0	0.4	0.0	0.0	136.3	0.2	62.4	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	9.3	10.4	29.5	10.6	0.0	0.0	33.7	15.4	11.2	5.6	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	58.5	63.0	121.0	21.3	0.0	0.0	193.3	21.5	128.9	32.1	32.2
LnGrp LOS	A	E	E	F	C		A	F	C	F	C	C
Approach Vol, veh/h		776			2033			1307			622	
Approach Delay, s/veh		60.1			49.6			96.3			64.2	
Approach LOS		E			D			F			E	

Timer - Assigned Phs	2	4	5	6	7	8
Phs Duration (G+Y+Rc), s	87.0	63.0	49.0	38.0	22.0	41.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	82.0	58.0	44.0	33.0	17.0	36.0
Max Q Clear Time (g_c+I1), s	26.0	14.3	46.0	22.7	19.0	38.0
Green Ext Time (p_c), s	31.9	2.8	0.0	5.6	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	66.1
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.
User approved changes to right turn type.
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	376	1076	127	169	492	120	150	661	121	140	351	153
Future Volume (veh/h)	376	1076	127	169	492	120	150	661	121	140	351	153
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.93	1.00		0.92	1.00		0.92
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	392	1121	125	176	512	100	156	689	116	146	366	125
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	334	1874	209	201	1414	267	111	778	131	166	742	248
Arrive On Green	0.19	0.41	0.41	0.11	0.33	0.33	0.06	0.26	0.26	0.09	0.29	0.29
Sat Flow, veh/h	1781	4599	512	1781	4250	804	1781	2975	500	1781	2536	847
Grp Volume(v), veh/h	392	829	417	176	407	205	156	411	394	146	254	237
Grp Sat Flow(s),veh/h/ln	1781	1702	1708	1781	1702	1649	1781	1777	1698	1781	1777	1607
Q Serve(g_s), s	30.0	30.5	30.6	15.6	14.5	15.2	10.0	35.6	35.7	13.0	18.9	19.6
Cycle Q Clear(g_c), s	30.0	30.5	30.6	15.6	14.5	15.2	10.0	35.6	35.7	13.0	18.9	19.6
Prop In Lane	1.00		0.30	1.00		0.49	1.00		0.29	1.00		0.53
Lane Grp Cap(c), veh/h	334	1387	696	201	1132	549	111	465	444	166	520	470
V/C Ratio(X)	1.17	0.60	0.60	0.88	0.36	0.37	1.40	0.88	0.89	0.88	0.49	0.50
Avail Cap(c_a), veh/h	334	1387	696	445	1132	549	111	555	531	167	611	552
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	0.80	1.00	1.00	1.00	0.09	0.09	0.09	0.97	0.97	0.97
Uniform Delay (d), s/veh	65.0	37.1	37.2	69.9	40.5	40.7	75.0	56.8	56.8	71.6	46.7	47.0
Incr Delay (d2), s/veh	100.8	1.5	3.0	11.5	0.9	1.9	185.5	1.5	1.6	36.5	0.7	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	28.0	13.2	13.5	7.8	6.3	6.6	10.3	16.2	15.6	7.6	8.6	8.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	165.8	38.7	40.2	81.4	41.4	42.6	260.5	58.3	58.4	108.2	47.4	47.8
LnGrp LOS	F	D	D	F	D	D	F	E	E	F	D	D
Approach Vol, veh/h		1638			788			961			637	
Approach Delay, s/veh		69.5			50.6			91.2			61.5	
Approach LOS		E			D			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.0	70.2	15.0	51.8	35.0	58.2	19.9	46.9
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	40.0	35.0	10.0	55.0	30.0	45.0	15.0	50.0
Max Q Clear Time (g_c+I1), s	17.6	32.6	12.0	21.6	32.0	17.2	15.0	37.7
Green Ext Time (p_c), s	0.5	1.7	0.0	3.3	0.0	4.4	0.0	4.2

Intersection Summary	
HCM 6th Ctrl Delay	69.7
HCM 6th LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	469	151	0	0	0	0	587	551	190	510	0
Future Volume (veh/h)	54	469	151	0	0	0	0	587	551	190	510	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.95	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.98				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	57	499	0				0	624	475	202	543	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	62	545					0	1715	726	353	2071	0
Arrive On Green	0.33	0.33	0.00				0.00	0.48	0.48	0.05	0.58	0.00
Sat Flow, veh/h	191	1670	1560				0	3647	1505	1781	3647	0
Grp Volume(v), veh/h	556	0	0				0	624	475	202	543	0
Grp Sat Flow(s),veh/h/ln	1861	0	1560				0	1777	1505	1781	1777	0
Q Serve(g_s), s	31.6	0.0	0.0				0.0	12.1	26.3	6.0	8.3	0.0
Cycle Q Clear(g_c), s	31.6	0.0	0.0				0.0	12.1	26.3	6.0	8.3	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	607	0					0	1715	726	353	2071	0
V/C Ratio(X)	0.92	0.00					0.00	0.36	0.65	0.57	0.26	0.00
Avail Cap(c_a), veh/h	710	0					0	1715	726	353	2071	0
HCM Platoon Ratio	1.00	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				0.00	0.18	0.18	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.6	0.0	0.0				0.0	17.9	21.5	14.2	11.3	0.0
Incr Delay (d2), s/veh	15.1	0.0	0.0				0.0	0.1	0.8	2.2	0.3	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
%ile BackOfQ(50%),veh/ln	16.6	0.0	0.0				0.0	4.9	9.1	2.6	3.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.7	0.0	0.0				0.0	18.0	22.4	16.4	11.6	0.0
LnGrp LOS	D	A					A	B	C	B	B	A
Approach Vol, veh/h		556						1099			745	
Approach Delay, s/veh		50.7						19.9			12.9	
Approach LOS		D						B			B	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	11.0	58.1		40.9		69.1						
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0						
Max Green Setting (Gmax), s	6.0	47.0		42.0		58.0						
Max Q Clear Time (g_c+I1), s	10.0	28.3		33.6		10.3						
Green Ext Time (p_c), s	0.0	6.2		2.3		4.2						

Intersection Summary		
HCM 6th Ctrl Delay		24.8
HCM 6th LOS		C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	36	14	62	38	93	11	38	32	231	66	30
Future Vol, veh/h	13	36	14	62	38	93	11	38	32	231	66	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	38	15	65	40	98	12	40	34	243	69	32
Number of Lanes	1	1	0	0	1	0	0	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	2
HCM Control Delay	9.1	11.1	8.7	11.4
HCM LOS	A	B	A	B

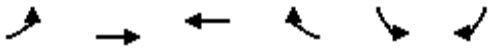
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	22%	0%	100%	0%	32%	100%	0%
Vol Thru, %	78%	0%	0%	72%	20%	0%	69%
Vol Right, %	0%	100%	0%	28%	48%	0%	31%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	32	13	50	193	231	96
LT Vol	11	0	13	0	62	231	0
Through Vol	38	0	0	36	38	0	66
RT Vol	0	32	0	14	93	0	30
Lane Flow Rate	52	34	14	53	203	243	101
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.084	0.047	0.024	0.084	0.31	0.396	0.144
Departure Headway (Hd)	5.897	4.976	6.42	5.717	5.494	5.864	5.14
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	611	710	552	620	650	610	691
Service Time	3.597	2.775	4.219	3.516	3.57	3.643	2.918
HCM Lane V/C Ratio	0.085	0.048	0.025	0.085	0.312	0.398	0.146
HCM Control Delay	9.1	8	9.4	9	11.1	12.5	8.8
HCM Lane LOS	A	A	A	A	B	B	A
HCM 95th-tile Q	0.3	0.1	0.1	0.3	1.3	1.9	0.5

Intersection	
Intersection Delay, s/veh	12.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	39	3	19	46	10	106	12	271	47	73	132	14
Future Vol, veh/h	39	3	19	46	10	106	12	271	47	73	132	14
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	47	4	23	55	12	128	14	327	57	88	159	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.8	10.7	14.1	11.7
HCM LOS	A	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	64%	28%	33%
Vol Thru, %	82%	5%	6%	60%
Vol Right, %	14%	31%	65%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	330	61	162	219
LT Vol	12	39	46	73
Through Vol	271	3	10	132
RT Vol	47	19	106	14
Lane Flow Rate	398	73	195	264
Geometry Grp	1	1	1	1
Degree of Util (X)	0.554	0.121	0.294	0.388
Departure Headway (Hd)	5.019	5.947	5.425	5.296
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	720	601	662	678
Service Time	3.051	3.999	3.466	3.333
HCM Lane V/C Ratio	0.553	0.121	0.295	0.389
HCM Control Delay	14.1	9.8	10.7	11.7
HCM Lane LOS	B	A	B	B
HCM 95th-tile Q	3.4	0.4	1.2	1.8



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	244	1348	530	50	0	1336
Future Volume (vph)	244	1348	530	50	0	1336
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	1.00	0.91	0.95			0.64
Frpb, ped/bikes	1.00	1.00	0.99			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	1.00	0.99			0.85
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	5085	3468			4053
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	5085	3468			4053
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	252	1390	546	52	0	1377
RTOR Reduction (vph)	0	0	8	0	0	40
Lane Group Flow (vph)	252	1390	590	0	0	1337
Confl. Peds. (#/hr)	67			67	119	
Confl. Bikes (#/hr)				1		4
Turn Type	Prot	NA	NA			Over
Protected Phases	6	6 4	4			6
Permitted Phases						
Actuated Green, G (s)	55.0	90.0	25.0			55.0
Effective Green, g (s)	55.0	90.0	25.0			55.0
Actuated g/C Ratio	0.61	1.00	0.28			0.61
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	1081	5085	963			2476
v/s Ratio Prot	0.14	0.27	c0.17			c0.33
v/s Ratio Perm						
v/c Ratio	0.23	0.27	0.61			0.54
Uniform Delay, d1	7.9	0.0	28.3			10.2
Progression Factor	1.00	1.00	1.00			1.65
Incremental Delay, d2	0.5	0.0	1.2			0.8
Delay (s)	8.4	0.0	29.4			17.5
Level of Service	A	A	C			B
Approach Delay (s)		1.3	29.4		17.5	
Approach LOS		A	C		B	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	71	1591	170	80	240	0	0	70	1
Future Volume (veh/h)	0	0	0	71	1591	170	80	240	0	0	70	1
Initial Q (Qb), veh				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
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1870	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				79	1768	173	89	267	0	0	78	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				178	4252	427	156	387	0	0	561	
Arrive On Green				0.71	0.71	0.71	0.16	0.16	0.00	0.00	0.16	0.00
Sat Flow, veh/h				249	5972	600	652	2534	0	0	3741	0
Grp Volume(v), veh/h				589	928	504	188	168	0	0	78	0
Grp Sat Flow(s),veh/h/ln				1858	1609	1746	1484	1617	0	0	1777	0
Q Serve(g_s), s				13.4	11.7	11.7	10.5	9.8	0.0	0.0	1.9	0.0
Cycle Q Clear(g_c), s				13.4	11.7	11.7	12.4	9.8	0.0	0.0	1.9	0.0
Prop In Lane				0.13		0.34	0.47		0.00	0.00		0.00
Lane Grp Cap(c), veh/h				1323	2291	1243	288	255	0	0	561	
V/C Ratio(X)				0.45	0.40	0.41	0.65	0.66	0.00	0.00	0.14	
Avail Cap(c_a), veh/h				1323	2291	1243	416	388	0	0	853	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				6.1	5.8	5.8	41.0	39.6	0.0	0.0	36.2	0.0
Incr Delay (d2), s/veh				1.1	0.5	1.0	2.5	2.9	0.0	0.0	0.1	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
%ile BackOfQ(50%),veh/ln				4.8	3.5	3.9	4.6	4.1	0.0	0.0	0.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				7.2	6.4	6.8	43.5	42.5	0.0	0.0	36.4	0.0
LnGrp LOS				A	A	A	D	D	A	A	D	
Approach Vol, veh/h					2020			356			78	
Approach Delay, s/veh					6.7			43.0			36.4	
Approach LOS					A			D			D	

Timer - Assigned Phs	2	4			8			
Phs Duration (G+Y+Rc), s	78.2	21.8			21.8			
Change Period (Y+Rc), s	7.0	6.0			6.0			
Max Green Setting (Gmax), s	63.0	24.0			24.0			
Max Q Clear Time (g_c+I1), s	15.4	14.4			3.9			
Green Ext Time (p_c), s	38.3	1.4			0.3			

Intersection Summary		
HCM 6th Ctrl Delay	12.9	
HCM 6th LOS	B	

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	18.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	2953	140	0	110
Future Vol, veh/h	0	0	2953	140	0	110
Conflicting Peds, #/hr	7	0	0	7	3	6
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	1	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	3281	156	0	122

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	-	1732
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	~ 66
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	~ 66
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	SB
HCM Control Delay, s	0	$ 537.9
HCM LOS		F

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	66
HCM Lane V/C Ratio	-	-	1.852
HCM Control Delay (s)	-	-	$ 537.9
HCM Lane LOS	-	-	F
HCM 95th %tile Q(veh)	-	-	11.1

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

Intersection	
Int Delay, s/veh	11.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	102	339	542	0	0	138
Future Vol, veh/h	102	339	542	0	0	138
Conflicting Peds, #/hr	18	1	0	73	73	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	113	377	602	0	0	153

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	773	603	0	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	171	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	367	499	-	0	0	-
Stage 1	547	-	-	0	0	-
Stage 2	859	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	361	499	-	-	-	-
Mov Cap-2 Maneuver	361	-	-	-	-	-
Stage 1	547	-	-	-	-	-
Stage 2	844	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28.5	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	361	499	-
HCM Lane V/C Ratio	-	0.314	0.755	-
HCM Control Delay (s)	-	19.5	31.2	-
HCM Lane LOS	-	C	D	-
HCM 95th %tile Q(veh)	-	1.3	6.5	-



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1305	137	4	27	635	292
Future Volume (veh/h)	1305	137	4	27	635	292
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.94	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1345	126	4	28	655	256
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	3474	1010	171	1597	775	350
Arrive On Green	0.68	0.68	0.68	0.68	0.22	0.22
Sat Flow, veh/h	5274	1484	189	2433	3456	1560
Grp Volume(v), veh/h	1345	126	16	16	655	256
Grp Sat Flow(s),veh/h/ln	1702	1484	919	1617	1728	1560
Q Serve(g_s), s	12.0	3.1	0.1	0.3	19.0	16.0
Cycle Q Clear(g_c), s	12.0	3.1	12.1	0.3	19.0	16.0
Prop In Lane		1.00	0.25		1.00	1.00
Lane Grp Cap(c), veh/h	3474	1010	668	1100	775	350
V/C Ratio(X)	0.39	0.12	0.02	0.01	0.84	0.73
Avail Cap(c_a), veh/h	3474	1010	668	1100	987	446
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.97	0.97	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.3	5.9	5.6	5.4	39.0	37.8
Incr Delay (d2), s/veh	0.3	0.2	0.1	0.0	5.5	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	1.0	0.1	0.1	8.6	6.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.6	6.1	5.6	5.4	44.5	42.3
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h	1471			32	911	
Approach Delay, s/veh	7.5			5.5	43.9	
Approach LOS	A			A	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		76.4		28.6		76.4
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		65.0		30.0		65.0
Max Q Clear Time (g_c+I1), s		14.1		21.0		14.0
Green Ext Time (p_c), s		0.4		2.5		29.3

Intersection Summary		
HCM 6th Ctrl Delay		21.2
HCM 6th LOS		C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	1471	48	0	0	0	0	198	55	49	66	0
Future Volume (veh/h)	55	1471	48	0	0	0	0	198	55	49	66	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.92				1.00		0.90	0.96		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	59	1582	49				0	213	33	53	71	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	1301	3728	1068				0	327	250	143	327	0
Arrive On Green	1.00	1.00	1.00				0.00	0.17	0.17	0.17	0.17	0.00
Sat Flow, veh/h	1781	5106	1462				0	1870	1431	1086	1870	0
Grp Volume(v), veh/h	59	1582	49				0	213	33	53	71	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1462				0	1870	1431	1086	1870	0
Q Serve(g_s), s	0.0	0.0	0.0				0.0	11.1	2.0	5.0	3.4	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0				0.0	11.1	2.0	16.2	3.4	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1301	3728	1068				0	327	250	143	327	0
V/C Ratio(X)	0.05	0.42	0.05				0.00	0.65	0.13	0.37	0.22	0.00
Avail Cap(c_a), veh/h	1301	3728	1068				0	534	409	264	534	0
HCM Platoon Ratio	2.00	2.00	2.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0				0.0	40.4	36.6	47.9	37.2	0.0
Incr Delay (d2), s/veh	0.1	0.3	0.1				0.0	2.2	0.2	1.6	0.3	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
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.0				0.0	5.3	0.7	1.4	1.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.1	0.3	0.1				0.0	42.6	36.8	49.5	37.5	0.0
LnGrp LOS	A	A	A				A	D	D	D	D	A
Approach Vol, veh/h		1690						246			124	
Approach Delay, s/veh		0.3						41.8			42.6	
Approach LOS		A						D			D	

Timer - Assigned Phs	4	6	8
Phs Duration (G+Y+Rc), s	23.3	81.7	23.3
Change Period (Y+Rc), s	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	65.0	30.0
Max Q Clear Time (g_c+I1), s	13.1	2.0	18.2
Green Ext Time (p_c), s	1.2	20.5	0.4

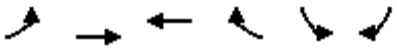
Intersection Summary	
HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	203	76	44	1646	209	62
Future Volume (veh/h)	203	76	44	1646	209	62
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.95	0.98		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	231	54	50	1870	238	13
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2077	473	125	4436	281	250
Arrive On Green	0.73	0.73	0.73	0.73	0.16	0.16
Sat Flow, veh/h	2935	647	111	6306	1781	1585
Grp Volume(v), veh/h	142	143	557	1363	238	13
Grp Sat Flow(s),veh/h/ln	1777	1712	1788	1464	1781	1585
Q Serve(g_s), s	2.1	2.2	0.0	10.9	11.7	0.6
Cycle Q Clear(g_c), s	2.1	2.2	10.3	10.9	11.7	0.6
Prop In Lane		0.38	0.09		1.00	1.00
Lane Grp Cap(c), veh/h	1299	1251	1351	3210	281	250
V/C Ratio(X)	0.11	0.11	0.41	0.42	0.85	0.05
Avail Cap(c_a), veh/h	1299	1251	1351	3210	495	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	1.00	1.00	0.87	0.87
Uniform Delay (d), s/veh	3.5	3.6	4.6	4.7	36.8	32.2
Incr Delay (d2), s/veh	0.2	0.2	0.9	0.4	6.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.7	3.4	2.7	5.5	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	3.7	3.7	5.6	5.1	42.9	32.2
LnGrp LOS	A	A	A	A	D	C
Approach Vol, veh/h	285			1920	251	
Approach Delay, s/veh	3.7			5.3	42.4	
Approach LOS	A			A	D	

Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	70.8				70.8	19.2
Change Period (Y+Rc), s	5.0				5.0	5.0
Max Green Setting (Gmax), s	55.0				55.0	25.0
Max Q Clear Time (g_c+I1), s	4.2				12.9	13.7
Green Ext Time (p_c), s	3.7				33.6	0.5

Intersection Summary						
HCM 6th Ctrl Delay			8.9			
HCM 6th LOS			A			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	146	151	1397	264	88	81
Future Volume (veh/h)	146	151	1397	264	88	81
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.96	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	155	161	1486	253	94	-30
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	188	1548	3692	628	109	97
Arrive On Green	0.11	0.83	0.67	0.67	0.06	0.00
Sat Flow, veh/h	1781	1870	5800	942	1781	1585
Grp Volume(v), veh/h	155	161	1295	444	94	-30
Grp Sat Flow(s),veh/h/ln	1781	1870	1609	1654	1781	1585
Q Serve(g_s), s	7.7	1.5	11.0	11.0	4.7	0.0
Cycle Q Clear(g_c), s	7.7	1.5	11.0	11.0	4.7	0.0
Prop In Lane	1.00			0.57	1.00	1.00
Lane Grp Cap(c), veh/h	188	1548	3217	1103	109	97
V/C Ratio(X)	0.83	0.10	0.40	0.40	0.86	-0.31
Avail Cap(c_a), veh/h	198	1548	3217	1103	495	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.85	0.85	1.00	0.00
Uniform Delay (d), s/veh	39.4	1.5	6.8	6.8	41.9	0.0
Incr Delay (d2), s/veh	23.1	0.1	0.3	0.9	17.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.3	3.3	3.6	2.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	62.6	1.6	7.1	7.8	59.3	0.0
LnGrp LOS	E	A	A	A	E	A
Approach Vol, veh/h		316	1739		64	
Approach Delay, s/veh		31.5	7.3		87.1	
Approach LOS		C	A		F	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	14.5	65.0			79.5	10.5
Change Period (Y+Rc), s	5.0	5.0			5.0	5.0
Max Green Setting (Gmax), s	10.0	40.0			55.0	25.0
Max Q Clear Time (g_c+I1), s	9.7	13.0			3.5	6.7
Green Ext Time (p_c), s	0.0	21.8			2.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

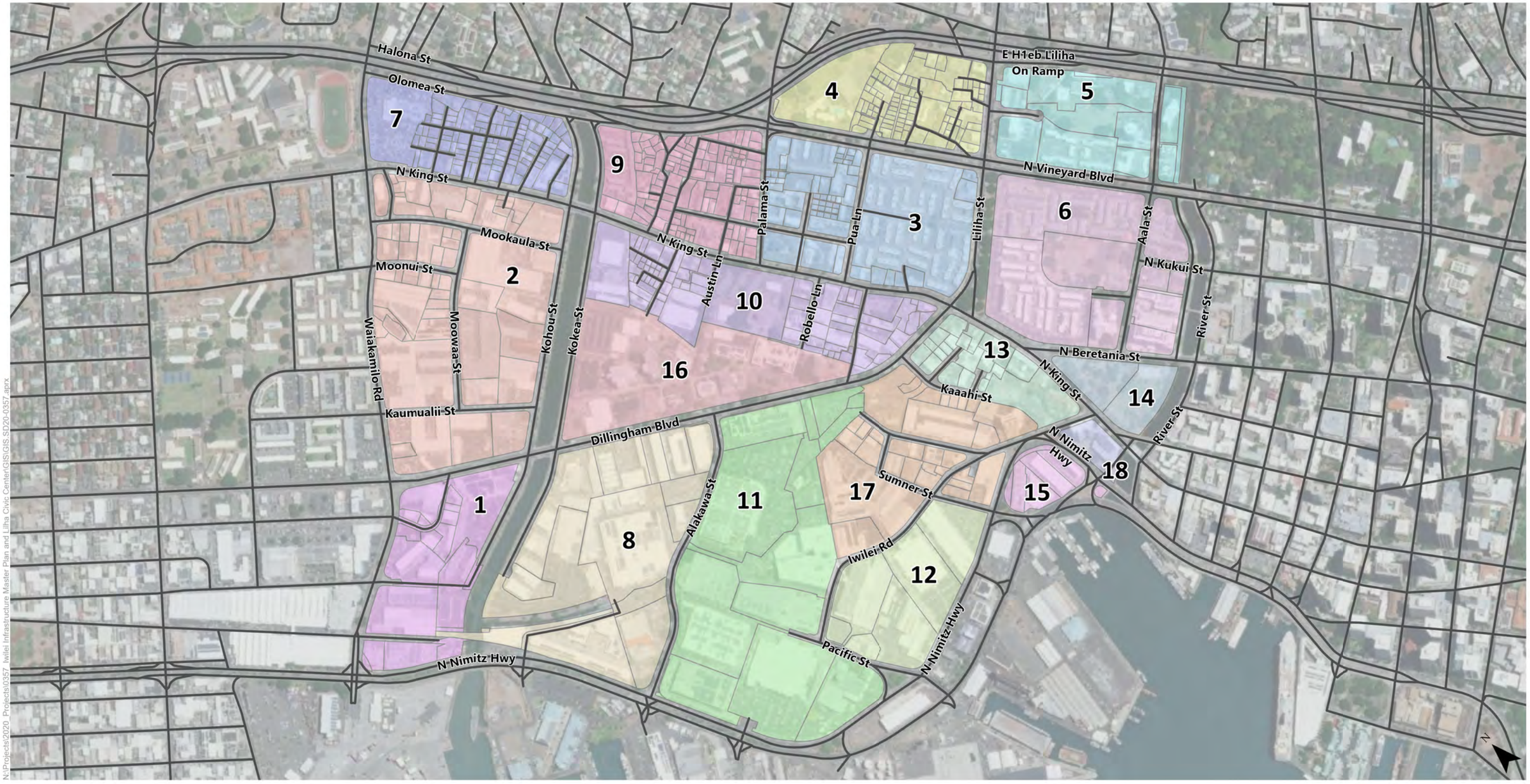


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1314	33	36	938	38	49
Future Volume (veh/h)	1314	33	36	938	38	49
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1383	35	38	987	40	52
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	4444	112	105	2665	87	77
Arrive On Green	0.87	0.87	0.87	0.87	0.05	0.05
Sat Flow, veh/h	5290	130	84	3156	1781	1585
Grp Volume(v), veh/h	919	499	500	525	40	52
Grp Sat Flow(s),veh/h/ln	1702	1847	1539	1617	1781	1585
Q Serve(g_s), s	5.9	5.9	0.0	7.6	2.6	3.9
Cycle Q Clear(g_c), s	5.9	5.9	5.8	7.6	2.6	3.9
Prop In Lane		0.07	0.08		1.00	1.00
Lane Grp Cap(c), veh/h	2954	1603	1367	1403	87	77
V/C Ratio(X)	0.31	0.31	0.37	0.37	0.46	0.67
Avail Cap(c_a), veh/h	2954	1603	1367	1403	824	733
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.09	0.09	1.00	1.00
Uniform Delay (d), s/veh	1.4	1.4	1.4	1.6	55.5	56.1
Incr Delay (d2), s/veh	0.3	0.5	0.1	0.1	3.7	9.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	1.0	1.1	1.2	1.3	1.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	1.7	1.9	1.5	1.6	59.3	65.8
LnGrp LOS	A	A	A	A	E	E
Approach Vol, veh/h	1418			1025	92	
Approach Delay, s/veh	1.8			1.6	62.9	
Approach LOS	A			A	E	

Timer - Assigned Phs	2		4		6
Phs Duration (G+Y+Rc), s	109.1		10.9		109.1
Change Period (Y+Rc), s	5.0		5.0		5.0
Max Green Setting (Gmax), s	54.5		55.5		54.5
Max Q Clear Time (g_c+I1), s	7.9		5.9		9.6
Green Ext Time (p_c), s	25.6		0.3		18.9

Intersection Summary		
HCM 6th Ctrl Delay		3.9
HCM 6th LOS		A

Appendix D: Proposed Land Use Development



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Appendix D

Grouped Parcels Zone Number

Resource Mapping Hawaii, Maxar

Trip Rates

Description	Unit	Rate	AM			PM		
			in	out	total	in	out	total
Residential								
(221) Multifamily Housing Mid-Rise Average Rate	per DU	4.54	23%	77%	0.37	61%	39%	0.39
Retail								
(822) Shopping Plaza (< 40K) Average Rate	per KSF	54.45	60%	40%	2.36	50%	50%	6.59
Office								
(720) General Office Building Average Rate	per KSF	10.84	88%	12%	1.52	17%	83%	1.44
Industrial								
(110) General Light Industrial Average Rate	per KSF	4.87	88%	12%	0.74	14%	86%	0.65
Recreational								
(445) Movie Theater	per KSF	78.09	0%	0%	0.00	94%	6%	6.17

Trip Generation

Zone	TOTAL TRIPS							TOTAL TRIPS + ACTIVE TRANSPORTATION REDUCTION						
	Daily	AM			PM			Daily	AM			PM		
		in	out	total	in	out	total		in	out	total	in	out	total
1	1,681	115	432	547	-23	-69	-92	925	54	203	257	-13	-39	-52
2	31,190	393	2,295	2,688	1,626	776	2,402	17,155	185	1,079	1,264	927	442	1,369
3	12,209	300	699	999	629	479	1,108	6,715	141	329	470	359	273	632
4	1,612	30	104	134	84	52	136	887	14	49	63	48	30	78
5	6,815	204	279	483	363	344	707	3,748	96	131	227	207	196	403
6	29,102	471	1,789	2,260	1,563	956	2,519	16,006	221	841	1,062	891	545	1,436
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	4,705	-23	673	650	198	-92	106	2,588	-11	316	305	113	-52	61
9	-15	-6	42	36	-8	-26	-34	-8	-3	20	17	-5	-15	-20
10	-665	-51	346	295	-113	-242	-355	-366	-24	163	139	-64	-138	-202
11	-3,100	-267	723	456	-303	-680	-983	-1,705	-125	340	215	-173	-388	-561
12	15,072	442	960	1,402	728	840	1,568	8,290	208	451	659	415	479	894
13	10,272	364	378	742	536	567	1,103	5,650	171	178	349	306	323	629
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	-1,163	-32	6	-26	-76	-84	-160	-640	-15	3	-12	-43	-48	-91
16	1,550	66	26	92	84	106	190	853	31	12	43	48	60	108
17	7,202	48	373	421	429	238	667	3,961	23	175	198	245	136	381
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	*116,467*	*2,054*	*9,125*	*11,179*	*5,717*	*3,165*	*8,882*	*64,057*	*966*	*4,290*	*5,256*	*3,261*	*1,804*	5,065

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
15017006	HCC Main Campus	Public/Institutional	0	567,538		0	-	615,017	-	Yes
15012010	650 Iwilei - Cannery Building and Parking	Commercial	0	558,005		1,425	558,005	-	-	Yes
15010010	735 Iwilei Consolidated	Commercial	0	463,669	-	575	70,000	0	0	Yes
15015011	Cannery Row Condo Master	Industrial	0	402,221		0	-	-	-	No
15010010	735 Iwilei - Regal Cinemas, parking structure, banquet hall	Commercial	0	384,161		71	17,343	-	-	Yes
17026004	American Savings Bank - Consolidated	Office/Commercial	0	373,000		0	0	-	-	Yes
15012007	Leased to Home Depot	Commercial	0	239,973		363	88,219	-	-	Yes
15012001	Iwilei Business Center	Industrial	0	232,019		0	-	-	-	No
15012018	La Tour Plaza - Condo Master		0	199,475		160	38,910	-	-	Yes
15020013		Commercial	0	195,769		212	51,456	-	-	Yes
17026004	American Savings Bank	Office/Commercial	0	187,487		0	0	-	-	Yes
15012017	Costco Warehouse and Parking	Commercial	0	152,727		437	106,108	-	-	Yes
15013012	Lowes Home Centers LLC - Retail Store Consolidated	Industrial	0	140,483		371	90,078	-	-	Yes
15013010	Lowes Home Centers LLC - Retail Store	Industrial	0	140,483		0	-	-	-	No
15012003		Industrial	0	140,323		71	17,253	-	-	Yes
15007009	Iwilei Center LLC	Industrial	0	136,390		227	55,110	-	-	Yes
15010015	Office of Hawaiian Affairs	Office	0	136,062		891	114,775	-	-	Yes
15023015		Industrial	0	122,218		175	42,420	-	-	Yes
15015024		Industrial	0	122,217		112	27,260	-	-	Yes
15013023	Lowes Home Centers LLC - Multiple Warehouses	Office	0	117,000		0	-	-	-	No
17023036	Keola Hoʻonanea Senior Housing	High DENSITY Residential (110+ du/acre)	175	110,466		175	-	-	-	No
17023039	Kauluwela #1 Apartments	Medium-High DENSITY Residential (60-110 hu/acre)	127	107,146		127	-	-	-	Yes
15019012	KS 02D - leased to Moowaa Investments LLC	Industrial	0	100,587	-	188	-	-	43,800	Yes
15015026		Office	0	99,291		246	59,715	-	-	Yes
15010007	City Mill	Office	0	92,610		1,000	150,000	-	-	Yes
15021002	KS 10B	Industrial	0	92,234		0	27,132	81,396	-	Yes
17023001	Kauluwela #2 Apartments	Low-Medium DENSITY Residential (8-25 du/acre)	120	90,588		122	-	-	-	Yes
17026010	Hawaiʻi USA Federal Credit Union	Office	0	88,728		150	36,356	-	-	Yes
15008006	Salvation Army	Industrial	0	80,886		500	100,000	-	-	Yes
15010001		Industrial	0	77,234		158	38,435	-	-	Yes
15015008		Industrial	0	76,745		220	53,351	-	-	Yes
17031040		Low-Medium DENSITY Residential (8-25 du/acre)	119	75,750		119	-	-	-	Yes
15004032	KS 11A - xConsolidated	Commercial/Industrial	0	74,826	-	850	8,000	-	0	Yes

