Final ~~Draft~~ Environmental Assessment

WAIEHU RESIDENTIAL COMMUNITY

Wailuku, Maui, Hawai'i

Applicant

Genova Construction Development
555 Corporate Drive, Suite 120
Ladera Ranch, CA 92694

Planning Consultant

Chris Hart & Partners, Inc.
2200 Main Street, Suite #527
Wailuku, Hawai'i, 96793

Accepting Authority

County of Maui
Department of Housing and Human Concerns

June 2022 ~~December 2021~~

Waiehu Residential Community

Wailuku, Maui, Hawai'i
TMK: (2) 3-3-002:031

Final Environmental Assessment

JUNE 2022

Prepared For:
Genova Construction Development
555 Corporate Drive, Suite 120
Ladera Ranch, CA 92694

Prepared By:
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This Final Environmental Assessment and all ancillary documents were prepared under my direction or supervision, and the information submitted to best of my knowledge, fully addresses document content requirements, set forth in Hawaii Revised Statues, Chapter 343, and Hawaii Administrative Rules 11-200. 1-7, as applicable.

Brett Davis
Senior Planner
Chris Hart and Partners, LLC.

June 2022

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Accepting Authority:
Maui County Department of Housing and Human Concerns

June 22

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ACRONYMS AND ABBREVIATIONS

ALISH	Agricultural Lands of Importance to the State of Hawai'i
BMP	Best Management Practices
BWS	Board of Water Supply (County of Maui)
CDP	Census Defined Place
CFR	Code of Federal Regulations
CIA	Cultural Impact Assessment
CIZ	Change of Zoning
CWRM	Commission on Water Resource Management
CY	Calendar Year
CZM	Coastal Zone Management
D&O	Decision and Order
DBEDT	Department of Business, Economic Development and Tourism (State of Hawai'i)
DEA	Draft Environmental Assessment
DEM	Department of Environmental Management (County of Maui)
DLNR	Department of Land and Natural Resources (State of Hawai'i)
DNL	Day-Night Average Sound Level
DOE	Department of Education (State of Hawai'i)
DOFAW	Division of Forestry and Wildlife
DOH	Department of Health (State of Hawai'i)
DOT	Department of Transportation (State of Hawai'i)
DPW	Department of Public Works (County of Maui)
DWS	Department of Water Supply (County of Maui)
FEA	Final Environmental Assessment
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GPD	Gallons per day
GPM	Gallons per minute
HDOH	State of Hawai'i Department of Heath
HEER	Hazard Evaluation and Emergency Response
HRS	Hawai'i Revised Statutes
HTA	Hawai'i Tourism Authority
KWWRF	Kahului Wastewater Reclamation Facility
LID	Low Impact Developments

LOS	Level of Service
LSB	Land Study Bureau
LUC	Land Use Commission (State of Hawai'i)
MECO	Maui Electric Company
MG	Million gallons
MGD	Million gallons per day
MSL	Mean Sea Level
MTA	Motion to Amend
MUTCD	Manual on Uniform Traffic Control Devices
NPA	North Project Area
NFA	No Further Action
NFIP	National Flood Insurance Program
NOAA	National Ocean and Atmospheric Association
NPDES	National Pollutant Discharge Elimination System
OEQC	Office of Environmental Quality Control (State of Hawai'i)
OHA	Office of Hawaiian Affairs
PER	Preliminary Engineering Report
Ppm	Parts Per Million
PV	Photovoltaic
ROW	Right-of-Way
SCS	Scientific Consultant Services, Inc.
SF	Square Feet
SHPD	State Historic Preservation Division (Hawai'i)
SLR-XA	Sea Level Rise Exposure Area
SMA	Special Management Area
TIAR	Traffic Impact Analysis Report
TMK	Tax Map Key
UBC	Uniform Building Code
UGB	Urban Growth Boundary
USFWS	United States Fish and Wildlife Service
VPI	Visitor Plant Inventory
WACI	Wailuku Agribusiness Company, Inc.
WCC	Wailuku Civic Complex

Table 1. Project Summary	
Project Name	Waiehu Residential Community
Applicant	Genova Construction Development 555 Corporate Drive, Suite 120 Ladera Ranch, California 92694 Contact: Mr. Brad Cook Phone: 949- 306-2943 Email: brad@genovacd.com
Summary of Proposed Action	The proposed action is to develop a portion of the existing undeveloped 238-acre land situated west of Kahekili Highway. Approximately 158 acres of land will be developed as a new 100% affordable, 752-unit residential community along with associated infrastructure, roadways, and amenities such as park space, walking trails, and landscaping. All units within the proposed community are for sale at prices determined by the Housing and Urban Development (HUD) annual price guidelines. Out of the proposed 752 dwelling units, 184 will be multi-family units and 568 will be single-family units. The proposed plan includes six (6) different types of single-family development to provide a variety of housing options to future residents. The proposed project also includes a retail space of an approximately 17,400 square feet and three (3) parks totaling 6.3 acres.
Project Location	Wailuku, Maui, Hawai'i
Land Ownership	Southwest 7 LLC 3837 W. Chester Pike Newtown Square, PA 19073
Tax Map Keys (TMK)	TMK No. (2) 3-3-002:031
Parcel Size	238 acres
Land Use Designations	State Land Use: Agricultural Community Plan: "AG" Agriculture County Zoning: "AG" Agriculture Project site is predominantly located within the Urban Growth Boundaries in the Maui Island Plan Note: Through the 201H process, the Applicant is requesting exemption from a Maui County Community Plan Amendment, a Change in Zoning, and compliance with the Maui Island Plan urban growth boundary.

Accepting Authority	Department of Housing and Human Concerns 2200 Main Street, Suite 546 Wailuku, Hawai'i 96793 Contact: Mr. Buddy Almeida Phone:808-270-7351 Email: Buddy.Almeida@co.maui.hi.us
Project Planning Consultant	Chris Hart & Partners, Inc. 2200 Main Street, Suite 527 Wailuku, HI 96793 Contact: Brett Davis, Senior Planner Phone:808-242-1955 Email: Bdavis@chpmaui.com
Chapter 343 Triggers	The triggers for the Waiehu Community are to amend the Wailuku-Kahului Community Plan from Agricultural to Urban use and off-site infrastructure work affecting State and County rights-of-way along Kahekili Highway.

EXECUTIVE SUMMARY

Brief Description of the Proposed Action

Situated in the Census Designated Place (CDP) of Waihee-Waiehu on the island of Maui, the project site is currently a vacant lot with a total area of approximately 238 acres. The project property — TMK (2) 3-3-002:031 is owned in fee simple by Southwest 7 LLC. The parcel lies from the intersection of Kahekili Highway and Waiehu Beach Road to the intersection of Kahekili Highway and Makaala Drive ― before expanding toward its *mauka* direction. The project site envelopes five (5) smaller parcels that are not owned by the applicant nor included in the proposed project, i.e., TMKs (2) 3-3-002: 009, 022, 010, 021, and 011. The Applicant and Planning Consultant have talked to property owners of these enclosed parcels about the proposed development. The Applicant will ensure that vehicular access to the property is maintained and that access to water is not impacted. The Applicant will continue to communicate throughout the land use entitlement process with adjacent neighbors.

Vacant land owned by the Free Church of Tonga abuts the northern property line and Ocean View Estates residential subdivision is adjacent to the northern side of the subject property. To the east is vacant land owned by the Maui Economic Opportunity (MEO) to be developed as 100% affordable multi-family development. Further east adjacent to the Wailuku River is vacant land dedicated for future residential development of the Piihana Project District 3. Kahekili Highway runs along the eastern property line from its northwestern arterial. To the south, Wailuku Country Estates agricultural subdivision is accessed from Kamaile Street. The western property line abuts rural residential lands that exist along Malaihi Road and an expansive vacant land owned by Wahi Hoomalu Limited Partnership.

The subject property was previously entitled as the Hale Mua affordable housing project. However, the project developer was not able to proceed with the project and the State Land Use Commission reclassified the subject property back to the Agricultural District. The subject property was previously used for sugar cane agriculture and more recently for macadamia nut production. However, the agricultural activity has not been continued for well over a decade leaving the subject property overgrown with remnant trees and dense tall grassland.

The Applicant, i.e., Genova Development Construction, is proposing a new 100% affordable residential community — to be known as the Waiehu Residential Community. The proposed development would utilize approximately 158-acre portion of the total acreage on the subject property.

In general, the proposed project would provide 752 dwelling units, centrally located retail space of an approximately 17,400 square feet, and three (3) parks totaling 6.3 acres. The proposed affordable project is subject to the required process described in Section 201H-38 of the Hawaii Revised Statutes.

The proposed development is compatible with the current uses around the subject property, especially the lands that have been developed as residential subdivisions on the north and east sides of the project site. The proposed project is not anticipated to adversely affect the unique character of Waihee-Waiehu with its combination of existing residential subdivisions, agricultural subdivisions, and rural settlements.

It is anticipated that the Waiehu residential community will be developed in several phases — projected to begin construction in 2024 and complete in 2032.

Section 343.5 Hawaii Revised Statutes (HRS) establishes nine "triggers" that require the preparation of an Environmental Assessment (EA) or Environmental Impact Statement (EIS). The triggers for the Waiehu Community are to amend the Wailuku-Kahului Community Plan from Agricultural to Urban use and Off-site infrastructure work affecting State and County rights-of-way along Kahekili Highway.

Alternatives Considered

As discussed in the following Section 1.7 (Alternatives), various development alternatives for the proposed action are considered. These alternatives include No Action/No Project/No Build Alternative, Alternative Development Concepts, and an Alternative Site Alternative. These Alternatives would be determined based on their ability to meet both the Purpose and need as well as the goals and objectives of the proposed action. The Alternative Actions are briefly described below:

- The No Action/No Project/No Build Alternative would retain the project site in its current condition. With this Alternative, the parcel would remain vacant and the potential for planned future urban development would remain unexplored.
- Alternate Development Concepts Alternative explored alternate densities and urban design layout to satisfy the need for housing within proximity to small town and urban amenities in the Wailuku/Kahului area.
- The Alternative Site Alternative assumes the development of the 100% affordable residential community to be located on another possible large-scale site within the Waihee-Waiehu area.

Significant Beneficial and Adverse Impacts (Including Cumulative and Secondary Impacts)

Cumulative impacts are defined as the impact on the environment, which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions.

Secondary impacts are those that have the potential to occur later in time or farther in the future, but which are reasonably foreseeable. They can be viewed as actions of others that are taken because of the presence of the project. Secondary impacts from highway projects, for example, can occur because they can induce development by removing transportation impediments to growth.

Table 2 provides, in a summary format, the discussion of the anticipated impacts of the proposed project and the proposed mitigation measures — which will be detailed in Chapter 2.

Table 2. Summary of Impacts and Mitigation Measures

Condition	Impacts	Mitigation
Topography and Soils	The proposed grading plan will require both excavation and embankment, with attempts to balance "cuts" and "fills", to the best extent feasible to accommodate drainage and service utilities, and to minimize the import and/or export of earthwork materials. .	• During site preparation, storm runoff from the site will be controlled in accordance with the County's "Soil Erosion and Sediment Control Standards"; • Minimizing the time of construction; • Retaining existing ground cover as long as possible; • Constructing drainage control features early; • Using temporary area sprinklers in non-active construction areas when ground cover is removed; • Providing a water truck on-site during the construction period to provide for immediate sprinkling as needed; • Using temporary berms and cut-off ditches, where needed, for control of erosion; • Watering graded areas when construction activity for each day has ceased;

Table 2. Summary of Impacts and Mitigation Measures		
Condition	**Impacts**	**Mitigation**
		• Grassing or planting all cut and fill slopes immediately after grading work has been completed; and • Installing silt screens where appropriate.
Natural Hazards	No adverse flood hazards impacting the site or the properties in the immediate vicinity are anticipated.	No adverse flood hazards impacting the site or the properties in the immediate vicinity are anticipated. The proposed action will be constructed in accordance with the Building Code adopted by the County of Maui.
Flora and Fauna	It is anticipated that the proposed action will not result in a significant impact to Flora and Fauna. (**See**: Appendix 4)	No mitigation measures are warranted. However, there are native seabirds, the Endangered Hawaiian petrel *(Pterodroma sandwichensis)*, and the Threatened Newell's shearwater *(Puffinus newelli)* that fly over these lowlands on the way to their burrows high in the mountains. These seabirds, and especially the fledglings, are attracted to bright lights in the evenings and early dawn hours — causing them to be disoriented and crash — later making them vulnerable to injury, vehicle strikes, and predators. It is recommended that any significant outdoor lighting in any proposed development on this property be shielded to direct the light downward to minimize disorientation of these protected seabirds. The Biological Resources Study for the proposed project noted no other issues are anticipated with wildlife species.

Table 2. Summary of Impacts and Mitigation Measures		
Condition	**Impacts**	**Mitigation**
Air Quality	It is anticipated that the proposed action will bear adverse long and short-term impacts on Air Quality. Short-term impacts associated with the proposed action include, but are not limited to, fugitive dust from vehicle movement and soil excavation activities and exhaust emissions from on-site construction equipment. Long-term impacts associated with the proposed action include but are not limited to; Carbon Monoxide emissions and other contaminants via motor vehicle traffic generated from the use of the site.	• Erecting a dust fence to shield the adjacent project sites; • Establishment of a frequent watering program to keep bare-dirt surfaces in construction areas from becoming significant sources of dust; • In dust-prone or dust-sensitive areas, measures include limiting the area that can be disturbed at any given time, applying chemical soil stabilizers, and mulching and/or using wind screens; • Open-bodied trucks to be always covered during the transportation of materials that could become airborne; • Road cleaning or tire washing as a form of dust control since the haul trucks tracking dirt onto paved streets from unpaved areas; and • Paving of parking areas and/or establishment of landscaping as early in the construction schedule as possible can also lower the potential for fugitive dust emissions.
Noise Quality	Audible construction noise will probably be unavoidable during the entire project construction period. It is anticipated that the actual work will be moving from one location on the project site to another during the construction period. Actual length of exposure	• The use of properly muffled construction equipment should be required on the job site. The incorporation of State Department of Health construction noise limits and curfew times — applicable on the island of Maui — is another noise mitigation measure which will be applied to this project.

Table 2. Summary of Impacts and Mitigation Measures		
Condition	**Impacts**	**Mitigation**
	to construction noise at any receptor location will probably be less than the total construction period for the entire project.	• The project will comply with State Department of Health noise regulations for construction activities. As stipulated by DOH permit requirements, noise-generating construction activities are not allowed on Sundays and holidays, during the early morning, and during the late evening and nighttime periods.
Historical Archaeological Resources	It is not anticipated that the proposed action will have an impact on Historical Archaeological Resources.	Although the proposed action is not anticipated to generate adverse impacts, the State of Hawaii Historic Preservation Division may require archaeological monitoring.
Visual Resources	It is anticipated that the proposed action will visually improve the project site without adversely impacting the view of the natural environment within the region.	All buildings within the proposed action will be designed in accordance with the applicable Maui County building code standards.
Agricultural Resources	The proposed action will have no effect on the Statewide growth of diversified agriculture.	No mitigation measures are warranted.
Groundwater Resources	It is not anticipated that the proposed action will create adverse impacts to groundwater resources.	It can be concluded that with proper best management practices to prevent material input to groundwater discharge by the proposed action.
Socio-Economic Environment		

Table 2. Summary of Impacts and Mitigation Measures		
Condition	**Impacts**	**Mitigation**
Population and Housing	The proposed action is anticipated to have an impact on the population due to the addition of 752 units of new 100% affordable housing community in Maui.	The proposed action is subject to Maui County Code, Chapter 2.96 (Residential Workforce Housing Policy). Workforce homes will be subject to the requirements of Chapter 2.96, MCC to ensure that affordable homes are available for full-time Maui residents.
Economy	The proposed action is anticipated to generate positive impacts to the economy through residential property taxes and the small commercial use will generate a small amount of jobs.	No mitigation measures are warranted.
Cultural Resources	The potential of the proposed action to have significant impacts on the Cultural resources that include flora, fauna, archaeological resources, beliefs, or practices is highly unlikely considering the long history of intensive agricultural use of the project site.	It is recommended that some mitigations measures are implemented such as: • Utilization of native flora throughout the property; and • Compliance with environmental and cultural mitigation measures.
Public Services		
Recreational Facilities	It is not anticipated that impacts to recreational resources will be significant due to the sufficient availability of these facilities and resources in proximity to the project site.	The project will provide approximately 6.3 acres of park space and trails and sidewalks creating a connected network in the new community.
Medical	The proposed action will generate	No mitigation measures are warranted.

Table 2. Summary of Impacts and Mitigation Measures		
Condition	**Impacts**	**Mitigation**
Facilities	population; however, is not anticipated to have an adverse impact upon existing medical facilities.	
Police and Fire Protection Services	The proposed action will increase the population of the immediate area; however, the proposed action is not anticipated to result in significant adverse impact upon existing police and fire protection services.	No mitigation measures are warranted. However, the proposed action will comply with any impact fee ordinances for police and fire that may be adopted.
Schools	Any secondary impacts resulting from an increased population due to the provision of 100% affordable residential community are anticipated to be minimal.	The proposed action will comply with any impact fee ordinances for public schools. The Applicant has been in contact with the DOE on the school impact fees.
Solid Waste	The proposed action is not anticipated to have an adverse impact upon existing solid waste facilities.	The following mitigation measures will include but are not limited to: • Green waste will be mulched onsite when practicable. • During construction, as required by County regulations, construction and demolition waste will be properly disposed.
Infrastructure		
Roadways	Upon full build out of the proposed action is anticipated to generate	Proposed mitigation measures specific to the impacted roadways are discussed in two (2)

Table 2. Summary of Impacts and Mitigation Measures		
Condition	**Impacts**	**Mitigation**
	additional traffic on the roadways within the vicinity of the project site.	different scenarios. A full account of conclusion with and without Imi Kala Street Extension and Bridge Improvements is detailed in Section 2.4.1 of this ~~D~~FEA.
Drainage	Development of the project site will decrease the overall permeable surface area of the project site. Thus, it is anticipated that this will generate a slight increase in the volume of runoff.	Warren S. Unemori Engineering, Inc. has prepared a drainage plan to mitigate surface runoff caused by seasonal storm events. Best management practices (BMPs) for mitigation will include but are not limited to: • Provide temporary sediment basins, temporary diversion berms, and swales to intercept runoff; • Install silt fences to detain sediment-laden stormwater runoff; • Install dust fences to control dust generated from construction; • Provide inlet protection to prevent sediment in stormwater runoff entering drain inlets; • Provide slope protection to help control erosion and stabilize slopes; and • Stabilize construction entrances and truck wash-down areas.
Water	It is anticipated that the proposed action will generate demand that will cause a less than significant impact on the Maui County water system.	The proposed project will include the construction of a new water storage tank with 1.0-million-gallon (MG) capacity. This proposed storage reservoir will be located at an elevation fully compatible with the Waiehu Heights 0.3 MG and Waiehu Kou 0.5 MG water storage tanks owned by the DWS. The new 1.0 MG tank will be configured in

Table 2. Summary of Impacts and Mitigation Measures		
Condition	**Impacts**	**Mitigation**
		order to be filled primarily from the DWS' Central Maui Water Transmission System, or alternately from the DWS' Waiehu wells for added reliability and will be dedicated to DWS upon completion. A primary distribution loop consisting of County-standard waterlines with 12-inch diameter — will be extended into the development area from the existing 16-inch transmission main used by DWS to serve the Waiehu Heights subdivision. Each of the residential areas comprising the proposed Waiehu Community will, in turn, draw water for domestic use and fire protection through this primary distribution loop.
Wastewater	It is anticipated that improvements maybe required to wastewater systems due to the increase wastewater flow from the use of the proposed action once it is developed and the non-existing sewer services within the subject property. However, there should be ample treatment capacity available to accommodate the approximately 255,000-gallon daily wastewater flow — which the proposed Waiehu Community project is expected to generate.	New gravity sewer pipes with branch network will be installed within the internal streets to collect wastewater from the various buildings within the proposed development. Section 2.4.4 of this ~~D~~FEA includes a discussion of two alternatives of wastewater collection routes. Both alternatives converge at an existing County Pumping Station along Waiehu Beach Road which, in turn, conveys wastewater to the Kahului Wastewater Treatment Facility for disposal.

Table 2. Summary of Impacts and Mitigation Measures		
Condition	**Impacts**	**Mitigation**
Other Utility Lines	Development of the project is anticipated to generate demand upon the existing electrical or telephone systems that will serve the subject property. Necessary utility improvements to accommodate the proposed project would involve Hawaiian Electric Company (HECO), Hawaiian Telcom, and Spectrum.	The proposed utility improvements will involve the installation of underground service distribution system infrastructure for Hawaiian Electric, Hawaiian Telcom, and Spectrum will be needed. Generally, the Applicant will be responsible to install basic infrastructure (i.e., handholes, conduit, and concrete pads for transformers, switchgear, and communication equipment), while the Utility Companies will be responsible to pull cable and install their equipment after the basic infrastructure has been installed and accepted. Applicant will also install the necessary infrastructure to provide street lighting, i.e., conduit, handholes, and concrete light bases. HECO will provide light fixtures for all roads that will be dedicated to the County of Maui. In addition, the Applicant will also furnish and install private light fixtures.

Compatibility with Land Use Plans and Policies

The relationship of the proposed action to potentially applicable land use plans and policies was evaluated and is discussed further in Chapter 3 (Relationship to Governmental Plans, Policies, and Controls) of this ~~Draft~~ Final EA. It was determined that the proposed action is supportive or consistent with numerous applicable plans and policies. The following plans were evaluated:

- The Hawai'i Revised statutes, Chapter 343, HRS
- The State Land Use Law, Chapter 205, HRS
- The Hawai'i State Plan, Chapter 226, HRS
- County of Maui General Plan (2010)
- Maui Island Plan (2012)
- Wailuku-Kahului Community Plan (2002)

- The Hawai'i Coastal Zone Management Program, Chapter 205A, HRS
- County Zoning

List of Permits and Approvals

Table 3. Anticipated Entitlement and Permit Approvals	
Permit / Approval	**Responsible Authority**
State	
State Land Use District Boundary Amendment (DBA)	State of Hawai'i Land Use Commission
HRS Chapter 6E Compliance (Historic Preservation Review)	State of Hawai'i, State Historic Preservation Division (SHPD)
National Pollutant Discharge Elimination System (NPDES) Permit	State of Hawai'i, Department of Health, Clean Water Branch
Permit to Perform Work within the State Right-of-Way (ROW)	State of Hawai'i, Department of Transportation (DOT)
Air Pollution Control Permit	State of Hawai'i, Department of Health (DOH)
Community Noise Permit	State of Hawai'i, DOH
County	
Hawai'i Revised Statute (HRS) Chapter 343 Compliance	Maui Department of Housing and Human Concerns
201H Affordable Housing Application	Maui County Council
Exemption from Change in Zoning (CIZ)	~~Maui Planning Commission and~~ Maui County Council
Exemption from Community Plan Amendment (CPA)	~~Maui Planning Commission and~~ Maui County Council
Exemption from Maui Island Plan Growth Boundary	Maui County Council
Subdivision	County of Maui, Department of Public Works, Development Services Administration
Grading and Grubbing Permit	County of Maui, Department of Public Works, Development Services Administration

Table 3. Anticipated Entitlement and Permit Approvals	
Driveway Permit	County of Maui, Department of Public Works, Development Services Administration
Building Permits	County of Maui, Department of Public Works, Development Services Administration
Wastewater Discharge Permit	County of Maui, Department of Environmental Management, Wastewater Reclamation Division

Irretrievable and Irreversible Commitment of Resources

Irreversible and irretrievable commitments of resources during construction include:

- Use of construction materials;
- Use of available space in the construction and demolition landfill;
- Expenditure of funds to finance construction;
- Construction manpower; and
- Use of energy in the form of direct consumption of fossil fuel for vehicles and equipment.

In the short-term, construction activities would require the consumption of fossil fuel and energy, as construction requires equipment that would use fuel, either gasoline or diesel, to operate. This would also include electrical construction equipment relying on fossil fuel generated electricity. Irreversible and irretrievable commitments to resources would be.

Relationship Between Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

Short-term uses associated with construction of the proposed action include temporary and permanent alteration of land, energy, fuel, elevated noise levels and other resources. The impact associated with use of these resources is anticipated to be minimal.

The proposed action will create long term benefits to the community such as job creation and aide in economic stimulus to the surrounding areas. The long-term use of the project will increase traffic in the immediate area, as well as add demand on public resources such as water, Police and Fire protection.

Probable Adverse Impacts that cannot be Avoided

Short-term uses associated with construction of the proposed action include use of water, energy, fuel, and other resources. The impact associated with use of these resources is anticipated to be minimal. Short-term uses and long-term productivity of water resources, flora and fauna, and health, safety, and well-being are summarized below.

Unavoidable short-term impacts, despite mitigation efforts, include those related to noise and air quality, and water quality as the result of construction activities.

Noise: Construction noise will be unavoidable during project construction. Short-term increases in noise levels will result from the use of construction equipment and vehicle movements on public roads and at the Project Site. Despite compliance with Chapter 46, Title 11, Community Noise Control, DOH, HAR, noise generated by construction activities will adversely impact nearby land uses. The use of muffled equipment, noise barriers, and restrictions on construction hours, as well as adherence to State DOH regulations on noise mitigation, will minimize construction equipment and vehicle noise. For construction work to be performed at night or on weekends and holidays, a Community Noise Variance permit from the DOH will be required if it exceeds regulatory noise levels.

Air Quality: Construction-related air quality impacts would result from airborne dust and exhaust emissions from internal combustion engines during site preparation and earth moving activities, the movement of construction vehicles on unpaved areas of the site, and from construction equipment. The construction contractor will be responsible for complying with State DOH regulations, which prohibit visible dust emissions at property boundaries.

Water Quality: No significant impacts on coastal waters are anticipated as a result of constructing and operating the proposed action. Construction activities will involve land-disturbing activities that may result in some short-term surface runoff and soil erosion. Associated construction plans will account for erosion control measures for all work proposed. Construction controls required by NPDES permits and compliance with the County of Maui's Rules Relating to Water Quality would reduce the risk of sediment and construction-related contaminants reaching nearby surface and coastal waters. In addition, any discharges related to project construction or operation activities will be required to comply with applicable State water quality standards as specified in HAR, Chapter 11-54 "Water Quality Standards" and HAR, Chapter 11-55 "Water Pollution Control."

During construction of the proposed action, any soil disturbances in excess of one acre would require a National Pollutant Discharge Elimination System (NPDES) permit administered by HDOH for storm water discharges associated with construction activities. This permit will describe BMPs for the project in order to properly manage storm water runoff.

Traffic: During construction, traffic near the project site will be impacted for the period of the construction activity. For example, during construction, heavy equipment and trucks will be traveling along existing roadways within the vicinity of the project site.

Where construction impacts may affect the traveling public along area roadways, traffic control plans will be prepared to ensure safe passage of passenger and commercial vehicles, bicycles, and pedestrians. Mitigation measures that may be considered include use of traffic control signage, temporary vehicle diversion barriers, flag persons or use of off-duty police officers.

The foregoing unavoidable effects are temporary in nature and associated with project construction. Mitigation measures may include, among others, the BMPs cited above, which are anticipated to provide the necessary environmental protections, and appropriately address public safety and welfare considerations to ensure implementation with the least amount of inconvenience, nuisance, and detriment.

As noted previously, the proposed action will, in the long run, serve as a source of revenue for the State of Hawaii and County of Maui, supporting programs that are covered as part of both governments' mandates.

Unavoidable long-term impacts resulting from development of the proposed action include the following:

Noise: Ambient noise levels in the vicinity will increase slightly as a result of the associated increase in vehicular traffic generated by the proposed action. It is acknowledged that use of the proposed action, in general, will generate increased noise emissions through vehicular traffic. However, the future vehicular noise emissions should not cause significant adverse impacts at existing noise sensitive receptors.

Topography: Although no significant adverse impacts on project site topography are anticipated to result from the implementation of the proposed action, it would nonetheless result in the unavoidable alteration of site topography. Specifically, the proposed grading plan will require both excavation and embankment, with attempts to balance "cuts" and "fills", to the best extent feasible to accommodate drainage and service utilities, and to minimize the import and/or export

of earthwork materials. Nevertheless, the existing site is already heavily altered and there are no natural features that would be affected by the development of the proposed action.

Visual Resources: It is anticipated that the full build of the proposed action would result in the unavoidable transformation of the visual and esthetic character of the project site. All new above-grade facilities are anticipated to be design guidelines that would emphasize aesthetic themes and landscaping compatible with the character of the natural and built-up environment and, therefore, would not be expected to substantially affect scenic vistas and view planes in the area.

Solid Waste Collection and Disposal: It is anticipated the project will generate an increase of solid waste through the construction and operation of the proposed action. Despite this expected increase, it is not expected that the additional waste generated will overtax the current capacity of solid waste facilities as operations of all the proposed elements of the proposed action will incorporate recycling and waste management strategies into the design.

Infrastructure and Utilities: Proposed action operations are anticipated to generate a greater demand for infrastructure and utilities regarding electrical and wastewater service. The proposed action will be modern facility that includes site improvements to accommodate wastewater services and other utility lines. It is anticipated that adverse impacts would be appropriately mitigated through adherence to State, and County of Maui regulatory requirements and the implementation of applicable BMPs.

Unresolved Issues

Short-term uses associated with construction of the proposed action include use of water, energy, fuel, and other resources. The impact associated with use of these resources is anticipated to be minimal. Short-term uses and long-term productivity of water resources, flora and fauna, and health, safety, and well-being are summarized below.

Unresolved issues are invariably associated with projects in the planning and conceptual design stages, as is the case for the proposed action in consideration under this EA process. Consequently, the various planning processes being pursued by the Proposing Applicant, including preparation of this ~~Draft~~ Final EA and community outreach efforts, have been conducted based on best available information and expertise of those knowledgeable in the design and construction of the types of facilities associated with the proposed action. It is anticipated that some adjustments will be made to the design and site layout and

by the Applicant. Project specific land use entitlements and permitting subject to approval may require additional design detail provided by the Applicant.

The following is a summary of identified unresolved issues which are discussed further in Chapter 4 (Unresolved Issues) of this ~~Draft~~ Final EA.

- Compliance with land use designations including the Maui Island Plan (Urban Growth Boundary).
- Compliance with the Wailuku-Kahului Community Plan.
- Compliance with Maui County Code Title 19, Zoning.
- Finalization of wastewater system capacity and on-site wastewater system improvements.
- Finalization of on-site utility improvements to accommodate electrical, phone, and other necessary utilities.

Consultation

Preparation of the Draft EA and Final EA involved the consultation with various State and County agencies such as Department of Education, State Historic Preservation Division, Office of Planning, Maui Planning Department, and the Maui County Department of Environmental Management. A list of those who participated in the consultation process is provided in Chapter 6 and their comments are reproduced in Appendix 3. A list of agencies that provided comments on the Draft EA is provided in Chapter 6 and their comments are reproduced in Appendix 11.

List of Relevant EA

The following Environmental Assessment (EA) documents ~~are being~~ were considered in the analysis of the preparation of the Draft EA and Final EA for the proposed Waiehu Residential Community.

- Final Environmental Assessment (FEA) Proposed Hale Mua Affordable Housing Subdivision, June 2005
- Final Environmental Assessment (FEA) Proposed Hale Mahaolu Ke Kahua Affordable Housing Community, June 2022

1. PROJECT DESCRIPTION

1.1. Introduction

The subject property is uniquely situated between town, country, mountain, and sea. The juxtaposition of this *ahupua'a* provides a unique setting that is diverse in resources and opportunities. Maui is the second most populated island in the Hawaiian archipelago yet suffers from one of the most undersupplied housing markets in the US. The strain on existing housing stock, mature households, and barriers to formation of new households, is not a constraint but rather an opportunity.

For nearly 100 years the subject property has been active farmland. In the early years it contributed to the robust sugar cane industry of Maui. Through the rich agricultural history of the site two topographic regions evolved based on the requirements of each of the crops. Along Kahekili Highway gentle sloping fields that were once sugar cane provide opportunities for higher density home types. The western portion of the site, once thick with Macadamia Nuts, has hill formations that are better suited for single family lots. These subtleties in the land provide ques to neighborhood crafting. Merging housing needs with quality amenities and placemaking practices.

As the sugar industry left the island and tastes changed, the land was repurposed for Macadamia Nut plantation in the 1980's. In recent years and multiple economic cycles, the previous landowner succumbed to deferred maintenance on the property becoming a bit of an eye-sore for the surrounding community. Under new ownership, the Applicant's commitment is to clean the site and become a good neighbor to the surrounding community. To date the Applicant has removed over 100 dumped cars, 1000's of pounds of trash, cleared blighted macadamia nut trees and are currently working with Maui Fire to clean the site of overgrowth. Working with the county of Maui we are creatively solving local and regional needs with traffic, water quality and improving regional trails and open space.

The Applicant's goal is to work with the land, accentuating its attributes as common amenity features promoting attainable and sustainable design. As developers, the Applicant recognizes associated costs with infrastructure to deliver a quality master plan community that is not a burden to future homeowners. This balance of quality design, core amenities and attainable housing is a balance of responsible development.

1.2. Property Location

Identified by TMK (2) 3-3-002:031, the project property is located in the Census Designated Place (CDP) of Waihee-Waiehu, Maui. The subject property occupies a total area of approximately 238 acres and is included within the Wailuku-Kahului community plan area.

The project property enveloped five (5) smaller parcels that are not owned by the applicant nor included in the proposed project, i.e., TMKs (2) 3-3-002: 009, 022, 010, 021, and 011.

Vacant land owned by the Free Church of Tonga abuts the northern property line and Ocean View Estates residential subdivision is adjacent to the northern side of the subject property. To the east is vacant land owned by the Maui Economic Opportunity (MEO) to be developed as 100% affordable multi-family development. Further east adjacent of the Wailuku River is vacant land dedicated for future residential development of the Piihana Project District 3. Kahekili Highway runs along the eastern property line from its northwestern arterial. To the south, Wailuku Country Estates agricultural subdivision is accessed from Kamaile Street. The western property line abuts rural residential lands that exist along Malaihi Road and an expansive vacant land owned by Wahi Hoomalu Limited Partnership. (**See**: Figure 1, "Location Map" & Figure 2, "Tax Map Key")

1.3. Land Ownership and Project Applicant

The subject property, TMK (2) 3-3-002:031, is owned in fee simple by Southwest 7 LLC. The subject property was previously entitled as the Hale Mua affordable housing project. However, the project developer was not able to proceed with the project and the State Land Use Commission reclassified the subject property back to the Agricultural District. The Applicant is Genova Development Construction and is proposing a new 100% affordable residential community.

1.4. Purpose and Need

The purpose of the project is to develop an approximately 158-acre portion of the total acreage on the subject property into Waiehu Residential Community — a 100% affordable housing project consisting of approximately 752 dwelling units, retail space of approximately 17,400 square feet, and three (3) parks totaling 6.3 acres. This project will help satisfy the need for affordable housing in central Maui. The proposed project will be processed through the entitlement process described in Section 201H-38 of the Hawai'i Revised Statutes.

1.5. Existing and Previous Land Use

The subject property was previously used for sugar cane agriculture and more recently for macadamia nut production as mentioned above. However, the agricultural activity has not been continued for well over a decade leaving the subject property overgrown with remnant trees and dense tall grassland. This vacant land lies *mauka* of Kahekili Highway to the south of Waiehu Stream. Elevation on the subject property range from 50 feet up to 270 feet above sea level. (**See:** Figure 3, Site Photographs)

1.6. Proposed Action (Preferred Alternative)

The proposed action is to develop a 158-acre portion of the total acreage on the subject property into Waiehu Residential Community — a 100% affordable housing project consisting of approximately 752 dwelling units, retail space of approximately 17,400 square feet, and three (3) parks totaling 6.3 acres.

As we move forward with the initial visioning for Waiehu Residential Community it is important to establish goals and guiding principles for the community. These simple, yet impactful statements are inspirational reminders of what we are trying to achieve during the crafting of project. These statements are purposefully evolutionary and not static, where team members expand on concept and grow with implementation.

Attainable Housing

- Provide creative housing solutions leveraging technology and latest construction methodologies to minimize construction burdens and future operational costs.
- Explore alternative construction methodologies that are fresh and responsive to the sensitivities of the workforce housing market.
- Deliver a broad mix of housing typologies to Maui providing housing opportunities a wide mix of social and economic backgrounds.

Health and wellness

- Create a community that promotes health and wellness.
- Deliver a community that is pedestrian-centric and kid friendly.
- Embrace the surrounding natural and enhanced landscape encouraging residents to explore.
- Make open space thoughtful in design and programming yet purposeful with infrastructure considerations.

Sustainability: A light on the land approach that passively promotes Economic and Environmental Sustainability

- Establish economic sustainability to ensure that Waiehu has zero net financial burden on the surrounding community or the county.
- Establish economic practices that ensures longevity and economic relief to future residents and encourages upward housing mobility.
- Promote environmental stewardship of the land be at the forefront of community design.
- Implement community wide environmentally sustainable design as a cost savings measure and not as future burden to the HOA.

Approximately 158 acres of land will be developed into a 100% affordable 752-unit residential community along with associated infrastructure, roadways, and amenities such as park space, walking trails, and landscaping. All units within the proposed community are for sale at prices determined by the Housing and Urban Development (HUD) annual price guidelines.

Out of the proposed 752 dwelling units, 184 will be multi-family units and 568 will be single-family units. The proposed plan includes six (6) different types of single-family development in order to provide a variety of housing options to future residents. The proposed project also includes retail space of approximately 17,400 square feet and three (3) parks totaling 6.3 acres. (**See:** Figure 4, Conceptual Site Plan [Preferred Alternative])

It is anticipated that the Waiehu residential community will be constructed in several phases — the construction is projected to start in 2024 and the final residences construction will be completed in 2032.