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
15020009	HCC Kokea Street Campus	Public/Institutional	0	71,304		0	-	-	-	No
15019015		Industrial	0	70,536		0	-	20,000	-	Yes
15033009	DHHL Kapalama - D. Otani Produce	Industrial	0	68,060		0	0	0	0	No
15020022	KS 09B - xConsolidated	Commercial	0	67,148	-	750	21,500	-		Yes
15021015	KS 10B - xConsolidated	Industrial	0	66,486	54,397	0	30,946	92,839	-	Yes
15020021	KS 09B - leased to RCK Partners Limited	Commercial	0	65,172		267	64,747	-	-	Yes
15006010		Commercial	286	60,440		286	17,169	-	-	Yes
15021023	KS 10A - leased to Kalani Properties LLC	Industrial	0	59,694		0	12,488	37,464	-	Yes
15019002	KS 03B	Industrial	0	58,915		200	-	-	-	Yes
15015022	Kapālama Hale	Public/Institutional	0	55,200		0	-	-	-	No
15020006	DHHL Kapālama - City Square Shopping Center	Commercial	0	52,677		500	18,500	-	-	Yes
15012012	478 Alakawa - Leased to Best Buy	Commercial	0	50,188		800	20,000	-	-	Yes
17031029	Leased to Banyan Housing & HPHA	Medium-High DENSITY Residential (60-110 hu/acre)	55	48,431		55	-	-	-	Yes
17023008	Liliha Square Shopping Center	Office	136	46,633		416	-	-	-	Yes
15005007	KS 15 - leased to 6+	Industrial	0	46,259		150	-	-	-	Yes
15003001	KS 03A - leased to Sen Plex Corporation	Industrial	0	45,684		0	30,000	-	-	Yes
16003064	KS 12 - xConsolidated		2	45,575	-	2	-	-	-	No
16003043	KS 12 - leased to Lithia of Honolulu F LLC		0	44,817		0	-	-	-	No
15020003	KS 09A - Leased to Kokea Center Partners LLC	Commercial	0	38,757	90,434	1,100	31,800	-	0	Yes
17031003	Leased to Pualani Manor Corp	Medium-High DENSITY Residential (60-110 hu/acre)	63	37,828		63	-	-	-	Yes
15020005		Vacant	0	37,282		72	17,373	-	-	Yes
15022010	KS 01B	Commercial	0	37,012		300	20,000	-	-	Yes
15019016	KS 03B - leased to Kalani Properties LLC	Industrial	0	33,920		330	-	-	30,000	Yes
15019017	KS 03B - leased to Kalani Properties LLC	Industrial	0	33,920		400	-	-	30,000	Yes
16002028			0	33,833		0	-	-	-	No
15012015	801 Dillingham - Parking/Warehouse	Commercial	0	33,730	18,313	400	20,000	0	-	Yes
15022003	KS 01B	Commercial	0	33,212		0	17,000	-	-	Yes
15008014	H&J Weinberg Foundation (old Flor a Dec)	Industrial	0	32,775		49	11,860	-	-	Yes
15019007	KS 02A	Industrial	0	31,486		200	-	-	-	Yes
15019004	KS 03B - xConsolidated	Commercial/Industrial	0	30,290	153,114	850	19,000	-	62,200	Yes
15019001	KS 03B	Commercial	0	29,854		200	-	-	-	Yes

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
15009009		Industrial	0	29,850		29	7,037	-	-	Yes
15006001		Commercial	0	29,654		89	21,526	-	-	Yes
15021043	KS 08 - xConsolidated	ROW/Industrial/Public-Institutional	0	29,199	21,283	111	27,048	-	-	Yes
15006008		High DENSITY Residential (110+ du/acre)	118	29,168		118	8,745	-	-	Yes
15022011	KS 01B - xConsolidated	Commercial/Industrial	0	27,598	41,044	661	80,100	-	0	Yes
15015021			0	27,144		86	20,913	-	-	Yes
15023009	KS 04 - leased to Kalani Properties LLC	Commercial	0	27,127		100	20,000	-	-	Yes
15007050	Leased to Intitute for Human Services (IHS)	Industrial	0	26,726		26	6,219	-	-	Yes
15007003		Commercial	72	26,496		72	13,661	-	-	Yes
15023030		Industrial	0	26,337		37	8,914	-	-	Yes
15022001	KS 01A	Commercial	0	26,182		611	32,000	-	-	Yes
15019005	KS 02B	Industrial	0	26,138		300	-	-	-	Yes
16001012		Public/Institutional	0	25,966		44	10,716	-	-	Yes
15022002	KS 01C	Commercial	0	25,747	12,681	296	19,800	-	-	Yes
17033005		Office	0	25,526		43	-	-	-	Yes
15004034	KS 11A - leased to J B L HAWAI'I LTD	Industrial	0	25,328		31	-	-	-	Yes
15023008	KS 04	Commercial	0	25,040		100	20,000	-	-	Yes
15004032	KS 11A - leased to Kokea Partnership	Industrial	0	24,960		0	-	-	-	No
15007033		Commercial	26	24,928		36	8,749	-	-	Yes
15008015	H&J Weinberg Foundation (old Flor a Dec)	Commercial	0	24,640		41	10,018	-	-	Yes
15004033	KS 11A - leased to Hawai'i Hochi Ltd	Commercial	0	24,538		26	-	-	-	Yes
15021015	KS 10B	Industrial	0	24,318		0	3,814	11,443	-	Yes
15007030	Iwilei Center LLC	Office	0	22,909		47	11,509	-	-	Yes
15023055		Industrial	0	21,608		64	15,447	-	-	Yes
15023002	KS 04 - leased to Kalani Properties LLC	Industrial	0	21,120		50	12,727	10,000	-	Yes
16002104	KS 11B - leased to H&K Inc	Parking Lot	0	20,813		23	5,688	-	-	Yes
15023007	KS 04 - leased to Hawaiian Candies & Nuts LTD	Industrial	0	20,772		60	0	-	-	Yes
15019004	KS 03B - leased to Kanraku II	Industrial	0	20,526		87	-	-	-	Yes
15019010	KS 02C	Industrial	0	20,175		0	30,000	-	-	Yes
15023004	KS 04 - leased to Kalani Properties LLC	Industrial	0	20,000		100	10,000	-	-	Yes
15003004		Industrial	0	19,506		41	9,919	-	-	Yes
17029006		Commercial	27	19,212		27	3,671	-	-	Yes
15006036		Commercial	0	18,614		56	13,521	-	-	Yes
15023006	KS 04 - leased to Ruth Meyer & Timaru Ventures LTD	Office	0	18,540		39	10,000	-	-	Yes
17026011		Office	0	18,126		61	14,713	-	-	Yes
15009014		Industrial	0	18,120		38	9,172	-	-	Yes
16002029			0	17,926		0	-	-	-	No
17032021		Commercial	30	17,616		30	-	-	-	No
15023041		Industrial	0	17,111		18	4,304	-	-	Yes

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
15019006	KS 02B - leased to Consolidated Elec Distr	Industrial	0	16,640		0	10,000	-	-	Yes
15003012	US Postal Service	Public/Institutional	0	16,418		0	-	-	-	No
15006033		Commercial	0	16,174		45	10,877	-	-	Yes
15008020	Warehouse - Adjacent to Nimitz	Industrial	0	16,038		0	-	-	-	No
15007037		Industrial	0	15,295		38	9,118	-	-	Yes
15009005		Industrial	0	15,075		36	8,674	-	-	Yes
15021022	KS 10A - xConsolidated	Industrial	0	14,924	44,771	0	15,359	66,108		Yes
17031048		Public/Institutional	1	14,620		46	11,233	-	-	Yes
17031057	7th Day Adventist	Public/Institutional	1	14,515		21	-	-	-	Yes
15023003	KS 04 - leased to Kalani Properties LLC	Industrial	0	14,400		60	12,727	10,000	-	Yes
15023005	KS 04 - leased to Kalani Properties LLC	Commercial	0	14,000		50	0	-	-	Yes
15009001	Leased to C&C Honolulu & Pu'uhonua Nonprofit Corp	Public/Institutional	0	13,782		25	6,080	-	-	Yes
17032022		Commercial	4	13,650		4	-	-	-	No
15007023		Commercial	2	13,335		2	-	-	-	No
15004019		Medium DENSITY Residential (25-60 hu/acre)	9	13,236		11	2,576	-	-	Yes
15009019			0	12,680		13	3,133	-	-	Yes
15009004		Commercial	0	12,552		30	7,403	-	-	Yes
15003011		Industrial	0	12,369		0	-	-	-	No
15005038		Industrial	0	12,204		8	-	-	-	Yes
15003016	KS 14	Commercial	0	12,142		33	8,105	-	-	Yes
15008004	H&J Weinberg Foundation (old Flor a Dec)	Industrial	0	12,045		31	7,500	-	-	Yes
15009006		Industrial	0	12,000		36	8,657	-	-	Yes
15019009	KS 02A	Industrial	0	12,000		100	-	-	-	Yes
15006019		Industrial	0	11,842		33	8,060	-	-	Yes
15023006	KS 04 - xConsolidated	Commercial/Industrial/Office	0	11,810	149,267	520	109,348	-	-	Yes
15019011	KS 02C - leased to Hawaiian Federal Credit Union	Industrial	0	11,775		0	-	-	-	No
15007001	Liliha Civic Center	Public/Institutional	0	11,599		600	242,099	-	-	Yes
15019009	KS 02A - xConsolidated	Commercial/Industrial	0	11,462	14,601	305	12,500	-	0	Yes
15003002	KS 03A - leased to Peiterson, Ltd Ptnshp, & Henry & Mary Leandro	Commercial	0	11,458		400	10,000	-	-	Yes
15005021		Industrial	0	11,325		19	4,664	-	-	Yes
15006009		Industrial	21	11,314		37	8,906	-	-	Yes
15005015		Industrial	0	11,232		6	-	-	-	Yes
15006040		Commercial	64	11,188		64	3,924	-	-	Yes
15003003		Industrial	0	10,800		18	4,258	-	-	Yes
16002063			14	10,785		14	-	-	-	No
15003001	KS 03A - xConsolidated	Commercial/Industrial	0	10,652	45,684	350	9,000	-	0	Yes
15019011	KS 02C - xConsolidated	Industrial	0	10,500	20,175	353	10,500	-	18,200	Yes

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
17026053	Leased to Kukui Gardens/EAH/DGI Associates	Residential	389	10,000		987	20,000	-	0	Yes
15023046		Industrial	0	9,649		23	5,528	-	-	Yes
15005019		Medium DENSITY Residential (25-60 hu/acre)	15	9,648		15	2,592	-	-	Yes
15019008	KS 02A	Commercial	0	9,642		100	-	-	-	Yes
15005022		Industrial	0	9,525		12	2,992	-	-	Yes
15006032		Industrial	0	9,128		27	6,533	-	-	Yes
15007021		Commercial	1	9,036		17	4,200	-	-	Yes
15005011		Public/institutional	0	8,990		9	2,185	-	-	Yes
17031004		Medium DENSITY Residential (25-60 hu/acre)	15	8,970		15	-	-	-	Yes
15023054		Commercial	0	8,829		24	5,723	-	-	Yes
15003015		Commercial	0	8,800		0	-	-	-	No
15006031		Industrial	0	8,780		26	6,296	-	-	Yes
17023025		Low-Medium DENSITY Residential (8-25 du/acre)	18	8,655		18	-	-	-	No
15021029		Industrial	0	8,640		47	11,336	-	-	Yes
17029001		Commercial	11	8,590		11	-	-	-	Yes
15006004		Industrial	0	8,438		22	5,254	-	-	Yes
17026006	Kalanihuia Homes	Medium-High DENSITY Residential (60-110 hu/acre)	150	8,293		500	0	-	0	Yes
15021028		Industrial	0	8,020		26	6,300	-	-	Yes
15023038		Industrial	0	7,978		11	2,609	-	-	Yes
16002102			1	7,951		1	-	-	-	No
15023037		Industrial	0	7,891		13	3,056	-	-	Yes
15006006		Industrial	0	7,736		24	5,926	-	-	Yes
17032023		Office	0	7,410		0	-	-	-	No
17031005		Medium DENSITY Residential (25-60 hu/acre)	9	7,170		9	-	-	-	Yes
15005013		Commercial	0	7,167		13	3,095	-	-	Yes
15023029		Industrial	0	7,164		9	2,276	-	-	Yes
15006018		Medium-High DENSITY Residential (60-110 hu/acre)	15	7,020		16	4,007	-	-	Yes
15005008		Industrial	0	6,904		8	-	-	-	Yes
15023044		Industrial	0	6,900		20	4,801	-	-	Yes
15021033		Industrial	0	6,834		20	4,845	-	-	Yes
16002038			0	6,604		0	-	-	-	No
17031052		Commercial	0	6,588		11	2,792	-	-	Yes

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
15004003		Low-Medium DENSITY Residential (8-25 du/acre)	10	6,480		10	-	-	-	Yes
15009015		Industrial	0	6,411		15	3,576	-	-	Yes
16003021			0	6,409		0	-	-	-	No
15007041		Industrial	0	6,407		22	5,301	-	-	Yes
15023028		Industrial	0	6,396		9	2,067	-	-	Yes
15023011		Commercial	0	6,396		19	4,500	-	-	Yes
15007032		Industrial	0	6,011		23	5,703	-	-	Yes
16001001		Commercial	3	5,994		8	2,061	-	-	Yes
16001069		Commercial	0	5,896		7	1,720	-	-	Yes
15007085			0	5,888		0	-	-	-	No
15004001		Industrial	0	5,886		10	-	-	-	Yes
17029013		Commercial	0	5,870		13	3,085	-	-	Yes
15009016		Industrial	0	5,750		15	3,553	-	-	Yes
15003019		Medium DENSITY Residential (25-60 hu/acre)	5	5,704		5	-	-	-	No
15003022		Commercial	0	5,560		9	2,222	-	-	Yes
15006005		Commercial	0	5,507		15	3,528	-	-	Yes
15004002		Industrial	0	5,500		9	-	-	-	Yes
16001004		Commercial	3	5,484		3	-	-	-	No
15007042		Commercial	0	5,472		16	3,843	-	-	Yes
15003005		Medium DENSITY Residential (25-60 hu/acre)	10	5,430		10	-	-	-	No
15003010	Pacific Auto Service	Commercial	0	5,332		0	-	-	-	No
15005009		Medium-High DENSITY Residential (60-110 hu/acre)	8	5,148		8	-	-	-	No
15004031		Commercial	0	5,093		13	3,224	-	-	Yes
15007043	First Hawaiian Bank	Office	0	4,995		60	14,573	-	-	Yes
15023051		Commercial	0	4,950		18	4,303	-	-	Yes
15009021			0	4,949		47	11,371	-	-	Yes
16003033			0	4,880		0	-	-	-	No
15021042		Commercial	0	4,842		19	4,531	-	-	Yes
15009013		Commercial	0	4,758		47	11,347	-	-	Yes
15004035		Industrial	0	4,560		0	-	-	-	No
17032025		Commercial	0	4,540		0	-	-	-	No
16003020			4	4,534		4	-	-	-	No
17032099			0	4,529		8	2,020	-	-	Yes
15021039		Industrial	0	4,500		0	-	-	-	No
15007026		Industrial	0	4,480		0	-	-	-	No
15021032		Industrial	0	4,456		10	2,458	-	-	Yes
15023019		Commercial	0	4,442		7	1,770	-	-	Yes
15007019		Commercial	0	4,416		15	3,700	-	-	Yes

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
15019006	KS 02B - xConsolidated	Industrial	0	4,397	77,197	339	5,000	-	0	Yes
15006017		Vacant	0	4,380		17	4,087	-	-	Yes
16001122	Honolulu Redevelopment Agency	Low-Medium DENSITY Residential (8-25 du/acre)	14	4,224		14	-	-	-	No
15023035		Commercial	0	4,216		9	2,279	-	-	Yes
16002005		Low DENSITY Residential (1-8 du/acre)	18	4,024		18	-	-	-	Yes
15004009		Industrial	0	4,004		0	-	-	-	No
15007028		Industrial	0	4,000		0	-	-	-	No
17026054	Waena Apartments Consolidated	Residential/Low-Medium DENSITY Residential (8-25 du/acre)	465	4,000		3,000	0	-		Yes
15023048		Industrial	0	4,000		20	4,806	-	-	Yes
15005034		Medium-High DENSITY Residential (60-110 hu/acre)	6	3,933		6	-	-	-	No
15021031		Industrial	0	3,900		20	4,917	-	-	Yes
15007052		Commercial	0	3,899		26	6,219	-	-	Yes
15003006		Commercial	0	3,818		6	1,525	-	-	Yes
15006015		Commercial	1	3,780		11	2,601	-	-	Yes
17032020		Commercial	0	3,736		0	-	-	-	No
15007046		Commercial	0	3,714		29	7,030	-	-	Yes
15005037		Medium-High DENSITY Residential (60-110 hu/acre)	10	3,640		10	-	-	-	Yes
17031032		Medium DENSITY Residential (25-60 hu/acre)	3	3,546		3	-	-	-	No
16001030		Public/Institutional	2	3,500		2	-	-	-	No
15023052		Industrial	0	3,462		18	4,384	-	-	Yes
15007054		Office	0	3,417		10	2,352	-	-	Yes
16003002			4	3,344		4	-	-	-	No
17033001		Commercial	0	3,333		0	-	-	-	No
15007049		Industrial	0	3,321		10	2,352	-	-	Yes
15023034		Industrial	0	3,220		0	-	-	-	No
17026054	Waena Apartments	Residential	366	3,200		2,400	0	-	-	Yes
15005010		Commercial	0	3,180		5	-	-	-	Yes
17031062			0	3,175		29	7,087	-	-	Yes
15007048		Industrial	0	3,170		10	2,352	-	-	Yes
15007031		Industrial	0	3,072		10	2,429	-	-	Yes
16002069			5	3,072		5	-	-	-	No
15023018		Commercial	0	3,053		11	2,636	-	-	Yes
15023033		Commercial	0	3,036		0	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
17033044		Commercial	0	3,034		0	-	-	-	No
17029012		Commercial	1	3,030		7	1,746	-	-	Yes
15004021		Commercial	0	2,944		0	-	-	-	No
15006034		Commercial	0	2,888		0	-	-	-	No
16001068		Commercial	2	2,880		2	-	-	-	No
17033045		Commercial	3	2,880		3	-	-	-	No
15003007		Medium-High DENSITY Residential (60-110 hu/acre)	4	2,856		4	-	-	-	No
16002103	KS 03C - leased to Seven-Eleven (Hawai'i) Inc		1	2,820		1	-	-	-	No
15003018		Commercial	0	2,726		0	-	-	-	No
16002036			0	2,724		0	-	-	-	No
15010008	Polynesian Hospitality Bus Depot	Industrial	0	2,601		31	7,479	-	-	Yes
16003032			0	2,294		0	-	-	-	No
15005035		Industrial	0	2,272		0	-	-	-	No
16001103		Commercial	3	2,240		3	-	-	-	No
15004026		Commercial	0	2,082		0	-	-	-	No
16002062			0	2,028		0	-	-	-	No
15020020	KS 09B - leased to RCK Partners Limited	Commercial	0	1,976		50	3,952	-	-	Yes
17029011		Commercial	0	1,932		7	1,675	-	-	Yes
16002111			6	1,920		6	-	-	-	No
15007055		Commercial	0	1,907		20	4,908	-	-	Yes
16001019		Commercial	2	1,792		2	-	-	-	No
16002039			0	1,740		0	-	-	-	No
16001014		Medium-High DENSITY Residential (60-110 hu/acre)	4	1,680		4	-	-	-	No
17029014		Commercial	0	1,624		13	3,150	-	-	Yes
16003001			2	1,610		2	-	-	-	No
16003042	KS 12 - leased to Lithia of Honolulu F LLC		0	1,458		0	-	-	-	No
15009018		Commercial	0	1,428		0	-	-	-	No
15009003	Leased to C&C Honolulu	Public/Institutional	0	1,400		0	-	-	-	No
15023050		Commercial	0	1,400		10	2,491	-	-	Yes
15004014		Medium DENSITY Residential (25-60 hu/acre)	2	1,320		2	-	-	-	No
15023016		Commercial	0	1,288		22	5,401	-	-	Yes
15004016		Medium DENSITY Residential (25-60 hu/acre)	2	1,152		2	-	-	-	No
15006007		Commercial	0	1,056		12	3,035	-	-	Yes
15022009		Commercial	0	990		29	0	-	-	Yes

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
17032019		Low DENSITY Residential (1-8 du/acre)	2	840		10	-	-	-	Yes
17026013	Waena Apartments	Low-Medium DENSITY Residential (8-25 du/acre)	102	800		600	-	-	-	Yes
15004007		Commercial	0	720		0	-	-	-	No
15004006		Vacant	1	700		1	-	-	-	No
15022006	KS 01B	Commercial	0	671		10	0	0	0	Yes
15023053		Commercial	0	598		21	4,988	-	-	Yes
15007006		Parking Lot	0	528		36	8,792	-	-	Yes
15020012			0	300		0	-	-	-	No
17031063	7th Day Adventist	Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17027001	ʻAʻala Park	Open Space	0	-		0	-	-	-	No
17027002	ʻAʻala Park	Open Space	0	-		0	-	-	-	No
15012014	Access/Parking	Vacant	0	-		0	0	-	-	Yes
17023034	Aloha United Way	Office	0	-		0	-	-	-	No
17026016	American Savings Bank	Office/Commercial	0	-		0	0	-	-	Yes
16002132	Auld Lane Mini Park	Open Space	0	-		0	-	-	-	No
17026008	Beretania Community Park	Open Space	0	-		0	-	-	-	No
15003020	Board of Water Supply	Public/Institutional	0	-		0	-	-	-	No
15020004	Drainage Way and Kapālama Canal	Water	0	-		0	-	-	-	No
15007086	HART	ROW	0	-		0	-	-	-	No
15007029	Iwilei Center LLC	Commercial	0	-		0	-	-	-	No
15033014	Kalihi Fire Station	Public/Institutional	0	-	11,745	0	-	-	-	No
15033015	Kalihi Fire Station	Public/Institutional	0	-	-	0	-	-	-	No
16001101	Kalihi-Pālama Health Center	Vacant	1	-		1	-	-	-	No
16001102	Kalihi-Pālama Health Center	Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
16001031	Kanoa Street Mini Park	Open Space	0	-		0	-	-	-	No
16000000	Kapālama Canal - Ma uka	ROW/Water/Greenway	0	-		0	-	-	-	No
15000000	Kapālama Catalytic Canal	ROW/Water/Greenway	0	-		0	-	-	-	No
15020011	Kapālama Catalytic Canal	ROW/Water/Greenway	0	-		0	-	-	-	No
17023040	Kauluwela Community Park	Open Space	0	-		0	-	-	-	No
17023041	Kauluwela Elementary School	Public/Institutional	0	-		0	-	-	-	No
17023033	Kauluwela Mall	Greenway	0	-		0	-	-	-	No
17023035	Kauluwela Mall - Remnant	Office	0	-		0	-	-	-	No
17026017	Kila Kalikimaka Mall	Office	0	-		0	-	-	-	No
17033007	Korean Christian Church	Low DENSITY Residential (1-8 du/acre)	6	-		29	-	-	-	Yes
15022005	KS 01B	Commercial	0	-		0	0	-	-	No
15022004	KS 01B	Commercial	0	-		11	0	-	-	Yes

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
15022008	KS 01B	Industrial	0	-		16	0	-	-	Yes
15019003	KS 03B	Industrial	0	-		22	0	-	-	Yes
15021046	KS 08	ROW	0	-		0	-	-	-	No
15021051	KS 08	Industrial	0	-		0	-	-	-	No
15021041	KS 08 - leased to JBL Hawai'i LTD		0	-		0	-	-	-	No
15020008	KS 09B - leased to RCK Partners Limited	Commercial	0	-		0	-	-	-	No
15020022	KS 09B - leased to RCK Partners Limited (ROW??)	ROW	0	-		0	-	-	-	No
16003034	KS 12 - leased to Lithia of Honolulu F LLC		1	-		1	-	-	-	No
16003064	KS 12 - leased to Lithia of Honolulu F LLC		1	-		1	-	-	-	No
15009002	Leased to C&C Honolulu	Office	0	-		0	-	-	-	No
15008005	Leased to H&J Weinberg Foundation	Open Space	0	-		0	-	-	-	No
15007002	Leased to Senior Residence at Iwilei	Vacant	160	-		160	-	-	-	No
17023043	Liliha Library	Public/Institutional	0	-		0	-	-	-	No
15010016	Lowes Home Centers LLC - ROW	Industrial	0	-		0	-	-	-	No
15010018	Lowes Home Centers LLC - ROW	Commercial	0	-		0	-	-	-	No
15012019	Lowes Home Centers LLC - ROW	Vacant	0	-		0	-	-	-	No
17029002	Methodist Episcopal Church	Public/Institutional	0	-		18	-	-	-	Yes
17031050	Olu Hale Kanoa Condo Master	Medium-High DENSITY Residential (60-110 hu/acre)	28	-		28	-	-	-	Yes
17045001	Pālama Settlement	Open Space	1	-		227	-	-	-	Yes
15006022	Parking/ROW	Parking Lot	0	-		0	-	-	-	No
15006030	Parking/ROW	Parking Lot	0	-		0	-	-	-	No
15005016	Princess Victoria Ka'iulani Elementary School	Public/Institutional	0	-		0	-	-	-	No
15020018	Remnant	Vacant	0	-		0	-	-	-	No
15020015	ROW	ROW	0	-		0	-	-	-	No
17032086	ROW	ROW	0	-		0	-	-	-	No
15005036	ROW/Remnant	ROW	0	-		0	-	-	-	No
15008009	ROW/Remnant	ROW	0	-		0	-	-	-	No
15015013	ROW/Remnant		0	-		0	-	-	-	No
15015020	ROW/Remnant		0	-		0	-	-	-	No
16002134	ROW/Remnant	ROW	0	-		0	-	-	-	No
17023042	ROW/Remnant	Public/Institutional	0	-		0	-	-	-	No
16002007	ROW/Remnant - H1	ROW	0	-		0	-	-	-	No
17033040	ROW/Remnant - Kiapu Place/H1	ROW	0	-		0	-	-	-	No
15008018	ROW/Remnant - Nimitz Hwy	ROW	0	-		0	-	-	-	No
17023037	ROW/Remnant - Vineyard Adjacent to Salvation Army	Office	0	-		0	-	-	-	No
17032044	ROW/Remnant - Vineyard and Pua	Open Space	0	-		0	-	-	-	No
17032046	ROW/Remnant - Vineyard and Pua	Open Space	0	-		0	-	-	-	No
17031011	ROW-Flag Lot	ROW	0	-		0	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
17031020	ROW-Flag Lot	ROW	0	-		0	-	-	-	No
17031045	ROW-Flag Lot	ROW	0	-		0	-	-	-	No
17032073	ROW-Flag Lot	ROW	0	-		0	-	-	-	No
17032087	ROW-Flag Lot	ROW	0	-		0	-	-	-	No
15012011	Sidewalk/ROW	ROW	0	-		0	0	-	-	Yes
15010014	Sidewalk/ROW	ROW	0	-		0	0	-	-	Yes
15040003	State of HI DOT Harbors Div	Public/Institutional	0	-		0	-	-	-	No
17026015	Storage - Remnant	Office	0	-		0	-	-	-	No
15003008		Parking Lot	0	-		0	-	-	-	No
15003017		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
15004004		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
15004005		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
15004010		Medium DENSITY Residential (25-60 hu/acre)	2	-		2	-	-	-	No
15004011		Medium DENSITY Residential (25-60 hu/acre)	2	-		2	-	-	-	No
15004012		Medium DENSITY Residential (25-60 hu/acre)	2	-		2	-	-	-	No
15004013		Medium DENSITY Residential (25-60 hu/acre)	2	-		2	-	-	-	No
15004015		Parking Lot	0	-		0	-	-	-	No
15004017		Medium DENSITY Residential (25-60 hu/acre)	2	-		2	-	-	-	No
15004024		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
15004025		Medium DENSITY Residential (25-60 hu/acre)	4	-		4	-	-	-	No
15004027		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
15004028		ROW	0	-		0	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
15004039		Medium DENSITY Residential (25-60 hu/acre)	2	-		2	-	-	-	No
15004040		ROW	0	-		0	-	-	-	No
15006013		Commercial	0	-		0	-	-	-	No
15006016		Parking Lot	0	-		0	-	-	-	No
15006021		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
15006023		Medium DENSITY Residential (25-60 hu/acre)	2	-		2	-	-	-	No
15006024		Medium DENSITY Residential (25-60 hu/acre)	2	-		2	-	-	-	No
15006025		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
15006044			0	-		0	-	-	-	No
15007016		Public/Institutional	0	-		0	-	-	-	No
15008001			251	-		251	-	-	-	No
15008019			0	-		0	-	-	-	No
15009011		Commercial	0	-		0	-	-	-	No
15009022			0	-		0	-	-	-	No
15013002			0	-		0	-	-	-	No
15013017			0	-		0	-	-	-	No
15021001		ROW	0	-		0	-	-	-	No
15023023			0	-		0	-	-	-	No
16001002		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001005		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001006		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001007		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		2	-	-	-	No
16001008		Low DENSITY Residential (1-8 du/acre)	1	-		1	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
16001010		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001013		Commercial	0	-		0	-	-	-	No
16001015		Low-Medium DENSITY Residential (8-25 du/acre)	0	-		0	-	-	-	No
16001016		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001017		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001020		Low-Medium DENSITY Residential (8-25 du/acre)	3	-		3	-	-	-	No
16001022		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001023		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001024		Medium DENSITY Residential (25-60 hu/acre)	2	-		2	-	-	-	No
16001027		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001029		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001033		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		2	-	-	-	No
16001034		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001035		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001039		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
16001040		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
16001041		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001042		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
16001043		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
16001044		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001045		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
16001046		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
16001047		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001048		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001049		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
16001055		ROW	0	-		0	-	-	-	No
16001057		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001059		Low-Medium DENSITY Residential (8-25 du/acre)	0	-		0	-	-	-	No
16001061		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001072		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
16001075		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001076		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001077		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001078		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001080		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001081		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001082		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001083		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001089		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
16001098			0	-		0	-	-	-	No
16001099			0	-		0	-	-	-	No
16001100		ROW	0	-		0	-	-	-	No
16001104		Commercial	1	-		1	-	-	-	No
16001105		Industrial	0	-		0	-	-	-	No
16001106		Vacant	0	-		0	-	-	-	No
16001107		ROW	0	-		0	-	-	-	No
16001111		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001112		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001113		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		2	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
16001114		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001115		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001116		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
16001117		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
16001118		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
16001119		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001121		ROW	0	-		0	-	-	-	No
16001124		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16001126			0	-		0	-	-	-	No
16001127			0	-		0	-	-	-	No
16002002		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002003		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002006		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		2	-	-	-	No
16002008		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		2	-	-	-	No
16002009		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002010		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002011		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
16002012		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002013		Low-Medium DENSITY Residential (8-25 du/acre)	3	-		3	-	-	-	No
16002014		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002015		Low-Medium DENSITY Residential (8-25 du/acre)	0	-		0	-	-	-	No
16002016		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002030			1	-		1	-	-	-	No
16002031			1	-		1	-	-	-	No
16002032			1	-		1	-	-	-	No
16002033			1	-		1	-	-	-	No
16002034			1	-		1	-	-	-	No
16002035			1	-		1	-	-	-	No
16002037			2	-		2	-	-	-	No
16002041			0	-		0	-	-	-	No
16002042			1	-		1	-	-	-	No
16002043			1	-		1	-	-	-	No
16002044			1	-		1	-	-	-	No
16002045			1	-		1	-	-	-	No
16002046			1	-		1	-	-	-	No
16002047			1	-		1	-	-	-	No
16002048			1	-		1	-	-	-	No
16002049			2	-		2	-	-	-	No
16002054			1	-		1	-	-	-	No
16002055			2	-		2	-	-	-	No
16002056			3	-		3	-	-	-	No
16002057			1	-		1	-	-	-	No
16002058			1	-		1	-	-	-	No
16002059			2	-		2	-	-	-	No
16002060			1	-		1	-	-	-	No
16002064			1	-		1	-	-	-	No
16002065			1	-		1	-	-	-	No
16002066			2	-		2	-	-	-	No
16002067			1	-		1	-	-	-	No
16002068			1	-		1	-	-	-	No
16002071			1	-		1	-	-	-	No
16002072			2	-		2	-	-	-	No
16002073			1	-		1	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
16002074			2	-		2	-	-	-	No
16002075			1	-		1	-	-	-	No
16002076			1	-		1	-	-	-	No
16002077			1	-		1	-	-	-	No
16002078			4	-		4	-	-	-	No
16002079			4	-		4	-	-	-	No
16002080			1	-		1	-	-	-	No
16002081			1	-		1	-	-	-	No
16002085			0	-		0	-	-	-	No
16002086			1	-		1	-	-	-	No
16002087			1	-		1	-	-	-	No
16002088			0	-		0	-	-	-	No
16002090			0	-		0	-	-	-	No
16002093		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002108			1	-		1	-	-	-	No
16002109			2	-		2	-	-	-	No
16002114			0	-		0	-	-	-	No
16002115		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002125		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002126		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002127		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002128		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002129		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002130		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002131		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
16002133			0	-		0	-	-	-	No
16002136			1	-		1	-	-	-	No
16002137			0	-		0	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
16002138			0	-		0	-	-	-	No
16002139			2	-		2	-	-	-	No
16002140			1	-		1	-	-	-	No
16002141			1	-		1	-	-	-	No
16002142			1	-		1	-	-	-	No
16002143			1	-		1	-	-	-	No
16003003			1	-		1	-	-	-	No
16003004			1	-		1	-	-	-	No
16003005			1	-		1	-	-	-	No
16003006			2	-		2	-	-	-	No
16003007			2	-		2	-	-	-	No
16003008			1	-		1	-	-	-	No
16003009			2	-		2	-	-	-	No
16003010			5	-		5	-	-	-	No
16003011			1	-		1	-	-	-	No
16003012			1	-		1	-	-	-	No
16003013		Public/Institutional	0	-		0	-	-	-	No
16003017			3	-		3	-	-	-	No
16003018			2	-		2	-	-	-	No
16003019			3	-		3	-	-	-	No
16003023			1	-		1	-	-	-	No
16003024			2	-		2	-	-	-	No
16003025			1	-		1	-	-	-	No
16003026			2	-		2	-	-	-	No
16003027			3	-		3	-	-	-	No
16003028			1	-		1	-	-	-	No
16003029			1	-		1	-	-	-	No
16003030			1	-		1	-	-	-	No
16003031			1	-		1	-	-	-	No
16003035			5	-		5	-	-	-	No
16003036			6	-		6	-	-	-	No
16003037			3	-		3	-	-	-	No
16003038			1	-		1	-	-	-	No
16003039			1	-		1	-	-	-	No
16003040			1	-		1	-	-	-	No
16003041			1	-		1	-	-	-	No
16003065			3	-		3	-	-	-	No
16003070			2	-		2	-	-	-	No
16003075			1	-		1	-	-	-	No
16003078			1	-		1	-	-	-	No
16003085			2	-		2	-	-	-	No
16003088			1	-		1	-	-	-	No
16003090			1	-		1	-	-	-	No
16003091			1	-		1	-	-	-	No
16008001			0	-		0	-	-	-	No
17026012		Public/Institutional	1	-		1	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
17031007		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031008		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031009		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031010		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031012		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031013		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031014		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031015		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031016		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031017		Medium DENSITY Residential (25-60 hu/acre)	2	-		2	-	-	-	No
17031018		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031019		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031021		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031022		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031023		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
17031024		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
17031025		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031033		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031034		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031035		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031037		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		2	-	-	-	No
17031042		Medium DENSITY Residential (25-60 hu/acre)	3	-		3	-	-	-	No
17031043		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031044		Medium DENSITY Residential (25-60 hu/acre)	2	-		2	-	-	-	No
17031046		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031053		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17031054		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032004		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032005		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032007		Medium DENSITY Residential (25-60 hu/acre)	0	-		0	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
17032009		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		2	-	-	-	No
17032010		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		2	-	-	-	No
17032011		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		2	-	-	-	No
17032012		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032013		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032014		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032015		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032016		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032017		Public/Institutional	0	-		0	-	-	-	No
17032030		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032031		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032032		Medium DENSITY Residential (25-60 hu/acre)	2	-		2	-	-	-	No
17032033		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032034		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032035		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
17032036		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032037		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032038		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032039		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032040		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032041		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032042		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032043		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032047		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032048		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
17032049		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032050		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032051		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032052		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032053		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
17032054		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032055		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032056		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032057		Low-Medium DENSITY Residential (8-25 du/acre)	5	-		5	-	-	-	No
17032059		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
17032060		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032061		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032062		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
17032063		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032064		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		2	-	-	-	No
17032066		Vacant	0	-		0	-	-	-	No
17032067		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032068		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032072		Vacant	0	-		0	-	-	-	No
17032074		Vacant	0	-		0	-	-	-	No
17032075		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032076		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
17032079		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032080			0	-		0	-	-	-	No
17032081		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032082		Office	0	-		0	-	-	-	No
17032083		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032084		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032085		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		2	-	-	-	No
17032088		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032089		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032090		Medium DENSITY Residential (25-60 hu/acre)	1	-		1	-	-	-	No
17032091		ROW	0	-		0	-	-	-	No
17032093		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032095			0	-		0	-	-	-	No
17032097		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17032098		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17033002		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No
17033003		Low-Medium DENSITY Residential (8-25 du/acre)	1	-		1	-	-	-	No