1.7. Alternatives

Under HAR Title 11, DOH, Chapter 200, EIS Rules, Section 11-200-17(F), a ~~D~~FEA must contain a section discussing alternatives that could attain the project objectives, regardless of cost, in sufficient detail to explain why the specific alternative was rejected. Alternatives to the preferred Waiehu Residential Community plan, along with reasons why each alternative was rejected, are described below.

Waiehu Residential Community Objectives – Objectives of the Waiehu Residential Community project are rooted in the desire to provide a diverse range of attainable housing types

for Maui residents. The proposed development plan will also foster connectivity to adjacent, existing and future urban uses by participating in regional transportation infrastructure improvements, while contributing to Maui's economy through real property taxes, and a proposed area for neighborhood business locations on site.

As discussed in Section 1.6, the objectives of Waiehu Residential Community encompassed the following three aspects.

Attainable Housing

- Provide creative housing solutions leveraging technology and latest construction methodologies to minimize construction burdens and future operational costs.
- Explore alternative construction methodologies that are fresh and responsive to the sensitivities of the workforce housing market.
- Deliver a broad mix of housing typologies to Maui providing housing opportunities a wide mix of social and economic backgrounds.

Health and wellness

- Create a community that promotes health and wellness.
- Deliver a community that is pedestrian-centric and kid friendly.
- Embrace the surrounding natural and enhanced landscape encouraging residents to explore.
- Make open space thoughtful in design and programming yet purposeful with infrastructure considerations.

Sustainability: A light on the land approach that passively promotes Economic and Environmental Sustainability.

- Establish economic sustainability to ensure that Waiehu has zero net financial burden on the surrounding community or the county.
- Establish economic practices that ensures longevity and economic relief to future residents and encourages upward housing mobility.
- Promote environmental stewardship of the land be at the forefront of community design.
- Implement community wide environmentally sustainable design as a cost savings measure and not as future burden to the HOA.

Three (3) alternatives to the Preferred Alternative (Proposed Action) were considered. These alternatives are discussed below.

1.7.1. No Action/No Project/No Build Alternative

Under the No Action/No Project/No Build Alternative, existing land use entitlements would remain, and the project site would be retained in its current condition. The proposed project site would remain vacant and designated for agricultural use.

This Alternative would leave the project site with the existing conditions, and nothing would change. No utilities nor improvements would be developed to serve the project site. The existing project site would remain vacant and possibly overgrown due to no development nor uses on the site. Under this Alternative, there would be no future 100% affordable housing provided.

The No Action/No Project/No Build Alternative would also deprive the State, County and general public of the socio-economic benefits associated with the Waiehu Residential Community, including the following.

- Property tax revenue for Maui County and to the State of Hawai'i;
- Provision of 752 dwelling units that are 100% affordable;
- Provision of a retail space of approximately 17,400 square feet; and
- Provision of three (3) parks totaling 6.3 acres.

However, potential benefits of the No Action/No Project/No Build Alternative would include the following.

- No short-term construction-related impacts (e.g., construction noise, construction equipment exhaust emissions, and fugitive dust);
- Avoidance of additional infrastructure demands (e.g., water, wastewater flows, electrical, and solid waste disposal);
- No increased traffic impacts on Kahekili Highway and associated infrastructure costs.

Therefore, this Alternative would not add to regional population increases, or require any public services, such as parks and schools, to accommodate an increased population in the area.

Despite the foregoing, the No Action/No Project/No Build Alternative was rejected for the following reasons:

- Does not meet all the objectives of the Waiehu Residential Community ownership;
- Would not address the current and future demand for affordable housing in Central Maui; and
- Would not provide the State and County the economic benefits associated with the implementation of the proposed community.

In summary, the benefits associated with the No Action/No Project/No Build Alternative are far outweighed by the benefits to the community that the Proposed Project (Preferred Alternative) would bring.

1.7.2. Alternative Development Concepts Alternative

Under the Alternative Development Concepts Alternative, the subject property would be developed with a different urban design. The project team developed alternate plan 2 as a market rate and affordable development of the entire project parcel resulting in 1,193 units, resulting in a very dense development with a large amount of pavement. The Maui County Planning Department provided the project team alternate plan 3 as another alternative to the proposed conceptual plan (**See:** Figures 5.1 & 5.2, Conceptual Site Plan Alternative 2 and 3)

A potential benefit of this Alternative would be that more homes are constructed in Waiehu to help alleviate the housing shortage in Maui County. In addition, the economy would benefit from an increase in property tax revenue for the County and State.

For the following reasons, the Alternative Development Concept Plan 2 was rejected:

- The Alternative Plan 2 contained market rate housing, during the early consultation process with the Department of Housing and Human Concerns (DHHC) it was determined that the project should be 100% affordable without market rate homes.
- The Alternative Plan 2 did not consider the existing neighbors by placing single family homes with cul-de-sacs thought the upper portion of the property.
- Plan 2 contains numerous dead-end roadways with cul-de-sacs requiring substantial roadway work to complete this design.
- Alterative Plan 2 contains meets some of the project objectives, but not to the same degree as the proposed project.

In consultation with the Planning Department, the project team was provided Alternate Plan 3 as an alternative to the proposed conceptual plan. (**See:** Figure 5.2, Conceptual Site Plan Alternative 3) The Department suggest that the project's land use be redesigned as a transit-oriented neighborhood by increasing densities at its core, creating a hierarchy of land divisions and housing typologies radiating out from a village common (or public

square) centrally located along the Kahekili Highway and surrounded by neighborhood supportive small retail spaces.

Benefits of this Alternative are that affordable homes are constructed in Waiehu to help alleviate the housing shortage in Maui County. In addition, the concept of a village common (or public square) would provide a centrally located area for commercial activity mixed with a bus stop. In consultation with the Maui County DOT, bus stops are preferred on collector roads rather than highways. However, the Applicant is committed to identifying appropriate bus stop locations in the final site plan.

For the following reasons, the Alternative Development Concept Plan 2 was rejected:

- Alternative Plan 3 does not consider leaving a natural buffer around the existing neighbors along the upper portion of the property.
- Alternative Plan 3 location for the bus stop and village commons along the highway could be problematic for creating a pedestrian friendly environment due to the high speeds, trip volumes and verticality of the access points. The design team made the shift to an internal location adjacent to the neighborhood collector, the main pedestrian corridor, and the loop road. The confluence of these three multimodal travel-ways was determined to be the most beneficial for the community and walkability for future residents.
- Alternative Plan 3 would have to account for site slope considerations, a traditional neighborhood design (TND) grid approach would have been cost prohibitive. This is in large part due to additional roadways, smaller graded lots, and increased non-permeable surfaces that would cause additional run-off and increase in stormwater conveyance and storage.
- Alternative Plan 3 has entrances located at Waiehu Beach Road and Makaala Drive. The project team explored this option, initially. However, due to the topography, logistics, requirements of stormwater management, County of Maui roadway design standards, and sewer lift station realities, the main access point was located further south. This location also improves the stacking distance requirement for our site as well as the proposed affordable housing project across the highway.
- Alterative Plan 3 contains meets some of the project objectives, but not to the same degree as the proposed project.

The project team will continue to consult with the planning department throughout the environmental review and urban design process to refine the site plan.

1.7.3. Alternative Site Alternative

Under the Alternative Site Alternative, the owner/applicant would have to find and develop another property of comparable size and appropriate location with an existing urban growth boundary designated for future urban development. In the context of the purpose and intent of the proposed action, the proposed project site is the most feasible location due to the availability of expansive vacant land, roadways, and adjacent to the established residential communities. This Alternative will assume the development of the Waiehu Residential Community to be located on another possible site within the Wailuku/Kahului area.

Potential benefits of this Alternative would be similar to the Preferred Alternative (Proposed Action) due to the only modification is generally the alternative project site. However, this Alternative leaves the project with unknown factors including the availability of expansive vacant land to accommodate the current plan of Waiehu Residential Community, the ability to obtain the land for the project, and the suitability of the proposed use with the surrounding uses within the vicinity of the alternate site.

For the following reasons, the Alternative Site Alternative was rejected:

- The Alternative Site Alternative meets some of the project objectives, but not to the same degree as the proposed project.
- Hinders the progress of the project to move forward by going through the preliminary process of searching, examining the new location (i.e., retaining the consultants to assess the new location and longer time of waiting for assessment and report drafting with regards to the assessment of the alternate site), and redoing the consultation process.
- Unknown additional costs and other unknown factors for the developers due to the change of the project site that may eventually lead to the failure of developing the project at all.

2. AFFECTED ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES

2.1 Physical Environment

2.1.1 Surrounding Land Uses

Existing Conditions. The subject property is an expansive vacant land of approximately 240 acres and identified as TMK (2) 3-3-002:031. The parcel lies from the intersection of Kahekili Highway and Waiehu Beach Road to the intersection of Kahekili Highway and Makaala Drive ― before expanding toward its *mauka* direction. There are five smaller parcels embedded within the area of the subject property, however, they are not owned by the owner of the subject property nor are they included within the proposed project. (**See**: Figure 2, "Tax Map Key")

The subject property is currently a vacant land populated by overgrown vegetation. Neighboring vacant lands can be found adjacent to the northern and southern property line and more can be found along the slopes of the West Maui Mountain.

Located within the CDP of Waihee-Waiehu, the project site is in close proximity to existing residential subdivisions on its *makai* side, i.e., the Ocean View Estates and Waiehu Kou Subdivision. Other subdivisions can be found on the south side of Waiehu Beach Road, i.e., the Paukukalo Homestead and Waiehu Terrace Residential Subdivision. Future residential development is planned to occur east of the subject property near the Wailuku River at the Pi'ihana Project District 3.

Rural settlements can be found abutting the *mauka* side of the property, while agricultural settlements exist along the north side of Malaihi Road.

The Waihee-Waiehu area elevation offers views of the Pacific Ocean and the West Maui Mountain. Maui's urban center, Kahului, and Maui's seat of government, Wailuku, can be reached within 1.5 miles from the subject property. The project site is accessed from Kahekili Highway. Bus stops are available along Makaala Drive with the closest bus stop is around 600 feet from the southern point of the subject property line.

The following is a description of zoning, community plan designations, and existing land uses adjacent and in close proximity to the subject property:

North: Zoning: INT Interim
Community Plan: OS Open Space & AG Agriculture
State Land Use: Agricultural
Maui Island Plan: Outside Growth Boundary and Rural Growth Boundary
Existing uses: Vacant Land, Rural Settlements, and Kahekili Highway

South: Zoning: AG Agriculture
Community Plan: AG Agriculture
State Land Use: Agricultural
Maui Island Plan: Outside Growth Boundary
Existing uses: Wailuku Country Estates Subdivision

East: Zoning: Road, AG Agriculture, INT Interim, and PD Project District
Community Plan: Highway, AG Agriculture, and PD Project District
State Land Use: Agricultural and Urban
Maui Island Plan: Urban Growth Boundary
Existing uses: Kahekili Highway and Vacant Lands

West: Zoning: INT Interim and RU-0.5 Rural – ½ Acre
Community Plan: OS Open Space, R Rural, and AG Agriculture
State Land Use: Rural and Agricultural
Maui Island Plan: Rural Growth Boundary
Existing uses: Rural Settlements and Expansive Vacant Land

Potential Impacts and Mitigation Measures. The proposed development is compatible with the current uses around the subject property, especially the lands that have been developed as residential subdivisions on the north and east sides of the project site. The proposed project will not adversely affect the unique character of Waihee-Waiehu with its combination of existing residential subdivisions, agricultural subdivisions, and rural settlements.

2.1.2 Topography and Soils

Existing Conditions. A Preliminary Engineering Report (PER) dated May 18, 2021, was prepared for the proposed project by Warren S. Unemori Engineering, Inc. According to the PER, the subject parcel slopes downward with an average grade of approximately 6 percent from west to east and an average of 4 percent from south to north. Elevations across the subject parcel range from 270 feet at its high point near the western boundary to 58 feet at its northeastern tip. Three (3) existing drainageways cross the parcel. (**See**: Appendix 5, Preliminary Engineering Report)

As previously discussed, only approximately 158 acres of the total acreage on the subject property that will be developed. The remaining portion of the land will be preserved as open space. According to the *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawai'i (August 1972),* prepared by the United States Department of Agriculture Soil Conservation Service, the soils within the project site are classified as Iao silty clay (IaA), Iao cobbly silty clay (IbB), and Wailuku silty clay (WvC). Iao silty clays are reportedly slow runoff soils posing a moderate erosion hazard; Iao cobbly silty clays are medium runoff soils posing a moderate erosion hazard; and Wailuku silty clays are slow to medium runoff soils with moderate permeability posing a slight to moderate erosion hazard. (**See**: Figure 10, Soil Classification Map).

Potential Impacts and Mitigation Measures. The proposed grading plan will require both excavation and embankment, with an attempt to balance cut and fill. Best Management Practices will be implemented during the construction phase and will be discussed further in the Drainage Section, 2.4.2 of this report. A National Pollution Discharge Elimination System (NPDES) Permit will be obtained for the proposed project, and if required, a Noise Permit will be obtained for construction activities. (**See**: Appendix 5, Preliminary Engineering Report)

During site preparation, storm runoff from the site will be controlled in accordance with the County's "Soil Erosion and Sediment Control Standards". Typical mitigation measures include appropriately stockpiling materials on the site to prevent runoff and commencing building construction and/or establishing landscaping as early as possible in order to minimize the length of exposure of disturbed soils.

Potential impacts to the landform include the soil erosion and the generation of dust during construction. Clearing and grubbing activities will temporarily disturb the soil retention

values of the existing vegetation and expose soils to erosion forces. Some wind erosions of soils could occur without a proper watering and re-vegetation program.

Measures taken to control erosion during the site development period may include, but are not limited to:

- Minimizing the time of construction;
- Retaining existing ground cover as long as possible;
- Constructing drainage control features early;
- Using temporary area sprinklers in non-active construction areas when ground cover is removed;
- Providing a water truck on-site during the construction period to provide for immediate sprinkling as needed;
- Using temporary berms and cut-off ditches, where needed, for control of erosion;
- Watering graded areas when construction activity for each day has ceased;
- Grassing or planting all cut and fill slopes immediately after grading work has been completed; and
- Installing silt screens where appropriate.

Construction activities on the property will comply with all applicable Federal, State, and County regulations and rules for erosion and sediment control. Prior to the issuance of a grading permit, a final erosion control plan and best management practices will be submitted to the County of Maui for review and approval. All construction activities will comply with the provisions of Chapter 11-60.1, Hawai'i Administrative Rules (HAR), Section 11-60.1-33, pertaining to Fugitive Dust.

The National Ocean and Atmospheric Association (NOAA) Coastal Zone Management Program developed a Practitioners Guide in 2006 for Low Impact Developments (LID) strategies. The Applicant will consider the following strategies for the proposed project:

1. Parking reduction (minimum amount of parking allowed per code in order to increase total landscaping)
2. Tree planting (The Landscape Plan will incorporate native plants)

After construction, the establishment of permanent landscaping will provide additional long-term erosion control.

2.1.3 Natural Hazards

Existing Conditions. Natural hazards impacting the Hawaiian Islands include hurricanes, tsunamis, volcanic eruptions, earthquakes, and flooding.

Seismic hazards are those related to ground shaking. Landslides, ground cracks, rock falls, and tsunamis are all seismic hazards. Engineers and other professionals have created a system of classifying seismic hazards based on the expected strength of ground shaking and the probability of the shaking actually occurring within a specified time. The results are included in the Uniform Building Code (UBC) as seismic provisions.

The UBC seismic provisions contain six seismic zones, ranging from 0 (no chance of severe ground shaking) to 4 (10 percent chance of severe shaking in a 50-year interval). Kauai County is located in Zone 1, the City and County of Honolulu is in Zone 2A, the County of Maui is in Zone 2B, and the County of Hawai'i is in Zone 4.

In addition to seismic hazards, devastating hurricanes occur and have impacted Hawai'i twice since 1980: Hurricane Iwa in 1982 and Hurricane Iniki in 1992. While it is difficult to predict these natural occurrences, it is reasonable to assume that future events could be likely given the recent record.

Tsunamis are large, rapidly moving ocean waves triggered by a major disturbance of the ocean floor, which is usually caused by an earthquake but sometimes can be produced by a submarine landslide or a volcanic eruption. About 50 tsunamis have been reported in the Hawaiian Islands since the early 1800s, including the most recent tsunami as a result of the March 2011 earthquake in Japan.

The proposed Waiehu Residential Community is located within the Tsunami Safe Zone; however, it is situated adjacent to the Extreme Tsunami Evacuation Zone on its northeastern property boundary. According to the Web Map of the County of Maui Civil Defense Siren, closest civil defense sirens are available at Lower Waiehu Beach Road and at the Waiehu Beach Park. (**See:** Figure 12, Tsunami Zone Evacuation Map)

Volcanic hazards are not a concern in the Central Maui area due to the dormant status of Haleakalā.

In Hawai'i, most earthquakes are linked to volcanic activity, unlike other areas where a shift in tectonic plates is the cause of an earthquake. Each year, thousands of earthquakes occur

in Hawai'i, the vast majority of them so small they are detectable only with highly sensitive instruments. On October 16, 2006, a 6.7 magnitude earthquake struck on the underwater segment of the major rift zone of the Hualalai volcano on the northwest side of the Island of Hawai'i. The earthquake caused rockslides and some damage to roadways on Maui.

Flood hazards are primarily identified by the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency's (FEMA), National Flood Insurance Program. According to Panel Number 150003 0383E dated November 04, 2015, of the Flood Insurance Rate Map, prepared by the United States Federal Emergency Management Agency, the subject parcel is situated within Zone "X". These are areas determined to be outside the 0.2% annual chance floodplain. A small portion along Waiehu Stream at the northeastern tip of the parcel lies within the Special Flood Hazard Area, i.e., Zones "A" and "AEF". Both flood zones are subject to inundation by the 1% annual chance flood. (**See:** Figure 11, Flood Map & Figure 12, Tsunami Zone Evacuation Map)

Potential Impacts and Mitigation Measures. The subject property is situated within the Tsunami Safe Zone. However, as the northeastern boundary of the property is situated adjacent to the Extreme Tsunami Evacuation Zone — proper emergency tsunami evacuation procedures will be implemented and adhered to during the events of tsunami. In addition, two civil defense sirens are located approximately 0.31 miles east of the property at Lower Waiehu Beach Road and approximately 0.45 miles north of the property at the Waiehu Beach Park. These existing outdoor warning sirens will alert the community during the events of emergency evacuation.

Sea level rise will have adverse effects on all shoreline communities, our economies, and our natural and cultural resources. Sea level rise should be fully considered for properties within low-lying lands, given high exposure and vulnerability of the region to coastal hazards. The findings of the Hawai'i Sea Level Rise Vulnerability and Adaptation Report 2017, identify an expected 3.2 feet rise in sea level across the main Hawaiian Islands. The report identifies the towns of Waiheʻe, Hāna, Lāhainā, Kīhei, and Sprecklesville that are most vulnerable to sea level rise. The project site is located approximately less than half a mile from the shoreline. Therefore, it is not anticipated that the project site will be affected by sea level rise over the next 30-70 years. (**See:** Figure 13, Sea Level Rise Exposure Area Map)

In general, no adverse flood hazards impacting the site or neighboring properties are anticipated since the immediate environs are situated outside the Special Flood Hazard Areas (SFHAs), outside the Tsunami Evacuation Zone, as well as the Sea Level Rise Exposure Area (SLR-XA). However, as discussed, areas northeast of the subject property are flood zoned AEF (i.e., the Waiehu Stream) and zoned A (i.e., the small tip of the northeastern corner of the subject parcel). The Waiehu Residential Community will be constructed in accordance with the Building Code adopted by the County of Maui. Despite the foregoing, emergency evacuation procedures will be adhered to during any occurrences of natural hazards.

2.1.4 Climate Change Assessment

Climate change impacts were based on region specific trends identified for the State of Hawai'i from a qualitative frame view — centered on available data and metrics. Those trends including air temperature, rainfall patterns, flooding, Sea Level Rise (SLR), shoreline erosion, and Greenhouse Gas (GHG) emissions.

The proposed project is in support of climate change mitigation efforts. Specific green building objectives included within the proposed project are as follows:

- Passive solar design;
- Photovoltaic solar panels;
- Efficient low emissivity glazing on glass to minimize ultraviolet and infrared light that passes through;
- Water conserving plumbing fixtures and fittings;
- Irrigation with automatic controllers, sensors, and metering of outdoor water use;
- Finish material pollutant controls meeting volatile organic compound (VOC) and formaldehyde limits (adhesives, sealants, caulks, paints and coatings, aerosol paints and coatings);
- Exterior material selection for sustainability and recycled content;
- Light pollution reduction;
- Low power consumption for lighting and design and dimming systems;
- Efficient variable refrigerant flow (VRF) heating and air-conditioning system design;
- Commissioning and testing of HVAC systems;
- Insulation and sealing of the exterior building envelope; and
- Electric Vehicle (EV) charging stations.

Temperature

Existing Conditions. Global mean temperature is projected to increase by at least 2.7°F (1.5°C) by the end of the century. Locally, the rate of warming air temperature in Hawai'i has quadrupled in the last 40 years — at a rate of over 0.3°F (0.17°C) per decade and is projected to continue warming with a range of +4-5°F (2.2-2.8°C) — for high emissions scenarios targeted by the year 2085.

Sea surface temperatures have warmed between 0.13°F and 0.41°F (0.07°C and 0.23°C) per decade in the Pacific for the last 40 years. This trend is projected to accelerate, warming by 2.3°F to 4.9°F (1.3°C to 2.7°C) before the end of the century.

Potential Impacts and Mitigation Measures. The proposed project is located in an urban area — where temperatures are significantly warmer than surrounding rural or natural areas. The proposed project is anticipated to contribute on the increasing amount of impervious surfaces that reflect heat and contribute to an urban heat island effect.

Measures to mitigate urban heat island include the following:

- Incorporate strategic landscaping on the remaining areas of the project site — providing trees and vegetative cover to absorb heat and provide shade to cool the surrounding landscape;
- Utilize roofing materials that would involve applying a reflective coating or using reflective materials; and
- Utilize reflective and porous pavement materials to the maximum extent practicable.

It is anticipated that the proposed project individually will not result in significant impacts to average global temperatures.

Rainfall

Existing Conditions. Rainfall trends and projections vary across the islands and the valleys. Hence, there are varying precipitation patterns anticipated with climate change. For Maui, trends in rainfall intensity are mixed. It is projected that the southerly main Hawaiian Islands (Hawai'i and Maui) may become wetter towards the end of the 21st century.

In the events of extreme rainfall, some infrastructure or resources that will be impacted include stormwater infrastructure, sustainable yield from aquifers, and water quality due to

runoff into coastal waters. While high intensity rainfall may cause flash flooding — it is a common occurrence in Hawai'i due to steep terrain and concrete stream channels.

Potential Impacts and Mitigation Measures. The proposed project is anticipated to decrease the amount of permeable area at the project site — runoff may increase during rainfall events resulting in indirect impacts on stormwater infrastructure and coastal water quality. However, no impacts to the sustainable yield from aquifers are anticipated as the proposed project is located below the Underground Injection Control (UIC) line — the underlying aquifer is not considered a drinking water source.

Runoff generated by the proposed project and drainage plan will be discussed in Section 2.4.2 (Drainage) of this report. The proposed project includes onsite drainage system improvements — spatial or temporal changes in rainfall patterns due to climate change are not anticipated to impact the proposed project.

It is anticipated that the proposed project individually will not result in a significant impact on the variation of seasonal rain patterns.

Flooding

Existing Conditions. The Waiehu area is subject to seasonal storm events that create isolated flooding events from runoff. However, most of the project site has a flood zone classification of Zone X — characterized as an area of minimal flooding, specifically areas determined to be outside the 0.2 percent annual chance flood plain.

Potential Impacts and Mitigation Measures. The proposed project also includes projection of runoff generated by the project and the mitigation measures to the increased runoff. More about runoff and drainage plan will be discussed in Section 2.4.2 (Drainage) of this DEIA.

Therefore, the proposed project will not result in direct, indirect, or cumulative impacts related to flooding.

Sea Level Rise

Existing Conditions. It is projected that global Sea Level Rise (SLR) will reach up to 3.2 feet by the year 2100. However, recent observations and projections show that this magnitude of sea level rise could occur sooner than that. Homes, businesses,

infrastructures, and resources within Sea Level Rise Exposure Area (SLR-XA) will be severely impacted.

Impacts of sea level rise to coastal resources are related to the widespread sea armoring. Maui has lost more than 4 miles of beaches to coastal erosion fronting seawalls and other shoreline armoring.

Potential Impacts and Mitigation Measures. The project site will not be subject to inundation pursuant to a 3.2-foot rise in sea level — the site is not located near or within the SLR-XA. Sea level rise could possibly inundate major highways located near the shoreline thereby limiting access to the area. However, these impacts, if any, are not anticipated to be significant as there are alternative routes to the project area available.

It is anticipated that the proposed project individually will not result in a significant impact on sea level rise.

Coastal Erosion

Existing Conditions. Maui's beaches have experienced the greatest amount of erosion compared to the other Hawaiian Islands. Eleven percent (6.8 km or 4.22 mi) of the total extent of Maui beaches studied was lost to erosion during the analysis period — the highest percentage of the islands in Hawai'i.

Potential Impacts and Mitigation Measures. Coastal erosion is a naturally occurring ocean process. Due to climate change — the effects of major storms, drought, destabilization of soil, and SLR have led to an accelerated rate of coastal erosion. The proposed project will not result in direct, indirect, or cumulative impacts related to coastal erosion due to its location away from the shoreline.

2.1.5 Flora and Fauna

Existing Conditions. The subject property was situated on a land formerly used for sugar cane agriculture and more recently for macadamia nut production. However, the land has lain fallow for well over a decade and is overgrown with remnant trees and dense tall grassland. The project area lies above Kahekili Highway to the south of Waiehu Stream at elevations ranging from 50 feet up to 270 feet above sea level. The land is gently to

moderately sloping. Rainfall at the project site averages between 25 inches and 30 inches per year. Rain mostly falls during the winter months.

A Biological Resources Study for The Waiehu Master Plan Project dated February 2021 was prepared by the Environmental Consultant, Mr. Robert W. Hobdy. The report contains both findings and recommendations based on the botanical and fauna surveys in the project area. The fauna survey includes mammals, birds, and insects.

Botanical Survey

A botanical survey was performed by walking through the subject property — to ensure maximum coverage of habitats surveyed. A more intensive examination was done on areas with highest likelihood to harbor native or rare plants such as gullies.

A total of sixty-nine (69) species were recorded during three site visits. About ninety-five (95) percent of the plants found in the project area consist of four abundant non-native species, i.e., the guinea grass *(Megathyrsus maximus)*, the macadamia nut tree *(Macadamia integrifolia)*, the koa haole *(Leucaena leucocephala)*, and the glycine vine *(Neonotonia wightii)*. The remaining plant species found in the project area were of uncommon or rare occurrence. Only three (3) species were found that are native to Hawai'i, i.e., moa *(Psilotum nudum)*, `uhaloa *(Waltheria indica)* and pōpolo *(Solanum americanum)* — they are common throughout Hawai'i and widespread in other countries. However, these three native plant species were of rare occurrence in the disturbed habitat within the project area.

As noted in the Botanical Survey Report, the vegetation throughout the project area was dominated by just a few non-native plants — most of them are of no particular environmental concern. The three native plant species are all listed as species of least concern. No Federally listed Endangered or Threatened native plant species (USFWS, 2021) were encountered during the survey nor were found that are candidates for such status. No special habitats or rare plant communities were found on the property either. (**See**: Appendix 4, Biological Resources Study for The Waiehu Master Plan Project)

Fauna Survey

A fauna survey was performed by walking through the subject property in conjunction with the botanical survey. Survey coverage included all parts of the project area. Field observations were conducted with the aid of binoculars and by listening to vocalizations. In addition, an evening visit was conducted to record crepuscular activities and vocalizations

— as well as to see any evidence of occurrence of the endemic and endangered Hawaiian hoary bat *(Lasiurus cinereus semotus)* in the project area.

The survey found four (4) species of non-native mammals in the project area during the three site visits, i.e., domestic dogs *(Canis familiaris)*, axis deer *(Axis axis)*, mongoose *(Herpestes auropunctatus)* and feral pigs *(Sus scrofa)*. Non-native mammals that would likely use the project area; however not seen during the survey, include rats *(Rattus spp.)*, mice *(Mus domesticus)*, and domestic cats *(Felis catus)*.

During the evening survey, a bat detecting device (Batbox III D) was used at two locations — set to the frequency of 27,000 Hertz that these bats are known to emit when echolocating for nocturnal flying insect prey. No bat activity was detected with the use of this device.

Twelve (12) widespread non-native bird species were observed during the three site visits. One (1) species, the zebra dove *(Geopelia striata)*, was abundant in the project area. Five (5) species were all uncommon, i.e., the spotted dove *(Streptopelia chinensis)*, northern cardinal *(Cardinalis cardinalis)*, nutmeg mannikin *(Lonchura punctulata)*, chestnut mannikin *(Lonchura malacca)*, and common chicken *(Gallus gallus)*. A few other non-native bird species would likely utilize this habitat occasionally. However, the project area contains tall and dense grassland and forest — not suitable for Hawai'i's native forest birds, sea birds, water birds, or nēnē — none of these species were seen in the project area.

Fourteen (14) insect species were recorded during the three site visits. One (1) species, the dung fly *(Musca sorbens)*, was common throughout the project area. Four (4) other species were uncommon, i.e., the Asian tiger mosquito *(Aedes albopictus)*, the Southern house mosquito *(Culex quinquefasciatus)*, the globe skimmer dragonfly *(Pantala flavescens)*, and the long-tailed blue butterfly *(Lampides boeticus)*. Two (2) species of dragonflies were native to Hawai'i, i.e., the globe skimmer, and the pinao or green darner *(Anax junius)*. The other twelve (12) species were non-native.

As noted in the Fauna Survey Report, nealy all mammal, bird, and insect species recorded during the survey were non-native in Hawai'i and of no conservation concern. The two (2) native dragonflies are both indigenous to Hawai'i, but also of natural occurrence in other countries — both are widespread throughout Hawai'i and are not of any particular

conservation concern. (**See**: Appendix 4, Biological Resources Study for The Waiehu Master Plan Project)

No Federally listed Endangered or Threatened animal species (USFWS, 2021) were encountered during the survey nor were found that are candidates for such status. No special habitats or rare animal communities were found on the property either.

While no Endangered Hawaiian bats were recorded during the survey, these wide-ranging nocturnally active flying mammals could occasionally pass through the area. If they show up in the project area, the proposed project will follow the guidelines from the U.S. Fish and Wildlife Service for their protection. (**See**: Appendix 4, Biological Resources Study for The Waiehu Master Plan Project)

Potential Impacts and Mitigation Measures. Since the flora and fauna survey conducted in February 2021 found no species determined to be especially rare, Threatened, Endangered, or candidates for listing as Threated or Endangered — were identified within the proposed project Site, and no special habitats were identified within the project site — it is anticipated that the proposed action will not result in a significant impact to Terrestrial Biota.

In addition to the above findings, no native bird species were found on the property during two site visits. However, there are native seabirds, the Endangered Hawaiian petrel *(Pterodroma sandwichensis)*, and the Threatened Newell's shearwater *(Puffinus newelli)* that fly over these lowlands on the way to their burrows high in the mountains. These seabirds, and especially the fledglings, are attracted to bright lights in the evenings and early dawn hours — causing them to be disoriented and crash — later making them vulnerable to injury, vehicle strikes, and predators. It is recommended that any significant outdoor lighting in any proposed development on this property be shielded to direct the light downward to minimize disorientation of these protected seabirds.

The Biological Resources Study for the proposed project noted no other issues are anticipated with wildlife species. In addition, an early consultation with the State of Hawai'i, Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW) was conducted, and a response letter dated September 20, 2021, was delivered to the said Division. The response letter presented the Applicant's commitment on complying with recommendations as suggested by DOFAW. (**See**: Appendix 3, Early

Consultation Comment Letters with Responses, Appendix 11, DEA comments Letters with Responses)

2.1.6 Air Quality

Existing Conditions. In general, air quality in Waihee-Waiehu is considered relatively good. Non-point source emissions (automobile) are not significant to generate a high concentration of pollutants. The Waihee-Waiehu area is influenced by the trade winds that generally travel through the north coast and across the isthmus between West Maui and Haleakala volcanoes. In an area where strong wind strengths occur and quickly disperse concentration of emissions, air pollution is generally not a significant problem. Moreover, vegetation can be found throughout the area and helps purifying the ambient air.

Potential Impacts and Mitigation Measures. Air quality impacts attributed to the proposed project could include dust generated by construction-related activities. Site work, such as demolition, grubbing, grading and building construction, could generate airborne particulate. Adequate dust control measures that comply with the provisions of Hawai'i Administrative Rules ― Chapter 11-60.1, "Air Pollution Control," Section 11-60.1-33, Fugitive Dust ― will be implemented during all phases of construction.

Short- and/or long-term impacts on air quality will occur either directly or indirectly as a consequence of project construction and use. Short-term impacts from fugitive dust will likely occur during the project construction phases. To a lesser extent, exhaust emissions from stationary and mobile construction equipment, from the disruption of traffic, and from workers' vehicles may also affect air quality during the period of construction. State air pollution control regulations require that there be no visible fugitive dust emissions at the property line. Hence, an effective dust control plan will be implemented to ensure compliance with State regulations. Fugitive dust emissions can be controlled to a large extent by implementing the following types of mitigation measures:

- Providing an adequate water source prior to start-up of construction for use in dust control;
- Landscaping and rapid covering of bare areas, including slopes, beginning with the initial grubbing and grading phase;
- Controlling of dust from shoulders, project entrances and other access roads;

- Providing adequate dust control measures during weekends, after hours and prior to daily start-up of construction activities;
- Controlling of dust from debris hauled away from the project site; and,
- Erecting a dust fence to shield the adjacent project sites.

Paving and landscaping of project areas early in the construction schedule will also reduce dust emissions. Monitoring dust at the project boundary during the period of construction could be considered as a means to evaluate the effectiveness of the project dust control program. Exhaust emissions can be mitigated by moving construction equipment and workers to and from the project site during off-peak traffic hours.

After construction, motor vehicles coming to and from the proposed development will result in a long-term increase in air pollution emissions in the project area.

Renewable energy sources, if developed, could reduce these emissions substantially. Incorporating energy conservation design features and promoting energy conservation programs within the development could also serve to reduce any associated emissions. Presently, all solid waste on Maui is landfilled, and any associated air pollution emissions are relatively negligible. Nevertheless, promoting conservation and recycling programs within the proposed hotel could serve to further reduce any associated impacts.

2.1.7 Noise Quality

Existing Conditions. Natural noises within the vicinity of the project site — the wind, rustling of trees and surrounding vegetation, and bioacoustics from animals such as birds — can be easily observed. Existing background noise in the vicinity of the project site is mainly attributable to the vehicular traffic on Kahekili Highway and surrounding roads. The noise levels around the project site are consistent with noise levels found in developed rural and urban areas.

Construction Noise. Audible construction noise will probably be unavoidable during the entire project construction period. It is anticipated that the actual work will be moving from one location on the project site to another during the construction period.

Adverse impacts from construction noise are not expected to be in the "public health and welfare" category — due to the temporary nature of the work and due to the administrative controls available for its regulation. Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site.

Mitigation of construction noise to inaudible levels will not be practical in all cases — due to the intensity of construction noise sources (72 to 80+ dBA at 150 FT distance) and the exterior nature of the work (grading and earth moving, trenching, concrete pouring, hammering, etc.).

The use of properly muffled construction equipment should be required on the job site. The incorporation of State Department of Health construction noise limits and curfew times — applicable on the island of Maui — is another noise mitigation measure which will be applied to this project.

Notwithstanding this, the project will comply with State Department of Health noise regulations for construction activities. As stipulated by DOH permit requirements, noise-generating construction activities are not allowed on Sundays and holidays, during the early morning, and during the late evening and nighttime periods.

2.1.8 Historical and Archaeological Resources

Existing Conditions. The subject property was previously proposed for a project named Hale Mua Affordable Housing and a Final Environmental Assessment (FEA) was published in 2005 for the said project. Hence, the following discussion of the historical and archaeological resources of the subject property refers to the 2005 FEA. The said FEA included a summary of Archaeological Inventory Survey (AIS) carried out by Scientific Consultant Services (SCS) dated 2004 and a letter from the State of Hawai'i Department of Land and Natural Resources (DLNR), Historic Preservation Division dated January 3, 2005.

The 2004 AIS included historic background research and settlement pattern analysis prior to fieldwork, a complete pedestrian survey of the project area, subsurface testing, and reporting. The 2005 FEA confirmed that the project site has been heavily affected by the history of commercial cultivation. The area was utilized for sugar cane production for over

100 years, followed by macadamia nut orchards for some 20 years. The land surface has thus been substantially altered by agricultural activities.

The following is the discussion of the 2004 AIS finding as summarized in the 2005 FEA.