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
17033004		Medium DENSITY Residential (25-60 hu/acre)	6	-		6	-	-	-	No
17033030			0	-		0	-	-	-	No
17033046		Medium DENSITY Residential (25-60 hu/acre)	4	-		4	-	-	-	No
17033047		Low-Medium DENSITY Residential (8-25 du/acre)	0	-		0	-	-	-	No
17033049		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		2	-	-	-	No
16001058		Medium DENSITY Residential (25-60 hu/acre)	12	-		12	-	-	-	Yes
16001038		Medium DENSITY Residential (25-60 hu/acre)	12	-		12	-	-	-	Yes
16001021		Low DENSITY Residential (1-8 du/acre)	11	-		11	-	-	-	Yes
17032026		Medium-High DENSITY Residential (60-110 hu/acre)	18	-		18	-	-	-	Yes
17031028		Medium DENSITY Residential (25-60 hu/acre)	20	-		20	-	-	-	Yes
17031006		Medium-High DENSITY Residential (60-110 hu/acre)	48	-		48	-	-	-	Yes
16002096		Low DENSITY Residential (1-8 du/acre)	144	-		144	-	-	-	Yes
16001108		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		4	-	-	-	Yes
16001090		Low DENSITY Residential (1-8 du/acre)	2	-		4	-	-	-	Yes
17032065		Low DENSITY Residential (1-8 du/acre)	3	-		5	-	-	-	Yes

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
16001096		Low DENSITY Residential (1-8 du/acre)	3	-		5	-	-	-	Yes
17031001		Low DENSITY Residential (1-8 du/acre)	3	-		5	-	-	-	Yes
16001051		Low DENSITY Residential (1-8 du/acre)	4	-		6	-	-	-	Yes
16001073		Low DENSITY Residential (1-8 du/acre)	2	-		5	-	-	-	Yes
17031002		Low DENSITY Residential (1-8 du/acre)	2	-		5	-	-	-	Yes
16001026		Low DENSITY Residential (1-8 du/acre)	2	-		5	-	-	-	Yes
16001009		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		5	-	-	-	Yes
15004008		Low DENSITY Residential (1-8 du/acre)	2	-		5	-	-	-	Yes
16001032		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		5	-	-	-	Yes
16001071		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		5	-	-	-	Yes
16001052		Low DENSITY Residential (1-8 du/acre)	3	-		6	-	-	-	Yes
16001053		Low-Medium DENSITY Residential (8-25 du/acre)	4	-		7	-	-	-	Yes
16001074		Low DENSITY Residential (1-8 du/acre)	5	-		8	-	-	-	Yes
17032096		Low DENSITY Residential (1-8 du/acre)	0	-		4	-	-	-	Yes
16001037		Low DENSITY Residential (1-8 du/acre)	1	-		5	-	-	-	Yes

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
16001092		Low DENSITY Residential (1-8 du/acre)	1	-		5	-	-	-	Yes
16001050		Low DENSITY Residential (1-8 du/acre)	1	-		5	-	-	-	Yes
16002017		Low DENSITY Residential (1-8 du/acre)	1	-		5	-	-	-	Yes
16001036		Low DENSITY Residential (1-8 du/acre)	1	-		5	-	-	-	Yes
16001123		Low DENSITY Residential (1-8 du/acre)	1	-		5	-	-	-	Yes
17032078		Low DENSITY Residential (1-8 du/acre)	1	-		5	-	-	-	Yes
17031027		Low DENSITY Residential (1-8 du/acre)	2	-		6	-	-	-	Yes
17033052		Low DENSITY Residential (1-8 du/acre)	2	-		6	-	-	-	Yes
17031030		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		6	-	-	-	Yes
17033041		Low DENSITY Residential (1-8 du/acre)	2	-		6	-	-	-	Yes
17031026		Low DENSITY Residential (1-8 du/acre)	4	-		8	-	-	-	Yes
16001070		Commercial	0	-		5	-	-	-	Yes
16001054		Low DENSITY Residential (1-8 du/acre)	1	-		6	-	-	-	Yes
15005012		Low DENSITY Residential (1-8 du/acre)	1	-		6	-	-	-	Yes
16001060		Low DENSITY Residential (1-8 du/acre)	4	-		9	-	-	-	Yes

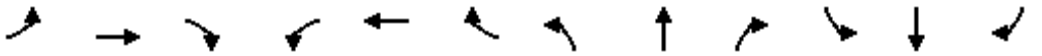
TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
17032069		Low DENSITY Residential (1-8 du/acre)	5	-		10	-	-	-	Yes
17032094		Low-Medium DENSITY Residential (8-25 du/acre)	2	-		8	-	-	-	Yes
16001056		Low DENSITY Residential (1-8 du/acre)	2	-		9	-	-	-	Yes
16001028		Low DENSITY Residential (1-8 du/acre)	8	-		17	-	-	-	Yes
17033006		Low DENSITY Residential (1-8 du/acre)	4	-		20	-	-	-	Yes
17032018		Low DENSITY Residential (1-8 du/acre)	5	-		22	-	-	-	Yes
16001003		Low DENSITY Residential (1-8 du/acre)	1	-		6	1,454	-	-	Yes
16002001		Commercial	0	-		8	1,930	-	-	Yes
15023045		Commercial	0	-		10	2,370	-	-	Yes
15020014	DHHL Kapālama - City Square Shopping Center (Radio Tower)	Industrial	0	-		10	2,499	-	-	Yes
15006042			0	-		11	2,738	-	-	Yes
15005014	Pālama Fire Station	Public/Institutional	0	-		11	2,765	-	-	Yes
16002105		Office	0	-		12	2,896	-	-	Yes
15007047		Industrial	0	-		12	3,034	-	-	Yes
15006020		Low DENSITY Residential (1-8 du/acre)	6	-		13	3,116	-	-	Yes
16002099		Commercial	0	-		13	3,125	-	-	Yes
15006014		Commercial	0	-		15	3,580	-	-	Yes
15005040	Leased to IES Retail, LLC	Commercial	0	-		19	4,516	-	-	Yes
15015004	H&J Weinberg Foundation (long term ground lease to Costco)	Industrial	0	-		19	4,692	-	-	Yes
15006003		Commercial	0	-		22	5,448	-	-	Yes
15004030	KS 11A - leased to Kokea Partnership	Industrial	0	-		24	5,753	-	-	Yes
15006043			0	-		25	6,056	-	-	Yes
15020002	KS 09B - leased to RCK Partners Limited	Commercial	0	-		25	6,111	-	-	Yes
15009010	Leased to C&C Honolulu - Health Services Branch	Public/Institutional	0	-		28	6,896	-	-	Yes
15023013		Industrial	0	-		29	6,959	-	-	Yes

TMK	Project Name	Existing Land Use	Existing Dwelling Unit	Existing Commercial (SF)	Existing Industrial (SF)	Residential Total Dwelling Units (Existing + New)	Commercial - Model OR Landowner input (SF)	IMX - Model OR Landowner Input (SF)	Industrial Landowner Input	New Development (Yes/No)
15023014		Industrial	0	-		29	7,065	-	-	Yes
15006012		Commercial	0	-		33	8,122	-	-	Yes
15015005	H&J Weinberg Foundation (long term ground lease to Costco)	Industrial	0	-		41	9,855	-	-	Yes
15022011	KS 01B	Industrial	0	-		54	10,000	-	-	Yes
15010017	356 Pacific - Parking/Warehouse	Industrial	0	-		143	10,633	-	-	Yes
15021045	KS 08	Industrial	0	-		47	11,353	-	-	Yes
15021024		Parking Lot	0	-		0	2,932	8,795	-	Yes
15021043	KS 08 - leased to Panmer Associates	Public/Institutional	0	-		49	11,975	-	-	Yes
17031064			0	-		56	13,552	-	-	Yes
15015003	H&J Weinberg Foundation (long term ground lease to Costco)	Industrial	0	-		57	13,931	-	-	Yes
15015002	Costco Gas Station	Industrial	0	-		74	18,021	-	-	Yes
15033022	Leased to 4 Wheels Auto	Industrial	0	-		0	5,002	15,006	-	Yes
15010019	735 Iwilei - Regal Cinemas, parking structure, banquet hall	Commercial	0	-		92	22,280	-	-	Yes
15015016	DMV Parking	Parking Lot	0	-		96	23,378	-	-	Yes
15020016	Leased to C&C - Department of Facility Maintenance	Office	0	-		104	25,294	-	-	Yes
15015001	H&J Weinberg Foundation (long term ground lease to Costco)	Parking Lot	0	-		104	25,308	-	-	Yes
15021004	KS 10A - leased to Mortgage Fin & Leasing Corp	Industrial	0	-		0	6,399	19,196	-	Yes
15013012	Lowes Home Centers LLC - Retail Store	Industrial	0	-		143	34,711	-	-	Yes
17029003	Mayor Wright Homes	Low-Medium DENSITY Residential (8-25 du/acre)	364	-		2,500	80,000	-	-	Yes
17023038	Salvation Army	Office	0	-		500	100,000	-	-	Yes
15012020	DHX-Dependable Hawaiian Express (brownfield redevelopment)	Vacant	0		70,911	0	-	-	-	No
15015025	HART ROW/Remnant	ROW	0			0	-	-	-	No
15015027	HART ROW/Remnant	ROW	0			0	-	-	-	No
15021022	KS 10A - ROW	Vacant	0			0	-	-	-	No
15015023	ROW/Remnant	ROW	0			0	-	-	-	No
15021044	ROW/Remnant	ROW	0			0	-	-	-	No
17023024	State of HI DOT Highways Div	ROW	0			0	-	-	-	No
15021047	Undefined-remnant	ROW	0			0	-	-	-	No
15021048	Undefined-remnant	ROW	0			0	-	-	-	No
15021049	Undefined-remnant	ROW	0			0	-	-	-	No
15021050	Undefined-remnant	ROW	0			0	-	-	-	No

Appendix E: Baseline 2035 + Project Intersection Analysis Worksheets

HCM 6th Signalized Intersection Summary
1: Waiakamilo Rd & N. Nimitz Hwy

06/24/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	144	4182	33	0	1700	317	32	9	0	338	47	536
Future Volume (veh/h)	144	4182	33	0	1700	317	32	9	0	338	47	536
Initial Q (Qb), veh	0	0	0	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	0.98	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	150	4356	0	0	1771	0	33	9	0	387	0	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	168	4933		0	2301		46	48		454	0	
Arrive On Green	0.09	0.77	0.00	0.00	0.65	0.00	0.03	0.03	0.00	0.13	0.00	0.00
Sat Flow, veh/h	1781	6696	0	0	3741	0	1781	1870	1560	3563	0	1585
Grp Volume(v), veh/h	150	4356	0	0	1771	0	33	9	0	387	0	0
Grp Sat Flow(s),veh/h/ln	1781	1609	0	0	1777	0	1781	1870	1560	1781	0	1585
Q Serve(g_s), s	16.7	97.8	0.0	0.0	70.0	0.0	3.7	0.9	0.0	21.3	0.0	0.0
Cycle Q Clear(g_c), s	16.7	97.8	0.0	0.0	70.0	0.0	3.7	0.9	0.0	21.3	0.0	0.0
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	168	4933		0	2301		46	48		454	0	
V/C Ratio(X)	0.89	0.88		0.00	0.77		0.72	0.19		0.85	0.00	
Avail Cap(c_a), veh/h	223	4933		0	2301		178	187		713	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.57	0.00	1.00	1.00	0.00	0.09	0.00	0.00
Uniform Delay (d), s/veh	89.6	16.8	0.0	0.0	24.8	0.0	96.7	95.3	0.0	85.4	0.0	0.0
Incr Delay (d2), s/veh	27.9	2.6	0.0	0.0	1.5	0.0	18.5	1.8	0.0	0.6	0.0	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	9.0	32.6	0.0	0.0	28.7	0.0	2.0	0.5	0.0	9.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	117.5	19.5	0.0	0.0	26.2	0.0	115.2	97.2	0.0	86.0	0.0	0.0
LnGrp LOS	F	B		A	C		F	F		F	A	
Approach Vol, veh/h		4506			1771			42			387	
Approach Delay, s/veh		22.7			26.2			111.3			86.0	
Approach LOS		C			C			F			F	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		159.4		30.5	23.8	135.5		10.2				
Change Period (Y+Rc), s		6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s		124.0		40.0	25.0	94.0		20.0				
Max Q Clear Time (g_c+I1), s		99.8		23.3	18.7	72.0		5.7				
Green Ext Time (p_c), s		24.2		1.3	0.2	18.9		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	27.9
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	194	1291	83	388	722	119	97	242	187	166	539	210
Future Volume (veh/h)	194	1291	83	388	722	119	97	242	187	166	539	210
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		0.97	1.00		1.00	1.00		0.93
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	198	1317	81	396	737	113	99	247	0	169	550	188
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	137	1497	92	137	1356	208	122	826		137	613	209
Arrive On Green	0.08	0.44	0.44	0.03	0.15	0.15	0.07	0.23	0.00	0.08	0.24	0.24
Sat Flow, veh/h	1781	3368	207	1781	3050	467	1781	3647	0	1781	2546	866
Grp Volume(v), veh/h	198	693	705	396	429	421	99	247	0	169	383	355
Grp Sat Flow(s),veh/h/ln	1781	1777	1798	1781	1777	1741	1781	1777	0	1781	1777	1635
Q Serve(g_s), s	10.0	46.2	46.5	10.0	29.1	29.1	7.1	7.5	0.0	10.0	27.1	27.4
Cycle Q Clear(g_c), s	10.0	46.2	46.5	10.0	29.1	29.1	7.1	7.5	0.0	10.0	27.1	27.4
Prop In Lane	1.00		0.11	1.00		0.27	1.00		0.00	1.00		0.53
Lane Grp Cap(c), veh/h	137	790	799	137	790	774	122	826		137	428	394
V/C Ratio(X)	1.45	0.88	0.88	2.89	0.54	0.54	0.81	0.30		1.23	0.89	0.90
Avail Cap(c_a), veh/h	137	790	799	137	790	774	137	929		137	465	427
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.89	0.89	0.89	0.56	0.56	0.00	0.68	0.68	0.68
Uniform Delay (d), s/veh	60.0	32.9	33.0	63.3	43.2	43.2	59.7	41.2	0.0	60.0	47.7	47.8
Incr Delay (d2), s/veh	236.4	13.2	13.4	868.0	2.4	2.4	16.9	0.1	0.0	140.3	13.6	15.4
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	18.5	22.4	22.9	37.8	14.5	14.2	3.8	3.3	0.0	9.9	13.6	12.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	296.4	46.1	46.4	931.4	45.6	45.7	76.7	41.3	0.0	200.3	61.4	63.3
LnGrp LOS	F	D	D	F	D	D	E	D		F	E	E
Approach Vol, veh/h		1596			1246			346			907	
Approach Delay, s/veh		77.3			327.2			51.4			88.0	
Approach LOS		E			F			D			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	63.8	13.9	37.3	15.0	63.8	15.0	36.2
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	10.0	54.0	10.0	34.0	10.0	54.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	12.0	48.5	9.1	29.4	12.0	31.1	12.0	9.5
Green Ext Time (p_c), s	0.0	3.9	0.0	2.0	0.0	5.8	0.0	1.6

Intersection Summary	
HCM 6th Ctrl Delay	153.5
HCM 6th LOS	F

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	60	34	154	73	18	55	257	96	29	561	89
Future Volume (veh/h)	45	60	34	154	73	18	55	257	96	29	561	89
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	0.99		0.99	1.00		0.97	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	53	71	34	181	86	12	65	302	84	34	660	89
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	240	253	95	415	145	17	275	1071	675	146	1310	173
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	367	977	369	912	561	66	281	2437	1536	65	2981	393
Grp Volume(v), veh/h	158	0	0	279	0	0	165	202	84	415	0	368
Grp Sat Flow(s),veh/h/ln	1713	0	0	1540	0	0	1101	1617	1536	1813	0	1626
Q Serve(g_s), s	0.0	0.0	0.0	2.8	0.0	0.0	0.4	2.6	1.1	0.0	0.0	5.4
Cycle Q Clear(g_c), s	2.4	0.0	0.0	5.1	0.0	0.0	5.8	2.6	1.1	5.3	0.0	5.4
Prop In Lane	0.34		0.22	0.65		0.04	0.39		1.00	0.08		0.24
Lane Grp Cap(c), veh/h	588	0	0	577	0	0	635	711	675	914	0	715
V/C Ratio(X)	0.27	0.00	0.00	0.48	0.00	0.00	0.26	0.28	0.12	0.45	0.00	0.51
Avail Cap(c_a), veh/h	1365	0	0	1288	0	0	3402	4636	4404	5148	0	4663
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.00	1.00
Uniform Delay (d), s/veh	10.0	0.0	0.0	10.9	0.0	0.0	5.8	5.9	5.5	6.7	0.0	6.7
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	0.2	0.2	0.1	0.4	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	1.5	0.0	0.0	0.4	0.6	0.2	1.3	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.2	0.0	0.0	11.5	0.0	0.0	6.0	6.2	5.6	7.0	0.0	7.3
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		158			279			451			783	
Approach Delay, s/veh		10.2			11.5			6.0			7.2	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	13.6	19.6	13.6	19.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	95.0	25.0	95.0
Max Q Clear Time (g_c+I1), s	4.4	7.4	7.1	7.8
Green Ext Time (p_c), s	0.9	6.1	1.7	3.1

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

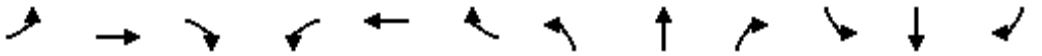
Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	2	10	11	3	117	6	299	23	76	641	13
Future Vol, veh/h	11	2	10	11	3	117	6	299	23	76	641	13
Conflicting Peds, #/hr	10	0	11	8	0	7	11	0	8	7	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	2	11	12	3	124	6	318	24	81	682	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1045	1224	370	865	1219	189	707	0	0	350	0	0
Stage 1	862	862	-	350	350	-	-	-	-	-	-	-
Stage 2	183	362	-	515	869	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	183	178	627	248	179	821	887	-	-	1206	-	-
Stage 1	316	370	-	639	631	-	-	-	-	-	-	-
Stage 2	801	624	-	511	367	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	136	154	614	216	155	807	878	-	-	1197	-	-
Mov Cap-2 Maneuver	136	154	-	216	155	-	-	-	-	-	-	-
Stage 1	310	326	-	629	621	-	-	-	-	-	-	-
Stage 2	662	614	-	439	323	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.5	12.7	0.2	1.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	878	-	-	209	609	1197	-	-
HCM Lane V/C Ratio	0.007	-	-	0.117	0.229	0.068	-	-
HCM Control Delay (s)	9.1	0	-	24.5	12.7	8.2	0.4	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.9	0.2	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	184	1064	149	61	742	265	255	348	78	235	901	533
Future Volume (veh/h)	184	1064	149	61	742	265	255	348	78	235	901	533
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		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	192	1108	150	64	773	0	266	362	69	245	939	385
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	1309	177	79	1210		247	833	157	265	1031	445
Arrive On Green	0.12	0.42	0.42	0.09	0.69	0.00	0.14	0.28	0.28	0.15	0.29	0.29
Sat Flow, veh/h	1781	3130	423	1781	3618	0	1781	2969	559	1781	3554	1534
Grp Volume(v), veh/h	192	628	630	64	773	0	266	215	216	245	939	385
Grp Sat Flow(s),veh/h/ln	1781	1777	1776	1781	1763	0	1781	1777	1752	1781	1777	1534
Q Serve(g_s), s	19.1	57.2	57.6	6.3	22.0	0.0	25.0	17.8	18.2	24.4	45.9	42.8
Cycle Q Clear(g_c), s	19.1	57.2	57.6	6.3	22.0	0.0	25.0	17.8	18.2	24.4	45.9	42.8
Prop In Lane	1.00		0.24	1.00		0.00	1.00		0.32	1.00		1.00
Lane Grp Cap(c), veh/h	213	743	743	79	1210		247	498	491	265	1031	445
V/C Ratio(X)	0.90	0.84	0.85	0.81	0.64		1.08	0.43	0.44	0.93	0.91	0.87
Avail Cap(c_a), veh/h	302	743	743	84	1210		247	498	491	396	1086	469
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.86	0.86	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	78.2	47.1	47.2	81.2	22.0	0.0	77.5	53.0	53.2	75.7	61.7	60.6
Incr Delay (d2), s/veh	22.3	11.3	11.6	36.1	2.2	0.0	78.6	0.6	0.6	16.9	11.1	15.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	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	27.8	28.0	3.6	7.2	0.0	16.9	8.2	8.2	12.5	22.4	18.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	100.5	58.4	58.8	117.4	24.2	0.0	156.1	53.6	53.8	92.6	72.7	75.6
LnGrp LOS	F	E	E	F	C		F	D	D	F	E	E
Approach Vol, veh/h		1450			837			697			1569	
Approach Delay, s/veh		64.2			31.3			92.8			76.5	
Approach LOS		E			C			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.5	80.3	31.7	55.5	26.0	66.8	30.0	57.2
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Max Green Setting (Gmax), s	8.5	72.0	40.0	40.0	30.5	50.0	25.0	55.0
Max Q Clear Time (g_c+I1), s	8.3	59.6	26.4	20.2	21.1	24.0	27.0	47.9
Green Ext Time (p_c), s	0.0	6.8	0.3	2.5	0.3	5.9	0.0	4.3

Intersection Summary	
HCM 6th Ctrl Delay	66.8
HCM 6th LOS	E

Notes

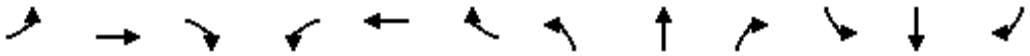
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	943	244	586	0	0	1176
Future Volume (veh/h)	943	244	586	0	0	1176
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	0	0	1870
Adj Flow Rate, veh/h	982	89	610	0	0	1225
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	1121	514	2006	0	0	2006
Arrive On Green	0.32	0.32	0.56	0.00	0.00	0.56
Sat Flow, veh/h	3456	1585	3741	0	0	3741
Grp Volume(v), veh/h	982	89	610	0	0	1225
Grp Sat Flow(s),veh/h/ln	1728	1585	1777	0	0	1777
Q Serve(g_s), s	24.1	3.6	8.1	0.0	0.0	20.6
Cycle Q Clear(g_c), s	24.1	3.6	8.1	0.0	0.0	20.6
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	1121	514	2006	0	0	2006
V/C Ratio(X)	0.88	0.17	0.30	0.00	0.00	0.61
Avail Cap(c_a), veh/h	1344	616	2006	0	0	2006
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	28.7	21.8	10.3	0.0	0.0	13.0
Incr Delay (d2), s/veh	5.9	0.2	0.4	0.0	0.0	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.5	1.3	3.1	0.0	0.0	7.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	34.6	21.9	10.7	0.0	0.0	14.4
LnGrp LOS	C	C	B	A	A	B
Approach Vol, veh/h	1071		610			1225
Approach Delay, s/veh	33.5		10.7			14.4
Approach LOS	C		B			B

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	55.8			55.8	34.2
Change Period (Y+Rc), s	5.0			5.0	5.0
Max Green Setting (Gmax), s	45.0			45.0	35.0
Max Q Clear Time (g_c+I1), s	10.1			22.6	26.1
Green Ext Time (p_c), s	4.7			9.8	3.1

Intersection Summary	
HCM 6th Ctrl Delay	20.7
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	1523	35	89	975	120	33	70	148	213	91	33
Future Volume (vph)	63	1523	35	89	975	120	33	70	148	213	91	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.0	6.0			5.0			5.0	
Lane Util. Factor		0.91		1.00	0.95			1.00			1.00	
Frpb, ped/bikes		1.00		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		1.00		1.00	0.98			0.92			0.99	
Flt Protected		1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)		5050		1770	3450			1701			1774	
Flt Permitted		0.80		0.09	1.00			0.94			0.39	
Satd. Flow (perm)		4055		173	3450			1603			721	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	66	1603	37	94	1026	126	35	74	156	224	96	35
RTOR Reduction (vph)	0	2	0	0	5	0	0	34	0	0	3	0
Lane Group Flow (vph)	0	1704	0	94	1147	0	0	231	0	0	352	0
Confl. Peds. (#/hr)			23			24	20					20
Confl. Bikes (#/hr)			1									
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		81.6		94.0	94.0			25.0			25.0	
Effective Green, g (s)		81.6		94.0	94.0			25.0			25.0	
Actuated g/C Ratio		0.63		0.72	0.72			0.19			0.19	
Clearance Time (s)		6.0		5.0	6.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		2545		215	2494			308			138	
v/s Ratio Prot				0.02	c0.33							
v/s Ratio Perm		c0.42		0.29				0.14			c0.49	
v/c Ratio		0.67		0.44	0.46			0.75			2.55	
Uniform Delay, d1		15.5		9.1	7.5			49.6			52.5	
Progression Factor		1.28		2.03	0.62			1.00			1.00	
Incremental Delay, d2		0.3		1.1	0.5			9.8			717.9	
Delay (s)		20.2		19.5	5.1			59.4			770.4	
Level of Service		C		B	A			E			F	
Approach Delay (s)		20.2			6.2			59.4			770.4	
Approach LOS		C			A			E			F	