> *"Thirteen (13) historic sites were documented during this survey, which were then condensed to seven (7) total sites when assigned State site numbers. One (1) of these, the sugar industry irrigation ditch known as Spreckels Ditch, had been recorded previously as State Site Number (SSN) 50-50-07-1508. The other six (6) were newly recorded. These include historic sugar agriculture features (SSN 50-50-04-55522), isolated lithic finds (SSN B5523), an isolated marine shell find (SSN B5524), an historic terrace and mound likely associated with plantation-era land clearing (SSN B5525), a concrete foundation remnant of an historic pig-raising facility (SSN B5526), and a terrace complex from an early historic period (SSN B5527).*
>
> *Although these sites were considered significant because of their ability to yield information about history or prehistory, that information has been documented. Thus, they are no longer deemed significant.*
>
> *Subsurface testing was also carried out in areas likely to have been least affected by historic activities. The only find of any significance was a sample of charcoal. These areas were determined to be culturally sterile."*

The 2005 FEA also discussed the 2004 AIS conducted on the area of the proposed Imi Kala Street Extension — as excerpted below.

> *"The survey identified four (4) sites of potential interest. One of these sites is Speckles Ditch, which has been previously identified and is recorded as SSN 50-50-04-5564 is the bridge which currently spans the Iao Stream. SSN 50-50-04-5565 represents the remnants of the lo'i fields uncovered during trenching in the area between the existing Imi Kala Street and Piihana Road. Finally, SSN 50-50-04-5566 is the unnamed ditch running parallel to Kahekili Highway. This is part of the irrigation system formerly used by Wailuku Agribusiness during agricultural production."*

Potential Impacts and Mitigation Measures. Section III.A.5 (Archaeological Resources) of the 2005 FEA discussed five (5) significance evaluations criteria for the State and National register of Historic Places, i.e., Criterion "A", "B", "C", "D", and "E". Each criterion described the significance aspect of the surveyed site with regards to historical events, lives of persons significant to the past, excellent site type, prehistory or history, or cultural significance. The sites identified in the 2004 AIS were considered significant under Criterion "D" because of their ability to yield information about history or prehistory.

State Historic Preservation Division (SHPD) letter dated January 3, 2005, concurred that all identified sites that are significant under Criterion "D", have yielded information important to history and that the sites have been adequately documented. SHPD agreed that monitoring is warranted on the subject parcel including monitoring within 50 meters of the highway. SHPD eventually concluded the letter that the 2004 AIS report was found to be adequate and could be accepted as final.

The full documentation of the 2005 Final Environmental Assessment can be accessed on the link below.

http://oeqc2.doh.hawaii.gov/EA_EIS_Library/2005-07-08-MA-FEA-Hale-Mua-Affordable-Housing-Subdivision.pdf

In addition to the foregoing, prior to the preparation of the Draft EA, a letter dated September 22, 2021, was sent to the SHPD requesting for concurrence with regards to Hawai'i Revised Statutes (HRS) Chapter 6E-42 Historic Preservation Review for the proposed 100% Affordable Housing project currently named as Waiehu Residential Community. The said letter includes an attachment of the HRS 6E Submittal Form. Section 5.7 of the form listed seven (7) known historic properties within the project area that are property identified and inventoried as follows.

- SIHP 50-50-07-01508 (Spreckels Ditch)
- SIHP 50-50-04-05522 (seven plantation features)
- SIHP 50-50-04-05523 (isolated lithics)
- SIHP 50-50-04-05524 (single marine shell)
- SIHP 50-50-04-05525 (Plantation era terrace and mound)
- SIHP 50-50-04-05526 (Concrete foundation of piggery)
- SIHP 50-50-04-05527 (Plantation era terrace complex, five features)

(**See**: Appendix 6, Archaeological 6E Consultation)

The Applicant will comply with the SHPD requirements and continue coordination to provide any Archaeological documentation requested during and after the environmental review process.

2.1.9 Visual Resources

Existing Conditions. The subject property is fronting the lower arterial of Kahekili Highway and due to its elevation and proximity to the slopes of the mountain, the area offers a closer view of the West Maui Mountain. View to the Pacific Ocean can be limited at certain viewpoints due to the existence of tall vegetation and surrounding residential structures that have taken the oceanfront lots.

Potential Impacts and Mitigation Measures. The Maui Coastal Scenic Resources Study (August 31, 1990) was prepared by Environmental Planning Associates, Inc. on behalf of the Maui Planning Department. The proposed Waiehu Residential Community is located in an area which is largely characterized by urban development with views towards Haleakalā and the West Maui Mountains. (**See**: Figure 14, Scenic Resources Map)

Landscape planting will be used to screen the building where possible and to provide visual context in blending the massing of the building to the site and surrounding environs.

While the proposed development will have an impact on views across the site, in the context of its undeveloped condition, the visual impacts are not anticipated to be significant in the context of existing visual resources in the vicinity.

Regarding design, the proposed project will complement the architectural character as other developed properties in the area. The Waiehu Residential Community is being designed to control the density, architectural design, and variation of all buildings in the project without sacrificing views or the aesthetic character of the proposed project.

Overall urban design of the project will position buildings fronting landscaped roadways to screen the massing of the buildings.

2.1.10 Agricultural Resources

Existing Conditions. As discussed in the earlier sections, the subject property was situated on a land formerly used for sugar cane agriculture and more recently for macadamia nut production. However, the land has lain fallow for well over a decade and is overgrown with remnant trees and dense tall grassland. The existing use on the subject property is vacant.

LSB. In 1967 The University of Hawai'i, Land Study Bureau (LSB), developed the Overall Productivity Rating, which classifies soils according to five (5) levels, ranging from "A", representing the class of highest productivity soils, to "E", representing the lowest.

The lands underlying the project site are classified as "C" and "B", representing middle range to upper middle range of productivity soils suited for agricultural production. (**See**: Figure 15, Land Study Bureau Map).

ALISH. In 1977, the State Department of Agriculture developed a classification system to identify Agricultural Lands of Importance to the State of Hawai'i (ALISH). The classification system is based primarily, although not exclusively, upon the soil characteristics of the lands. The three (3) classes of ALISH lands are: "Prime", "Unique", and "Other", with all remaining lands termed "Unclassified". When utilized with modern farming methods, "Prime" agricultural lands have a soil quality, growing season and moisture supply necessary to produce sustained crop yields economically. "Unique" agricultural lands possess a combination of soil quality, growing season, and moisture supply to produce sustained high yields of a specific crop. "Other" agricultural lands include those that have not been rated as "Prime" or "Unique" but are still considered important agricultural lands.

The ALISH system classifies almost the entirety of the subject property as "Prime". There are two areas not classified within the ALISH system situated along the western boundaries of the subject property. When utilized with modern farming methods, "Prime" agricultural lands have a soil quality, growing season and moisture supply necessary to produce sustained crop yields economically. (**See**: Figure 16, Agricultural Lands of Importance to the State of Hawai'i Map)

Potential Impacts and Mitigation Measures. The LSB and ALISH classification systems indicate that the lands underlying the subject property possess soil ratings for productive agricultural uses. As previously discussed, the current condition of the subject property is

vacant. The subject property was situated on a land formerly used for sugar cane agriculture and more recently for macadamia nut production. However, the land has lain fallow for well over a decade and is overgrown with remnant trees and dense tall grassland.

The 2005 Final Environmental Assessment (FEA) and Finding of No Significant Impact (FONSI) published for the formerly proposed Hale Mua Affordable Housing. The following is the discussion of the agricultural conditions within the subject property as described within Section III.B.3 of the 2005 FEA.

> *"Although the land was previously engaged in large agricultural activities, it is presently fallow, undeveloped and predominantly vegetated with macadamia nut trees and introduced grass species. With the parceling and sale of lands owned by Wailuku Agribusiness Company, Inc. (WACI), the viability of large-scale agricultural operations in this area of Central Maui has been reduced. The removal approximately 240 acres of land from State "Agricultural" District represents a reduction of 0.1 percent of the total agricultural lands designated on the island of Maui. In the context of WACI's land disposition objectives and overall agricultural productivity needs for the island, the conversion of the subject property from fallow conditions to affordable and market housing uses are not deemed adverse."*

Based on the foregoing, the proposed use of the subject property on the lands designated within LSB and ALISH are not anticipated to adversely affect the availability of agricultural lands within Maui County and the agricultural activities in the island of Maui. In addition, the immediate environs of the subject property are predominantly vacant lands. The land east of the Kahekili Highway or across the subject property on the east (i.e., TMK (2) 3-3-001:106) is currently designated "Prime" within the ALISH system and classified as "B" within LSB system. The said land is proposed for Hale Mahaolu Ke Kahua Affordable Housing Community, a 100% Affordable Housing Project on 11 acres.

In addition, as previously discussed, the Draft EA included a consultation letter to SHPD with regards to HRS 6E-42 Historic Preservation Review for the proposed project. The letter confirmed that the parcel has been altered in several ways through its history of commercial cultivation. Planted protective windows, pushed topsoil deposits, and irrigation construction have noticeably altered the landscape. The project area, along with adjacent parcels, was utilized for sugar cane production for over 100 years, starting in the late 1800s.

In the 1980s, macadamia nut trees replaced the sugar cane, and the land surface still bears evidence from the earth moving of heavy machinery. The "nonstony" ground surface was described as "well-suited" for machine tilling, having a "slope of predominantly 8 percent" with near optimal conditions for sugar cane productivity. As such, this letter supports the discussion of former agricultural uses on the subject property (**See**: Appendix 6, Archaeological 6E Consultation).

2.1.11 Groundwater Resources

Existing Conditions. MDWS has completed improvements to its Iao (Surface) Water Treatment Plant to expand its capacity from 1.7 to 3.2 MGD and the water use permit application was approved for the increase from 1.7 to 3.2 MGD by the State Commission on Water Resource Management (CWRM) in 2021. The new capacity should ensure that the 100% affordable Waiehu Residential Community will be served by the County water system.

Potential Impacts and Mitigation Measures. It is anticipated that domestic consumption by the proposed development will be between 367,000 and 490,000 gallons of potable water per day.

The proposed project will also require a fire protection system to protect the residential and neighborhood commercial areas within the development. The system is expected to have the capacity of delivering a fire flow of 2,000 gallons per minute (gpm) for as long as 2 hours. Duplex and single-family residential areas will require a sustained fire flow of 1,250 gpm and 1,000 gpm, respectively.

The proposed project does not have sufficient water rights to enable any development of new water sources. Therefore, the proposed 100% affordable project will have to depend on the Maui County DWS for potable water. The potable water is expected to come from the DWS' existing groundwater wells located in upper Waiehu and North Waihee with groundwater source from the Iao and Waihee aquifers.

According to the PER, County DWS has indicated that they are currently drawing an amount of water from their existing wells in the Iao and Waihee aquifers — reaching the maximum pumpage recommended by CWRM. While there are strategies that Maui County has identified to develop new source capacity or free existing capacity for the other uses,

such strategies will take time to pursue — so, there may not be a sufficient quantity of water at the outset to build out the entire development. Consequently, development of the proposed project has to be phased and the build-out has to be timed to reflect the availability of water source capacity.

The proposed project will include the construction of a new water storage tank with 1.0-million-gallon (MG) capacity. This proposed storage reservoir will be located at an elevation fully compatible with the Waiehu Heights 0.3 MG and Waiehu Kou 0.5 MG water storage tanks owned by the DWS. The new 1.0 MG tank will be configured in order to be filled primarily from the DWS' Central Maui Water Transmission System, or alternately from the DWS' Waiehu wells for added reliability and will be dedicated to DWS upon completion.

2.2 Socio-Economic Environment

2.2.1 Population and Housing

Existing Conditions. The United States Census Bureau (USCB) conducts a census every ten years to count the population and housing units for the entire United States. The most recent decennial census was conducted in 2020. While data is available covering the Counties in the United States, 2020 census data for Maui Island is still very limited. Therefore, for the purpose of preparing this DEA, the Maui Island population uses 2010 census data which was 139,528 residents — a total of the population of 24 Census Designated Places (CDP) in Maui Island. This data is presented within the Maui County Data Book 2019 pages 14 and 15.

According to the USCB, the April 2020 Maui County population was 164,754 residents — about 6.4% increase from the April 2010 population, i.e., 154,834 residents. In 2020, the population density for Maui County was about 142 people per square mile — slightly higher than the approximately 133 people per square mile population density in 2010.

Population growth in Maui County was projected to continue with the year 2030's resident population projected to reach 189,947 and the year 2040's to reach 205,040. The said projection is presented within the Maui County Data Book 2019 page 23. The 2019 housing

count in Maui County was recorded to reach 74,561 units with a total occupancy of 61% between 2015 to 2019.

The project site is situated within the Waihee-Waiehu Census Designated Place (CDP). The United States Census Bureau records that the April 2020 population for Waihee-Waiehu CDP is 9,234 residents — about 4.45% increase from the April 2010 population, i.e., 8,841 residents. The UCSB April 2020 census shows that Kahului CDP has the largest population in Maui County (28,219 residents), with Kīhei CDP on the second (21,423 residents), Wailuku CDP on the third (17,697 residents), and Lahaina CDP on the fourth rank (12,702 residents).

A market study for the proposed project was done by Mr. Robbins Boud of the Real Estate Analytics and the draft report was dated August 2021. The report presents a summary of how economic, socio-economic and demographic factors are examined and applied to the proposed Waiehu Residential Community to generate the requested supportable product segments, pricing structures and absorption potential for Waiehu. The report accounts for all requirements associated with a 100% Workforce Residential Community.

Potential Impacts and Mitigation Measures. The Waiehu Residential Community is subject to Maui County Code, Chapter 2.96 (Residential Workforce Housing Policy). Workforce homes will be subject to the requirements of Chapter 2.96, MCC to ensure that affordable homes are available for full-time Maui residents. (**See**: Appendix 10, Draft 201H Exemption List)

2.2.2 Economy

Existing Conditions. As previously discussed, prior to the preparation of the Draft EA, the Applicant has retained Mr. Robbins Boud of the Real Estate Analytics to prepare a market study for the proposed project. Apart from analyzing the housing market, the report also presents a general analysis of the economy and the relationship between the project site and the surrounding areas that generate economic activities. Main job centers in Wailuku and Kahului are within a short distance of the site.

According to the Maui Island Plan (December 2012), diversifying Maui's economy has been a key, longstanding County policy. The Economic Development chapter of the plan includes the following statement in its analysis of the island's challenges and opportunities:

"The Island of Maui, like the County as a whole, faces two fundamental challenges in economic development: (1) diversification; and (2) increasing the number and proportion of living wage jobs. There is a subset of more specific challenges, such as the high cost of housing and the need to strengthen public education".

Maui's employment is comprised primarily of jobs in the retail trade, accommodation, eating and drinking, and government sectors, which collective comprise more than 40 percent of total jobs in the county.

Potential Impacts and Mitigation Measures.

Short-term construction related impacts. On a short-term basis, the project will support the economy via direct and indirect construction-related employment, as well as through the purchase of construction materials and building-related services. Employment from construction will generate direct jobs during the construction phase.

Long-term community related impacts. On a long-term basis, the future residents and small-scale commercial businesses will contribute to the economy in the form of taxes and commercial transactions. The fiscal effects of the proposed residential communities' taxes will positively impact Maui County and the State.

In conclusion, the proposed action will help meet the demand for much need affordable housing as identified by the market study and supported by the lack of housing inventory in the immediate vicinity. The proposed action is estimated to generate taxes for the state and County. (**See:** Appendix 8, Market Study)

Short-term construction related impacts. On a short-term basis, the project will support the economy via direct and indirect construction-related employment, as well as through the purchase of construction materials and building-related services. (**See:** Appendix 8, Market Study)

Long-term community related impacts. On a long-term basis, the future residents will contribute to the economy in the form of property taxes and the small businesses will contribute a small amount of employment, business taxes and commercial transactions.

2.2.3 Cultural Resources

Existing Conditions. A Cultural Impact Assessment (CIA) Report was prepared for the proposed project by Honua Consulting (Honua) and CKM Cultural Resources in September 2021 (**See**: Appendix 7, Cultural Impact Assessment). As previously discussed, a similar affordable housing project was proposed on the subject property, however, named Hale Mua Affordable Housing Project. As such, the CIA for the proposed Waiehu Residential Community includes the works and findings prepared by CKM Cultural Resources in 2004 and improved by the current consultant, i.e., Honua.

The CIA was conducted in accordance with Act 50 (2000 Session Laws of Hawai'i) and the guidelines for Assessing Cultural Impact Assessments Environmental Review Program (ERP) — formerly named the State of Hawai'i, Office of Environmental Quality Control (OEQC) — including extensive archival research in addition to interviews with culturally knowledgeable individuals. The CIA also complies with the Ka Paʻakai decision and the state's obligation to assess the potential impact any state action or decision may have on traditional and customary practices.

The project area is located in the *ahupua'a* of Wailuku, within the *moku* (district) of the same name. Wailuku *moku* consists of four *ahupua'a*: Waihe'e, Waiehu, Wailuku, and Waikapu. The *ahupua'a* of Waiehu is located within the larger *moku* of Wailuku, south of the *ahupua'a* of Waihe'e and north of the *ahupua'a* of Wailuku.

The CIA includes the discussion of natural resources within the subject property, specifically those natural resources that may have cultural significance or use. The analysis includes the findings from the biological resources study for the proposed project, conducted by Mr. Robert W. Hobdy — as discussed in Section 2.1.6 (Flora and Fauna) of this ~~Draft~~ Final EA.

The three (3) indigenous species found within the project site and recorded during the Botanical Survey includes, *ʻuhaloa (Waltheria indica), moa (Psilotum nudum),* and *pōpolo (Solanum americanum)*. *ʻUhaloa* is primarily a medicinal plant. This native weed remains abundant throughout the Hawaiian Islands and is still treasured as a natural and safe tonic for bodily ailments today. *Moa* was traditionally used and continuously to be used in *lei*. *Moa* also had medicinal purposes and would be used as a laxative or to treat respiratory infections. *Pōpolo* is an extremely important medicinal plant, but it is also functioned in other aspects of Hawaiian culture. Uses related to *pōpolo* includes consumption as the plant

produces edible berries, dyes created from both the berries and the leaves of this plant, and the most contribution of this plant to Hawaiian culture is as a medicinal treatment. The CIA acknowledges that these three (3) indigenous plants are present on all of the Hawaiian Islands and are not of conservation or environmental concern.

Two faunal specifies were indigenous to the Hawaiian Islands, i.e., the globe skimmer (*Anax junius*) and green darner (*Pantala flavescens*), both are referred to pinao in the Hawaiian language. Neither are of conservation concern. While no seabirds were identified on property, the biological resources study notes that there are native seabirds, the Endangered Hawaiian petrel (*Pterodroma sandwichensis*) and the Threatened Newell's shearwater (*Puffinus newelli*) that fly over these lowlands on the way to their burrows high in the mountains. The Hawaiian petrel is referred to as *ʻUaʻu* and the shearwater is referred to as *ʻUaʻu kani* in the Hawaiian language.

Other environmental features discussed in the CIA with regards to the project site are the Waiehu Stream which is one of the four water sources making up Nā Wai ʻEha, the different types of rain that occur within Wailuku *moku*, the name of the wind identified for the Wailuku area, fresh water (*wai*), the bathing spot in Waiehu (*Pauku Kalo*), intangible cultural resources, cultural practices, and geographic features of the area.

Prior to the preparation of the CIA, oral records, interviews, and consultations were conducted. In 2003, two (2) interviewees recorded in the previous CIA, i.e., James Tatsuo Tanaka from the Wailuku area and Robert "Bobby" Lu'uwai from the Makena area. Both interviewees are fishermen, and their interviews gave insights to the oral histories of the fishing areas in Maui. One of the important testimonials was about how the plantation harmed the fisheries due to the pollution caused by the use of fertilizers that got washed up to the ocean during the event of heavy rainfall.

In 2004, six (6) individuals were interviewed. Most of the interviewees mentioned about the sugar cane fields situated within the subject property. None of the interviewees had any knowledge of Hawaiian practices or ceremonies on the property. One of the interviewees mentioned that she heard about burials on the project property. She told about how the archaeologist was told about the burials, however, not able to find it.

In 2021, an interview with Kumu Hula Hokulani Holt-Padilla was conducted via Zoom. She was raised in the lower Waiehu area and would frequent the adjacent parcels in search

of *kōkoʻolau* to make tea. She would often visit the Waiehu stream that borders the project area to gather *ʻōpae* and plums. The informant was not aware of any burials within the project area but stated that this locale was heavily disturbed during the sugar cane era and made mention of burials located in the sand dune in the adjacent properties.

Potential Impacts and Mitigation Measures. Waiehu is rich with both pre-contact and post-contact histories. The CIA concludes that in applying *Ka Pa'akai*, no cultural, historical, or natural resources have been identified in the project area and no traditional or customary Native Hawaiian rights are currently exercised in the project area. Although, some customary practices do continue in the larger geographic extent of Wailuku. The CIA emphasizes that while there are no traditional or customary practices occurring directly within the project area, there remains a vibrant, active cultural in the surrounding area, particularly *kalo* farmers. Therefore, the project should take appropriate steps to ensure that its resource usage does not adversely impact these individuals, groups, or practices. While the project is unlikely to have any direct, indirect, or cumulative adverse impact on pre-contact historic properties or Hawaiian cultural practices, it would be well-advised to carefully monitor its water usage during development and operation to ensure that it does not exceed the water usage projected in its environmental assessment and impact surrounding kalo farmers and practitioners. The project also has an opportunity to enrich the area through interpretive botanical, cultural and historical programs. The project should also take appropriate steps with area experts on proper naming practices and landscaping. (**See**: Appendix 7, Cultural Impact Assessment)

2.3 Public Services

2.3.1 Recreational Facilities

Existing Conditions. The closest recreational facility to the project site is the County-owned Waiehu Golf Course located at the northern side of the Waihee-Waiehu CDP offering a view of the ocean. The project site also benefits from the proximity to the district center of Wailuku where more recreational facilities can be found, i.e., the Keopuolani Regional Park which is adjacent to the Maui Arts and Cultural Center, the Kepaniwai Park which can be found on the way to the Iao Valley, Maui Botanical Gardens which can be found across the War Memorial Complex, Wailuku Gymnasium, and Wells Community

Complex. The last three facilities provide active recreation where residents can perform different type of sports with adequate county facilities.

Potential Impacts and Mitigation Measures. The proposed Waiehu Residential Community includes the provision of three (3) parks within the subject property, totaling approximately 6.3 acres. In addition, as previously discussed, only approximately 158 acres of the total acreage on the subject property that will be developed. The remaining portion of the land will be preserved as open space. Therefore, the proposed project is not anticipated to have an adverse impact upon existing park and recreational facilities. This ~~Draft~~ Final EA includes a list of 201H Exemption Requests for the proposed project. An exemption from Section 18.16.320, Maui County Codes (MCC), Parks and Playgrounds, shall be granted to allow the project to be exempt from Park assessment fees. (**See**: Appendix 10, Draft 201H Exemption List)

2.3.2 Medical Facilities

Existing Conditions. Major medical facilities are located approximately 3.1 miles from the proposed project Site at Maui Memorial Medical Center and the Kaiser Permanente Health Clinic.

Potential Impacts and Mitigation Measures. The proposed 100% affordable project will generate additional residential units for Maui residents. It is anticipated that the project will provide housing for the existing population and not creating a new population of people, therefore the proposed project is not anticipated to have an adverse impact upon existing medical facilities.

2.3.3 Police and Fire Protection Services

Existing Conditions. The Maui Police Department has been serving the community through the prevention of crime, preservation of public peace, and protection of life as well as property. Four police stations currently exist in the Island of Maui, i.e., in Wailuku, Lahaina, Kihei, and Hana. The Waihee-Waiehu area is served by the Wailuku Police Station, about 8-minute drive from the project site.

The Maui Department of Fire and Public Safety has been serving the community in the protection of life, property, and environment from fires, hazardous material releases, and other life-threatening emergencies. The Department of Fire and Public Safety has fourteen stations throughout the County including ten stations on the island of Maui. The Waihee-Waiehu area is served by the Wailuku Fire Station, about 6-minute drive from the project site.

Potential Impacts and Mitigation Measures. The proposed 100% affordable housing project will generate tax revenues that provide additional funds to the County for police and fire capital facility improvements and service upgrades.

2.3.4 Schools

Existing Conditions. Maui schools are organized into complexes and complex areas. A complex consists of a high school and all of the intermediate/middle and elementary schools that flow into it. Groups of two to four complexes form a "complex area" that is under the supervision of a complex area superintendent.

The Waiehu Residential Community site is located within the State Department of Education's (DOE) Maui Complex, within the Baldwin-Kekaulike-Maui Complex-Area.

The Central Maui area is also serviced by private schools, which provide education for preschool through high school age children.

Potential Impacts and Mitigation Measures. Prior to the preparation of the Draft EA, the Applicant has consulted with the State of Hawai'i, Department of Education (DOE), about the proposed project. A response letter dated September 29, 2021, was delivered to the DOE containing the Applicant's understanding that the proposed project is in the Central Maui School Impact District and the commitment to coordinate with DOE staff to discuss executing an Educational Contribution Agreement. (**See**: Appendix 3, Early Consultation Comment Letters with Responses <u>and Appendix 11) The Applicant will contribute the required educational contribution required by the State</u>.

2.3.5 Emergency Management Agency

Existing Conditions. The Maui Emergency Management Agency has a mission to achieve community resiliency within the County of Maui by planning, preparing, and coordinating emergency management operations during disaster situations and coordinating post-disaster recovery operations. The closest shelter locations from the project site are War Memorial Gym and Maui High School — about 3 miles and 5 miles respectively.

Potential Impacts and Mitigation Measures. The proposed project is not anticipated to have an adverse impact upon existing emergency shelters or access to the identified shelter locations. Instead, the project site benefits from the proximity to the existing emergency shelters.

2.3.6 Solid Waste

Existing Conditions. The Central Maui Landfill in Puunene and the Hana landfill are the only landfills currently operating on Maui. The County provides service of residential solid waste collection from residential areas to the Central Maui Landfill (CML) which also accepts waste from private refuse collection companies. It is expected that 50 additional acres facility will be acquired for expansion before capacity of the CML is reached in 2026. The County currently maintains a construction and demolition (C&D) material recovery facility since the private C&D facility has reached capacity and is now closed.

Potential Impacts and Mitigation Measures. The proposed project is a 100% Affordable Housing consisting of approximately 752 dwelling units, retail space of approximately 17,400 square feet, and three (3) parks totaling 6.3 acres. Once developed, the Waiehu Residential Community will receive County's service of residential solid waste collection. As such, the proposed project is not anticipated to have an adverse impact upon existing solid waste facilities. Green waste will be mulched onsite when practicable. During construction, as required by County regulations, construction and demolition waste will be properly disposed.

In 2009 the Integrated Solid Waste Management Plan (ISWMP) for Maui County was updated and projected that the Central Maui Landfill will have adequate capacity to accommodate Residential and Commercial waste through the year 2026. This estimate does not take into account future increases in source reduction and waste diversion. Increases in waste diversion achieved through education, recycling, composting, and reuse programs are expected to decrease demand for landfill space and extend the life of the Central Maui Landfill beyond the currently projected closure year. The County's

Department of Environmental Management, Solid Waste Division, anticipates that additional phases of the Central Maui Landfill will be developed as needed to accommodate future waste.

Very little demolition material is expected, as the site is currently vacant. During the short term, construction activities will require the disposal of the existing onsite waste, as well as cleared vegetation and construction-related solid waste. A solid waste management plan will be coordinated with the County's Solid Waste Division for the disposal of onsite and construction-related waste material. The Applicant will work with the contractor to minimize the amount of solid waste generated during the construction of the project. The project will also provide on-site recycling opportunities in an effort to reduce solid waste entering the landfill.

This Draft EA includes a list of 201H Exemption Requests for the proposed project. An exemption from Section 8.04, Maui County Codes (MCC), Refuse Collection and Landfills, shall be granted to exempt the project from construction waste disposal permit and fees during the construction phase of the project but not long-term ongoing operations. (**See**: Appendix 10, Draft 201H Exemption List)

2.4 Infrastructure

2.4.1 Drainage

Existing Conditions. A Preliminary Engineering Report (PER) was prepared by Warren S. Unemori on May 18, 2021, for the proposed project (**See**: Appendix 5, Preliminary Engineering Report). As discussed in Section 2.1.2 of this FEA (Topography and Soils), elevations across the subject parcel range from 270 feet to 58 feet and slopes range from 6 percent to 4 percent. The PER covers the discussion of existing drainage conditions on the subject property including offsite and onsite flows.

The project site is currently undeveloped. Existing drainageways include two (2) gullies running across the subject property and the Waiehu Stream along the northwestern property line. All of these drainageways receive onsite and offsite flows before eventually converging into the main stem of the Waiehu Stream near the intersection of Kahekili

Highway and Waiehu Beach Road. Figure 3-2 of the PER exhibits a map of the existing drainageways running across the subject property and the final discharge into the ocean.

Offsite Flows. Existing offsite flows are received from approximately 3,600 acres of lands located above and west of the project site. Runoff from these offsite lands passes through the project site in three (3) distinct drainageways as discussed above.

Waiehu Stream drains approximately 2,854 acres of land above the subject property. The stream also conveys a 100-year storm flow of approximately 5,550 cubic feet per second (cfs) along the northern boundary of the project parcel before crossing the northeastern tip on its way across Kahekili Highway to the Ocean.

Gully 1 drains approximately 637 acres of land above the subject property and conveys an approximately 1,575 cfs storm flow at the western boundary of the project parcel. Gully 1 continues across the project parcel to an existing 48-inch culvert crossing at Kahekili Highway, then along the base of the Waiehu sand dune before crossing Waiehu Beach Road and flowing into the main stem of Waiehu Stream.

Gully 2 drains approximately 138 acres of land above the subject property and conveys an approximately 365 cfs storm flow into the subject parcel at its western (*mauka*) boundary. Gully 2 continues across the project parcel, later converges with the main stem of Waiehu Stream located upstream of the point where the Waiehu Stream crosses Kahekili Highway.

Figure 3-3 of the PER exhibits a map of the above-mentioned drainageways along with the existing flow path of the stream or gully and direction of the flow.

Onsite Flows. The existing subject property is an undeveloped land containing 238 acres. The subject property generates a 100-year storm flow of approximately 282 cfs. Flows are conveyed by the three existing drainageways across the subject property, i.e., 31 cfs running on Waiehu Stream, 13 cfs on Gully 1, and the remaining 238 cfs on Gully 2.

Figure 3-4 of the PER exhibits a map of the above-mentioned drainageways along with the existing flow path of the stream or gully and direction of flow. (**See**: Appendix 5, Preliminary Engineering Report)

Potential Impacts and Mitigation Measures. Warren S. Unemori Engineering, Inc. has prepared a drainage plan for the proposed project to mitigate surface runoff caused by seasonal storm events.

As discussed, the proposed project will only develop a portion of the subject property — the central 158-acre of land closest to Kahekili Highway to be developed as a compact residential community, while the remaining 80-acre of land will be preserved as an open space.

The drainage plan identifies the existing drainageways as Drainage Area 1 (Gully 1), Drainage Area 2 (Gully 2), and Drainage Area 3 (Waiehu Stream). After the development of the proposed project, the 100-year peak flow generated by Drainage Area 2 is expected to increase to 580 cfs — approximately 342 cfs increase over the existing flows. As Drainage Areas 1 and 3 will not be developed, the flows are expected to remain at the pre-development levels, i.e., 13 cfs and 31 cfs respectively. Figures 3-5 and 3-6 of the PER exhibit the drainage plan and the system improvements.

Table 4 summarizes the post-development drainage condition before the mitigation measures applied.

Table 4. Increase in Runoff Attributable to the Development of Waiehu Residential Community

Drainage Area	Pre-Development Flow	Post-Development Flow before Mitigation	Net Change
Onsite	282 cfs	624 cfs	+342 cfs

(**See**: Appendix 5, Preliminary Engineering Report)

Runoff from the offsite lands and the undeveloped onsite lands preserved as open space — will pass through the project parcel and be conveyed in the open drainageways — in the manner allowed under Maui County's Storm Drainage Rules.

Runoff from the developed project site will be captured by a conventional urban storm drainage system consisting of curbside drain inlets and underground drain pipes installed within the roads which will collect runoff from rooftops, yards, and pavements. Eventually, runoff will be conveyed into one of the two stormwater detention basins constructed within the development for treatment. These basins will perform two functions as follows.

- Suppressing the increase in the peak flow attributable to the development to ensure that flows released downstream remain at or below pre-development levels — so, it will not cause flooding downstream; and

- Providing the "detention-based" treatment required by the Maui County Department of Public Works to remove trash and sediment — while also keeping the quality of stormwater released downstream at acceptable levels.

It is expected that — with the onsite stormwater treatment through detention basins — the proposed Waiehu Residential Community will be able to fully mitigate its impact on downstream drainage conditions.

2.4.2 Roadways

Existing Conditions: A Traffic Impact Analysis Report (TIAR) was prepared by Austin, Tsutsumi & Associates, Inc. (ATA) May 20, 2021, to evaluate the potential traffic impacts resulting from the proposed Waiehu Residential Community project (**See**: Appendix 9, Traffic Impact Analysis Report).

The Waiehu area in the immediate vicinity of the project site is largely comprised of single-family homes with a few community parks. This area is served by Waiehu Beach Road and Kahekili Highway. These two regional roadways provide access to schools and commercial areas in Kahului and Wailuku.

During the morning peak hour, as residents leave for work and school, southbound Waiehu Beach Road experiences extensive queueing with traffic from the Waiehu Beach Road/Eha Street intersection.

As a result of the queue spillback along Waiehu Beach Road, right-turning movements from side streets turning onto southbound Waiehu Beach Road — can experience slower progression or blockages, resulting in varying lengths of side street queues. However, these right-turn vehicles were also observed to filter into the Waiehu Beach Road queue slowly but consistently — which helped to process lengthy side street queues. The congestion along Waiehu Beach Road generally lasted for about an hour and dissipated completely by 8:00 AM.

In addition, during the AM peak period (roughly 7:15 to 7:45 AM), southbound traffic along Kahekili Highway was observed to queue from the Happy Valley area — and extend to between Puohala Road and Makaala Drive. By 8:00 AM, all queues had dissipated. The length of time in queue can vary between 4 to 8 minutes. No persistent queueing was observed along Kahekili Highway or Waiehu Beach Road during the PM peak hour.

Main Street experiences relatively slow-moving stop-and-go traffic conditions — due to on-street parking stalls, pedestrian crossing, and numerous businesses and driveways throughout the stretch in the study area.

The following roadways were analyzed as part of the TIAR analysis.

Central Avenue is a north-south, two-way, two-lane County roadway. This road begins to the north at its intersection with Mill Street and continues southward until its intersection with Main Street.

Church Street is currently a southbound, one-way, single-lane County roadway. This road begins to the north at its intersection with Waikahe Trail and extends to the south, terminating at its T-intersection with Kaohu Street. Marked curbside parking is available. As part of roadway improvements from the Wailuku Civic Complex (WCC), Church Street is under ongoing modification to provide two-way traffic between Vineyard Street and Main Street.

Eha Street is a two-way, two-lane, east-west County roadway providing access to commercial, industrial, and residential areas. Eha Street begins to the west at its intersection of Wili Pa Loop/Imi Kala Street and continues eastward until its intersection with Waiehu Beach Road.

High Street is a north-south, two-way, two-lane, County roadway. This road begins to the north at its intersection with Vineyard Street and continues southward until its intersection with Keanu Street — where it also transitions to Honoapiilani Highway. The posted speed limit is 20 mph.

Imi Kala Street is a north-south, two-way, two-lane County roadway. This road begins to the north at its intersection with Wili Pa Loop/Eha Street and extends to the south until it terminates at its T-intersection with Mill Street. The posted speed limit is 20 mph.

Kahekili Highway is a two-way, two-lane roadway with segments in both County and State jurisdiction. The County jurisdiction starts in the Happy Valley area at its intersection with Market Street/Mokuhau Road/Piihana Road and extends northward towards Waiehu. The roadway changes from County to State jurisdiction in the area of the Kahekili Highway/Waiehu Beach Road intersection and continues northward — generally following the coastline until it transitions to Honoapiilani Highway near the Kapalua region.

Kahului Beach Road is a north-south, two-way, four-lane State roadway. This road begins to the north at its intersection with Waiehu Beach Road. It extends to the east until its intersection with Kaahumanu Avenue — where it continues as Kane Street. The posted speed limit is 35 mph.

Kamaile Street is an east-west, two-way, two-lane County roadway. This road begins to the east at its T-intersection with Kahekili Highway and extends southwest until it terminates in a dead end shortly after Maunalei Place. The posted speed limit is 20 mph.

Kaniela Street is a north-south, two-way, two-lane County roadway. This road begins to the north at its T-intersection with Mill Street and extends to the south until it terminates at a T-intersection with Lower Main Street. There is no posted speed limit along Kaniela Street.

Lower Waiehu Beach Road is a two-way, two-lane County roadway. This road begins to the south at its intersection with Waiehu Beach Road/Wailupe Drive and extends northeast, generally following the coastline until it terminates at Waiehu Beach Park.

Main Street is an east-west, two-way, two-lane State roadway providing connectivity to commercial areas in Wailuku. Main Street begins to the east at its intersection with Lower Main Street and Kaahumanu Avenue and continues westward where it splits into Iao Valley Road and West Alu Road. Marked curbside parking is available along Main Street between Central Avenue and High Street.

Makaala Drive is a two-way, two-lane County roadway providing connection to residences in the Waiehu area. This roadway begins to the west with its intersection with Kahekili Highway and continues eastward until its intersection with Waiehu Beach Road. The posted speed limit is 20 mph.

Market Street is a north-south, two-way, two-lane County roadway. This road begins to the north at its intersection with Kahekili Highway/Piihana Road/Mokuhau Road and extends southward until its intersection with Main Street. Market Street is a two-way, two-lane roadway between its northern terminus and Vineyard Street, then transitions into a one-lane, one-way northbound only roadway between Vineyard Street and Main Street. Market Street serves many businesses and homes in Wailuku Town and provides regional access to Waihee/Waiehu via Kahekili Highway.