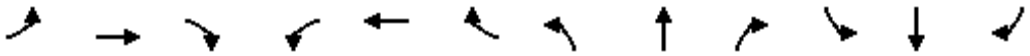
Intersection Summary			
HCM 2000 Control Delay	92.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	115.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	1424	71	115	997	10	64	62	285	18	66	39
Future Volume (veh/h)	38	1424	71	115	997	10	64	62	285	18	66	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	1.00		0.94	0.96		0.94	0.98		0.90
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	40	1499	68	121	1049	10	67	65	254	19	69	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	2776	125	214	2180	21	102	86	271	91	296	77
Arrive On Green	0.60	0.60	0.60	1.00	1.00	1.00	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	70	4590	206	328	3604	34	201	316	995	161	1084	283
Grp Volume(v), veh/h	560	511	536	121	517	542	386	0	0	108	0	0
Grp Sat Flow(s),veh/h/ln	1691	1549	1627	328	1777	1861	1512	0	0	1527	0	0
Q Serve(g_s), s	0.0	17.5	17.5	27.4	0.0	0.0	16.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	15.2	17.5	17.5	44.9	0.0	0.0	22.4	0.0	0.0	4.3	0.0	0.0
Prop In Lane	0.07		0.13	1.00		0.02	0.17		0.66	0.18		0.19
Lane Grp Cap(c), veh/h	1066	937	984	214	1075	1126	460	0	0	464	0	0
V/C Ratio(X)	0.53	0.55	0.55	0.56	0.48	0.48	0.84	0.00	0.00	0.23	0.00	0.00
Avail Cap(c_a), veh/h	1066	937	984	214	1075	1126	467	0	0	471	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.34	0.34	0.34	0.79	0.79	0.79	0.54	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.0	10.5	10.5	7.2	0.0	0.0	31.8	0.0	0.0	25.3	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.8	0.7	8.2	1.2	1.2	7.3	0.0	0.0	0.3	0.0	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	5.8	5.5	5.8	1.5	0.4	0.4	9.0	0.0	0.0	1.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.7	11.3	11.2	15.5	1.2	1.2	39.1	0.0	0.0	25.6	0.0	0.0
LnGrp LOS	B	B	B	B	A	A	D	A	A	C	A	A
Approach Vol, veh/h		1607			1180			386			108	
Approach Delay, s/veh		11.0			2.7			39.1			25.6	
Approach LOS		B			A			D			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	60.4	29.6	60.4	29.6
Change Period (Y+Rc), s	6.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	54.0	25.0	54.0	25.0
Max Q Clear Time (g_c+I1), s	19.5	6.3	46.9	24.4
Green Ext Time (p_c), s	25.2	0.5	5.8	0.2

Intersection Summary	
HCM 6th Ctrl Delay	11.8
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	266	1577	39	7	933	330	75	47	76	178	21	177
Future Volume (vph)	266	1577	39	7	933	330	75	47	76	178	21	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0			6.0			5.0			5.0	
Lane Util. Factor	1.00	0.95			0.91			1.00			1.00	
Frpb, ped/bikes	1.00	1.00			0.98			0.97			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			0.98	
Frt	1.00	1.00			0.96			0.95			0.94	
Flt Protected	0.95	1.00			1.00			0.98			0.98	
Satd. Flow (prot)	1770	3490			4795			1685			1676	
Flt Permitted	0.15	1.00			0.93			0.70			0.66	
Satd. Flow (perm)	287	3490			4442			1208			1133	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	277	1643	41	7	972	344	78	49	79	185	22	184
RTOR Reduction (vph)	0	1	0	0	59	0	0	17	0	0	24	0
Lane Group Flow (vph)	277	1683	0	0	1264	0	0	189	0	0	367	0
Confl. Peds. (#/hr)			30			20			40	40		
Confl. Bikes (#/hr)			3			1						
Bus Blockages (#/hr)	0	4	0	0	0	4	0	0	4	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	94.0	94.0			79.1			25.0			25.0	
Effective Green, g (s)	94.0	94.0			79.1			25.0			25.0	
Actuated g/C Ratio	0.72	0.72			0.61			0.19			0.19	
Clearance Time (s)	5.0	6.0			6.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	320	2523			2702			232			217	
v/s Ratio Prot	c0.07	0.48										
v/s Ratio Perm	c0.56				0.28			0.16			c0.32	
v/c Ratio	0.87	0.67			0.47			0.81			1.69	
Uniform Delay, d1	11.0	9.6			13.9			50.3			52.5	
Progression Factor	3.02	0.40			0.83			1.00			1.00	
Incremental Delay, d2	10.5	0.6			0.1			19.3			329.7	
Delay (s)	43.7	4.4			11.7			69.6			382.2	
Level of Service	D	A			B			E			F	
Approach Delay (s)		10.0			11.7			69.6			382.2	
Approach LOS		A			B			E			F	

Intersection Summary			
HCM 2000 Control Delay	51.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	116.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	1491	228	182	905	14	230	60	148	57	131	12
Future Volume (veh/h)	34	1491	228	182	905	14	230	60	148	57	131	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		0.94	0.98		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	36	1569	226	192	953	13	242	63	111	60	138	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	426	1867	263	237	1902	26	269	54	95	152	326	22
Arrive On Green	1.00	1.00	1.00	1.00	1.00	1.00	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	576	3111	439	262	3170	43	742	193	340	361	1173	77
Grp Volume(v), veh/h	36	881	914	192	466	500	416	0	0	208	0	0
Grp Sat Flow(s),veh/h/ln	576	1777	1773	262	1549	1664	1276	0	0	1612	0	0
Q Serve(g_s), s	0.0	0.0	0.0	54.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	54.0	0.0	0.0	25.0	0.0	0.0	9.0	0.0	0.0
Prop In Lane	1.00		0.25	1.00		0.03	0.58		0.27	0.29		0.05
Lane Grp Cap(c), veh/h	426	1066	1064	237	929	998	418	0	0	499	0	0
V/C Ratio(X)	0.08	0.83	0.86	0.81	0.50	0.50	1.00	0.00	0.00	0.42	0.00	0.00
Avail Cap(c_a), veh/h	426	1066	1064	237	929	998	418	0	0	499	0	0
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.76	0.76	0.76	0.92	0.92	0.92	0.42	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	4.9	0.0	0.0	34.7	0.0	0.0	26.6	0.0	0.0
Incr Delay (d2), s/veh	0.3	5.7	7.0	23.2	1.8	1.7	27.5	0.0	0.0	0.6	0.0	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	0.0	1.7	2.1	1.5	0.5	0.5	12.4	0.0	0.0	3.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.3	5.7	7.0	28.1	1.8	1.7	62.2	0.0	0.0	27.1	0.0	0.0
LnGrp LOS	A	A	A	C	A	A	E	A	A	C	A	A
Approach Vol, veh/h		1831			1158			416			208	
Approach Delay, s/veh		6.3			6.1			62.2			27.1	
Approach LOS		A			A			E			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	60.0	30.0	60.0	30.0
Change Period (Y+Rc), s	6.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	54.0	25.0	54.0	25.0
Max Q Clear Time (g_c+I1), s	2.0	11.0	56.0	27.0
Green Ext Time (p_c), s	42.1	1.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	13.9
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	186	4095	40	0	1485	225	17	32	9	385	51	412
Future Volume (veh/h)	186	4095	40	0	1485	225	17	32	9	385	51	412
Initial Q (Qb), veh	0	0	0	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	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	200	4403	0	0	1597	0	18	34	0	453	0	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	0	2	2	2	2	2	2	2	2
Cap, veh/h	242	4820		0	2324		28	59		540	0	
Arrive On Green	0.07	0.75	0.00	0.00	0.65	0.00	0.02	0.02	0.00	0.15	0.00	0.00
Sat Flow, veh/h	3456	6696	0	0	3647	1585	1171	2511	0	3563	0	1560
Grp Volume(v), veh/h	200	4403	0	0	1597	0	28	24	0	453	0	0
Grp Sat Flow(s),veh/h/ln	1728	1609	0	0	1777	1585	1812	1777	0	1781	0	1560
Q Serve(g_s), s	11.4	108.8	0.0	0.0	56.5	0.0	3.0	2.7	0.0	24.7	0.0	0.0
Cycle Q Clear(g_c), s	11.4	108.8	0.0	0.0	56.5	0.0	3.0	2.7	0.0	24.7	0.0	0.0
Prop In Lane	1.00		0.00	0.00		1.00	0.65		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	242	4820		0	2324		44	43		540	0	
V/C Ratio(X)	0.83	0.91		0.00	0.69		0.63	0.56		0.84	0.00	
Avail Cap(c_a), veh/h	605	4820		0	2324		136	133		623	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.12	0.12	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	91.8	19.9	0.0	0.0	21.7	0.0	96.7	96.5	0.0	82.5	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.5	0.0	0.0	1.7	0.0	14.0	10.8	0.0	8.8	0.0	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	5.1	36.3	0.0	0.0	23.2	0.0	1.6	1.4	0.0	12.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.7	20.4	0.0	0.0	23.4	0.0	110.7	107.3	0.0	91.3	0.0	0.0
LnGrp LOS	F	C		A	C		F	F		F	A	
Approach Vol, veh/h		4603			1597			52			453	
Approach Delay, s/veh		23.5			23.4			109.1			91.3	
Approach LOS		C			C			F			F	

Timer - Assigned Phs	2	4	5	6	8
Phs Duration (G+Y+Rc), s	154.8	35.3	19.0	135.8	9.9
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	135.0	35.0	35.0	95.0	15.0
Max Q Clear Time (g_c+I1), s	110.8	26.7	13.4	58.5	5.0
Green Ext Time (p_c), s	24.2	1.1	0.6	15.6	0.1

Intersection Summary	
HCM 6th Ctrl Delay	28.8
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	119.4

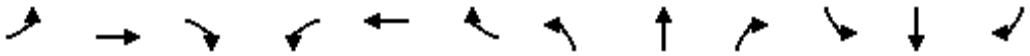
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	218	97	427	157	127	610
Future Vol, veh/h	218	97	427	157	127	610
Conflicting Peds, #/hr	7	0	0	7	7	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	251	111	491	180	146	701

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1238	343	0	0	678	0
Stage 1	588	-	-	-	-	-
Stage 2	650	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	~ 168	653	-	-	910	-
Stage 1	518	-	-	-	-	-
Stage 2	481	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 122	649	-	-	904	-
Mov Cap-2 Maneuver	~ 122	-	-	-	-	-
Stage 1	514	-	-	-	-	-
Stage 2	351	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 614.3	0	2.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	163	904	-
HCM Lane V/C Ratio	-	-	2.221	0.161	-
HCM Control Delay (s)	-	-	$ 614.3	9.7	0.9
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	29.5	0.6	-

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



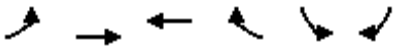
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	1150	637	473	811	25	349	3	285	0	0	0
Future Volume (veh/h)	18	1150	637	473	811	25	349	3	285	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.97	1.00		0.90			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	18	1173	512	483	828	25	358	0	102			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	33	1763	732	397	2445	74	589	0	233			
Arrive On Green	0.02	0.66	0.66	0.22	0.70	0.70	0.17	0.00	0.17			
Sat Flow, veh/h	1781	3554	1475	1781	3489	105	3563	0	1407			
Grp Volume(v), veh/h	18	1173	512	483	422	431	358	0	102			
Grp Sat Flow(s),veh/h/ln	1781	1777	1475	1781	1777	1817	1781	0	1407			
Q Serve(g_s), s	1.3	26.0	28.5	29.0	12.1	12.1	12.1	0.0	8.5			
Cycle Q Clear(g_c), s	1.3	26.0	28.5	29.0	12.1	12.1	12.1	0.0	8.5			
Prop In Lane	1.00		1.00	1.00		0.06	1.00		1.00			
Lane Grp Cap(c), veh/h	33	1763	732	397	1245	1273	589	0	233			
V/C Ratio(X)	0.55	0.67	0.70	1.22	0.34	0.34	0.61	0.00	0.44			
Avail Cap(c_a), veh/h	137	1763	732	397	1245	1273	767	0	303			
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.69	0.69	0.69	1.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	62.9	15.6	16.0	50.5	7.6	7.6	50.3	0.0	48.8			
Incr Delay (d2), s/veh	3.6	1.4	3.8	118.0	0.7	0.7	1.0	0.0	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			
%ile BackOfQ(50%),veh/ln	0.6	9.2	8.8	25.9	4.6	4.7	5.5	0.0	6.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.5	17.0	19.8	168.5	8.4	8.4	51.3	0.0	50.1			
LnGrp LOS	E	B	B	F	A	A	D	A	D			
Approach Vol, veh/h		1703			1336			460				
Approach Delay, s/veh		18.3			66.2			51.1				
Approach LOS		B			E			D				

Timer - Assigned Phs	1	2		4	5	6			
Phs Duration (G+Y+Rc), s	34.0	69.5		26.5	7.4	96.1			
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0			
Max Green Setting (Gmax), s	29.0	58.0		28.0	10.0	77.0			
Max Q Clear Time (g_c+I1), s	31.0	30.5		14.1	3.3	14.1			
Green Ext Time (p_c), s	0.0	21.1		1.4	0.0	14.7			

Intersection Summary			
HCM 6th Ctrl Delay		40.9	
HCM 6th LOS		D	

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	166	1260	769	105	169	241
Future Volume (veh/h)	166	1260	769	105	169	241
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.95	1.00	0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	189	1432	874	84	192	226
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	298	2089	2180	920	205	241
Arrive On Green	1.00	1.00	0.61	0.61	0.28	0.28
Sat Flow, veh/h	383	3559	3647	1500	742	874
Grp Volume(v), veh/h	318	1303	874	84	419	0
Grp Sat Flow(s),veh/h/ln	690	1549	1777	1500	1620	0
Q Serve(g_s), s	17.7	0.0	11.4	2.1	22.8	0.0
Cycle Q Clear(g_c), s	29.1	0.0	11.4	2.1	22.8	0.0
Prop In Lane	0.59			1.00	0.46	0.54
Lane Grp Cap(c), veh/h	487	1900	2180	920	446	0
V/C Ratio(X)	0.65	0.69	0.40	0.09	0.94	0.00
Avail Cap(c_a), veh/h	487	1900	2180	920	450	0
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.36	0.36	1.00	1.00	0.33	0.00
Uniform Delay (d), s/veh	2.5	0.0	8.9	7.1	31.9	0.0
Incr Delay (d2), s/veh	2.5	0.7	0.6	0.2	12.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.2	4.1	0.7	10.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.0	0.7	9.5	7.3	44.4	0.0
LnGrp LOS	A	A	A	A	D	A
Approach Vol, veh/h		1621	958		419	
Approach Delay, s/veh		1.6	9.3		44.4	
Approach LOS		A	A		D	

Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	60.2				60.2	29.8
Change Period (Y+Rc), s	5.0				5.0	5.0
Max Green Setting (Gmax), s	55.0				55.0	25.0
Max Q Clear Time (g_c+I1), s	13.4				31.1	24.8
Green Ext Time (p_c), s	8.0				14.7	0.0

Intersection Summary		
HCM 6th Ctrl Delay	10.0	
HCM 6th LOS	B	

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	222	1493	174	53	524	106	154	140	56	124	222	470
Future Volume (veh/h)	222	1493	174	53	524	106	154	140	56	124	222	470
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		0.90	0.96		0.85	0.92		0.86
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	231	1555	174	55	546	102	160	146	44	129	231	236
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	255	2414	270	71	1788	324	75	454	137	171	257	470
Arrive On Green	0.14	0.52	0.52	0.04	0.42	0.42	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	1781	4617	516	1781	4266	772	889	1320	398	408	749	1368
Grp Volume(v), veh/h	231	1146	583	55	432	216	160	0	190	360	0	236
Grp Sat Flow(s),veh/h/ln	1781	1702	1728	1781	1702	1634	889	0	1718	1157	0	1368
Q Serve(g_s), s	20.4	38.7	38.9	4.9	13.5	14.1	5.3	0.0	13.1	36.6	0.0	21.9
Cycle Q Clear(g_c), s	20.4	38.7	38.9	4.9	13.5	14.1	55.0	0.0	13.1	49.7	0.0	21.9
Prop In Lane	1.00		0.30	1.00		0.47	1.00		0.23	0.36		1.00
Lane Grp Cap(c), veh/h	255	1780	904	71	1427	685	75	0	591	428	0	470
V/C Ratio(X)	0.90	0.64	0.65	0.78	0.30	0.32	2.14	0.00	0.32	0.84	0.00	0.50
Avail Cap(c_a), veh/h	390	1780	904	167	1427	685	75	0	591	428	0	470
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.91	0.91	0.91	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	67.5	27.5	27.5	76.1	30.9	31.1	78.9	0.0	38.7	56.5	0.0	41.6
Incr Delay (d2), s/veh	17.2	1.8	3.5	15.3	0.5	1.1	556.7	0.0	0.3	13.9	0.0	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	10.6	16.3	17.0	2.6	5.8	5.9	14.6	0.0	5.7	15.8	0.0	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	84.7	29.3	31.0	91.4	31.4	32.2	635.6	0.0	39.0	70.4	0.0	42.5
LnGrp LOS	F	C	C	F	C	C	F	A	D	E	A	D
Approach Vol, veh/h		1960			703			350			596	
Approach Delay, s/veh		36.3			36.4			311.8			59.4	
Approach LOS		D			D			F			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	27.9	72.1		60.0	11.3	88.7		60.0
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	35.0	55.0		55.0	15.0	75.0		55.0
Max Q Clear Time (g_c+I1), s	22.4	16.1		57.0	6.9	40.9		51.7
Green Ext Time (p_c), s	0.5	4.9		0.0	0.0	17.2		1.1

Intersection Summary	
HCM 6th Ctrl Delay	66.8
HCM 6th LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1096	74	362	602	249	0	745	847	444	710	212
Future Volume (veh/h)	0	1096	74	362	602	249	0	745	847	444	710	212
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.92	1.00		0.95	1.00		0.98	1.00		0.90
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	1118	75	369	614	223	0	760	714	453	724	213
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	2	2	2	2	2	0	2	2	2	2	2
Cap, veh/h	0	1241	83	466	1044	379	0	828	1011	473	1411	415
Arrive On Green	0.00	0.26	0.26	0.09	0.28	0.28	0.00	0.23	0.23	0.27	0.53	0.53
Sat Flow, veh/h	0	5025	325	3456	2497	906	0	3647	2725	1781	2681	789
Grp Volume(v), veh/h	0	783	410	369	437	400	0	760	714	453	505	432
Grp Sat Flow(s),veh/h/ln	0	1702	1778	1728	1777	1626	0	1777	1363	1781	1870	1599
Q Serve(g_s), s	0.0	40.0	40.1	18.8	38.1	38.2	0.0	37.6	15.4	45.1	31.5	31.6
Cycle Q Clear(g_c), s	0.0	40.0	40.1	18.8	38.1	38.2	0.0	37.6	15.4	45.1	31.5	31.6
Prop In Lane	0.00		0.18	1.00		0.56	0.00		1.00	1.00		0.49
Lane Grp Cap(c), veh/h	0	870	454	466	743	680	0	828	1011	473	984	842
V/C Ratio(X)	0.00	0.90	0.90	0.79	0.59	0.59	0.00	0.92	0.71	0.96	0.51	0.51
Avail Cap(c_a), veh/h	0	870	454	466	743	680	0	849	1027	515	1039	888
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.96	0.96	0.96	0.00	0.91	0.91	0.23	0.23	0.23
Uniform Delay (d), s/veh	0.0	64.8	64.8	79.4	51.4	51.4	0.0	67.4	48.4	65.1	27.7	27.7
Incr Delay (d2), s/veh	0.0	14.2	23.7	8.7	3.3	3.6	0.0	13.6	2.0	10.4	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	19.2	21.3	9.2	18.5	17.0	0.0	18.5	22.4	21.9	14.4	12.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	79.0	88.5	88.1	54.7	55.0	0.0	80.9	50.4	75.5	27.8	27.8
LnGrp LOS	A	E	F	F	D	E	A	F	D	E	C	C
Approach Vol, veh/h		1193			1206			1474			1390	
Approach Delay, s/veh		82.2			65.0			66.1			43.3	
Approach LOS		F			E			E			D	

Timer - Assigned Phs	2	4	5	6	7	8
Phs Duration (G+Y+Rc), s	80.3	99.7	29.3	51.0	52.8	46.9
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	70.0	100.0	19.0	46.0	52.0	43.0
Max Q Clear Time (g_c+I1), s	40.2	33.6	20.8	42.1	47.1	39.6
Green Ext Time (p_c), s	11.8	8.1	0.0	3.2	0.7	2.4

Intersection Summary	
HCM 6th Ctrl Delay	63.5
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.
User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	524	1195	177	339	396	89	145	573	506	208	594	193
Future Volume (veh/h)	524	1195	177	339	396	89	145	573	506	208	594	193
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.93	1.00		0.85	1.00		0.93
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	546	1245	173	353	412	67	151	597	517	217	619	180
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	278	1426	198	377	1649	259	167	444	330	167	662	192
Arrive On Green	0.16	0.32	0.32	0.21	0.38	0.38	0.09	0.25	0.25	0.09	0.25	0.25
Sat Flow, veh/h	1781	4458	619	1781	4398	690	1781	1777	1321	1781	2646	768
Grp Volume(v), veh/h	546	951	467	353	316	163	151	597	517	217	415	384
Grp Sat Flow(s),veh/h/ln	1781	1702	1674	1781	1702	1684	1781	1777	1321	1781	1777	1637
Q Serve(g_s), s	25.0	42.2	42.2	31.2	10.2	10.7	13.4	40.0	40.0	15.0	36.6	36.8
Cycle Q Clear(g_c), s	25.0	42.2	42.2	31.2	10.2	10.7	13.4	40.0	40.0	15.0	36.6	36.8
Prop In Lane	1.00		0.37	1.00		0.41	1.00		1.00	1.00		0.47
Lane Grp Cap(c), veh/h	278	1089	535	377	1277	632	167	444	330	167	444	409
V/C Ratio(X)	1.96	0.87	0.87	0.94	0.25	0.26	0.90	1.34	1.57	1.30	0.93	0.94
Avail Cap(c_a), veh/h	278	1089	535	445	1277	632	167	444	330	167	444	409
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.70	0.70	0.70	1.00	1.00	1.00	0.29	0.29	0.29	0.90	0.90	0.90
Uniform Delay (d), s/veh	67.5	51.3	51.4	62.0	34.4	34.6	71.8	60.0	60.0	72.5	58.7	58.8
Incr Delay (d2), s/veh	441.8	7.1	13.2	25.4	0.5	1.0	17.8	159.2	259.0	168.4	25.2	27.3
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	45.6	19.1	19.7	16.8	4.4	4.7	7.0	37.7	37.1	14.7	19.6	18.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	509.3	58.4	64.5	87.4	34.9	35.6	89.5	219.2	319.0	240.9	83.9	86.1
LnGrp LOS	F	E	E	F	C	D	F	F	F	F	F	F
Approach Vol, veh/h		1964			832			1265			1016	
Approach Delay, s/veh		185.2			57.3			244.5			118.3	
Approach LOS		F			E			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	38.8	56.2	20.0	45.0	30.0	65.0	20.0	45.0
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	40.0	45.0	15.0	40.0	25.0	60.0	15.0	40.0
Max Q Clear Time (g_c+I1), s	33.2	44.2	15.4	38.8	27.0	12.7	17.0	42.0
Green Ext Time (p_c), s	0.6	0.7	0.0	0.7	0.0	3.5	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	165.6
HCM 6th LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	364	333	0	0	0	0	624	608	303	709	0
Future Volume (veh/h)	26	364	333	0	0	0	0	624	608	303	709	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.95	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.98				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	28	387	0				0	664	526	322	754	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	31	432					0	1876	797	432	2374	0
Arrive On Green	0.25	0.25	0.00				0.00	0.53	0.53	0.10	0.67	0.00
Sat Flow, veh/h	126	1738	1560				0	3647	1510	1781	3647	0
Grp Volume(v), veh/h	415	0	0				0	664	526	322	754	0
Grp Sat Flow(s),veh/h/ln	1864	0	1560				0	1777	1510	1781	1777	0
Q Serve(g_s), s	25.8	0.0	0.0				0.0	13.0	30.3	9.5	10.7	0.0
Cycle Q Clear(g_c), s	25.8	0.0	0.0				0.0	13.0	30.3	9.5	10.7	0.0
Prop In Lane	0.07		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	464	0					0	1876	797	432	2374	0
V/C Ratio(X)	0.90	0.00					0.00	0.35	0.66	0.74	0.32	0.00
Avail Cap(c_a), veh/h	621	0					0	1876	797	480	2374	0
HCM Platoon Ratio	1.00	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				0.00	0.09	0.09	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.6	0.0	0.0				0.0	16.4	20.5	12.3	8.4	0.0
Incr Delay (d2), s/veh	12.6	0.0	0.0				0.0	0.0	0.4	5.6	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
%ile BackOfQ(50%),veh/ln	18.4	0.0	0.0				0.0	5.3	10.5	4.2	4.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.1	0.0	0.0				0.0	16.5	20.9	17.9	8.7	0.0
LnGrp LOS	E	A					A	B	C	B	A	A
Approach Vol, veh/h		415						1190			1076	
Approach Delay, s/veh		56.1						18.4			11.5	
Approach LOS		E						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	16.8	68.4		34.8		85.2
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	15.8	50.0		40.0		70.0
Max Q Clear Time (g_c+I1), s	11.5	32.3		27.8		12.7
Green Ext Time (p_c), s	0.4	6.6		2.0		6.4

Intersection Summary	
HCM 6th Ctrl Delay	21.5
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	64	149	19	45	50	125	9	24	18	120	33	111
Future Vol, veh/h	64	149	19	45	50	125	9	24	18	120	33	111
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	157	20	47	53	132	9	25	19	126	35	117
Number of Lanes	1	1	0	0	1	0	0	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	2
HCM Control Delay	10.4	11.6	9.2	10.3
HCM LOS	B	B	A	B

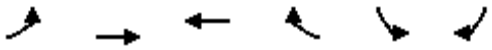
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	27%	0%	100%	0%	20%	100%	0%
Vol Thru, %	73%	0%	0%	89%	23%	0%	23%
Vol Right, %	0%	100%	0%	11%	57%	0%	77%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	33	18	64	168	220	120	144
LT Vol	9	0	64	0	45	120	0
Through Vol	24	0	0	149	50	0	33
RT Vol	0	18	0	19	125	0	111
Lane Flow Rate	35	19	67	177	232	126	152
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.062	0.029	0.118	0.28	0.356	0.227	0.228
Departure Headway (Hd)	6.451	5.6	6.294	5.709	5.533	6.458	5.405
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	555	639	571	631	651	557	665
Service Time	4.186	3.335	4.018	3.433	3.556	4.183	3.13
HCM Lane V/C Ratio	0.063	0.03	0.117	0.281	0.356	0.226	0.229
HCM Control Delay	9.6	8.5	9.9	10.6	11.6	11.1	9.7
HCM Lane LOS	A	A	A	B	B	B	A
HCM 95th-tile Q	0.2	0.1	0.4	1.1	1.6	0.9	0.9

Intersection	
Intersection Delay, s/veh	34.9
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	1	158	74	95	53	128	313	18	99	121	6
Future Vol, veh/h	9	1	158	74	95	53	128	313	18	99	121	6
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	1	190	89	114	64	154	377	22	119	146	7
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.5	18.2	58.9	17.8
HCM LOS	B	C	F	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	28%	5%	33%	44%
Vol Thru, %	68%	1%	43%	54%
Vol Right, %	4%	94%	24%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	459	168	222	226
LT Vol	128	9	74	99
Through Vol	313	1	95	121
RT Vol	18	158	53	6
Lane Flow Rate	553	202	267	272
Geometry Grp	1	1	1	1
Degree of Util (X)	0.983	0.391	0.533	0.531
Departure Headway (Hd)	6.397	6.959	7.175	7.021
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	570	514	500	512
Service Time	4.397	5.033	5.243	5.087
HCM Lane V/C Ratio	0.97	0.393	0.534	0.531
HCM Control Delay	58.9	14.5	18.2	17.8
HCM Lane LOS	F	B	C	C
HCM 95th-tile Q	13.8	1.8	3.1	3.1



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	675	1738	188	166	0	962
Future Volume (vph)	675	1738	188	166	0	962
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	1.00	0.86	0.95			0.64
Frpb, ped/bikes	1.00	1.00	0.99			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	1.00	0.93			0.85
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	6408	3268			4053
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	6408	3268			4053
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	696	1792	194	171	0	992
RTOR Reduction (vph)	0	0	19	0	0	589
Lane Group Flow (vph)	696	1792	346	0	0	403
Confl. Peds. (#/hr)						63
Confl. Bikes (#/hr)				6		
Turn Type	Prot	NA	NA			Over
Protected Phases	6	6 4	4			6
Permitted Phases						
Actuated Green, G (s)	36.6	90.0	43.4			36.6
Effective Green, g (s)	36.6	90.0	43.4			36.6
Actuated g/C Ratio	0.41	1.00	0.48			0.41
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	719	6408	1575			1648
v/s Ratio Prot	c0.39	c0.28	0.11			0.10
v/s Ratio Perm						
v/c Ratio	0.97	0.28	0.22			0.24
Uniform Delay, d1	26.1	0.0	13.5			17.6
Progression Factor	1.11	1.00	0.14			1.00
Incremental Delay, d2	16.5	0.0	0.1			0.3
Delay (s)	45.5	0.0	2.0			17.9
Level of Service	D	A	A			B
Approach Delay (s)		12.7	2.0		17.9	
Approach LOS		B	A		B	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	118	2800	86	85	169	0	0	214	2
Future Volume (veh/h)	0	0	0	118	2800	86	85	169	0	0	214	2
Initial Q (Qb), veh				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
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1870	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				131	3111	93	94	188	0	0	238	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				171	4357	132	174	365	0	0	642	
Arrive On Green				0.67	0.67	0.67	0.18	0.18	0.00	0.00	0.18	0.00
Sat Flow, veh/h				253	6455	196	592	2108	0	0	3741	0
Grp Volume(v), veh/h				960	1508	867	140	142	0	0	238	0
Grp Sat Flow(s),veh/h/ln				1858	1609	1830	998	1617	0	0	1777	0
Q Serve(g_s), s				31.3	25.8	26.4	7.9	7.1	0.0	0.0	5.3	0.0
Cycle Q Clear(g_c), s				31.3	25.8	26.4	13.2	7.1	0.0	0.0	5.3	0.0
Prop In Lane				0.14		0.11	0.67		0.00	0.00		0.00
Lane Grp Cap(c), veh/h				1254	2171	1235	247	292	0	0	642	
V/C Ratio(X)				0.77	0.69	0.70	0.57	0.48	0.00	0.00	0.37	
Avail Cap(c_a), veh/h				1254	2171	1235	360	431	0	0	948	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				9.8	8.9	9.0	36.9	33.1	0.0	0.0	32.4	0.0
Incr Delay (d2), s/veh				4.5	1.9	3.4	2.1	1.2	0.0	0.0	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
%ile BackOfQ(50%),veh/ln				12.0	8.0	9.8	3.1	2.8	0.0	0.0	2.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				14.3	10.8	12.4	39.0	34.4	0.0	0.0	32.7	0.0
LnGrp LOS				B	B	B	D	C	A	A	C	
Approach Vol, veh/h					3335			282			238	
Approach Delay, s/veh					12.2			36.7			32.7	
Approach LOS					B			D			C	