Mill Street is an east-west, two-way, two-lane County roadway. This road begins to the west at its intersection with Market Street and extends westward until it terminates to the east at its intersection with Lower Main Street. Mill Street serves a number of businesses and homes in Wailuku.

Mission Street is a north-south, two-way, two-lane local County roadway. This road begins to the north at its T-intersection with Mill Street and extends to the south — until it terminates at its T-intersection with Lower Main Street. The posted speed limit is 20 mph.

Mokuhau Road is an east-west, two-way, two-lane local County roadway. This road begins to the east at its intersection with Kahekili Highway/Piihana Road/Market Street and extends westward until it terminates in a cul-de-sac near the Konko Mission of Wailuku.

Piihana Road is an east-west, two-way local County roadway. This road begins to the west at its intersection with Kahekili Highway/Mokuhau Road/Market Street and extends eastward for approximately one mile — where it terminates in a cul-de-sac. Piihana Road serves mostly residential and agricultural uses.

Puuohala Road is an east-west, two-way, two-lane local County roadway. This road begins to the east at its T-intersection with Kahekili Highway and extends to the west — until it terminates in a dead end shortly after Maoi Street. The posted speed limit is 20 mph.

Vineyard Street is an east-west, two-way, two-lane County roadway. This road begins to the east as a cul-de-sac near the Vineyard Street/Mission Street intersection and extends westward — until it transitions into Ilina Street about 600 feet west of Uhiwai Place.

Waiehu Beach Road is generally a north-south, two-way County roadway. This road begins to the south at its intersection with Kahului Beach Road and Lower Main Street — and extends northward and terminates at its intersection with Kahekili Highway near the Waiehu Stream. The posted speed limit is 30 mph.

Wailupe Drive is a two-way, two-lane local County roadway providing access for residences in Waiehu Heights. Wailupe Drive begins to the east at its intersection with Waiehu Beach Road and Lower Waiehu Beach Road — and extends westward and southwest until it terminates in a cul-de-sac near its intersection with Olena Street.

Existing Traffic Volumes

Due to the restrictions enforced during the COVID-19 pandemic, traffic volumes throughout the State were significantly lower than normal levels. Therefore, this study utilized the turning movement counts that were collected from 2016 to 2019 — before impacts of the pandemic. Based on early consultation with the State of Hawai'i Department of Transportation (HDOT) and County Department of Public Works (DPW), the use of historic counts was acceptable to use as a basis for existing conditions. A growth rate of 1 percent per year along Kahekili Highway, Waiehu Beach Road, Main Street, and High Street was applied to increase regional traffic counts from 2016 to 2019 to constitute the Existing 2021 volumes analyzed in this study.

Previous turning movement counts were not available at five (5) of the study intersections and counts. Therefore, data for these study intersections recorded in February 2021 — when traffic volumes had not yet returned to pre-pandemic conditions. To adjust these counts to pre-pandemic levels, traffic counts were concurrently taken at the Waiehu Beach Road/Makaala Drive intersection in 2021. The result was compared to the pre-pandemic 2016 volumes for that intersection to determine the calculated rate increase that should be applied to the five intersections counted in 2021.

For purposes of this study, the Kahekili Highway and Waiehu Beach Road corridors are assumed to be in the north-south direction, except at the Kahekili Highway/Waiehu Beach Road intersection — where the Waiehu Beach Road approach is designated in the westbound direction.

1. **Kahekili Highway/Waiehu Beach Road** (Tuesday, May 1, 2018)
2. **Kahekili Highway/Makaala Drive** (Tuesday, May 1, 2018)
3. **Waiehu Beach Road/Makaala Drive** (Tuesday, September 20, 2016)
4. **Kahekili Highway/Kamaile Street** (Thursday, February 18, 2021)
5. **Kahekili Highway/Puuohala Road** (Thursday, February 18, 2021)
6. **Market Street/Kahekili Highway/Piihana Road** (Tuesday, September 20, 2016)
7. **Waiehu Beach Road/Eha Street/Nukuwai Place** (Thursday, May 3, 2018)
8. **Lower Main Street/Kahului Beach Road/Waiehu Beach Road** (Thursday, May 3, 2018)
9. **Market Street/Mill Street** (Tuesday, May 1, 2018)

10. **Central Avenue/Mill Street** (Tuesday, May 1, 2018)
11. **Kaniela Street/Mill Street** (Thursday, February 18, 2021)
12. **Mission Street/Mill Street** (Thursday, February 18, 2021)
13. **Imi Kala Street/Wili Pa Loop/Eha Street** (Thursday, February 18, 2021)
14. **Mill Street/Imi Kala Street** (Thursday, February 18, 2021)
15. **Market Street/Vineyard Street** (Thursday, February 2, 2017)
16. **Main Street/High Street** (Tuesday, May 1, 2018)
17. **Church Street/Main Street** (Thursday, February 2, 2017)
18. **Market Street/Main Street** (Thursday, February 2, 2017)
19. **Main Street/Central Avenue** (Tuesday, May 8, 2018)
20. **Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road (Day, Date)**

Multimodal Facilities

Sidewalks are provided along the majority of roadways in the adjacent Waiehu Heights subdivision, although there is minimal connectivity to nearby Wailuku or Kahului. There are currently no sidewalks provided along Kahekili Highway in the study area.

HDOT completed the Bike Plan Hawai'i Master Plan. This Bike Master Plan identifies existing and proposed bicycle facilities. The following locations provide existing bike facilities.

- Waiehu Beach Road between Kahekili Highway and Kahului Beach Road;
- Kahekili Highway between Waiehu Beach Road and Piihana Road;
- Kaahumanu from Lunalilo Street, through to Hana Highway; and
- Kanaloa Avenue from Kahului Beach Road, through to Mahalani Street.

The Bike Plan Hawai'i Master Plan also identifies the following locations as future signed-shared roadways in the vicinity of the proposed project.

- Main Street between High Street and Kaahumanu Avenue; and
- Market Street between Main Street and Piihana Road.

Figure 3.2 of the TIAR depicts a map of the existing and proposed pedestrian and bicycle facilities.

The Maui Bus system offers several routes that connect the major areas in Maui. The following are several routes in the vicinity of the proposed project.

- **Waihee Villager Route 8** runs between Queen Kaahumanu Center in Kahului and the Richard Pablo Caldito Sr Park — via Kahului Beach Road, Waiehu Beach Road, and Kahekili Highway; and
- **Wailuku Loop Routes 1 and 2** serve a number of locations throughout Waiale, Waikapu, and Wailuku. There are several stops for both routes along Makaala Drive and Waiehu Beach Road — these stops are in close proximity with the project site.

However, the nearest bus stop — in the vicinity of the proposed project — is located along Kahekili Highway about 0.20 miles north of the Kahekili Highway/Waiehu Beach Road intersection. Figure 3.3 of the TIAR depicts a map of the transit routes.

Existing Intersection Operations

Operating conditions at an intersection by approach are expressed as a qualitative measure known as Level of Service (LOS) ranging from A to F. LOS A represents free-flow operations with low delay, while LOS F represents congested conditions with relatively high delay. The overall intersection LOS is a weighted average of the LOS of individual traffic movement groups.

The observations and analysis described below are based on prevailing observations during the time at which the data was collected. Hereinafter, observations that are expressed as ongoing and current shall represent the conditions that prevailed at the time at which the data was collected.

1. Kahekili Highway/Waiehu Beach Road

All movements operate at LOS C or better across both peak hours. All approaches are currently single shared lanes. The following operational observations were made:

- Relatively low westbound left-turn peak traffic of only 36 left-turners during the AM peak hours of traffic and 31 during the PM peak hours of traffic — that infrequently blocked westbound right-turn progression;
- Low conflicting northbound traffic provided frequent gaps in traffic — allowing multiple westbound right-turn vehicles and southbound left-turn vehicles to proceed unimpeded;

- No lengthy queues were observed along the southbound Kahekili Highway approach due to low conflicting northbound traffic;
- Limited conflicts and delays for westbound right-turn vehicles with opposing northbound through vehicles due to lengthy gaps;
- Southbound left-turn vehicles were observed to frequently slow down or stop to allow the more critical westbound left-turn vehicles to proceed through the intersection — thereby reducing overall westbound approach delays and obstructions for right-turn vehicles. Westbound approach queues along Waiehu Beach Road were manageable, extending about 250 to 350 feet long at its maximum.

Although LOS operations are acceptable and queuing was observed to be moderate during the heavier AM peak hour, a signal would be warranted assuming the full westbound left-turn/right-turn lane volume is included in the warrant due to the shared lane approach. However, a signal would not be warranted if separate westbound left-turn and right-turn lanes were provided, and only westbound left-turn volumes are included in the warrant.

Therefore, in lieu of a signal, consideration should be made to first widen the westbound Waiehu Beach Road approach to provide separate left-turn and right-turn lanes. Widening the westbound approach will store the relatively low westbound left-turn movement of only 30 to 35 vehicles — to allow the heavier westbound right-turn movement progression through the intersection. As discussed above, observations indicate little conflicts and delays for westbound right-turners with opposing northbound through vehicles due to lengthy gaps in northbound flows.

2. Kahekili Highway/Makaala Drive

All movements operate adequately at LOS C or better across both peak hours. When southbound queues along Kahekili Highway extended beyond Makaala Drive, southbound vehicles allowed westbound left-turn vehicles to proceed through the intersection. As a result, westbound left-turn queues were observed to extend by only 5 to 6 cars at its maximum.

3. Waiehu Beach Road/Makaala Drive

All movements at the Waiehu Beach Road/Makaala Drive intersection operate at LOS D or better across both peak hours — except for the eastbound right-turn movement, operating at LOS F during the AM peak hour — due to high southbound Waiehu Beach Road traffic conflicting with a high 417-vehicle right-turn volume from Makaala Drive.

Extensive queueing during the AM peak hour along Waiehu Beach Road stemming from the Waiehu Beach Road/Eha Street intersection resulted in the eastbound Makaala Drive right-turn movement experiencing slower progression — however, vehicles were able to consistently filter into the slow-moving southbound Waiehu Beach Road queue. Queues along Makaala Drive ranged from 10 to 40 vehicles long — and at its longest, requires 2 to 4 minutes to turn onto Waiehu Beach Road.

The northbound left-turn movement volume along Waiehu Beach Road exceeds 300 vehicles during the PM peak hour; however, observations indicate that frequent gaps in traffic resulted in minimal delays and queues. Left-turn queues remained within the left-turn storage lane — with queues only stacking from 1 to 3 vehicles at a time.

4 & 5. Kahekili Highway/Kamaile Street and Kahekili Highway/Puuohala Road
All movements operate adequately at LOS C or better across both peak hours.

6. Market Street/Kahekili Highway/Piihana Road
All movements at this intersection operate at LOS D or better across both peak hours — except for the westbound Piihana Road approach operating at LOS E during the AM peak hour despite significantly under capacity. Due to the skewed alignment of this intersection, the Piihana Road approach is provided with limited sight-distance to conflicting southbound traffic along Kahekili Highway.

7. Waiehu Beach Road/Eha Street/Nukuwai Place
During the AM peak hour, the Eha Street and Nukuwai Place approaches and Waiehu Beach Road northbound left-turn and southbound through movements operate at LOS F — with the southbound through movement operating over capacity. Turning movements suggest that a significantly high volume — about one-third of the total southbound Waiehu Beach Road volume during the AM peak hour — turns right onto Eha Street.

An existing right-turn storage lane is provided; however, relatively short (150 feet long) due to the constraints of the upstream bridge over Wailuku River — limiting the lengthening of this right-turn pocket. This short right-turn lane along Waiehu Beach Road leads to two (2) issues during the AM peak hour — contributing to the lengthy AM queues along Waiehu Beach Road as follows.

- Forcing these right-turning vehicles to decelerate in the through lane and slowing progression along Waiehu Beach Road and through the intersection; and

- When given a red light, southbound through vehicles will queue up in the through lane — blocking access to the right-turn lane. When this occurs, right-turning vehicles will be locked up in the same queue as through vehicles — further expanding the queues along Waiehu Beach Road.

8. Lower Main Street/Kahului Beach Road/Waiehu Beach Road

All movements operate at LOS D or better across both peak hours. During the PM peak hour, the westbound right-turn volume from Kahului Beach Road to Waiehu Beach Road is significantly high (821 PM peak right-turns) — primarily due to commuting Waiehu/Waihee residents returning home from work.

The westbound approach is currently a shared westbound through/right-turn lane, so westbound through vehicles frequently block the heavy westbound right-turn movement from accessing the slip lane — resulting in queueing in the outer westbound lane that can extend through the Kahului Beach Road/Kanaloa Avenue intersection. The queue spillback is generally confined to the outer lane — and progression along Kahului Beach Road and Kanaloa Avenue is maintained by the inner through lane.

9. Market Street/Mill Street

During the AM peak hour, the lengthy southbound congestion occurring along Market Street — primarily stem from this intersection. Turning movements suggest that a significantly high volume — about half of the total southbound Market Street approach volume in the AM peak hour — turns left onto Mill Street.

An existing left-turn storage lane is provided; however, relatively short (100 feet long). This short left-turn lane along Market Street locks up southbound left-turn vehicles in the same queue as through vehicles, lengthening the queues beyond Happy Valley.

The westbound Mill Street left-turn movement operates at LOS F during the AM and PM peak hour — and the westbound right-turn movement operates at LOS E during the PM peak hour. Observations show that mainline traffic along Market Street frequently stopped to allow the westbound left-turners to proceed — resulting in significantly less delays and queues. Average westbound approach queues were relatively minimal with only 1 to 4 vehicles and occasional maximum queues of 5 to 7 vehicles.

10. Central Avenue/Mill Street

All movements operate at LOS C or better across both peak hours — except for the northbound approach during the PM peak hour operating at LOS E despite significantly under capacity.

The left and right-turn movements into Central Avenue towards Main Street and the right turns out of Central Avenue towards Imi Kala Street are relatively high — about 200 vehicles during the AM and PM peak hours.

All approaches are shared lane approaches with no storage lanes. Queues can vary based on platoons of conflicting vehicles; however, no consistent congestion was observed.

11 & 12. Kaniela Street/ Mill Street and Mission Street/ Mill Street
All movements operate at LOS C or better across both peak hours.

13. Imi Kala Street/Eha Street/Wili Pa Loop
The southbound Imi Kala Street approach currently ends in a stub-out only serving the driveway of a small medical building. Therefore, turning volumes into and out of the southbound approach are minimal — less than 15 vehicles during each of the AM and PM peak hours.

Volumes are also relatively low on Wili Pa Loop primarily serving various office/industrial uses — and Eha Street serving a mix of residential/industrial/office uses. As a result, all movements operate at LOS B or better across both peak hours.

14. Imi Kala Street/Mill Street
The Mill Street/Imi Kala intersection is a T-intersection serving relatively high turning volumes — due to various of businesses and residences along Wili Pa Loop and Eha Street. Despite the high volumes, the eastbound left-turn movement operates at LOS A across both peak hours and the southbound right-turn movement operates at LOS C or better across both peak hours — due to relatively low conflicting westbound through volumes along Mill Street. The southbound left-turn movement operates at LOS F during both peak hours despite under capacity. Signal warrant suggests that a signal is not warranted under existing conditions.

15. Market Street/Vineyard Street
This four-way stop controlled intersection operates adequately with all movements at LOS D or better except for the northbound approach during the PM peak hour — operating at LOS E and under capacity conditions. Based on AM observations, southbound traffic

occasionally spilled back into the Market Street/Mill Street intersection — partly contributed to heavy AM congestion on Kahekili Highway. Observations indicate that northbound queues can occur but vary in length — due to on-street parking (some parallel parking), pedestrian crossing, and generally slow-moving traffic less than 10 mph.

16. Main Street/High Street

All movements operate at LOS C or better across both peak hours. During both peaks, southbound traffic can queue back from Main Street to Vineyard Street in part, due to the single shared lane approach. Traffic along the northbound approach varies during the AM peak hour due to commuter traffic and school related traffic.

17. Church Street/Main Street

All movements operate at LOS C or better across both peak hours. The north leg of the intersection will become a two-way street and a future signal is planned at this intersection as part of improvements for the WCC.

18. Market Street/Main Street

All movements operate at LOS A across both peak hours — except for the northbound approach operating at LOS E during the AM and PM peak hours — primarily due to the coordinated signal timings which favor progression along Main Street. All movements on the northbound approach remain under capacity during the AM and PM peak hours.

19. Main Street/Central Avenue

All movements at this intersection operate at LOS D or better across both peak hours — except for the southbound left-turn movement operating at LOS E during the AM peak hour — due to the coordinated signal timings which favor progression along Main Street. Queues along Central Avenue can spill back to the nearby Vineyard Street in the southbound direction for portions of the AM and PM peak hour periods.

20. Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road

During the AM and PM peak hours, the eastbound and westbound stop-controlled movements along Wailupe Drive and Lower Waiehu Beach Road operate at LOS E/F — however, at under capacity conditions.

During the AM peak hour, traffic along Waiehu Beach Road was observed to queue beyond the Waiehu Beach Road/Wailupe Drive/Waiehu Beach Road intersection. When this occurs, right-turning movements from Wailupe Drive turning onto southbound Waiehu

Beach Road can experience slower progression — however, they are consistently filtered into the slow-moving Waiehu Beach Road queue.

Table 5 displays the existing conditions Level of Service (LOS) for each signalized and unsignalized intersection.