Timer - Assigned Phs	2	4	8
Phs Duration (G+Y+Rc), s	67.7	22.3	22.3
Change Period (Y+Rc), s	7.0	6.0	6.0
Max Green Setting (Gmax), s	53.0	24.0	24.0
Max Q Clear Time (g_c+I1), s	33.3	15.2	7.3
Green Ext Time (p_c), s	19.6	1.1	1.3

Intersection Summary	
HCM 6th Ctrl Delay	15.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	1683	208	0	83
Future Vol, veh/h	0	0	1683	208	0	83
Conflicting Peds, #/hr	0	0	0	9	9	4
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	1	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	1870	231	0	92

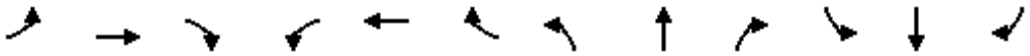
Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	-	1064
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	188
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	186
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	SB
HCM Control Delay, s	0	42
HCM LOS		E

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	186
HCM Lane V/C Ratio	-	-	0.496
HCM Control Delay (s)	-	-	42
HCM Lane LOS	-	-	E
HCM 95th %tile Q(veh)	-	-	2.4

HCM 6th Signalized Intersection Summary
25: Iwilei Rd & Ka'aahi St

07/01/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	0	143	0	52	225	121	255	0	0	211	0
Future Volume (veh/h)	29	0	143	0	52	225	121	255	0	0	211	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.85	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	0	1870	0	1870	1870	1870	1870	0	0	1870	0
Adj Flow Rate, veh/h	31	0	151	0	55	250	127	283	0	0	234	0
Peak Hour Factor	0.95	0.95	0.95	0.90	0.95	0.90	0.95	0.90	0.90	0.90	0.90	0.95
Percent Heavy Veh, %	2	0	2	0	2	2	2	2	0	0	2	0
Cap, veh/h	53	0	0	0	383	277	159	1151	0	0	890	0
Arrive On Green	0.03	0.00	0.00	0.00	0.20	0.20	0.09	0.62	0.00	0.00	0.48	0.00
Sat Flow, veh/h	1781	31		0	1870	1353	1781	1870	0	0	1870	0
Grp Volume(v), veh/h	31	52.7		0	55	250	127	283	0	0	234	0
Grp Sat Flow(s),veh/h/ln	1781	D		0	1870	1353	1781	1870	0	0	1870	0
Q Serve(g_s), s	1.5			0.0	2.2	16.2	6.3	6.2	0.0	0.0	6.7	0.0
Cycle Q Clear(g_c), s	1.5			0.0	2.2	16.2	6.3	6.2	0.0	0.0	6.7	0.0
Prop In Lane	1.00			0.00		1.00	1.00		0.00	0.00		0.00
Lane Grp Cap(c), veh/h	53			0	383	277	159	1151	0	0	890	0
V/C Ratio(X)	0.58			0.00	0.14	0.90	0.80	0.25	0.00	0.00	0.26	0.00
Avail Cap(c_a), veh/h	358			0	405	293	259	1151	0	0	890	0
HCM Platoon Ratio	1.00			1.00	1.00	1.00	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	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	43.1			0.0	29.3	34.9	40.2	7.8	0.0	0.0	14.1	0.0
Incr Delay (d2), s/veh	9.6			0.0	0.2	28.4	8.7	0.5	0.0	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
%ile BackOfQ(50%),veh/ln	0.8			0.0	1.0	7.4	3.1	2.4	0.0	0.0	2.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.7			0.0	29.5	63.3	48.9	8.3	0.0	0.0	14.8	0.0
LnGrp LOS	D			A	C	E	D	A	A	A	B	A
Approach Vol, veh/h					305			410			234	
Approach Delay, s/veh					57.2			20.9			14.8	
Approach LOS					E			C			B	

Timer - Assigned Phs		2			5	6	7	8				
Phs Duration (G+Y+Rc), s		59.9			12.6	47.3	7.2	22.9				
Change Period (Y+Rc), s		4.5			4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s		38.9			13.1	21.3	18.1	19.5				
Max Q Clear Time (g_c+I1), s		8.2			8.3	8.7	3.5	18.2				
Green Ext Time (p_c), s		1.8			0.1	1.0	0.0	0.2				

Intersection Summary		
HCM 6th Ctrl Delay		31.8
HCM 6th LOS		C



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1609	160	4	54	332	179
Future Volume (veh/h)	1609	160	4	54	332	179
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.95	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1659	134	4	56	342	156
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	4586	370	119	1951	468	211
Arrive On Green	0.25	0.25	0.75	0.75	0.14	0.14
Sat Flow, veh/h	6349	492	97	2674	3456	1560
Grp Volume(v), veh/h	1315	478	30	30	342	156
Grp Sat Flow(s),veh/h/ln	1609	1753	1070	1617	1728	1560
Q Serve(g_s), s	20.2	20.3	0.2	0.4	8.5	8.6
Cycle Q Clear(g_c), s	20.2	20.3	20.5	0.4	8.5	8.6
Prop In Lane		0.28	0.14		1.00	1.00
Lane Grp Cap(c), veh/h	3635	1321	851	1218	468	211
V/C Ratio(X)	0.36	0.36	0.03	0.02	0.73	0.74
Avail Cap(c_a), veh/h	3635	1321	851	1218	960	433
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.97	0.97	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	15.9	3.1	2.8	37.3	37.4
Incr Delay (d2), s/veh	0.3	0.7	0.1	0.0	2.2	5.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	9.6	0.1	0.1	3.7	3.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.2	16.7	3.2	2.8	39.5	42.3
LnGrp LOS	B	B	A	A	D	D
Approach Vol, veh/h	1793			60	498	
Approach Delay, s/veh	16.3			3.0	40.4	
Approach LOS	B			A	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		72.8		17.2		72.8
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		55.0		25.0		55.0
Max Q Clear Time (g_c+I1), s		22.5		10.6		22.3
Green Ext Time (p_c), s		0.6		1.5		26.1

Intersection Summary		
HCM 6th Ctrl Delay		21.1
HCM 6th LOS		C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	1539	53	0	0	0	0	127	48	48	99	0
Future Volume (veh/h)	25	1539	53	0	0	0	0	127	48	48	99	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.90				1.00		0.88	0.92		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	27	1655	52				0	137	25	52	106	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	1249	3581	998				0	351	261	219	351	0
Arrive On Green	0.70	0.70	0.70				0.00	0.19	0.19	0.19	0.19	0.00
Sat Flow, veh/h	1781	5106	1422				0	1870	1390	1124	1870	0
Grp Volume(v), veh/h	27	1655	52				0	137	25	52	106	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1422				0	1870	1390	1124	1870	0
Q Serve(g_s), s	0.4	12.9	1.0				0.0	5.8	1.3	3.8	4.4	0.0
Cycle Q Clear(g_c), s	0.4	12.9	1.0				0.0	5.8	1.3	9.6	4.4	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1249	3581	998				0	351	261	219	351	0
V/C Ratio(X)	0.02	0.46	0.05				0.00	0.39	0.10	0.24	0.30	0.00
Avail Cap(c_a), veh/h	1249	3581	998				0	520	386	320	520	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.41	0.41	0.41				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	4.1	5.9	4.2				0.0	32.1	30.3	36.3	31.5	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.0				0.0	0.7	0.2	0.6	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
%ile BackOfQ(50%),veh/ln	0.1	3.8	0.3				0.0	2.6	0.5	1.1	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.1	6.1	4.2				0.0	32.8	30.4	36.8	32.0	0.0
LnGrp LOS	A	A	A				A	C	C	D	C	A
Approach Vol, veh/h		1734						162			158	
Approach Delay, s/veh		6.0						32.4			33.6	
Approach LOS		A						C			C	

Timer - Assigned Phs		4		6		8
Phs Duration (G+Y+Rc), s		21.9		68.1		21.9
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		25.0		55.0		25.0
Max Q Clear Time (g_c+I1), s		7.8		14.9		11.6
Green Ext Time (p_c), s		0.7		18.8		0.6

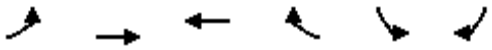
Intersection Summary	
HCM 6th Ctrl Delay	10.2
HCM 6th LOS	B



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	526	232	84	1020	130	24
Future Volume (veh/h)	526	232	84	1020	130	24
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.97	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	598	215	95	1159	148	4
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1993	715	340	4067	186	166
Arrive On Green	0.78	0.78	0.78	0.78	0.10	0.10
Sat Flow, veh/h	2635	912	365	5424	1781	1585
Grp Volume(v), veh/h	418	395	276	978	148	4
Grp Sat Flow(s),veh/h/ln	1777	1676	1159	1464	1781	1585
Q Serve(g_s), s	6.0	6.0	0.7	5.6	7.3	0.2
Cycle Q Clear(g_c), s	6.0	6.0	6.7	5.6	7.3	0.2
Prop In Lane		0.54	0.34		1.00	1.00
Lane Grp Cap(c), veh/h	1393	1315	963	3444	186	166
V/C Ratio(X)	0.30	0.30	0.29	0.28	0.79	0.02
Avail Cap(c_a), veh/h	1393	1315	963	3444	495	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.82	0.82	1.00	1.00	0.97	0.97
Uniform Delay (d), s/veh	2.7	2.7	2.5	2.7	39.3	36.2
Incr Delay (d2), s/veh	0.5	0.5	0.7	0.2	7.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.5	1.0	1.1	3.5	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	3.2	3.2	3.2	2.9	46.6	36.2
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h	813			1254	152	
Approach Delay, s/veh	3.2			3.0	46.3	
Approach LOS	A			A	D	

Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	75.6				75.6	14.4
Change Period (Y+Rc), s	5.0				5.0	5.0
Max Green Setting (Gmax), s	55.0				55.0	25.0
Max Q Clear Time (g_c+I1), s	8.0				8.7	9.3
Green Ext Time (p_c), s	13.3				23.9	0.3

Intersection Summary						
HCM 6th Ctrl Delay			6.0			
HCM 6th LOS			A			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	365	364	668	214	313	101
Future Volume (veh/h)	365	364	668	214	313	101
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.95	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	388	387	711	173	333	41
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	198	1268	2654	618	376	335
Arrive On Green	0.11	0.68	0.51	0.51	0.21	0.21
Sat Flow, veh/h	1781	1870	5455	1209	1781	1585
Grp Volume(v), veh/h	388	387	658	226	333	41
Grp Sat Flow(s),veh/h/ln	1781	1870	1609	1576	1781	1585
Q Serve(g_s), s	10.0	7.6	7.0	7.4	16.3	1.9
Cycle Q Clear(g_c), s	10.0	7.6	7.0	7.4	16.3	1.9
Prop In Lane	1.00			0.77	1.00	1.00
Lane Grp Cap(c), veh/h	198	1268	2466	806	376	335
V/C Ratio(X)	1.96	0.31	0.27	0.28	0.89	0.12
Avail Cap(c_a), veh/h	198	1268	2466	806	495	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.94	0.94	1.00	1.00
Uniform Delay (d), s/veh	40.0	5.9	12.5	12.6	34.4	28.7
Incr Delay (d2), s/veh	450.0	0.6	0.2	0.8	14.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	29.0	2.7	2.4	2.6	8.4	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	490.0	6.5	12.7	13.4	48.6	28.9
LnGrp LOS	F	A	B	B	D	C
Approach Vol, veh/h		775	884		374	
Approach Delay, s/veh		248.6	12.9		46.4	
Approach LOS		F	B		D	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	15.0	51.0				66.0	24.0
Change Period (Y+Rc), s	5.0	5.0				5.0	5.0
Max Green Setting (Gmax), s	10.0	40.0				55.0	25.0
Max Q Clear Time (g_c+I1), s	12.0	9.4				9.6	18.3
Green Ext Time (p_c), s	0.0	12.6				5.4	0.7

Intersection Summary	
HCM 6th Ctrl Delay	108.9
HCM 6th LOS	F



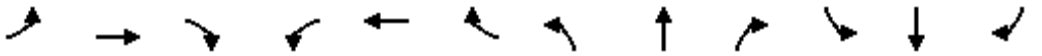
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1455	146	103	897	134	56
Future Volume (veh/h)	1455	146	103	897	134	56
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1532	154	108	944	141	59
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	3898	391	201	1733	172	153
Arrive On Green	0.83	0.83	0.83	0.83	0.10	0.10
Sat Flow, veh/h	4884	474	199	2182	1781	1585
Grp Volume(v), veh/h	1106	580	330	722	141	59
Grp Sat Flow(s),veh/h/ln	1702	1785	679	1617	1781	1585
Q Serve(g_s), s	10.8	10.9	9.6	18.2	10.1	4.5
Cycle Q Clear(g_c), s	10.8	10.9	20.5	18.2	10.1	4.5
Prop In Lane		0.27	0.33		1.00	1.00
Lane Grp Cap(c), veh/h	2814	1475	598	1336	172	153
V/C Ratio(X)	0.39	0.39	0.55	0.54	0.82	0.39
Avail Cap(c_a), veh/h	2814	1475	598	1336	356	317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.16	0.16	1.00	1.00
Uniform Delay (d), s/veh	2.9	2.9	3.1	3.5	57.6	55.1
Incr Delay (d2), s/veh	0.4	0.8	0.6	0.3	9.3	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	2.9	1.5	4.5	5.0	1.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	3.3	3.7	3.7	3.8	66.9	56.7
LnGrp LOS	A	A	A	A	E	E
Approach Vol, veh/h	1686			1052	200	
Approach Delay, s/veh	3.4			3.8	63.9	
Approach LOS	A			A	E	

Timer - Assigned Phs	2		4		6
Phs Duration (G+Y+Rc), s	112.5		17.5		112.5
Change Period (Y+Rc), s	5.0		5.0		5.0
Max Green Setting (Gmax), s	94.0		26.0		94.0
Max Q Clear Time (g_c+I1), s	12.9		12.1		22.5
Green Ext Time (p_c), s	44.2		0.5		29.4

Intersection Summary		
HCM 6th Ctrl Delay	7.7	
HCM 6th LOS	A	

HCM 6th Signalized Intersection Summary
1: Waiakamilo Rd & N. Nimitz Hwy

06/24/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	229	2961	337	146	3298	28	15	12	0	279	3	270
Future Volume (veh/h)	229	2961	337	146	3298	28	15	12	0	279	3	270
Initial Q (Qb), veh	0	0	0	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	0.98	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	239	3084	0	152	3435	0	16	12	0	293	0	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	223	3585		134	3330		35	37		349	0	
Arrive On Green	0.13	0.70	0.00	0.10	0.87	0.00	0.02	0.02	0.00	0.10	0.00	0.00
Sat Flow, veh/h	1781	5274	0	1781	5274	0	1781	1870	1560	3563	0	1585
Grp Volume(v), veh/h	239	3084	0	152	3435	0	16	12	0	293	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	0	1781	1702	0	1781	1870	1560	1781	0	1585
Q Serve(g_s), s	25.0	90.8	0.0	15.0	130.4	0.0	1.8	1.3	0.0	16.2	0.0	0.0
Cycle Q Clear(g_c), s	25.0	90.8	0.0	15.0	130.4	0.0	1.8	1.3	0.0	16.2	0.0	0.0
Prop In Lane	1.00		0.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	223	3585		134	3330		35	37		349	0	
V/C Ratio(X)	1.07	0.86		1.14	1.03		0.46	0.33		0.84	0.00	
Avail Cap(c_a), veh/h	223	3585		134	3330		89	94		713	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.20	0.20	0.00	1.00	1.00	0.00	0.09	0.00	0.00
Uniform Delay (d), s/veh	87.5	22.4	0.0	90.0	13.3	0.0	97.0	96.7	0.0	88.6	0.0	0.0
Incr Delay (d2), s/veh	81.1	2.9	0.0	79.4	17.1	0.0	8.9	5.0	0.0	0.5	0.0	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	16.5	34.7	0.0	9.7	27.3	0.0	0.9	0.7	0.0	7.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	168.6	25.3	0.0	169.4	30.4	0.0	105.9	101.7	0.0	89.1	0.0	0.0
LnGrp LOS	F	C		F	F		F	F		F	A	
Approach Vol, veh/h		3323			3587			28			293	
Approach Delay, s/veh		35.7			36.3			104.1			89.1	
Approach LOS		D			D			F			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.0	146.4		24.6	30.0	136.4		8.9				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	15.0	114.0		40.0	25.0	104.0		10.0				
Max Q Clear Time (g_c+I1), s	17.0	92.8		18.2	27.0	132.4		3.8				
Green Ext Time (p_c), s	0.0	21.0		1.0	0.0	0.0		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		38.4
HCM 6th LOS		D

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	297	1211	73	311	970	167	49	571	249	188	420	149
Future Volume (veh/h)	297	1211	73	311	970	167	49	571	249	188	420	149
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		0.96	1.00		1.00	1.00		0.92
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	303	1236	68	317	990	159	50	583	0	192	429	122
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	148	1522	84	148	1357	218	65	713		148	664	186
Arrive On Green	0.08	0.45	0.45	0.03	0.15	0.15	0.04	0.20	0.00	0.08	0.25	0.25
Sat Flow, veh/h	1781	3388	186	1781	3020	485	1781	3647	0	1781	2679	751
Grp Volume(v), veh/h	303	647	657	317	582	567	50	583	0	192	282	269
Grp Sat Flow(s),veh/h/ln	1781	1777	1797	1781	1777	1728	1781	1777	0	1781	1777	1653
Q Serve(g_s), s	10.0	37.9	38.0	10.0	37.5	37.6	3.3	18.8	0.0	10.0	17.1	17.5
Cycle Q Clear(g_c), s	10.0	37.9	38.0	10.0	37.5	37.6	3.3	18.8	0.0	10.0	17.1	17.5
Prop In Lane	1.00		0.10	1.00		0.28	1.00		0.00	1.00		0.45
Lane Grp Cap(c), veh/h	148	798	808	148	798	776	65	713		148	440	409
V/C Ratio(X)	2.04	0.81	0.81	2.14	0.73	0.73	0.77	0.82		1.29	0.64	0.66
Avail Cap(c_a), veh/h	148	798	808	148	798	776	148	1007		148	503	468
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.68	0.68	0.68	0.09	0.09	0.00	0.82	0.82	0.82
Uniform Delay (d), s/veh	55.0	28.6	28.7	58.3	44.1	44.2	57.3	45.9	0.0	55.0	40.4	40.5
Incr Delay (d2), s/veh	491.2	8.8	8.8	526.0	4.0	4.1	1.8	0.3	0.0	166.8	1.8	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	24.7	17.7	18.0	26.5	18.8	18.3	1.5	8.3	0.0	11.4	7.7	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	546.2	37.4	37.4	584.4	48.1	48.3	59.2	46.2	0.0	221.8	42.2	42.8
LnGrp LOS	F	D	D	F	D	D	E	D		F	D	D
Approach Vol, veh/h		1607			1466			633			743	
Approach Delay, s/veh		133.3			164.1			47.2			88.8	
Approach LOS		F			F			D			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	59.9	9.4	35.7	15.0	59.9	15.0	30.1
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	10.0	44.0	10.0	34.0	10.0	44.0	10.0	34.0
Max Q Clear Time (g_c+I1), s	12.0	40.0	5.3	19.5	12.0	39.6	12.0	20.8
Green Ext Time (p_c), s	0.0	2.8	0.0	3.0	0.0	2.8	0.0	3.3

Intersection Summary	
HCM 6th Ctrl Delay	123.8
HCM 6th LOS	F

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	82	60	99	85	59	33	513	310	36	414	72
Future Volume (veh/h)	81	82	60	99	85	59	33	513	310	36	414	72
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	0.99		0.95	0.99		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	95	96	69	116	100	54	39	604	312	42	487	64
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	178	106	294	174	79	161	1529	703	167	1313	167
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.47	0.47	0.47	0.47	0.47	0.47
Sat Flow, veh/h	483	749	445	593	733	332	90	3288	1511	98	2824	359
Grp Volume(v), veh/h	260	0	0	270	0	0	338	305	312	305	0	288
Grp Sat Flow(s),veh/h/ln	1678	0	0	1658	0	0	1762	1617	1511	1665	0	1616
Q Serve(g_s), s	0.0	0.0	0.0	0.2	0.0	0.0	0.0	4.2	4.7	0.0	0.0	3.9
Cycle Q Clear(g_c), s	4.3	0.0	0.0	4.5	0.0	0.0	4.0	4.2	4.7	3.5	0.0	3.9
Prop In Lane	0.37		0.27	0.43		0.20	0.12		1.00	0.14		0.22
Lane Grp Cap(c), veh/h	545	0	0	547	0	0	939	752	703	896	0	752
V/C Ratio(X)	0.48	0.00	0.00	0.49	0.00	0.00	0.36	0.41	0.44	0.34	0.00	0.38
Avail Cap(c_a), veh/h	1305	0	0	1291	0	0	4327	4089	3820	3895	0	4088
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.00	1.00
Uniform Delay (d), s/veh	11.4	0.0	0.0	11.5	0.0	0.0	5.9	5.9	6.1	5.7	0.0	5.9
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.7	0.0	0.0	0.2	0.4	0.4	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	1.5	0.0	0.0	0.9	0.9	0.9	0.8	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.1	0.0	0.0	12.2	0.0	0.0	6.1	6.3	6.5	6.0	0.0	6.2
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		260			270			955			593	
Approach Delay, s/veh		12.1			12.2			6.3			6.1	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	13.0	20.6	13.0	20.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	25.0	85.0	25.0	85.0
Max Q Clear Time (g_c+I1), s	6.3	5.9	6.5	6.7
Green Ext Time (p_c), s	1.6	4.7	1.7	6.3

Intersection Summary	
HCM 6th Ctrl Delay	7.7
HCM 6th LOS	A

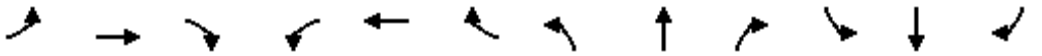
Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Traffic Vol, veh/h	16	2	16	10	4	81	13	572	28	147	557	14
Future Vol, veh/h	16	2	16	10	4	81	13	572	28	147	557	14
Conflicting Peds, #/hr	4	0	1	1	0	4	29	0	7	7	0	29
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	2	17	11	4	86	14	609	30	156	593	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1281	1616	334	1270	1608	331	637	0	0	646	0	0
Stage 1	942	942	-	659	659	-	-	-	-	-	-	-
Stage 2	339	674	-	611	949	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	123	103	662	125	104	665	943	-	-	935	-	-
Stage 1	283	340	-	419	459	-	-	-	-	-	-	-
Stage 2	649	452	-	448	337	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	78	72	643	93	73	658	917	-	-	929	-	-
Mov Cap-2 Maneuver	78	72	-	93	73	-	-	-	-	-	-	-
Stage 1	269	247	-	406	445	-	-	-	-	-	-	-
Stage 2	543	438	-	322	244	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	42.3	20.5	0.3	2.6
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	917	-	-	132	333	929	-	-
HCM Lane V/C Ratio	0.015	-	-	0.274	0.303	0.168	-	-
HCM Control Delay (s)	9	0.1	-	42.3	20.5	9.7	0.8	-
HCM Lane LOS	A	A	-	E	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1	1.3	0.6	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	998	209	53	822	391	257	786	68	243	575	343
Future Volume (veh/h)	124	998	209	53	822	391	257	786	68	243	575	343
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		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	129	1040	201	55	856	0	268	819	65	253	599	252
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	138	1063	205	71	1132		211	958	76	243	1088	473
Arrive On Green	0.08	0.36	0.36	0.04	0.32	0.00	0.12	0.29	0.29	0.14	0.31	0.31
Sat Flow, veh/h	1781	2964	571	1781	3618	0	1781	3327	264	1781	3554	1545
Grp Volume(v), veh/h	129	622	619	55	856	0	268	437	447	253	599	252
Grp Sat Flow(s),veh/h/ln	1781	1777	1758	1781	1763	0	1781	1777	1815	1781	1777	1545
Q Serve(g_s), s	7.9	38.0	38.3	3.4	24.0	0.0	13.0	25.6	25.6	15.0	15.5	14.9
Cycle Q Clear(g_c), s	7.9	38.0	38.3	3.4	24.0	0.0	13.0	25.6	25.6	15.0	15.5	14.9
Prop In Lane	1.00		0.32	1.00		0.00	1.00		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	138	637	631	71	1132		211	512	523	243	1088	473
V/C Ratio(X)	0.94	0.98	0.98	0.78	0.76		1.27	0.85	0.85	1.04	0.55	0.53
Avail Cap(c_a), veh/h	138	637	631	94	1132		211	549	561	243	1163	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.74	0.74	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.5	34.8	34.9	52.3	33.5	0.0	48.5	37.0	37.0	47.5	31.8	31.6
Incr Delay (d2), s/veh	57.8	30.4	31.5	19.3	3.5	0.0	154.6	11.9	11.7	69.0	0.5	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	5.7	21.4	21.5	1.9	10.6	0.0	14.8	12.6	12.9	11.3	6.7	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	108.3	65.2	66.4	71.6	37.0	0.0	203.1	48.9	48.7	116.5	32.3	32.6
LnGrp LOS	F	E	E	E	D		F	D	D	F	C	C
Approach Vol, veh/h		1370			911			1152			1104	
Approach Delay, s/veh		69.8			39.1			84.7			51.7	
Approach LOS		E			D			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	44.4	20.0	36.7	13.0	40.3	18.0	38.7
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.8	35.7	15.0	34.0	8.5	33.0	13.0	36.0
Max Q Clear Time (g_c+I1), s	5.4	40.3	17.0	27.6	9.9	26.0	15.0	17.5
Green Ext Time (p_c), s	0.0	0.0	0.0	3.0	0.0	3.3	0.0	4.9

Intersection Summary	
HCM 6th Ctrl Delay	63.0
HCM 6th LOS	E

Notes

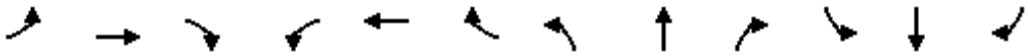
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	537	435	1050	0	0	709
Future Volume (veh/h)	537	435	1050	0	0	709
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	0	0	1870
Adj Flow Rate, veh/h	559	392	1094	0	0	739
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	991	455	2179	0	0	2179
Arrive On Green	0.29	0.29	0.61	0.00	0.00	0.61
Sat Flow, veh/h	3456	1585	3741	0	0	3741
Grp Volume(v), veh/h	559	392	1094	0	0	739
Grp Sat Flow(s),veh/h/ln	1728	1585	1777	0	0	1777
Q Serve(g_s), s	13.8	23.4	17.2	0.0	0.0	10.2
Cycle Q Clear(g_c), s	13.8	23.4	17.2	0.0	0.0	10.2
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	991	455	2179	0	0	2179
V/C Ratio(X)	0.56	0.86	0.50	0.00	0.00	0.34
Avail Cap(c_a), veh/h	1382	634	2179	0	0	2179
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	30.3	33.8	10.8	0.0	0.0	9.4
Incr Delay (d2), s/veh	0.5	8.7	0.8	0.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	9.9	6.5	0.0	0.0	3.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	30.8	42.5	11.6	0.0	0.0	9.9
LnGrp LOS	C	D	B	A	A	A
Approach Vol, veh/h	951		1094			739
Approach Delay, s/veh	35.6		11.6			9.9
Approach LOS	D		B			A

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	66.3			66.3	33.7
Change Period (Y+Rc), s	5.0			5.0	5.0
Max Green Setting (Gmax), s	50.0			50.0	40.0
Max Q Clear Time (g_c+I1), s	19.2			12.2	25.4
Green Ext Time (p_c), s	9.7			6.0	3.3

Intersection Summary	
HCM 6th Ctrl Delay	19.4
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	1346	57	118	1124	395	58	113	132	118	110	75
Future Volume (vph)	101	1346	57	118	1124	395	58	113	132	118	110	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.0	6.0			5.0			5.0	
Lane Util. Factor		0.91		1.00	0.95			1.00			1.00	
Frpb, ped/bikes		1.00		1.00	0.98			0.99			0.99	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.99		1.00	0.96			0.94			0.97	
Flt Protected		1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)		5024		1769	3333			1722			1745	
Flt Permitted		0.67		0.10	1.00			0.81			0.51	
Satd. Flow (perm)		3360		195	3333			1404			903	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	106	1417	60	124	1183	416	61	119	139	124	116	79
RTOR Reduction (vph)	0	4	0	0	21	0	0	23	0	0	10	0
Lane Group Flow (vph)	0	1579	0	124	1578	0	0	296	0	0	310	0
Confl. Peds. (#/hr)	23		21	21		23	26					26
Confl. Bikes (#/hr)			6			5			1			
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		70.9		84.0	84.0			25.0			25.0	
Effective Green, g (s)		70.9		84.0	84.0			25.0			25.0	
Actuated g/C Ratio		0.59		0.70	0.70			0.21			0.21	
Clearance Time (s)		6.0		5.0	6.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		1985		242	2333			292			188	
v/s Ratio Prot				0.03	c0.47							
v/s Ratio Perm		c0.47		0.32				0.21			c0.34	
v/c Ratio		0.80		0.51	0.68			1.01			1.65	
Uniform Delay, d1		19.0		9.6	10.3			47.5			47.5	
Progression Factor		0.87		2.50	0.29			1.00			1.00	
Incremental Delay, d2		0.5		0.9	0.8			56.2			313.5	
Delay (s)		17.0		24.8	3.8			103.7			361.0	
Level of Service		B		C	A			F			F	
Approach Delay (s)		17.0			5.3			103.7			361.0	
Approach LOS		B			A			F			F	

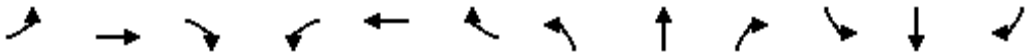
Intersection Summary			
HCM 2000 Control Delay	46.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	119.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	1367	102	122	1336	9	147	157	214	14	33	38
Future Volume (veh/h)	43	1367	102	122	1336	9	147	157	214	14	33	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.95	0.98		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	45	1439	92	128	1406	8	155	165	206	15	35	11
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	92	2779	176	228	2318	13	158	128	154	105	228	63
Arrive On Green	0.64	0.64	0.64	1.00	1.00	1.00	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	83	4342	275	339	3622	21	446	512	616	241	913	254
Grp Volume(v), veh/h	519	519	539	128	690	724	526	0	0	61	0	0
Grp Sat Flow(s),veh/h/ln	1542	1549	1609	339	1777	1865	1574	0	0	1407	0	0
Q Serve(g_s), s	0.0	18.1	18.1	26.0	0.0	0.0	22.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	13.8	18.1	18.1	44.1	0.0	0.0	25.0	0.0	0.0	2.6	0.0	0.0
Prop In Lane	0.09		0.17	1.00		0.01	0.29		0.39	0.25		0.18
Lane Grp Cap(c), veh/h	1026	991	1030	228	1137	1194	440	0	0	397	0	0
V/C Ratio(X)	0.51	0.52	0.52	0.56	0.61	0.61	1.20	0.00	0.00	0.15	0.00	0.00
Avail Cap(c_a), veh/h	1026	991	1030	228	1137	1194	440	0	0	397	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.57	0.57	0.57	0.09	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	9.0	9.7	9.7	6.3	0.0	0.0	38.7	0.0	0.0	29.1	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.2	0.2	5.6	1.4	1.3	90.0	0.0	0.0	0.2	0.0	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	5.1	5.6	5.8	1.4	0.4	0.4	22.0	0.0	0.0	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.1	9.9	9.9	11.9	1.4	1.3	128.6	0.0	0.0	29.3	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	F	A	A	C	A	A
Approach Vol, veh/h		1576			1542			526			61	
Approach Delay, s/veh		9.7			2.2			128.6			29.3	
Approach LOS		A			A			F			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	70.0	30.0	70.0	30.0
Change Period (Y+Rc), s	6.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	64.0	25.0	64.0	25.0
Max Q Clear Time (g_c+I1), s	20.1	4.6	46.1	27.0
Green Ext Time (p_c), s	29.8	0.3	15.2	0.0

Intersection Summary	
HCM 6th Ctrl Delay	23.8
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	271	1257	67	64	1486	260	33	29	2	229	36	118
Future Volume (vph)	271	1257	67	64	1486	260	33	29	2	229	36	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0			6.0			5.0			5.0	
Lane Util. Factor	1.00	0.95			0.91			1.00			1.00	
Frpb, ped/bikes	1.00	1.00			0.99			1.00			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			0.97	
Frt	1.00	0.99			0.98			1.00			0.96	
Flt Protected	0.95	1.00			1.00			0.97			0.97	
Satd. Flow (prot)	1770	3470			4899			1805			1683	
Flt Permitted	0.06	1.00			0.78			0.78			0.80	
Satd. Flow (perm)	117	3470			3839			1451			1380	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	282	1309	70	67	1548	271	34	30	2	239	38	123
RTOR Reduction (vph)	0	2	0	0	23	0	0	1	0	0	13	0
Lane Group Flow (vph)	282	1377	0	0	1863	0	0	65	0	0	387	0
Confl. Peds. (#/hr)	30		23	23		30			39	39		
Confl. Bikes (#/hr)			11			5						
Bus Blockages (#/hr)	0	4	0	0	0	4	0	0	4	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	84.0	84.0			69.0			25.0			25.0	
Effective Green, g (s)	84.0	84.0			69.0			25.0			25.0	
Actuated g/C Ratio	0.70	0.70			0.58			0.21			0.21	
Clearance Time (s)	5.0	6.0			6.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	219	2429			2207			302			287	
v/s Ratio Prot	c0.11	0.40										
v/s Ratio Perm	c0.79				0.49			0.04			c0.28	
v/c Ratio	1.29	0.57			0.84			0.22			1.35	
Uniform Delay, d1	34.4	9.0			21.1			39.4			47.5	
Progression Factor	1.68	0.36			0.90			1.00			1.00	
Incremental Delay, d2	144.5	0.4			2.4			0.4			177.5	
Delay (s)	202.2	3.7			21.3			39.7			225.0	
Level of Service	F	A			C			D			F	
Approach Delay (s)		37.4			21.3			39.7			225.0	
Approach LOS		D			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	48.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.33		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	115.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	1292	270	98	1393	43	79	190	239	18	44	17
Future Volume (veh/h)	55	1292	270	98	1393	43	79	190	239	18	44	17
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		0.96	0.97		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	58	1360	270	103	1466	40	83	200	232	19	46	7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	294	1882	366	181	2367	64	95	164	179	101	224	30
Arrive On Green	1.00	1.00	1.00	1.00	1.00	1.00	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	347	2941	572	210	3698	100	214	658	715	221	897	120
Grp Volume(v), veh/h	58	811	819	333	618	659	515	0	0	72	0	0
Grp Sat Flow(s),veh/h/ln	347	1777	1736	808	1549	1651	1587	0	0	1238	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	21.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0.0	0.0	3.1	0.0	0.0
Prop In Lane	1.00		0.33	0.31		0.06	0.16		0.45	0.26		0.10
Lane Grp Cap(c), veh/h	294	1137	1111	564	991	1057	439	0	0	355	0	0
V/C Ratio(X)	0.20	0.71	0.74	0.59	0.62	0.62	1.17	0.00	0.00	0.20	0.00	0.00
Avail Cap(c_a), veh/h	294	1137	1111	564	991	1057	439	0	0	355	0	0
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.77	0.77	0.77	0.68	0.68	0.68	0.09	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	38.6	0.0	0.0	29.3	0.0	0.0
Incr Delay (d2), s/veh	1.2	3.0	3.4	3.1	2.0	1.9	80.9	0.0	0.0	0.3	0.0	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	0.1	0.9	1.0	0.5	0.6	0.6	20.7	0.0	0.0	1.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	1.2	3.0	3.4	3.1	2.0	1.9	119.5	0.0	0.0	29.6	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	F	A	A	C	A	A
Approach Vol, veh/h		1688			1609			515			72	
Approach Delay, s/veh		3.1			2.2			119.5			29.6	
Approach LOS		A			A			F			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	70.0	30.0	70.0	30.0
Change Period (Y+Rc), s	6.0	5.0	6.0	5.0
Max Green Setting (Gmax), s	64.0	25.0	64.0	25.0
Max Q Clear Time (g_c+I1), s	2.0	5.1	2.0	27.0
Green Ext Time (p_c), s	44.9	0.3	41.7	0.0

Intersection Summary	
HCM 6th Ctrl Delay	18.7
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	517	3042	23	36	2476	482	29	32	51	404	19	376
Future Volume (veh/h)	517	3042	23	36	2476	482	29	32	51	404	19	376
Initial Q (Qb), veh	0	0	0	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	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	556	3271	0	39	2662	0	31	34	0	448	0	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	518	3549		50	2927		46	57		527	0	
Arrive On Green	0.15	0.69	0.00	0.03	0.57	0.00	0.03	0.03	0.00	0.15	0.00	0.00
Sat Flow, veh/h	3456	5274	0	1781	5106	1585	1596	2064	0	3563	0	1560
Grp Volume(v), veh/h	556	3271	0	39	2662	0	35	30	0	448	0	0
Grp Sat Flow(s),veh/h/ln	1728	1702	0	1781	1702	1585	1791	1777	0	1781	0	1560
Q Serve(g_s), s	30.0	108.7	0.0	4.4	93.0	0.0	3.8	3.4	0.0	24.5	0.0	0.0
Cycle Q Clear(g_c), s	30.0	108.7	0.0	4.4	93.0	0.0	3.8	3.4	0.0	24.5	0.0	0.0
Prop In Lane	1.00		0.00	1.00		1.00	0.89		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	518	3549		50	2927		52	51		527	0	
V/C Ratio(X)	1.07	0.92		0.78	0.91		0.67	0.59		0.85	0.00	
Avail Cap(c_a), veh/h	518	3549		134	2927		90	89		623	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	85.0	25.9	0.0	96.5	38.1	0.0	96.2	96.0	0.0	83.0	0.0	0.0
Incr Delay (d2), s/veh	36.8	0.5	0.0	21.9	5.4	0.0	14.3	10.4	0.0	9.5	0.0	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	16.0	40.8	0.0	2.3	38.8	0.0	2.0	1.7	0.0	12.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	121.8	26.4	0.0	118.5	43.5	0.0	110.5	106.4	0.0	92.5	0.0	0.0
LnGrp LOS	F	C		F	D		F	F		F	A	
Approach Vol, veh/h		3827			2701			65			448	
Approach Delay, s/veh		40.3			44.6			108.6			92.5	
Approach LOS		D			D			F			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.6	144.0		34.6	35.0	119.6		10.8				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	15.6	120.0		35.0	30.0	105.0		10.0				
Max Q Clear Time (g_c+I1), s	6.4	110.7		26.5	32.0	95.0		5.8				
Green Ext Time (p_c), s	0.0	9.0		1.1	0.0	9.2		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	45.9
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	73.4

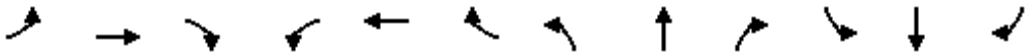
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	57	131	1047	211	87	814
Future Vol, veh/h	57	131	1047	211	87	814
Conflicting Peds, #/hr	10	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	151	1203	243	100	936

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2005	725	0	0	1448	0
Stage 1	1327	-	-	-	-	-
Stage 2	678	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	~ 52	368	-	-	464	-
Stage 1	212	-	-	-	-	-
Stage 2	466	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 28	367	-	-	463	-
Mov Cap-2 Maneuver	~ 28	-	-	-	-	-
Stage 1	212	-	-	-	-	-
Stage 2	254	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 897.7	0	4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	79	463	-
HCM Lane V/C Ratio	-	-	2.735	0.216	-
HCM Control Delay (s)	-	-	$ 897.7	14.9	2.8
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	21	0.8	-

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



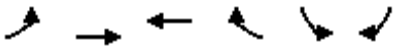
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	761	459	328	1290	32	648	0	908	0	0	0
Future Volume (veh/h)	8	761	459	328	1290	32	648	0	908	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.95	1.00		0.97			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	8	777	246	335	1316	33	661	0	533			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	17	1503	631	360	2159	54	891	0	376			
Arrive On Green	0.02	0.85	0.85	0.20	0.62	0.62	0.25	0.00	0.25			
Sat Flow, veh/h	1781	3554	1491	1781	3508	88	3563	0	1505			
Grp Volume(v), veh/h	8	777	246	335	666	683	661	0	533			
Grp Sat Flow(s),veh/h/ln	1781	1777	1491	1781	1777	1819	1781	0	1505			
Q Serve(g_s), s	0.5	7.2	4.6	22.2	27.7	27.8	20.5	0.0	30.0			
Cycle Q Clear(g_c), s	0.5	7.2	4.6	22.2	27.7	27.8	20.5	0.0	30.0			
Prop In Lane	1.00		1.00	1.00		0.05	1.00		1.00			
Lane Grp Cap(c), veh/h	17	1503	631	360	1093	1119	891	0	376			
V/C Ratio(X)	0.46	0.52	0.39	0.93	0.61	0.61	0.74	0.00	1.42			
Avail Cap(c_a), veh/h	74	1503	631	371	1093	1119	891	0	376			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.80	0.80	0.80	1.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	58.5	5.9	5.7	47.1	14.2	14.2	41.4	0.0	45.0			
Incr Delay (d2), s/veh	5.5	1.0	1.5	28.8	2.5	2.5	3.4	0.0	202.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.3	2.0	1.4	12.7	11.3	11.6	9.4	0.0	43.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.1	6.9	7.1	75.8	16.7	16.7	44.8	0.0	247.4			
LnGrp LOS	E	A	A	E	B	B	D	A	F			
Approach Vol, veh/h		1031			1684			1194				
Approach Delay, s/veh		7.4			28.5			135.2				
Approach LOS		A			C			F				

Timer - Assigned Phs	1	2		4	5	6			
Phs Duration (G+Y+Rc), s	29.2	55.8		35.0	6.2	78.8			
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0			
Max Green Setting (Gmax), s	25.0	50.0		30.0	5.0	70.0			
Max Q Clear Time (g_c+I1), s	24.2	9.2		32.0	2.5	29.8			
Green Ext Time (p_c), s	0.1	15.8		0.0	0.0	24.5			

Intersection Summary	
HCM 6th Ctrl Delay	55.5
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	211	955	1362	327	129	248
Future Volume (veh/h)	211	955	1362	327	129	248
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.96	1.00	0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	240	1085	1548	257	147	224
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	172	2023	2320	988	157	239
Arrive On Green	1.00	1.00	0.65	0.65	0.25	0.25
Sat Flow, veh/h	154	3251	3647	1514	636	969
Grp Volume(v), veh/h	240	1085	1548	257	372	0
Grp Sat Flow(s),veh/h/ln	154	1549	1777	1514	1609	0
Q Serve(g_s), s	38.5	0.0	26.8	7.1	22.6	0.0
Cycle Q Clear(g_c), s	65.3	0.0	26.8	7.1	22.6	0.0
Prop In Lane	1.00			1.00	0.40	0.60
Lane Grp Cap(c), veh/h	172	2023	2320	988	397	0
V/C Ratio(X)	1.39	0.54	0.67	0.26	0.94	0.00
Avail Cap(c_a), veh/h	172	2023	2320	988	402	0
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.57	0.57	1.00	1.00	0.18	0.00
Uniform Delay (d), s/veh	21.4	0.0	10.7	7.3	36.9	0.0
Incr Delay (d2), s/veh	195.8	0.6	1.5	0.6	8.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.4	0.2	9.8	2.3	9.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	217.3	0.6	12.2	7.9	45.1	0.0
LnGrp LOS	F	A	B	A	D	A
Approach Vol, veh/h		1325	1805		372	
Approach Delay, s/veh		39.8	11.6		45.1	
Approach LOS		D	B		D	

Timer - Assigned Phs	2	6	8
Phs Duration (G+Y+Rc), s	70.3	70.3	29.7
Change Period (Y+Rc), s	5.0	5.0	5.0
Max Green Setting (Gmax), s	65.0	65.0	25.0
Max Q Clear Time (g_c+I1), s	28.8	67.3	24.6
Green Ext Time (p_c), s	18.6	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	25.8
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	1444	133	45	732	81	264	116	57	95	261	490
Future Volume (veh/h)	320	1444	133	45	732	81	264	116	57	95	261	490
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.98	1.00		0.93	0.95		0.93
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	333	1504	133	47	762	78	275	121	45	99	272	277
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	223	2797	247	61	2349	239	45	357	133	117	260	414
Arrive On Green	0.13	0.59	0.59	0.03	0.50	0.50	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1781	4732	418	1781	4698	478	858	1270	472	314	925	1472
Grp Volume(v), veh/h	333	1082	555	47	551	289	275	0	166	371	0	277
Grp Sat Flow(s),veh/h/ln	1781	1702	1746	1781	1702	1771	858	0	1742	1239	0	1472
Q Serve(g_s), s	20.0	30.5	30.5	4.2	15.4	15.6	0.0	0.0	12.1	32.9	0.0	26.7
Cycle Q Clear(g_c), s	20.0	30.5	30.5	4.2	15.4	15.6	45.0	0.0	12.1	45.0	0.0	26.7
Prop In Lane	1.00		0.24	1.00		0.27	1.00		0.27	0.27		1.00
Lane Grp Cap(c), veh/h	223	2012	1032	61	1702	886	45	0	490	377	0	414
V/C Ratio(X)	1.50	0.54	0.54	0.78	0.32	0.33	6.11	0.00	0.34	0.98	0.00	0.67
Avail Cap(c_a), veh/h	223	2012	1032	111	1702	886	45	0	490	377	0	414
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.64	0.64	0.64	0.94	0.00	0.94	1.00	0.00	1.00
Uniform Delay (d), s/veh	70.0	19.6	19.6	76.7	23.9	23.9	80.0	0.0	45.7	63.2	0.0	50.9
Incr Delay (d2), s/veh	245.2	1.0	2.0	12.6	0.3	0.6	2344.1	0.0	0.4	42.0	0.0	4.1
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	24.4	12.6	13.2	2.2	6.5	6.9	31.2	0.0	5.4	19.9	0.0	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	315.2	20.7	21.6	89.3	24.2	24.5	2424.1	0.0	46.1	105.3	0.0	55.0
LnGrp LOS	F	C	C	F	C	C	F	A	D	F	A	E
Approach Vol, veh/h		1970			887			441			648	
Approach Delay, s/veh		70.7			27.7			1529.0			83.8	
Approach LOS		E			C			F			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	35.0	85.0		50.0	10.4	99.6		50.0
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	30.0	80.0		45.0	10.0	90.0		45.0
Max Q Clear Time (g_c+I1), s	22.0	17.6		47.0	6.2	32.5		47.0
Green Ext Time (p_c), s	0.0	7.3		0.0	0.0	20.4		0.0

Intersection Summary	
HCM 6th Ctrl Delay	226.2
HCM 6th LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	716	116	755	1222	500	0	944	647	247	792	162
Future Volume (veh/h)	0	716	116	755	1222	500	0	944	647	247	792	162
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.89	1.00		0.94	1.00		0.98	1.00		0.86
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	731	114	770	1247	481	0	963	595	252	808	159
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	2	2	2	2	2	0	2	2	2	2	2
Cap, veh/h	0	1052	161	806	1257	459	0	924	1360	238	1215	239
Arrive On Green	0.00	0.24	0.24	0.23	0.51	0.51	0.00	0.26	0.26	0.13	0.43	0.43
Sat Flow, veh/h	0	4551	673	3456	2482	906	0	3647	2726	1781	2847	560
Grp Volume(v), veh/h	0	565	280	770	873	855	0	963	595	252	504	463
Grp Sat Flow(s),veh/h/ln	0	1702	1652	1728	1777	1610	0	1777	1363	1781	1777	1631
Q Serve(g_s), s	0.0	22.7	23.3	33.0	71.4	76.0	0.0	39.0	0.0	20.0	34.1	34.1
Cycle Q Clear(g_c), s	0.0	22.7	23.3	33.0	71.4	76.0	0.0	39.0	0.0	20.0	34.1	34.1
Prop In Lane	0.00		0.41	1.00		0.56	0.00		1.00	1.00		0.34
Lane Grp Cap(c), veh/h	0	817	396	806	900	816	0	924	1360	238	758	696
V/C Ratio(X)	0.00	0.69	0.71	0.95	0.97	1.05	0.00	1.04	0.44	1.06	0.67	0.67
Avail Cap(c_a), veh/h	0	817	396	806	900	816	0	924	1360	238	758	696
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.72	0.72	0.72	0.00	0.86	0.86	0.24	0.24	0.24
Uniform Delay (d), s/veh	0.0	51.9	52.2	56.7	35.9	37.0	0.0	55.5	24.5	65.0	34.4	34.4
Incr Delay (d2), s/veh	0.0	4.8	10.1	17.2	19.1	40.3	0.0	39.1	0.2	46.2	0.5	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	10.3	10.8	16.3	35.1	38.4	0.0	22.2	12.4	12.2	14.9	13.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	56.7	62.3	73.9	55.0	77.3	0.0	94.6	24.7	111.2	35.0	35.0
LnGrp LOS	A	E	E	E	D	F	A	F	C	F	C	D
Approach Vol, veh/h		845			2498			1558			1219	
Approach Delay, s/veh		58.6			68.5			67.9			50.7	
Approach LOS		E			E			E			D	

Timer - Assigned Phs	2	4	5	6	7	8
Phs Duration (G+Y+Rc), s	81.0	69.0	40.0	41.0	25.0	44.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	76.0	64.0	35.0	36.0	20.0	39.0
Max Q Clear Time (g_c+I1), s	78.0	36.1	35.0	25.3	22.0	41.0
Green Ext Time (p_c), s	0.0	7.5	0.0	6.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	63.4
HCM 6th LOS	E

Notes

User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	415	1136	157	444	582	120	160	747	210	144	657	327
Future Volume (veh/h)	415	1136	157	444	582	120	160	747	210	144	657	327
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.90	1.00		0.92	1.00		0.93	1.00		0.93
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	432	1183	157	462	606	100	167	778	209	150	684	307
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	334	1010	134	445	1261	203	111	823	221	167	776	348
Arrive On Green	0.19	0.23	0.23	0.25	0.29	0.29	0.06	0.31	0.31	0.09	0.34	0.34
Sat Flow, veh/h	1781	4465	592	1781	4367	704	1781	2696	724	1781	2308	1036
Grp Volume(v), veh/h	432	902	438	462	469	237	167	513	474	150	527	464
Grp Sat Flow(s),veh/h/ln	1781	1702	1653	1781	1702	1667	1781	1777	1644	1781	1777	1566
Q Serve(g_s), s	30.0	36.2	36.2	40.0	18.2	18.8	10.0	45.1	45.1	13.3	44.7	44.7
Cycle Q Clear(g_c), s	30.0	36.2	36.2	40.0	18.2	18.8	10.0	45.1	45.1	13.3	44.7	44.7
Prop In Lane	1.00		0.36	1.00		0.42	1.00		0.44	1.00		0.66
Lane Grp Cap(c), veh/h	334	770	374	445	983	481	111	542	502	167	598	527
V/C Ratio(X)	1.29	1.17	1.17	1.04	0.48	0.49	1.50	0.95	0.95	0.90	0.88	0.88
Avail Cap(c_a), veh/h	334	770	374	445	983	481	111	555	514	167	611	538
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	0.80	1.00	1.00	1.00	0.09	0.09	0.09	0.95	0.95	0.95
Uniform Delay (d), s/veh	65.0	61.9	61.9	60.0	47.0	47.2	75.0	54.3	54.3	71.7	50.1	50.1
Incr Delay (d2), s/veh	148.9	88.3	98.1	52.7	1.7	3.6	229.3	3.9	4.2	40.4	13.3	14.8
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	27.5	25.1	25.4	24.6	8.0	8.4	11.7	20.8	19.2	8.0	22.1	19.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	213.9	150.2	160.0	112.7	48.6	50.7	304.3	58.2	58.5	112.1	63.4	64.9
LnGrp LOS	F	F	F	F	D	D	F	E	E	F	E	E
Approach Vol, veh/h		1772			1168			1154			1141	
Approach Delay, s/veh		168.1			74.4			94.0			70.4	
Approach LOS		F			E			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	45.0	41.2	15.0	58.8	35.0	51.2	20.0	53.8
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	40.0	35.0	10.0	55.0	30.0	45.0	15.0	50.0
Max Q Clear Time (g_c+I1), s	42.0	38.2	12.0	46.7	32.0	20.8	15.3	47.1
Green Ext Time (p_c), s	0.0	0.0	0.0	4.1	0.0	4.9	0.0	1.7

Intersection Summary	
HCM 6th Ctrl Delay	109.6
HCM 6th LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	469	152	0	0	0	0	666	590	190	641	0
Future Volume (veh/h)	54	469	152	0	0	0	0	666	590	190	641	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.95	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.98				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	57	499	0				0	709	517	202	682	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	62	545					0	1715	726	323	2071	0
Arrive On Green	0.33	0.33	0.00				0.00	0.48	0.48	0.05	0.58	0.00
Sat Flow, veh/h	191	1670	1560				0	3647	1505	1781	3647	0
Grp Volume(v), veh/h	556	0	0				0	709	517	202	682	0
Grp Sat Flow(s),veh/h/ln	1861	0	1560				0	1777	1505	1781	1777	0
Q Serve(g_s), s	31.6	0.0	0.0				0.0	14.2	29.8	6.0	10.9	0.0
Cycle Q Clear(g_c), s	31.6	0.0	0.0				0.0	14.2	29.8	6.0	10.9	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	607	0					0	1715	726	323	2071	0
V/C Ratio(X)	0.92	0.00					0.00	0.41	0.71	0.62	0.33	0.00
Avail Cap(c_a), veh/h	710	0					0	1715	726	323	2071	0
HCM Platoon Ratio	1.00	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				0.00	0.09	0.09	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.6	0.0	0.0				0.0	18.4	22.4	14.9	11.9	0.0
Incr Delay (d2), s/veh	15.1	0.0	0.0				0.0	0.1	0.5	3.7	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
%ile BackOfQ(50%),veh/ln	16.6	0.0	0.0				0.0	5.7	10.3	2.8	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.7	0.0	0.0				0.0	18.5	23.0	18.7	12.3	0.0
LnGrp LOS	D	A					A	B	C	B	B	A
Approach Vol, veh/h		556						1226			884	
Approach Delay, s/veh		50.7						20.4			13.7	
Approach LOS		D						C			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	11.0	58.1		40.9		69.1
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	6.0	47.0		42.0		58.0
Max Q Clear Time (g_c+I1), s	8.0	31.8		33.6		12.9
Green Ext Time (p_c), s	0.0	6.4		2.3		5.5

Intersection Summary	
HCM 6th Ctrl Delay	24.5
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	11.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	95	10	14	62	38	126	11	38	32	217	66	131
Future Vol, veh/h	95	10	14	62	38	126	11	38	32	217	66	131
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	100	11	15	65	40	133	12	40	34	228	69	138
Number of Lanes	1	1	0	0	1	0	0	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	2
HCM Control Delay	10.7	12.5	9.3	11.9
HCM LOS	B	B	A	B

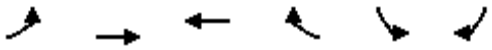
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	22%	0%	100%	0%	27%	100%	0%
Vol Thru, %	78%	0%	0%	42%	17%	0%	34%
Vol Right, %	0%	100%	0%	58%	56%	0%	66%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	32	95	24	226	217	197
LT Vol	11	0	95	0	62	217	0
Through Vol	38	0	0	10	38	0	66
RT Vol	0	32	0	14	126	0	131
Lane Flow Rate	52	34	100	25	238	228	207
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.092	0.052	0.19	0.041	0.386	0.399	0.306
Departure Headway (Hd)	6.412	5.586	6.829	5.908	5.839	6.293	5.316
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	559	640	526	606	616	573	676
Service Time	4.154	3.327	4.566	3.645	3.87	4.023	3.046
HCM Lane V/C Ratio	0.093	0.053	0.19	0.041	0.386	0.398	0.306
HCM Control Delay	9.8	8.6	11.2	8.9	12.5	13.2	10.4
HCM Lane LOS	A	A	B	A	B	B	B
HCM 95th-tile Q	0.3	0.2	0.7	0.1	1.8	1.9	1.3

Intersection	
Intersection Delay, s/veh	268.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	39	3	318	104	91	166	129	496	47	164	103	8
Future Vol, veh/h	39	3	318	104	91	166	129	496	47	164	103	8
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	47	4	383	125	110	200	155	598	57	198	124	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	104.8	117.1	518.7	70.3
HCM LOS	F	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	11%	29%	60%
Vol Thru, %	74%	1%	25%	37%
Vol Right, %	7%	88%	46%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	672	360	361	275
LT Vol	129	39	104	164
Through Vol	496	3	91	103
RT Vol	47	318	166	8
Lane Flow Rate	810	434	435	331
Geometry Grp	1	1	1	1
Degree of Util (X)	2.083	1.055	1.093	0.896
Departure Headway (Hd)	9.92	12.227	12.387	13.441
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	372	299	296	272
Service Time	7.92	10.227	10.387	11.441
HCM Lane V/C Ratio	2.177	1.452	1.47	1.217
HCM Control Delay	518.7	104.8	117.1	70.3
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	54.3	11.9	12.7	7.9



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	330	1290	325	166	0	1725
Future Volume (vph)	330	1290	325	166	0	1725
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	1.00	0.86	0.95			0.64
Frpb, ped/bikes	1.00	1.00	0.97			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	1.00	0.95			0.85
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	6408	3265			4053
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	6408	3265			4053
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	340	1330	335	171	0	1778
RTOR Reduction (vph)	0	0	73	0	0	113
Lane Group Flow (vph)	340	1330	433	0	0	1665
Confl. Peds. (#/hr)	67			67	119	
Confl. Bikes (#/hr)				1		4
Turn Type	Prot	NA	NA			Over
Protected Phases	6	6 4	4			6
Permitted Phases						
Actuated Green, G (s)	56.0	90.0	24.0			56.0
Effective Green, g (s)	56.0	90.0	24.0			56.0
Actuated g/C Ratio	0.62	1.00	0.27			0.62
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	1101	6408	870			2521
v/s Ratio Prot	0.19	0.21	c0.13			c0.41
v/s Ratio Perm						
v/c Ratio	0.31	0.21	0.50			0.66
Uniform Delay, d1	7.9	0.0	27.9			10.9
Progression Factor	1.00	1.00	1.00			2.14
Incremental Delay, d2	0.7	0.0	0.4			1.0
Delay (s)	8.7	0.0	28.3			24.3
Level of Service	A	A	C			C
Approach Delay (s)		1.8	28.3		24.3	
Approach LOS		A	C		C	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	167	1773	170	80	273	0	0	30	1
Future Volume (veh/h)	0	0	0	167	1773	170	80	273	0	0	30	1
Initial Q (Qb), veh				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
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1870	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				186	1970	173	89	303	0	0	33	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				362	4123	370	154	413	0	0	564	
Arrive On Green				0.71	0.71	0.71	0.16	0.16	0.00	0.00	0.16	0.00
Sat Flow, veh/h				509	5796	520	650	2689	0	0	3741	0
Grp Volume(v), veh/h				674	1068	587	209	183	0	0	33	0
Grp Sat Flow(s),veh/h/ln				1845	1609	1763	1637	1617	0	0	1777	0
Q Serve(g_s), s				16.6	14.4	14.4	11.4	10.7	0.0	0.0	0.8	0.0
Cycle Q Clear(g_c), s				16.6	14.4	14.4	12.3	10.7	0.0	0.0	0.8	0.0
Prop In Lane				0.28		0.29	0.43		0.00	0.00		0.00
Lane Grp Cap(c), veh/h				1312	2288	1254	311	257	0	0	564	
V/C Ratio(X)				0.51	0.47	0.47	0.67	0.71	0.00	0.00	0.06	
Avail Cap(c_a), veh/h				1312	2288	1254	443	388	0	0	853	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				6.6	6.2	6.2	40.5	39.9	0.0	0.0	35.7	0.0
Incr Delay (d2), s/veh				1.4	0.7	1.3	2.5	3.7	0.0	0.0	0.0	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
%ile BackOfQ(50%),veh/ln				6.0	4.3	5.0	5.1	4.5	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				8.0	6.9	7.5	43.0	43.6	0.0	0.0	35.8	0.0
LnGrp LOS				A	A	A	D	D	A	A	D	
Approach Vol, veh/h					2329			392			33	
Approach Delay, s/veh					7.4			43.3			35.8	
Approach LOS					A			D			D	

Timer - Assigned Phs	2	4			8			
Phs Duration (G+Y+Rc), s	78.1	21.9			21.9			
Change Period (Y+Rc), s	7.0	6.0			6.0			
Max Green Setting (Gmax), s	63.0	24.0			24.0			
Max Q Clear Time (g_c+I1), s	18.6	14.3			2.8			
Green Ext Time (p_c), s	39.6	1.6			0.1			

Intersection Summary		
HCM 6th Ctrl Delay	12.8	
HCM 6th LOS	B	

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	94.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	3054	333	0	201
Future Vol, veh/h	0	0	3054	333	0	201
Conflicting Peds, #/hr	7	0	0	7	3	6
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	1	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	3393	370	0	223

Major/Minor	Major2		Minor2	
Conflicting Flow All	-	0	-	1895
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	~ 51
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	~ 51
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

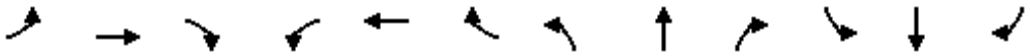
Approach	WB	SB
HCM Control Delay, s	0	$ 1682.7
HCM LOS		F

Minor Lane/Major Mvmt	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	51
HCM Lane V/C Ratio	-	-	4.379
HCM Control Delay (s)	-	-	$ 1682.7
HCM Lane LOS	-	-	F
HCM 95th %tile Q(veh)	-	-	24.9

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

HCM 6th Signalized Intersection Summary
25: Iwilei Rd & Ka'aahi St

07/01/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	0	146	0	92	339	253	501	0	0	83	6
Future Volume (veh/h)	59	0	146	0	92	339	253	501	0	0	83	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	0	1870	0	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h	62	0	154	0	97	377	266	557	0	0	92	6
Peak Hour Factor	0.95	0.95	0.95	0.90	0.95	0.90	0.95	0.90	0.90	0.90	0.90	0.95
Percent Heavy Veh, %	2	0	2	0	2	2	2	2	0	0	2	2
Cap, veh/h	81	0	0	0	374	317	303	1131	0	0	668	44
Arrive On Green	0.05	0.00	0.00	0.00	0.20	0.20	0.17	0.60	0.00	0.00	0.38	0.38
Sat Flow, veh/h	1781	62		0	1870	1583	1781	1870	0	0	1737	113
Grp Volume(v), veh/h	62	56.5		0	97	377	266	557	0	0	0	98
Grp Sat Flow(s),veh/h/ln	1781	E		0	1870	1583	1781	1870	0	0	0	1850
Q Serve(g_s), s	3.1			0.0	3.9	18.0	13.1	15.1	0.0	0.0	0.0	3.1
Cycle Q Clear(g_c), s	3.1			0.0	3.9	18.0	13.1	15.1	0.0	0.0	0.0	3.1
Prop In Lane	1.00			0.00		1.00	1.00		0.00	0.00		0.06
Lane Grp Cap(c), veh/h	81			0	374	317	303	1131	0	0	0	712
V/C Ratio(X)	0.77			0.00	0.26	1.19	0.88	0.49	0.00	0.00	0.00	0.14
Avail Cap(c_a), veh/h	356			0	374	317	350	1131	0	0	0	712
HCM Platoon Ratio	1.00			1.00	1.00	1.00	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	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	42.5			0.0	30.4	36.0	36.4	10.0	0.0	0.0	0.0	18.0
Incr Delay (d2), s/veh	14.0			0.0	0.4	112.9	19.7	1.5	0.0	0.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7			0.0	1.8	16.7	7.2	6.0	0.0	0.0	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.5			0.0	30.7	148.9	56.1	11.6	0.0	0.0	0.0	18.4
LnGrp LOS	E			A	C	F	E	B	A	A	A	B
Approach Vol, veh/h					474			823			98	
Approach Delay, s/veh					124.8			26.0			18.4	
Approach LOS					F			C			B	

Timer - Assigned Phs		2			5	6	7	8				
Phs Duration (G+Y+Rc), s		58.9			19.8	39.1	8.6	22.5				
Change Period (Y+Rc), s		4.5			4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s		40.5			17.7	18.3	18.0	18.0				
Max Q Clear Time (g_c+I1), s		17.1			15.1	5.1	5.1	20.0				
Green Ext Time (p_c), s		3.8			0.2	0.3	0.1	0.0				

Intersection Summary												
HCM 6th Ctrl Delay			58.9									
HCM 6th LOS			E									



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1302	82	4	27	546	399
Future Volume (veh/h)	1302	82	4	27	546	399
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.93	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1342	70	4	28	563	366
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	4048	211	170	1546	900	406
Arrive On Green	0.64	0.64	0.64	0.64	0.26	0.26
Sat Flow, veh/h	6545	327	198	2485	3456	1560
Grp Volume(v), veh/h	1030	382	16	16	563	366
Grp Sat Flow(s),veh/h/ln	1609	1784	981	1617	1728	1560
Q Serve(g_s), s	10.1	10.2	0.1	0.4	15.1	23.8
Cycle Q Clear(g_c), s	10.1	10.2	10.3	0.4	15.1	23.8
Prop In Lane		0.18	0.24		1.00	1.00
Lane Grp Cap(c), veh/h	3109	1150	675	1042	900	406
V/C Ratio(X)	0.33	0.33	0.02	0.02	0.63	0.90
Avail Cap(c_a), veh/h	3109	1150	675	1042	987	446
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.4	8.5	6.8	6.7	34.3	37.5
Incr Delay (d2), s/veh	0.3	0.8	0.1	0.0	1.1	20.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	3.9	0.1	0.1	6.4	11.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.7	9.2	6.8	6.7	35.4	57.5
LnGrp LOS	A	A	A	A	D	E
Approach Vol, veh/h	1412			32	929	
Approach Delay, s/veh	8.9			6.8	44.1	
Approach LOS	A			A	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		72.6		32.4		72.6
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		65.0		30.0		65.0
Max Q Clear Time (g_c+I1), s		12.3		25.8		12.2
Green Ext Time (p_c), s		0.4		1.5		28.3

Intersection Summary		
HCM 6th Ctrl Delay		22.6
HCM 6th LOS		C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	1575	48	0	0	0	0	328	55	49	90	0
Future Volume (veh/h)	55	1575	48	0	0	0	0	328	55	49	90	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.92				1.00		0.93	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	59	1694	49				0	353	33	53	97	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	1173	3363	957				0	460	362	138	460	0
Arrive On Green	0.88	0.88	0.88				0.00	0.25	0.25	0.25	0.25	0.00
Sat Flow, veh/h	1781	5106	1453				0	1870	1470	986	1870	0
Grp Volume(v), veh/h	59	1694	49				0	353	33	53	97	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1453				0	1870	1470	986	1870	0
Q Serve(g_s), s	0.5	7.7	0.5				0.0	18.4	1.8	5.5	4.3	0.0
Cycle Q Clear(g_c), s	0.5	7.7	0.5				0.0	18.4	1.8	24.0	4.3	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1173	3363	957				0	460	362	138	460	0
V/C Ratio(X)	0.05	0.50	0.05				0.00	0.77	0.09	0.38	0.21	0.00
Avail Cap(c_a), veh/h	1173	3363	957				0	534	420	177	534	0
HCM Platoon Ratio	1.33	1.33	1.33				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.82	0.82	0.82				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	2.3	2.7	2.3				0.0	36.8	30.5	47.9	31.5	0.0
Incr Delay (d2), s/veh	0.1	0.4	0.1				0.0	5.7	0.1	1.7	0.2	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
%ile BackOfQ(50%),veh/ln	0.2	1.8	0.1				0.0	9.0	0.7	1.4	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	2.3	3.1	2.3				0.0	42.5	30.6	49.6	31.7	0.0
LnGrp LOS	A	A	A				A	D	C	D	C	A
Approach Vol, veh/h		1802						386			150	
Approach Delay, s/veh		3.1						41.5			38.0	
Approach LOS		A						D			D	

Timer - Assigned Phs	4	6	8
Phs Duration (G+Y+Rc), s	30.8	74.2	30.8
Change Period (Y+Rc), s	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	65.0	30.0
Max Q Clear Time (g_c+I1), s	20.4	9.7	26.0
Green Ext Time (p_c), s	1.5	22.2	0.2

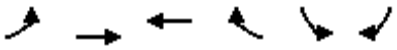
Intersection Summary	
HCM 6th Ctrl Delay	11.7
HCM 6th LOS	B



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	305	153	68	1948	339	62
Future Volume (veh/h)	305	153	68	1948	339	62
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.94	0.99		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	347	142	77	2214	385	13
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1583	632	147	3862	424	377
Arrive On Green	0.65	0.65	0.65	0.65	0.24	0.24
Sat Flow, veh/h	2526	972	157	6173	1781	1585
Grp Volume(v), veh/h	251	238	643	1648	385	13
Grp Sat Flow(s),veh/h/ln	1777	1627	1700	1464	1781	1585
Q Serve(g_s), s	5.2	5.4	5.1	18.9	18.9	0.6
Cycle Q Clear(g_c), s	5.2	5.4	17.4	18.9	18.9	0.6
Prop In Lane		0.60	0.12		1.00	1.00
Lane Grp Cap(c), veh/h	1156	1059	1151	2858	424	377
V/C Ratio(X)	0.22	0.22	0.56	0.58	0.91	0.03
Avail Cap(c_a), veh/h	1156	1059	1151	2858	495	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	1.00	1.00	0.65	0.65
Uniform Delay (d), s/veh	6.4	6.4	8.4	8.8	33.3	26.3
Incr Delay (d2), s/veh	0.4	0.4	2.0	0.9	13.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	1.8	6.4	5.4	9.5	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.8	6.9	10.4	9.6	46.7	26.4
LnGrp LOS	A	A	B	A	D	C
Approach Vol, veh/h	489			2291	398	
Approach Delay, s/veh	6.8			9.8	46.0	
Approach LOS	A			A	D	

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	63.6			63.6	26.4
Change Period (Y+Rc), s	5.0			5.0	5.0
Max Green Setting (Gmax), s	55.0			55.0	25.0
Max Q Clear Time (g_c+I1), s	7.4			20.9	20.9
Green Ext Time (p_c), s	7.0			31.2	0.5

Intersection Summary		
HCM 6th Ctrl Delay	13.9	
HCM 6th LOS	B	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	322	178	1694	399	240	173
Future Volume (veh/h)	322	178	1694	399	240	173
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.96	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	343	189	1802	396	255	68
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	198	1346	2914	639	301	268
Arrive On Green	0.11	0.72	0.55	0.55	0.17	0.17
Sat Flow, veh/h	1781	1870	5531	1155	1781	1585
Grp Volume(v), veh/h	343	189	1650	548	255	68
Grp Sat Flow(s),veh/h/ln	1781	1870	1609	1599	1781	1585
Q Serve(g_s), s	10.0	2.8	20.9	21.0	12.5	3.4
Cycle Q Clear(g_c), s	10.0	2.8	20.9	21.0	12.5	3.4
Prop In Lane	1.00			0.72	1.00	1.00
Lane Grp Cap(c), veh/h	198	1346	2669	884	301	268
V/C Ratio(X)	1.73	0.14	0.62	0.62	0.85	0.25
Avail Cap(c_a), veh/h	198	1346	2669	884	495	440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.69	0.69	1.00	1.00
Uniform Delay (d), s/veh	40.0	3.9	13.7	13.7	36.3	32.5
Incr Delay (d2), s/veh	350.1	0.2	0.8	2.3	7.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	28.6	0.9	7.1	7.5	5.9	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	390.1	4.1	14.4	15.9	43.4	33.0
LnGrp LOS	F	A	B	B	D	C
Approach Vol, veh/h		532	2198		323	
Approach Delay, s/veh		253.0	14.8		41.2	
Approach LOS		F	B		D	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	15.0	54.8			69.8	20.2
Change Period (Y+Rc), s	5.0	5.0			5.0	5.0
Max Green Setting (Gmax), s	10.0	40.0			55.0	25.0
Max Q Clear Time (g_c+I1), s	12.0	23.0			4.8	14.5
Green Ext Time (p_c), s	0.0	16.0			2.4	0.7

Intersection Summary	
HCM 6th Ctrl Delay	59.1
HCM 6th LOS	E



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1547	132	158	1362	280	102
Future Volume (veh/h)	1547	132	158	1362	280	102
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1628	139	166	1434	295	107
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	3490	298	156	1504	336	299
Arrive On Green	0.73	0.73	0.73	0.73	0.19	0.19
Sat Flow, veh/h	4961	409	161	2150	1781	1585
Grp Volume(v), veh/h	1156	611	577	1023	295	107
Grp Sat Flow(s),veh/h/ln	1702	1797	609	1617	1781	1585
Q Serve(g_s), s	16.8	16.8	70.6	56.1	19.3	7.1
Cycle Q Clear(g_c), s	16.8	16.8	87.4	56.1	19.3	7.1
Prop In Lane		0.23	0.29		1.00	1.00
Lane Grp Cap(c), veh/h	2479	1309	482	1178	336	299
V/C Ratio(X)	0.47	0.47	1.20	0.87	0.88	0.36
Avail Cap(c_a), veh/h	2479	1309	482	1178	824	733
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.49	0.49	1.00	1.00
Uniform Delay (d), s/veh	6.7	6.7	23.7	12.1	47.4	42.4
Incr Delay (d2), s/veh	0.6	1.2	99.1	4.6	7.4	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	5.7	27.7	18.7	9.2	2.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.3	7.9	122.8	16.6	54.8	43.1
LnGrp LOS	A	A	F	B	D	D
Approach Vol, veh/h	1767			1600	402	
Approach Delay, s/veh	7.5			55.0	51.7	
Approach LOS	A			D	D	

Timer - Assigned Phs	2		4		6
Phs Duration (G+Y+Rc), s	92.4		27.6		92.4
Change Period (Y+Rc), s	5.0		5.0		5.0
Max Green Setting (Gmax), s	54.5		55.5		54.5
Max Q Clear Time (g_c+I1), s	18.8		21.3		89.4
Green Ext Time (p_c), s	27.3		1.3		0.0

Intersection Summary	
HCM 6th Ctrl Delay	32.4
HCM 6th LOS	C

Appendix F: Baseline 2035 + Project + Improvements Intersection Analysis Worksheets

HCM 6th Signalized Intersection Summary
2: Waiakamilo Rd & Dillingham Blvd

06/24/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	194	1291	83	388	722	119	97	242	187	166	539	210
Future Volume (veh/h)	194	1291	83	388	722	119	97	242	187	166	539	210
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		0.97	1.00		1.00	1.00		0.93
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	198	1317	81	396	737	113	99	247	0	169	550	188
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	224	1243	76	274	1211	186	115	821		137	619	211
Arrive On Green	0.13	0.37	0.37	0.05	0.13	0.13	0.06	0.23	0.00	0.08	0.24	0.24
Sat Flow, veh/h	1781	3368	207	1781	3049	467	1781	3647	0	1781	2546	866
Grp Volume(v), veh/h	198	693	705	396	429	421	99	247	0	169	383	355
Grp Sat Flow(s),veh/h/ln	1781	1777	1798	1781	1777	1740	1781	1777	0	1781	1777	1635
Q Serve(g_s), s	14.2	48.0	48.0	20.0	29.7	29.7	7.2	7.5	0.0	10.0	27.0	27.3
Cycle Q Clear(g_c), s	14.2	48.0	48.0	20.0	29.7	29.7	7.2	7.5	0.0	10.0	27.0	27.3
Prop In Lane	1.00		0.11	1.00		0.27	1.00		0.00	1.00		0.53
Lane Grp Cap(c), veh/h	224	656	663	274	706	691	115	821		137	432	398
V/C Ratio(X)	0.88	1.06	1.06	1.45	0.61	0.61	0.86	0.30		1.23	0.89	0.89
Avail Cap(c_a), veh/h	260	656	663	274	706	691	115	916		137	480	441
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.78	0.78	0.78	0.56	0.56	0.00	0.68	0.68	0.68
Uniform Delay (d), s/veh	55.9	41.0	41.0	61.7	46.9	46.9	60.2	41.3	0.0	60.0	47.5	47.5
Incr Delay (d2), s/veh	25.7	51.3	52.6	215.7	3.0	3.1	28.8	0.1	0.0	140.3	12.2	13.8
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	8.0	30.0	30.6	26.0	14.8	14.5	4.2	3.3	0.0	9.9	13.4	12.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	81.6	92.3	93.6	277.4	50.0	50.1	89.1	41.4	0.0	200.3	59.6	61.3
LnGrp LOS	F	F	F	F	D	D	F	D		F	E	E
Approach Vol, veh/h		1596			1246			346			907	
Approach Delay, s/veh		91.5			122.3			55.1			86.5	
Approach LOS		F			F			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	54.0	13.4	37.6	21.3	57.6	15.0	36.0
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	10.0	44.5	8.4	35.1	19.0	45.5	10.0	33.5
Max Q Clear Time (g_c+I1), s	22.0	50.0	9.2	29.3	16.2	31.7	12.0	9.5
Green Ext Time (p_c), s	0.0	0.0	0.0	2.3	0.1	4.7	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	96.7
HCM 6th LOS	F

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	2	10	11	3	117	6	299	23	76	641	13
Future Volume (veh/h)	11	2	10	11	3	117	6	299	23	76	641	13
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	0.99		0.99	1.00		0.97	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	12	2	11	12	3	124	6	318	24	81	682	14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	300	83	146	160	22	307	144	1452	108	252	1401	28
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.45	0.45	0.45	0.45	0.45	0.45
Sat Flow, veh/h	469	378	666	69	101	1405	15	3241	241	204	3128	63
Grp Volume(v), veh/h	25	0	0	139	0	0	184	0	164	399	0	378
Grp Sat Flow(s),veh/h/ln	1513	0	0	1575	0	0	1848	0	1649	1704	0	1690
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	4.3
Cycle Q Clear(g_c), s	0.3	0.0	0.0	2.0	0.0	0.0	1.6	0.0	1.7	4.0	0.0	4.3
Prop In Lane	0.48		0.44	0.09		0.89	0.03		0.15	0.20		0.04
Lane Grp Cap(c), veh/h	528	0	0	489	0	0	966	0	739	924	0	757
V/C Ratio(X)	0.05	0.00	0.00	0.28	0.00	0.00	0.19	0.00	0.22	0.43	0.00	0.50
Avail Cap(c_a), veh/h	1340	0	0	1386	0	0	2113	0	1800	1957	0	1845
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.4	0.0	0.0	9.0	0.0	0.0	4.6	0.0	4.6	5.2	0.0	5.3
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.2	0.3	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.5	0.0	0.0	0.3	0.0	0.3	0.7	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	0.0	0.0	9.3	0.0	0.0	4.7	0.0	4.7	5.5	0.0	5.8
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		25			139			348			777	
Approach Delay, s/veh		8.4			9.3			4.7			5.7	
Approach LOS		A			A			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	10.4	16.6	10.4	16.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.5	29.5	21.5	29.5
Max Q Clear Time (g_c+I1), s	4.0	3.7	2.3	6.3
Green Ext Time (p_c), s	0.7	2.1	0.1	5.3

Intersection Summary	
HCM 6th Ctrl Delay	5.9
HCM 6th LOS	A



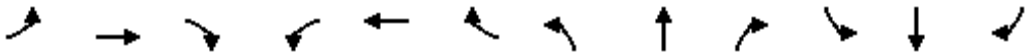
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	184	1064	149	61	742	265	255	348	78	235	901	533
Future Volume (veh/h)	184	1064	149	61	742	265	255	348	78	235	901	533
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	192	1108	150	64	773	0	266	362	69	245	939	385
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	1309	177	79	1210		247	833	157	265	1031	634
Arrive On Green	0.12	0.42	0.42	0.09	0.69	0.00	0.14	0.28	0.28	0.15	0.29	0.29
Sat Flow, veh/h	1781	3130	423	1781	3618	0	1781	2969	559	1781	3554	1534
Grp Volume(v), veh/h	192	628	630	64	773	0	266	215	216	245	939	385
Grp Sat Flow(s),veh/h/ln	1781	1777	1776	1781	1763	0	1781	1777	1752	1781	1777	1534
Q Serve(g_s), s	19.1	57.2	57.6	6.3	22.0	0.0	25.0	17.8	18.2	24.4	45.9	35.6
Cycle Q Clear(g_c), s	19.1	57.2	57.6	6.3	22.0	0.0	25.0	17.8	18.2	24.4	45.9	35.6
Prop In Lane	1.00		0.24	1.00		0.00	1.00		0.32	1.00		1.00
Lane Grp Cap(c), veh/h	213	743	743	79	1210		247	498	491	265	1031	634
V/C Ratio(X)	0.90	0.84	0.85	0.81	0.64		1.08	0.43	0.44	0.93	0.91	0.61
Avail Cap(c_a), veh/h	302	743	743	84	1210		247	498	491	396	1086	658
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.86	0.86	0.00	0.98	0.98	0.98	1.00	1.00	1.00
Uniform Delay (d), s/veh	78.2	47.1	47.2	81.2	22.0	0.0	77.5	53.0	53.2	75.7	61.7	41.9
Incr Delay (d2), s/veh	22.3	11.3	11.6	36.1	2.2	0.0	78.0	0.6	0.6	16.9	11.1	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	10.2	27.8	28.0	3.6	7.2	0.0	16.9	8.2	8.2	12.5	22.4	14.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	100.5	58.4	58.8	117.4	24.2	0.0	155.5	53.6	53.8	92.6	72.7	43.4
LnGrp LOS	F	E	E	F	C		F	D	D	F	E	D
Approach Vol, veh/h		1450			837			697			1569	
Approach Delay, s/veh		64.2			31.3			92.6			68.6	
Approach LOS		E			C			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.5	80.3	31.7	55.5	26.0	66.8	30.0	57.2
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Max Green Setting (Gmax), s	8.5	72.0	40.0	40.0	30.5	50.0	25.0	55.0
Max Q Clear Time (g_c+I1), s	9.3	59.6	26.4	20.2	21.1	24.0	27.0	47.9
Green Ext Time (p_c), s	0.0	6.8	0.3	2.5	0.3	5.9	0.0	4.3

Intersection Summary	
HCM 6th Ctrl Delay	64.0
HCM 6th LOS	E

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	1523	35	89	975	120	33	70	148	213	91	33
Future Volume (vph)	63	1523	35	89	975	120	33	70	148	213	91	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.0	6.0			5.0			5.0	
Lane Util. Factor		0.91		1.00	0.95			1.00			1.00	
Frpb, ped/bikes		1.00		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		1.00		1.00	0.98			0.92			0.99	
Flt Protected		1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)		5050		1770	3450			1701			1774	
Flt Permitted		0.78		0.06	1.00			0.92			0.57	
Satd. Flow (perm)		3924		120	3450			1576			1037	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	66	1603	37	94	1026	126	35	74	156	224	96	35
RTOR Reduction (vph)	0	2	0	0	6	0	0	7	0	0	3	0
Lane Group Flow (vph)	0	1704	0	94	1146	0	0	258	0	0	352	0
Confl. Peds. (#/hr)			23			24	20					20
Confl. Bikes (#/hr)			1									
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		63.2		73.2	73.2			45.8			45.8	
Effective Green, g (s)		63.2		73.2	73.2			45.8			45.8	
Actuated g/C Ratio		0.49		0.56	0.56			0.35			0.35	
Clearance Time (s)		6.0		5.0	6.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		1907		131	1942			555			365	
v/s Ratio Prot				0.03	c0.33							
v/s Ratio Perm		c0.43		0.38				0.16			c0.34	
v/c Ratio		0.89		0.72	0.59			0.46			0.96	
Uniform Delay, d1		30.4		20.6	18.6			32.6			41.3	
Progression Factor		1.11		1.27	0.84			1.00			1.00	
Incremental Delay, d2		0.6		13.0	1.0			0.6			37.3	
Delay (s)		34.1		39.2	16.6			33.2			78.6	
Level of Service		C		D	B			C			E	
Approach Delay (s)		34.1			18.3			33.2			78.6	
Approach LOS		C			B			C			E	

Intersection Summary			
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	115.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	218	0	97	0	427	157	127	610	0
Future Volume (veh/h)	0	0	0	218	0	97	0	427	157	127	610	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	0	251	0	111	0	491	180	146	701	0
Peak Hour Factor	0.95	0.95	0.95	0.87	0.95	0.87	0.95	0.87	0.87	0.87	0.87	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	598	0	453	13	144	0	1207	440	269	1180	0
Arrive On Green	0.00	0.00	0.00	0.32	0.00	0.32	0.00	0.47	0.47	0.47	0.47	0.00
Sat Flow, veh/h	0	1870	0	980	41	452	0	2639	927	330	2573	0
Grp Volume(v), veh/h	0	0	0	362	0	0	0	342	329	396	451	0
Grp Sat Flow(s),veh/h/ln	0	1870	0	1473	0	0	0	1777	1695	1201	1617	0
Q Serve(g_s), s	0.0	0.0	0.0	9.2	0.0	0.0	0.0	5.5	5.5	6.0	8.9	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	9.6	0.0	0.0	0.0	5.5	5.5	11.5	8.9	0.0
Prop In Lane	0.00		0.00	0.69		0.31	0.00		0.55	0.37		0.00
Lane Grp Cap(c), veh/h	0	598	0	610	0	0	0	843	804	682	767	0
V/C Ratio(X)	0.00	0.00	0.00	0.59	0.00	0.00	0.00	0.41	0.41	0.58	0.59	0.00
Avail Cap(c_a), veh/h	0	1483	0	1302	0	0	0	1889	1803	1401	1719	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	13.3	0.0	0.0	0.0	7.5	7.5	8.7	8.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.3	0.3	0.8	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	2.7	0.0	0.0	0.0	1.6	1.5	1.9	2.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	0.0	14.3	0.0	0.0	0.0	7.8	7.8	9.5	9.1	0.0
LnGrp LOS	A	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		0			362			671			847	
Approach Delay, s/veh		0.0			14.3			7.8			9.3	
Approach LOS					B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	25.2	18.4	25.2	18.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	46.4	34.6	46.4	34.6
Max Q Clear Time (g_c+I1), s	7.5	0.0	13.5	11.6
Green Ext Time (p_c), s	4.9	0.0	7.2	2.3

Intersection Summary	
HCM 6th Ctrl Delay	9.7
HCM 6th LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	1150	637	473	811	25	349	3	285	0	0	0
Future Volume (veh/h)	18	1150	637	473	811	25	349	3	285	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.92	1.00		0.97	1.00		0.90			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	18	1173	512	483	828	25	389	0	69			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	33	1558	642	504	2453	74	590	0	233			
Arrive On Green	0.02	0.44	0.44	0.28	0.70	0.70	0.17	0.00	0.17			
Sat Flow, veh/h	1781	3554	1465	1781	3489	105	3563	0	1407			
Grp Volume(v), veh/h	18	1173	512	483	422	431	389	0	69			
Grp Sat Flow(s),veh/h/ln	1781	1777	1465	1781	1777	1817	1781	0	1407			
Q Serve(g_s), s	1.3	36.8	40.1	35.5	12.3	12.3	13.6	0.0	5.7			
Cycle Q Clear(g_c), s	1.3	36.8	40.1	35.5	12.3	12.3	13.6	0.0	5.7			
Prop In Lane	1.00		1.00	1.00		0.06	1.00		1.00			
Lane Grp Cap(c), veh/h	33	1558	642	504	1250	1278	590	0	233			
V/C Ratio(X)	0.55	0.75	0.80	0.96	0.34	0.34	0.66	0.00	0.30			
Avail Cap(c_a), veh/h	67	1558	642	522	1250	1278	670	0	265			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.69	0.69	0.69	1.00	1.00	1.00	0.92	0.00	0.92			
Uniform Delay (d), s/veh	64.7	31.3	32.2	46.9	7.7	7.7	52.0	0.0	48.7			
Incr Delay (d2), s/veh	3.7	2.4	7.1	28.1	0.7	0.7	1.8	0.0	0.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.6	16.1	15.3	19.6	4.7	4.8	6.3	0.0	4.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.5	33.7	39.3	75.0	8.4	8.4	53.8	0.0	49.3			
LnGrp LOS	E	C	D	E	A	A	D	A	D			
Approach Vol, veh/h		1703			1336			458				
Approach Delay, s/veh		35.7			32.5			53.1				
Approach LOS		D			C			D				

Timer - Assigned Phs	1	2		4	5	6
Phs Duration (G+Y+Rc), s	12.6	63.3		27.0	7.4	98.5
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s	39.6	54.0		25.0	5.0	88.0
Max Q Clear Time (g_c+I1), s	37.5	42.1		15.6	3.3	14.3
Green Ext Time (p_c), s	0.2	10.3		1.2	0.0	15.0

Intersection Summary	
HCM 6th Ctrl Delay	36.8
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	222	1493	174	53	524	106	154	140	56	124	222	470
Future Volume (veh/h)	222	1493	174	53	524	106	154	140	56	124	222	470
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		0.90	0.95		0.85	0.92		1.00
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	231	1555	174	55	546	102	160	146	44	129	231	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	255	2440	273	70	1510	610	271	446	134	167	251	
Arrive On Green	0.14	0.53	0.53	0.04	0.43	0.43	0.34	0.34	0.34	0.34	0.34	0.00
Sat Flow, veh/h	1781	4617	516	1781	3554	1434	1087	1319	398	405	741	1585
Grp Volume(v), veh/h	231	1146	583	55	546	102	160	0	190	360	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1729	1781	1777	1434	1087	0	1717	1146	0	1585
Q Serve(g_s), s	20.4	38.3	38.4	4.9	16.7	7.0	0.0	0.0	13.2	37.0	0.0	0.0
Cycle Q Clear(g_c), s	20.4	38.3	38.4	4.9	16.7	7.0	35.7	0.0	13.2	50.2	0.0	0.0
Prop In Lane	1.00		0.30	1.00		1.00	1.00		0.23	0.36		1.00
Lane Grp Cap(c), veh/h	255	1799	914	70	1510	610	271	0	581	418	0	
V/C Ratio(X)	0.91	0.64	0.64	0.78	0.36	0.17	0.59	0.00	0.33	0.86	0.00	
Avail Cap(c_a), veh/h	356	1799	914	111	1510	610	345	0	697	520	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.87	0.87	0.87	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	67.5	26.8	26.8	76.2	31.2	28.5	46.8	0.0	39.4	57.6	0.0	0.0
Incr Delay (d2), s/veh	20.7	1.7	3.4	15.0	0.6	0.5	2.1	0.0	0.3	11.6	0.0	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	10.8	16.0	16.8	2.6	7.4	2.6	5.8	0.0	5.7	15.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	88.2	28.5	30.2	91.1	31.8	29.0	48.9	0.0	39.7	69.2	0.0	0.0
LnGrp LOS	F	C	C	F	C	C	D	A	D	E	A	
Approach Vol, veh/h		1960			703			350			360	
Approach Delay, s/veh		36.1			36.1			43.9			69.2	
Approach LOS		D			D			D			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	27.9	73.0		59.1	11.3	89.6		59.1
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	22.9	48.0		65.0	10.0	70.0		65.0
Max Q Clear Time (g_c+I1), s	22.4	18.7		37.7	6.9	40.4		52.2
Green Ext Time (p_c), s	0.5	4.4		1.9	0.0	16.0		1.9

Intersection Summary	
HCM 6th Ctrl Delay	40.4
HCM 6th LOS	D

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	524	1195	177	339	396	89	145	573	506	208	594	193
Future Volume (veh/h)	524	1195	177	339	396	89	145	573	506	208	594	193
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.92	1.00		0.91	1.00		0.87	1.00		0.94
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	546	1245	173	353	412	67	151	597	517	217	619	180
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	606	1252	174	323	1260	197	172	533	407	200	839	243
Arrive On Green	0.18	0.28	0.28	0.18	0.29	0.29	0.10	0.30	0.30	0.11	0.32	0.32
Sat Flow, veh/h	3456	4453	619	1781	4386	686	1781	1777	1357	1781	2655	770
Grp Volume(v), veh/h	546	952	466	353	316	163	151	597	517	217	414	385
Grp Sat Flow(s),veh/h/ln	1728	1702	1667	1781	1702	1669	1781	1777	1357	1781	1777	1648
Q Serve(g_s), s	24.8	44.6	44.6	29.0	11.7	12.3	13.4	48.0	48.0	18.0	33.2	33.4
Cycle Q Clear(g_c), s	24.8	44.6	44.6	29.0	11.7	12.3	13.4	48.0	48.0	18.0	33.2	33.4
Prop In Lane	1.00		0.37	1.00		0.41	1.00		1.00	1.00		0.47
Lane Grp Cap(c), veh/h	606	957	469	323	978	479	172	533	407	200	562	521
V/C Ratio(X)	0.90	0.99	0.99	1.09	0.32	0.34	0.88	1.12	1.27	1.08	0.74	0.74
Avail Cap(c_a), veh/h	734	957	469	323	978	479	189	533	407	200	562	521
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.70	0.70	0.70	1.00	1.00	1.00	0.26	0.26	0.26	0.90	0.90	0.90
Uniform Delay (d), s/veh	64.6	57.4	57.4	65.5	44.8	45.0	71.4	56.0	56.0	71.0	48.8	48.8
Incr Delay (d2), s/veh	9.4	23.0	33.4	77.4	0.9	1.9	11.2	61.2	126.6	84.1	4.6	5.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.7	22.2	23.2	20.1	5.1	5.5	6.7	30.5	30.7	12.9	15.6	14.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.0	80.3	90.8	142.9	45.7	47.0	82.6	117.2	182.6	155.1	53.4	53.8
LnGrp LOS	E	F	F	F	D	D	F	F	F	F	D	D
Approach Vol, veh/h		1964			832			1265			1016	
Approach Delay, s/veh		81.1			87.2			139.8			75.3	
Approach LOS		F			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	34.0	50.0	20.4	55.6	33.0	51.0	23.0	53.0
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	29.0	45.0	17.0	49.0	34.0	40.0	18.0	48.0
Max Q Clear Time (g_c+I1), s	31.0	46.6	15.4	35.4	26.8	14.3	20.0	50.0
Green Ext Time (p_c), s	0.0	0.0	0.1	4.4	1.3	3.2	0.0	0.0

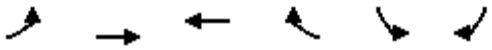
Intersection Summary	
HCM 6th Ctrl Delay	95.5
HCM 6th LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	9	1	158	74	95	53	128	313	18	99	121	6
Future Volume (veh/h)	9	1	158	74	95	53	128	313	18	99	121	6
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	0.99		0.95	0.98		0.97	0.99		0.95
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	1	190	89	114	64	154	377	22	119	146	7
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	116	16	401	245	239	110	292	562	30	381	419	17
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	31	58	1405	385	836	385	352	1221	65	511	910	38
Grp Volume(v), veh/h	202	0	0	267	0	0	553	0	0	272	0	0
Grp Sat Flow(s),veh/h/ln	1493	0	0	1606	0	0	1638	0	0	1458	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.7	0.0	0.0	5.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.9	0.0	0.0	4.6	0.0	0.0	9.4	0.0	0.0	3.5	0.0	0.0
Prop In Lane	0.05		0.94	0.33		0.24	0.28		0.04	0.44		0.03
Lane Grp Cap(c), veh/h	533	0	0	594	0	0	884	0	0	818	0	0
V/C Ratio(X)	0.38	0.00	0.00	0.45	0.00	0.00	0.63	0.00	0.00	0.33	0.00	0.00
Avail Cap(c_a), veh/h	1381	0	0	1453	0	0	2418	0	0	2101	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.4	0.0	0.0	10.6	0.0	0.0	7.6	0.0	0.0	6.0	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.5	0.0	0.0	0.7	0.0	0.0	0.2	0.0	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	1.0	0.0	0.0	1.4	0.0	0.0	2.1	0.0	0.0	0.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.9	0.0	0.0	11.2	0.0	0.0	8.3	0.0	0.0	6.3	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		202			267			553			272	
Approach Delay, s/veh		10.9			11.2			8.3			6.3	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	14.6	20.8	14.6	20.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	30.5	50.5	30.5	50.5
Max Q Clear Time (g_c+I1), s	6.6	11.4	5.9	5.5
Green Ext Time (p_c), s	1.7	4.4	1.3	2.2

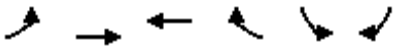
Intersection Summary	
HCM 6th Ctrl Delay	8.9
HCM 6th LOS	A



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	1683	208	0	83
Future Volume (vph)	0	0	1683	208	0	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.5			4.5
Lane Util. Factor			0.91			1.00
Frpb, ped/bikes			1.00			0.98
Flpb, ped/bikes			1.00			1.00
Frt			0.98			0.86
Flt Protected			1.00			1.00
Satd. Flow (prot)			4977			1582
Flt Permitted			1.00			1.00
Satd. Flow (perm)			4977			1582
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	1870	231	0	92
RTOR Reduction (vph)	0	0	17	0	0	19
Lane Group Flow (vph)	0	0	2084	0	0	73
Confl. Peds. (#/hr)				9	9	4
Confl. Bikes (#/hr)				3		
Turn Type			NA			Perm
Protected Phases			6			
Permitted Phases						4
Actuated Green, G (s)			60.5			20.5
Effective Green, g (s)			60.5			20.5
Actuated g/C Ratio			0.67			0.23
Clearance Time (s)			4.5			4.5
Vehicle Extension (s)			3.0			3.0
Lane Grp Cap (vph)			3345			360
v/s Ratio Prot			c0.42			
v/s Ratio Perm						c0.05
v/c Ratio			0.62			0.20
Uniform Delay, d1			8.3			28.1
Progression Factor			1.00			1.00
Incremental Delay, d2			0.9			1.3
Delay (s)			9.2			29.4
Level of Service			A			C
Approach Delay (s)		0.0	9.2		29.4	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	365	364	668	214	313	101
Future Volume (veh/h)	365	364	668	214	313	101
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.94	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	388	387	711	173	333	41
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	1267	1964	456	377	336
Arrive On Green	0.24	0.68	0.38	0.38	0.21	0.21
Sat Flow, veh/h	1781	1870	5445	1203	1781	1585
Grp Volume(v), veh/h	388	387	660	224	333	41
Grp Sat Flow(s),veh/h/ln	1781	1870	1609	1561	1781	1585
Q Serve(g_s), s	19.0	7.6	8.9	9.4	16.3	1.9
Cycle Q Clear(g_c), s	19.0	7.6	8.9	9.4	16.3	1.9
Prop In Lane	1.00			0.77	1.00	1.00
Lane Grp Cap(c), veh/h	432	1267	1829	591	377	336
V/C Ratio(X)	0.90	0.31	0.36	0.38	0.88	0.12
Avail Cap(c_a), veh/h	594	1267	1829	591	515	458
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.94	0.94	1.00	1.00
Uniform Delay (d), s/veh	33.0	5.9	20.1	20.3	34.4	28.7
Incr Delay (d2), s/veh	13.0	0.6	0.5	1.7	12.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	2.7	3.3	3.6	8.2	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	46.0	6.5	20.6	22.0	47.3	28.9
LnGrp LOS	D	A	C	C	D	C
Approach Vol, veh/h		775	884		374	
Approach Delay, s/veh		26.3	21.0		45.3	
Approach LOS		C	C		D	

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	36.8	39.1				65.9	24.1
Change Period (Y+Rc), s	5.0	5.0				5.0	5.0
Max Green Setting (Gmax), s	30.0	19.0				54.0	26.0
Max Q Clear Time (g_c+I1), s	21.0	11.4				9.6	18.3
Green Ext Time (p_c), s	0.9	4.9				5.4	0.7

Intersection Summary	
HCM 6th Ctrl Delay	27.5
HCM 6th LOS	C

HCM 6th Signalized Intersection Summary
2: Waiakamilo Rd & Dillingham Blvd

06/24/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	297	1211	73	311	970	167	49	571	249	188	420	149
Future Volume (veh/h)	297	1211	73	311	970	167	49	571	249	188	420	149
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.96	1.00		1.00	1.00		0.92
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	303	1236	68	317	990	159	50	583	0	192	429	122
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	208	1382	76	223	1257	202	65	711		148	662	186
Arrive On Green	0.12	0.41	0.41	0.04	0.14	0.14	0.04	0.20	0.00	0.08	0.25	0.25
Sat Flow, veh/h	1781	3387	186	1781	3019	484	1781	3647	0	1781	2679	751
Grp Volume(v), veh/h	303	648	656	317	582	567	50	583	0	192	282	269
Grp Sat Flow(s),veh/h/ln	1781	1777	1796	1781	1777	1726	1781	1777	0	1781	1777	1653
Q Serve(g_s), s	14.0	40.7	40.9	15.0	38.0	38.1	3.3	18.8	0.0	10.0	17.1	17.5
Cycle Q Clear(g_c), s	14.0	40.7	40.9	15.0	38.0	38.1	3.3	18.8	0.0	10.0	17.1	17.5
Prop In Lane	1.00		0.10	1.00		0.28	1.00		0.00	1.00		0.45
Lane Grp Cap(c), veh/h	208	725	733	223	740	719	65	711		148	439	409
V/C Ratio(X)	1.46	0.89	0.90	1.42	0.79	0.79	0.77	0.82		1.29	0.64	0.66
Avail Cap(c_a), veh/h	208	725	733	223	740	719	132	992		148	512	477
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.54	0.54	0.54	0.09	0.09	0.00	0.82	0.82	0.82
Uniform Delay (d), s/veh	53.0	33.1	33.1	57.5	46.6	46.6	57.3	45.9	0.0	55.0	40.4	40.6
Incr Delay (d2), s/veh	230.7	15.6	15.7	204.3	4.6	4.8	1.8	0.4	0.0	166.8	1.8	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	19.6	20.3	20.6	19.8	19.1	18.6	1.5	8.3	0.0	11.4	7.7	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	283.7	48.7	48.9	261.9	51.2	51.4	59.2	46.3	0.0	221.8	42.2	42.7
LnGrp LOS	F	D	D	F	D	D	E	D		F	D	D
Approach Vol, veh/h		1607			1466			633			743	
Approach Delay, s/veh		93.1			96.8			47.3			88.8	
Approach LOS		F			F			D			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.0	55.0	9.3	35.7	19.0	56.0	15.0	30.0
Change Period (Y+Rc), s	5.0	6.0	5.0	6.0	5.0	6.0	5.0	6.0
Max Green Setting (Gmax), s	25.0	39.5	8.9	34.6	14.0	40.5	10.0	33.5
Max Q Clear Time (g_c+I1), s	17.0	42.9	5.3	19.5	16.0	40.1	12.0	20.8
Green Ext Time (p_c), s	0.0	0.0	0.0	3.0	0.0	0.3	0.0	3.2

Intersection Summary	
HCM 6th Ctrl Delay	87.1
HCM 6th LOS	F

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	2	16	10	4	81	13	572	28	147	557	14
Future Volume (veh/h)	16	2	16	10	4	81	13	572	28	147	557	14
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	0.99		0.99	0.99		0.95	0.99		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	17	2	17	11	4	86	14	609	30	156	593	15
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	270	68	137	157	27	255	142	1648	80	376	1218	31
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.50	0.50	0.50	0.50	0.50	0.50
Sat Flow, veh/h	450	361	726	92	144	1350	22	3320	161	392	2453	62
Grp Volume(v), veh/h	36	0	0	101	0	0	344	0	309	354	0	410
Grp Sat Flow(s),veh/h/ln	1537	0	0	1585	0	0	1841	0	1663	1219	0	1687
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	2.0	0.0	4.6
Cycle Q Clear(g_c), s	0.5	0.0	0.0	1.6	0.0	0.0	3.2	0.0	3.3	5.3	0.0	4.6
Prop In Lane	0.47		0.47	0.11		0.85	0.04		0.10	0.44		0.04
Lane Grp Cap(c), veh/h	476	0	0	439	0	0	1045	0	826	787	0	838
V/C Ratio(X)	0.08	0.00	0.00	0.23	0.00	0.00	0.33	0.00	0.37	0.45	0.00	0.49
Avail Cap(c_a), veh/h	1186	0	0	1208	0	0	2116	0	1830	1486	0	1856
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.6	0.0	0.0	10.0	0.0	0.0	4.4	0.0	4.5	4.7	0.0	4.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.3	0.0	0.0	0.2	0.0	0.3	0.4	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.4	0.0	0.0	0.5	0.0	0.5	0.6	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.7	0.0	0.0	10.3	0.0	0.0	4.6	0.0	4.7	5.1	0.0	5.2
LnGrp LOS	A	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		36			101			653			764	
Approach Delay, s/veh		9.7			10.3			4.7			5.2	
Approach LOS		A			B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	9.9	18.7	9.9	18.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.5	31.5	19.5	31.5
Max Q Clear Time (g_c+I1), s	3.6	5.3	2.5	7.3
Green Ext Time (p_c), s	0.4	4.4	0.1	5.9

Intersection Summary	
HCM 6th Ctrl Delay	5.4
HCM 6th LOS	A



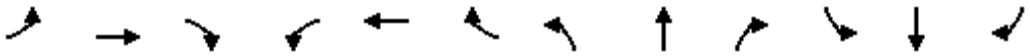
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	998	209	53	822	391	257	786	68	243	575	343
Future Volume (veh/h)	124	998	209	53	822	391	257	786	68	243	575	343
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	129	1040	201	55	856	0	268	819	65	253	599	252
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	138	1063	205	71	1132		211	958	76	243	1088	596
Arrive On Green	0.08	0.36	0.36	0.04	0.32	0.00	0.12	0.29	0.29	0.14	0.31	0.31
Sat Flow, veh/h	1781	2964	571	1781	3618	0	1781	3327	264	1781	3554	1545
Grp Volume(v), veh/h	129	622	619	55	856	0	268	437	447	253	599	252
Grp Sat Flow(s),veh/h/ln	1781	1777	1758	1781	1763	0	1781	1777	1815	1781	1777	1545
Q Serve(g_s), s	7.9	38.0	38.3	3.4	24.0	0.0	13.0	25.6	25.6	15.0	15.5	13.2
Cycle Q Clear(g_c), s	7.9	38.0	38.3	3.4	24.0	0.0	13.0	25.6	25.6	15.0	15.5	13.2
Prop In Lane	1.00		0.32	1.00		0.00	1.00		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	138	637	631	71	1132		211	512	523	243	1088	596
V/C Ratio(X)	0.94	0.98	0.98	0.78	0.76		1.27	0.85	0.85	1.04	0.55	0.42
Avail Cap(c_a), veh/h	138	637	631	94	1132		211	549	561	243	1163	628
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.74	0.74	0.00	0.93	0.93	0.93	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.5	34.8	34.9	52.3	33.5	0.0	48.5	37.0	37.0	47.5	31.8	25.0
Incr Delay (d2), s/veh	57.8	30.4	31.5	19.3	3.5	0.0	152.7	11.2	11.0	69.0	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	21.4	21.5	1.9	10.6	0.0	14.7	12.5	12.8	11.3	6.7	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	108.3	65.2	66.4	71.6	37.0	0.0	201.2	48.1	48.0	116.5	32.3	25.5
LnGrp LOS	F	E	E	E	D		F	D	D	F	C	C
Approach Vol, veh/h		1370			911			1152			1104	
Approach Delay, s/veh		69.8			39.1			83.7			50.1	
Approach LOS		E			D			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	44.4	20.0	36.7	13.0	40.3	18.0	38.7
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.8	35.7	15.0	34.0	8.5	33.0	13.0	36.0
Max Q Clear Time (g_c+I1), s	5.4	40.3	17.0	27.6	9.9	26.0	15.0	17.5
Green Ext Time (p_c), s	0.0	0.0	0.0	3.0	0.0	3.3	0.0	4.9

Intersection Summary	
HCM 6th Ctrl Delay	62.4
HCM 6th LOS	E

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	1346	57	118	1124	395	58	113	132	118	110	75
Future Volume (vph)	101	1346	57	118	1124	395	58	113	132	118	110	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		5.0	6.0			5.0			5.0	
Lane Util. Factor		0.91		1.00	0.95			1.00			1.00	
Frpb, ped/bikes		1.00		1.00	0.98			0.99			0.99	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.99		1.00	0.96			0.94			0.97	
Flt Protected		1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)		5025		1770	3333			1721			1745	
Flt Permitted		0.65		0.09	1.00			0.85			0.61	
Satd. Flow (perm)		3253		171	3333			1475			1083	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	106	1417	60	124	1183	416	61	119	139	124	116	79
RTOR Reduction (vph)	0	4	0	0	23	0	0	21	0	0	10	0
Lane Group Flow (vph)	0	1579	0	124	1576	0	0	298	0	0	309	0
Confl. Peds. (#/hr)	23		21	21		23	26					26
Confl. Bikes (#/hr)			6			5			1			
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		63.3		73.3	73.3			35.7			35.7	
Effective Green, g (s)		63.3		73.3	73.3			35.7			35.7	
Actuated g/C Ratio		0.53		0.61	0.61			0.30			0.30	
Clearance Time (s)		6.0		5.0	6.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		1715		171	2035			438			322	
v/s Ratio Prot				0.03	c0.47							
v/s Ratio Perm		c0.49		0.41				0.20			c0.29	
v/c Ratio		1.10dl		0.73	0.77			0.68			0.96	
Uniform Delay, d1		26.0		14.9	17.2			37.1			41.5	
Progression Factor		0.84		2.03	0.31			1.00			1.00	
Incremental Delay, d2		0.9		7.2	1.4			4.3			39.4	
Delay (s)		22.8		37.4	6.8			41.4			80.9	
Level of Service		C		D	A			D			F	
Approach Delay (s)		22.8			9.0			41.4			80.9	
Approach LOS		C			A			D			F	

Intersection Summary			
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	119.9%	ICU Level of Service	H
Analysis Period (min)	15		

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	57	0	131	0	1047	211	87	814	0
Future Volume (veh/h)	0	0	0	57	0	131	0	1047	211	87	814	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	0	66	0	151	0	1203	243	100	936	0
Peak Hour Factor	0.95	0.95	0.95	0.87	0.95	0.87	0.95	0.87	0.87	0.87	0.87	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	361	0	160	22	205	0	1855	372	169	1542	0
Arrive On Green	0.00	0.00	0.00	0.19	0.00	0.19	0.00	0.63	0.63	0.63	0.63	0.00
Sat Flow, veh/h	0	1870	0	349	116	1065	0	3042	591	130	2536	0
Grp Volume(v), veh/h	0	0	0	217	0	0	0	721	725	440	596	0
Grp Sat Flow(s),veh/h/ln	0	1870	0	1530	0	0	0	1777	1763	964	1617	0
Q Serve(g_s), s	0.0	0.0	0.0	4.4	0.0	0.0	0.0	12.8	13.1	5.3	10.9	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	6.7	0.0	0.0	0.0	12.8	13.1	18.4	10.9	0.0
Prop In Lane	0.00		0.00	0.30		0.70	0.00		0.34	0.23		0.00
Lane Grp Cap(c), veh/h	0	361	0	388	0	0	0	1118	1109	694	1017	0
V/C Ratio(X)	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.65	0.65	0.63	0.59	0.00
Avail Cap(c_a), veh/h	0	722	0	678	0	0	0	2164	2147	1266	1969	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	19.1	0.0	0.0	0.0	5.8	5.9	5.3	5.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.6	0.7	1.0	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	0.0	0.0	0.0	2.3	0.0	0.0	0.0	3.0	3.1	1.5	2.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	0.0	20.3	0.0	0.0	0.0	6.5	6.6	6.3	6.0	0.0
LnGrp LOS	A	A	A	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		0			217			1446			1036	
Approach Delay, s/veh		0.0			20.3			6.5			6.1	
Approach LOS					C			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	36.3	14.2	36.3	14.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	61.5	19.5	61.5	19.5
Max Q Clear Time (g_c+I1), s	15.1	0.0	20.4	8.7
Green Ext Time (p_c), s	15.5	0.0	11.4	0.9

Intersection Summary	
HCM 6th Ctrl Delay	7.5
HCM 6th LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	761	459	328	1290	32	648	0	908	0	0	0
Future Volume (veh/h)	8	761	459	328	1290	32	648	0	908	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.95	1.00		0.97			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	8	777	246	335	1316	33	827	0	355			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	17	1409	589	361	2067	52	983	0	417			
Arrive On Green	0.01	0.53	0.53	0.20	0.59	0.59	0.28	0.00	0.28			
Sat Flow, veh/h	1781	3554	1486	1781	3508	88	3563	0	1511			
Grp Volume(v), veh/h	8	777	246	335	666	683	827	0	355			
Grp Sat Flow(s),veh/h/ln	1781	1777	1486	1781	1777	1819	1781	0	1511			
Q Serve(g_s), s	0.5	17.5	12.0	22.2	29.5	29.6	26.3	0.0	26.7			
Cycle Q Clear(g_c), s	0.5	17.5	12.0	22.2	29.5	29.6	26.3	0.0	26.7			
Prop In Lane	1.00		1.00	1.00		0.05	1.00		1.00			
Lane Grp Cap(c), veh/h	17	1409	589	361	1047	1072	983	0	417			
V/C Ratio(X)	0.46	0.55	0.42	0.93	0.64	0.64	0.84	0.00	0.85			
Avail Cap(c_a), veh/h	74	1409	589	386	1047	1072	1336	0	566			
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.80	0.80	0.80	1.00	1.00	1.00	0.70	0.00	0.70			
Uniform Delay (d), s/veh	58.9	21.2	20.0	47.0	16.2	16.2	41.0	0.0	41.1			
Incr Delay (d2), s/veh	5.5	1.2	1.7	26.9	3.0	2.9	2.6	0.0	6.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.3	6.8	4.1	12.5	12.4	12.7	11.8	0.0	21.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.5	22.5	21.7	73.9	19.1	19.1	43.6	0.0	47.7			
LnGrp LOS	E	C	C	E	B	B	D	A	D			
Approach Vol, veh/h		1031			1684			1182				
Approach Delay, s/veh		22.6			30.0			44.8				
Approach LOS		C			C			D				

Timer - Assigned Phs	1	2		4	5	6			
Phs Duration (G+Y+Rc), s	9.3	52.6		38.1	6.2	75.7			
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0			
Max Green Setting (Gmax), s	26.3	34.0		45.0	5.0	55.0			
Max Q Clear Time (g_c+I1), s	24.2	19.5		28.7	2.5	31.6			
Green Ext Time (p_c), s	0.1	8.8		4.4	0.0	16.8			

Intersection Summary		
HCM 6th Ctrl Delay		32.5
HCM 6th LOS		C

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	1444	133	45	732	81	264	116	57	95	261	490
Future Volume (veh/h)	320	1444	133	45	732	81	264	116	57	95	261	490
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.98	0.98		0.95	0.97		1.00
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	333	1504	133	47	762	78	275	121	45	99	272	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	355	2257	199	60	1107	482	337	506	188	172	428	
Arrive On Green	0.20	0.48	0.48	0.03	0.31	0.31	0.40	0.40	0.40	0.40	0.40	0.00
Sat Flow, veh/h	1781	4730	418	1781	3554	1546	1080	1279	476	363	1083	1585
Grp Volume(v), veh/h	333	1082	555	47	762	78	275	0	166	371	0	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1744	1781	1777	1546	1080	0	1755	1446	0	1585
Q Serve(g_s), s	29.5	39.0	39.0	4.2	30.1	5.9	22.2	0.0	10.1	27.4	0.0	0.0
Cycle Q Clear(g_c), s	29.5	39.0	39.0	4.2	30.1	5.9	59.8	0.0	10.1	37.5	0.0	0.0
Prop In Lane	1.00		0.24	1.00		1.00	1.00		0.27	0.27		1.00
Lane Grp Cap(c), veh/h	355	1624	832	60	1107	482	337	0	694	600	0	
V/C Ratio(X)	0.94	0.67	0.67	0.78	0.69	0.16	0.81	0.00	0.24	0.62	0.00	
Avail Cap(c_a), veh/h	401	1624	832	89	1107	482	383	0	768	668	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.83	0.83	0.83	0.94	0.00	0.94	1.00	0.00	0.00
Uniform Delay (d), s/veh	63.1	32.1	32.1	76.7	48.3	39.9	52.8	0.0	32.3	42.8	0.0	0.0
Incr Delay (d2), s/veh	28.0	2.2	4.2	18.8	2.9	0.6	10.9	0.0	0.2	1.5	0.0	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	16.2	16.8	17.7	2.3	14.0	2.4	12.0	0.0	4.5	12.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	91.0	34.3	36.3	95.5	51.2	40.5	63.7	0.0	32.5	44.2	0.0	0.0
LnGrp LOS	F	C	D	F	D	D	E	A	C	D	A	
Approach Vol, veh/h		1970			887			441			371	
Approach Delay, s/veh		44.4			52.6			51.9			44.2	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.9	54.9		68.2	10.4	81.3		68.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	11.9	39.0		70.0	8.0	67.0		70.0				
Max Q Clear Time (g_c+I1), s	31.5	32.1		61.8	6.2	41.0		39.5				
Green Ext Time (p_c), s	0.5	3.1		1.5	0.0	14.5		2.7				

Intersection Summary	
HCM 6th Ctrl Delay	47.3
HCM 6th LOS	D

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	415	1136	157	444	582	120	160	747	210	144	657	327
Future Volume (veh/h)	415	1136	157	444	582	120	160	747	210	144	657	327
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.90	1.00		0.93	1.00		0.92	1.00		0.92
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	432	1183	157	462	606	100	167	778	209	150	684	307
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	487	1118	148	445	1572	254	167	774	208	156	646	290
Arrive On Green	0.14	0.25	0.25	0.25	0.36	0.36	0.09	0.29	0.29	0.09	0.28	0.28
Sat Flow, veh/h	3456	4471	593	1781	4377	707	1781	2694	724	1781	2298	1031
Grp Volume(v), veh/h	432	901	439	462	468	238	167	513	474	150	529	462
Grp Sat Flow(s),veh/h/ln	1728	1702	1660	1781	1702	1680	1781	1777	1641	1781	1777	1552
Q Serve(g_s), s	19.6	40.0	40.0	40.0	16.4	16.9	15.0	46.0	46.0	13.4	45.0	45.0
Cycle Q Clear(g_c), s	19.6	40.0	40.0	40.0	16.4	16.9	15.0	46.0	46.0	13.4	45.0	45.0
Prop In Lane	1.00		0.36	1.00		0.42	1.00		0.44	1.00		0.66
Lane Grp Cap(c), veh/h	487	851	415	445	1223	604	167	511	472	156	500	437
V/C Ratio(X)	0.89	1.06	1.06	1.04	0.38	0.39	1.00	1.00	1.00	0.96	1.06	1.06
Avail Cap(c_a), veh/h	605	851	415	445	1223	604	167	511	472	156	500	437
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.66	0.66	0.66	1.00	1.00	1.00	0.09	0.09	0.09	0.95	0.95	0.95
Uniform Delay (d), s/veh	67.5	60.0	60.0	60.0	38.1	38.3	72.5	57.0	57.0	72.7	57.5	57.5
Incr Delay (d2), s/veh	9.0	42.0	52.5	52.7	0.9	1.9	20.9	13.0	13.5	58.9	55.6	58.3
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	9.3	22.2	22.9	24.6	7.1	7.4	7.9	22.5	20.8	8.7	27.9	24.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.5	102.0	112.5	112.7	39.0	40.2	93.4	70.0	70.5	131.7	113.1	115.8
LnGrp LOS	E	F	F	F	D	D	F	F	F	F	F	F
Approach Vol, veh/h		1772			1168			1154			1141	
Approach Delay, s/veh		98.4			68.4			73.6			116.6	
Approach LOS		F			E			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	45.0	45.0	20.0	50.0	27.5	62.5	19.0	51.0
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	40.0	40.0	15.0	45.0	28.0	52.0	14.0	46.0
Max Q Clear Time (g_c+I1), s	42.0	42.0	17.0	47.0	21.6	18.9	15.4	48.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.9	5.3	0.0	0.0

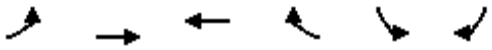
Intersection Summary	
HCM 6th Ctrl Delay	90.2
HCM 6th LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	3	318	104	91	166	129	496	47	164	103	8
Future Volume (veh/h)	39	3	318	104	91	166	129	496	47	164	103	8
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		0.95	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	47	4	383	125	110	200	155	598	57	198	124	10
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	26	503	161	135	207	197	653	61	257	148	11
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.52	0.52	0.52	0.52	0.52	0.52
Sat Flow, veh/h	110	69	1340	290	359	552	283	1249	116	368	283	20
Grp Volume(v), veh/h	434	0	0	435	0	0	810	0	0	332	0	0
Grp Sat Flow(s),veh/h/ln	1519	0	0	1200	0	0	1648	0	0	671	0	0
Q Serve(g_s), s	0.0	0.0	0.0	9.8	0.0	0.0	0.0	0.0	0.0	3.1	0.0	0.0
Cycle Q Clear(g_c), s	22.0	0.0	0.0	31.8	0.0	0.0	40.9	0.0	0.0	44.0	0.0	0.0
Prop In Lane	0.11		0.88	0.29		0.46	0.19		0.07	0.60		0.03
Lane Grp Cap(c), veh/h	615	0	0	502	0	0	911	0	0	416	0	0
V/C Ratio(X)	0.71	0.00	0.00	0.87	0.00	0.00	0.89	0.00	0.00	0.80	0.00	0.00
Avail Cap(c_a), veh/h	615	0	0	502	0	0	934	0	0	430	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	24.2	0.0	0.0	27.4	0.0	0.0	19.6	0.0	0.0	20.3	0.0	0.0
Incr Delay (d2), s/veh	3.7	0.0	0.0	14.7	0.0	0.0	10.4	0.0	0.0	9.9	0.0	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	8.2	0.0	0.0	10.8	0.0	0.0	16.7	0.0	0.0	7.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.8	0.0	0.0	42.0	0.0	0.0	30.0	0.0	0.0	30.2	0.0	0.0
LnGrp LOS	C	A	A	D	A	A	C	A	A	C	A	A
Approach Vol, veh/h		434			435			810			332	
Approach Delay, s/veh		27.8			42.0			30.0			30.2	
Approach LOS		C			D			C			C	

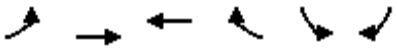
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	37.8	50.9	37.8	50.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	33.3	47.7	33.3	47.7
Max Q Clear Time (g_c+I1), s	33.8	42.9	24.0	46.0
Green Ext Time (p_c), s	0.0	2.5	2.1	0.5

Intersection Summary	
HCM 6th Ctrl Delay	32.2
HCM 6th LOS	C



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	3054	333	0	201
Future Volume (vph)	0	0	3054	333	0	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.5			4.5
Lane Util. Factor			0.91			1.00
Frpb, ped/bikes			1.00			0.98
Flpb, ped/bikes			1.00			1.00
Frt			0.99			0.86
Flt Protected			1.00			1.00
Satd. Flow (prot)			4991			1576
Flt Permitted			1.00			1.00
Satd. Flow (perm)			4991			1576
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	3393	370	0	223
RTOR Reduction (vph)	0	0	13	0	0	1
Lane Group Flow (vph)	0	0	3750	0	0	222
Confl. Peds. (#/hr)	7			7	3	6
Turn Type			NA			Perm
Protected Phases			6			
Permitted Phases						4
Actuated Green, G (s)			73.9			17.1
Effective Green, g (s)			73.9			17.1
Actuated g/C Ratio			0.74			0.17
Clearance Time (s)			4.5			4.5
Vehicle Extension (s)			3.0			3.0
Lane Grp Cap (vph)			3688			269
v/s Ratio Prot			c0.75			
v/s Ratio Perm						c0.14
v/c Ratio			1.02			0.83
Uniform Delay, d1			13.0			40.0
Progression Factor			1.00			1.00
Incremental Delay, d2			19.2			18.3
Delay (s)			32.3			58.3
Level of Service			C			E
Approach Delay (s)		0.0	32.3		58.3	
Approach LOS		A	C		E	

Intersection Summary			
HCM 2000 Control Delay	33.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	322	178	1694	399	240	173
Future Volume (veh/h)	322	178	1694	399	240	173
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.95	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	343	189	1802	396	255	68
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	380	1353	2391	524	295	262
Arrive On Green	0.21	0.72	0.45	0.45	0.17	0.17
Sat Flow, veh/h	1781	1870	5524	1154	1781	1585
Grp Volume(v), veh/h	343	189	1652	546	255	68
Grp Sat Flow(s),veh/h/ln	1781	1870	1609	1591	1781	1585
Q Serve(g_s), s	16.9	2.8	25.6	25.7	12.5	3.4
Cycle Q Clear(g_c), s	16.9	2.8	25.6	25.7	12.5	3.4
Prop In Lane	1.00			0.73	1.00	1.00
Lane Grp Cap(c), veh/h	380	1353	2192	723	295	262
V/C Ratio(X)	0.90	0.14	0.75	0.76	0.87	0.26
Avail Cap(c_a), veh/h	435	1353	2192	723	356	317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.69	0.69	1.00	1.00
Uniform Delay (d), s/veh	34.5	3.8	20.4	20.4	36.6	32.7
Incr Delay (d2), s/veh	19.9	0.2	1.7	5.1	17.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.2	0.9	9.4	10.0	6.7	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	54.4	4.0	22.1	25.5	53.6	33.3
LnGrp LOS	D	A	C	C	D	C
Approach Vol, veh/h		532	2198		323	
Approach Delay, s/veh		36.5	22.9		49.3	
Approach LOS		D	C		D	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	24.2	45.9			70.1	19.9
Change Period (Y+Rc), s	5.0	5.0			5.0	5.0
Max Green Setting (Gmax), s	22.0	35.0			62.0	18.0
Max Q Clear Time (g_c+I1), s	19.9	27.7			4.8	14.5
Green Ext Time (p_c), s	0.3	7.1			2.4	0.3

Intersection Summary	
HCM 6th Ctrl Delay	28.1
HCM 6th LOS	C