Table 5. Existing Conditions Level of Service (LOS)

Intersection	Existing 2021 Conditions					
	AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kahekili Hwy & Waiehu Beach Rd						
WB LT/RT	23.4	0.64	C	17.6	0.57	C
SB LT	8.5	0.25	A	8.6	0.20	A
OVERALL	8.6	-	-	8.4	-	-
2: Kahekili Hwy & Makaala Dr						
WB LT	21.6	0.41	C	13.5	0.18	B
WB RT	9.5	0.06	A	10.2	0.01	B
SB LT	7.9	0.07	A	8.2	0.01	A
OVERALL	5.0	-	-	2.1	-	-
3: Waiehu Beach Rd & Makaala Dr						
NB LT	9.3	0.11	A	10.0	0.32	B
EB LT	16.7	0.02	C	30.4	0.10	D
EB RT	55.5	0.94	F	15.1	0.38	C
OVERALL	16.8	-	-	4.1	-	-
4: Kahekili Hwy & Kamaile St.						
NB LT	8.5	0.02	A	7.8	0.03	A
EB LT/RT	13.1	0.11	B	12.1	0.08	B
OVERALL	1.1	-	-	1.2	-	-
5: Kahekili Hwy & Puuohala Rd						
NB LT	8.9	0.06	A	8.0	0.09	A
EB LT/RT	15.5	0.30	C	10.9	0.11	B
OVERALL	2.7	-	-	1.9	-	-
6: Market St/Kahekili Hwy & Piihana Rd						
NB LT	9.4	0.04	A	7.9	0.04	A
EB LT/TH/RT	18.7	0.17	C	11.9	0.09	B
WB LT/TH/RT	44.6	0.44	E	29.4	0.26	D
SB LT	7.9	0.00	A	8.9	0.01	A
OVERALL	3.5	-	-	2.3	-	-
7: Waiehu Beach Rd & Eha St/Nukuwai Pl.						
NB LT	105.2	0.87	F	15.4	0.29	B
NB TH/RT	5.8	0.29	A	19.6	0.78	B
EB LT/TH	106.4	0.71	F	30.0	0.70	C
EB RT	85.6	0.02	F	18.8	0.05	B
WB LT/TH/RT	86.3	0.08	F	18.4	0.01	B
SB LT	5.1	0.00	A	0.0	0.00	A
SB TH	79.7	1.07	F*	23.9	0.58	C
SB RT	9.1	0.35	A	19.1	0.29	B
OVERALL	52.2	-	D	22.5	-	C

Intersection	Existing 2021 Conditions					
	AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
8: Lower Main St/Kahului Beach Rd & Waiehu Beach Rd						
EB LT	16.0	0.24	B	16.9	0.29	B
EB TH	11.2	0.39	B	6.7	0.37	A
WB TH	24.8	0.80	C	19.3	0.80	B
WB TH/RT	25.5	0.81	C	22.8	0.85	C
SB LT/RT	29.8	0.82	C	37.5	0.77	D
OVERALL	22.9	-	C	19.7	-	B
9: Market St & Mill St.						
WB LT	191.8	0.75	F	64.3	0.40	F
WB RT	12.5	0.25	B	36.3	0.78	E
SB LT	10.8	0.43	B	11.1	0.30	B
OVERALL	8.3	-	-	10.6	-	-
10: Central Ave & Mill St.						
NB LT/RT	19.9	0.4	C	35.1	0.66	E
WB LT	10.4	0.3	B	9.2	0.24	A
OVERALL	4.9	-	-	7.8	-	-
11: Kaniela St. & Mill St.						
NB LT/RT	16.6	0.2	C	17.9	0.20	C
WB LT	8.8	0.0	A	8.4	0.02	A
OVERALL	1.4	-	-	1.4	-	-
12: Mission St. & Mill St.						
NB LT/RT	15.9	0.3	C	19.8	0.33	C
WB LT	8.8	0.1	A	8.6	0.08	A
OVERALL	2.2	-	-	2.6	-	-
13: Imi Kala St. & Eha St.						
NB LT	10.1	0.20	B	8.9	0.06	A
NB TH/RT	8.7	0.22	A	9.4	0.32	A
EB LT/TH/RT	8.2	0.11	A	8.1	0.11	A
WB LT/TH/RT	10.4	0.33	B	9.8	0.27	A
SB LT/TH/RT	8.2	0.02	A	8.3	0.02	A
OVERALL	9.5	-	A	9.3	-	A
14: Mill St. & Imi Kala St.						
EB LT	8.8	0.30	A	8.8	0.29	A
SB LT	59.2	0.42	F	129.0	0.91	F
SB RT	12.3	0.35	B	15.5	0.54	C
OVERALL	7.4	-	-	16.0	-	-
15: Market St & Vineyard St						
NB LT/TH/RT	18.8	0.55	C	43.1	0.86	E
EB LT	17.9	0.48	C	28.6	0.70	D
EB TH	11.0	0.10	B	13.4	0.27	B
WB TH/RT	15.5	0.39	C	17.5	0.42	C
SB LT	11.1	0.12	B	12.4	0.12	B
SB RT	25.0	0.75	C	19.4	0.58	C
OVERALL	19.7	-	C	27.5	-	D

Intersection	Existing 2021 Conditions					
	AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
16: Main St & High St						
NB LT	12.7	0.09	B	14.2	0.14	B
NB TH	14.0	0.37	B	16.4	0.55	B
NB RT	12.9	0.18	B	13.7	0.16	B
EB LT	15.0	0.02	B	17.3	0.04	B
EB TH/RT	17.6	0.46	B	19.9	0.48	B
WB LT	10.6	0.45	B	12.0	0.59	B
WB TH/RT	7.1	0.11	A	8.0	0.17	A
SB LT/TH/RT	16.3	0.61	B	18.1	0.66	B
OVERALL	13.9	-	B	15.2	-	B
17: Church St. & Main St						
WB LT	8.3	0.04	A	8.4	0.02	A
SB LT	20.0	0.11	C	23.2	0.30	C
SB TH/RT	14.0	0.33	B	12.4	0.20	B
OVERALL	3.2	-	-	3.2	-	-
18: Market St & Main St						
NB LT/TH	70.1	0.82	E	64.7	0.80	E
NB RT	56.2	0.01	E	52.3	0.01	D
EB LT	3.0	0.13	A	3.1	0.18	A
EB TH	2.7	0.26	A	2.9	0.30	A
WB TH	5.4	0.35	A	5.3	0.33	A
WB RT	3.8	0.07	A	4.1	0.10	A
OVERALL	11.3	-	B	10.2	-	B
19: Main St & Central Ave						
EB LT	12.6	0.13	B	11.1	0.17	B
EB TH	12.0	0.30	B	10.8	0.43	B
WB TH	18.3	0.46	B	19.2	0.64	B
WB RT	14.1	0.17	B	12.5	0.17	B
SB LT	65.2	0.92	E	40.9	0.90	D
SB RT	39.0	0.04	D	18.5	0.07	B
OVERALL	30.3	-	C	22.4	-	C
20: Waiehu Beach Rd & Wailupe Dr/Lower Waiehu Beach Rd						
NB LT	8.3	0.10	A	8.6	0.18	A
EB LT/TH	23.1	0.20	C	37.9	0.16	E
EB RT	12.5	0.32	B	11.3	0.21	B
WB LT/TH	90.6	0.82	F	149.0	0.90	F
WB RT	9.8	0.02	A	10.8	0.01	B
SB LT	7.9	0.00	A	8.4	0.02	A
OVERALL	13.9	-	-	12.7	-	-

* denotes overcapacity conditions

Potential Impacts and Mitigation Measures. By the Year 2030, the following developments — excluding the proposed project — are expected to be completed and occupied in the vicinity of the study intersections.

- **Boys & Girls Clubhouse** proposes a two-story clubhouse to replace the existing covered basketball court adjacent to the Paukukalo Community Center in Waiehu.

- **Wailuku Civic Complex (WCC)** proposes infrastructure improvements along Church Street and Vineyard Street as part of phase 1A. Phase 1B includes a new multi-level parking. Phase 2 of WCC is planned to construct a civic building and plaza; however, remained uncertain due to funding concerns.

  As part of the WCC project, the existing parking lot access on Vineyard Street will be removed and the existing two-way driveway at Market Street and Pili Street intersection will be converted to provide entry only. In addition, Church Street will be converted from its existing one-way, one-lane southbound roadway into a two-way, two-lane roadway between Main Street and Vineyard Street.

  Despite funding has not yet been allocated for the completion of all phases, to remain conservative, all phases of WCC were assumed to be constructed by Year 2030 for purposes of this TIAR.

- **Waiehu Affordable Housing** proposes to construct a 120-unit affordable housing development on a roughly 13-acre site located in Waiehu — east of Kahekili Highway and south of Waiehu Beach Road — directly across from the proposed project site. The project will also include a 3,000 square foot (SF) non-profit building and a 3,600 SF community center.

In addition, there are several roadway improvements planned by the Maui Metropolitan Planning Organization. The plan is documented as the Hele Mai Maui Long Range Transportation Plan 2040 dated December 2019 (hereinafter referred to as "Hele Mai Maui LRTP 2040 Plan"). The Hele Mai Maui LRTP 2040 Plan identifies various long-range transportation improvements for the island of Maui — including improvements previously identified as future planned, programmed, or funded improvements by Maui County or The State of Hawai'i. The Hele Mai Maui LRTP 2040 Plan identifies several improvements in the Study Area as follows.

- **Mill Street Pavement Reconstruction.** Pavement along Mill Street is planned to be reconstructed. No widening capacity improvements, additional lanes, or traffic control

changes are planned. Therefore, it will not impact vehicular operational conditions on Mill Street. Future intersection improvements and a possible signal have been previously identified at the Mill Street/Imi Kala Street Intersection; however, it is not planned as part of the reconstruction, nor is it currently budgeted for any future County-led improvement.

- **Imi Kala Street Extension & Bridge Improvement (Phase I).** This regional improvement would provide a new paved roadway between Kahekili Highway to the north and the existing Imi Kala Street/Wili Pa Loop/Eha Street intersection to the south. The existing Imi Kala Bridge will also need to be reconstructed to meet the traffic demands.

  These improvements will collectively be referred to as "Imi Kala Street Extension & Bridge Improvements" and is planned to alleviate some of the traffic congestion along Kahekili Highway and Waiehu Beach Road.

  The Imi Kala Street Extension & Bridge Improvements were previously tied to the conditions of approval for the former Hale Mua development. As a result, this TIAR analyzes the WITH and WITHOUT Imi Kala Street Extension & Bridge Improvements for both Base and Future Year conditions.

- **Imi Kala Street Extension (Phase II).** This improvement is proposed by Maui County and would provide a new paved road from the existing Imi Kala Street/Mill Street intersection and traverse south, adjacent to St. Anthony School, terminating at the south end at Lower Main Street. Based on discussions with County DPW, there is currently no time frame for completion of this improvement; therefore, not included in this TIAR.

Base Year 2030 Analysis (WITHOUT Imi Kala Street Extension & Bridge Improvements)

The ambient traffic growth and trips generated by background developments are anticipated to increase traffic by approximately 110 vehicles along Kahekili Highway and approximately 150 to 200 vehicles along Waiehu Beach Road during each of the AM and PM peak hours in the vicinity of the project site. Based on these increases, AM queueing along both Kahekili Highway and Waiehu Beach Road are expected to persist through the Base Year Condition. All intersections will continue operating adequately similar to existing conditions, except for the following.

1. Kahekili Highway/Waiehu Beach Road

Due to volume increases from defacto growth and trips generated by background projects, the westbound movement is anticipated to slightly worsen from LOS C to LOS F during the AM peak hours and from LOS C to LOS D during the PM peak hours — despite the movement will continue to operate under capacity.

Observation of existing conditions showed that vehicles along mainline Kahekili Highway sometimes stopped in the travel way to yield to westbound left-turn vehicles. It is anticipated that such behavior will continue in the Base Year scenario — and the delay for the westbound approach may be lower than what is projected in Synchro analysis.

A signal would be warranted with Base Year volumes assuming the full westbound left-turn/right-turn lane volume is included in the warrant — due to the shared lane approach. However, a signal would not be warranted if separate westbound left-turn and right-turn lanes were provided, and only westbound left-turn volumes are included in the warrant.

If separate right and left-turn lanes were installed, the critical westbound left-turn movement is anticipated to continue operating at LOS F(D) but will continue to serve a relatively low volume of only 40 to 50 peak vehicles. With the westbound right-turn and left-turns separated, the heavier right-turn movements will be able to bypass left-turn queues to continue through the intersection more efficiently. In addition, a southbound left-turn lane is warranted based on volumes and is recommended.

2. Kahekili Highway/Makaala Drive

Due to increased volumes, movements at this intersection will experienced increased delay. However, all movements are anticipated to operate at LOS D or better across both peak hours. A signal would only be warranted under the 70 percent factor; however, as LOS operations are adequate, a signal is not recommended.

3. Waiehu Beach Road/Makaala Drive

With increased volumes along Waiehu Beach Road, it is anticipated that existing congestion may worsen. During the AM peak hour, the eastbound right-turn movement is anticipated to operate at LOS F and overcapacity conditions. It is anticipated that regional congestion along Waiehu Beach Road will continue and result in intermittent progression for right-turners onto Waiehu Beach Road during heavy AM congestion times, as it did with existing conditions.

During the PM peak hour, the eastbound left-turn is anticipated to worsen to LOS E but will continue to service a low 15 peak vehicles. This movement is also provided with a median refuge lane which shall continue to reduce eastbound left-turn delays.

6. Kahekili Highway/Market Street/Mokuhau Road/Piihana Road

All movements at this intersection operate at LOS C or better across both peak hours. However, the westbound approach is anticipated to operate at LOS F and LOS E — compared to LOS E and LOS D with existing conditions — during the AM and PM peak hours, respectively. The westbound approach is anticipated to continue to service a relatively low volume of approximately 50 to 65 peak vehicles per hour and with under capacity conditions and little to no queuing.

7. Waiehu Beach Road/Eha Street/Nukuwai Place

During the PM peak hour, traffic will operate adequately, similar to existing conditions. During the AM peak hour, congestive conditions will continue to occur. All movements operating at LOS F with existing conditions will continue operating at LOS F during the Base Year.

As previously mentioned, the overcapacity conditions during the AM peak hour are primarily due to the short right-turn pocket forcing southbound right-turn vehicles to decelerate in the through lane — which limits progression through the signal when the light for the southbound approach is green, and the southbound through movement queue spillback blocking access to the right-turn pocket when the light is red.

Improvements to extend the southbound right-turn lane is difficult due to the existing bridge over Wailuku River that limits the lengthening of the right-turn pocket.

9. Market Street/Mill Street

The existing high volume of southbound left-turn vehicles combined with a relatively short left-turn pocket — resulted in extensive queue in the southbound direction stemming from this intersection. Analysis shows the westbound left-turn movement operates at LOS F and over capacity conditions during the AM peak hour.

During the PM peak hour, the westbound left turn movement operates at LOS F and the westbound right-turn movement operates at LOS F and over capacity conditions. However, observations show that mainline traffic along Market Street frequently stopped to allow left-turners to proceed, resulting in significantly less delays and queues. This behavior is

anticipated to continue with Base Year conditions and may result in lower delay than Synchro suggests.

10. Central Avenue/Mill Street

Due to increased conflicting volumes along Mill Street with Base Year conditions, it is anticipated that the northbound approach will operate at LOS F and under capacity conditions during the PM peak hour. All other movements are anticipated to operate at LOS C or better across both peak hours.

14. Imi Kala Street/Mill Street

Following the increased volumes with Base Year conditions, the southbound left-turn is anticipated to continue to operate at LOS F during the AM peak hour — and lower to LOS F and overcapacity conditions during the PM peak hour over Existing conditions. A signal is warranted with Base Year 2030 volumes. If a signal is installed, it is anticipated that all movements will operate at LOS B or better across both peak hours.

15. Market Street/Vineyard Street

During the AM peak hour, the southbound right-turn lane is anticipated to get lower from LOS C with existing conditions to LOS F with Base Year conditions. During the PM peak hour, the northbound approach and eastbound left-turn movement are anticipated to operate at LOS F and near-capacity conditions, and the southbound right-turn movement is anticipated to operate at LOS E.

A signal is warranted with Base Year 2030 volumes; however, based on discussions with Maui County, a signal may be infeasible given the narrow roadway widths and limited right-of-way.

17. Church Street/Main Street

As part of the Wailuku Civic Complex project, Church Street will be converted from the existing one-way, one-lane roadway to a two-way, two-lane roadway. In addition, all movements are anticipated to operate at LOS D or better across both peak hours — with the installation of a signal.

19. Main Street/Central Avenue

Due to the increases in volumes with Base Year conditions, it is anticipated that movements at this intersection will experience a slight increase in delay — despite all movements are anticipated to operate similarly to Existing conditions.

All movements are anticipated to operate at LOS D or better across both peak hours. However, the southbound left-turn movement is anticipated to continue to operate at LOS E during the AM peak hour as it did with existing conditions.

20. Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road

Due to increased volumes along Waiehu Beach Road, it is anticipated that the westbound shared left-turn movement will operate at LOS F and overcapacity conditions during the PM peak hour. All other movements are anticipated to operate similarly to existing conditions.

Table 6 below summarizes the Base Year 2030 LOS (WITHOUT Imi Kala Bridge Extension) at the study intersections compared to existing conditions.

Table 6. Summary of Base Year 2030 LOS (WITHOUT Imi Kala Bridge Extension)

Intersection	Existing 2021 Conditions						Base Year 2030 NO Imi Kala St. Extension Conditions No Improvements						Base Year 2030 NO Imi Kala St. Extension Conditions With Improvements					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kahekili Hwy & Waiehu Beach Rd													Mitigation: Widen to provide westbound right-turn and left-turn lanes, and southbound left-turn lane					
WB LT	-	-	-	-	-	-	-	-	-	-	-	-	63.4	0.45	F	29.4	0.27	D
WB LT/RT	23.4	0.64	C	17.6	0.57	C	57.8	0.91	F	33.1	0.80	D	-	-	-	-	-	-
WB RT	-	-	-	-	-	-	-	-	-	-	-	-	12.4	0.40	B	15.3	0.52	C
SB LT	8.5	0.25	A	8.6	0.20	A	8.9	0.29	A	8.9	0.23	A	8.9	0.29	A	8.9	0.23	A
OVERALL	8.6	-	-	8.4	-	-	17.2	-	-	13.6	-	-	7.2	-	-	8.0	-	-
2: Kahekili Hwy & Makaala Dr													Same as NO IMPROVEMENTS Conditions					
WB LT	21.6	0.41	C	13.5	0.18	B	28.9	0.52	D	15.7	0.23	C						
WB RT	9.5	0.06	A	10.2	0.01	B	9.7	0.07	A	10.8	0.05	B						
SB LT	7.9	0.07	A	8.2	0.01	A	8.0	0.08	A	8.4	0.02	A						
OVERALL	5.0	-	-	2.1	-	-	6.0	-	-	2.5	-	-						
3: Waiehu Beach Rd & Makaala Dr													Same as NO IMPROVEMENTS Conditions					
NB LT	9.3	0.11	A	10.0	0.32	B	9.7	0.13	A	10.7	0.37	B						
EB LT	16.7	0.02	C	30.4	0.10	D	18.2	0.03	C	36.3	0.12	E						
EB RT	55.5	0.94	F	15.1	0.38	C	95.7	1.07	F*	17.4	0.44	C						
OVERALL	16.8	-	-	4.1	-	-	26.6	-	-	4.2	-	-						
4: Kahekili Hwy & Kamaile St.													Same as NO IMPROVEMENTS Conditions					
NB LT	8.5	0.02	A	7.8	0.03	A	8.8	0.03	A	8.0	0.04	A						
EB LT/RT	13.1	0.11	B	12.1	0.08	B	14.4	0.13	B	13.2	0.09	B						
OVERALL	1.1	-	-	1.2	-	-	1.1	-	-	1.1	-	-						
5: Kahekili Hwy & Puuohala Rd													Same as NO IMPROVEMENTS Conditions					
NB LT	8.9	0.06	A	8.0	0.09	A	9.3	0.07	A	8.2	0.10	A						
EB LT/RT	15.5	0.30	C	10.9	0.11	B	18.3	0.37	C	11.7	0.13	B						
OVERALL	2.7	-	-	1.9	-	-	2.8	-	-	1.8	-	-						
6: Market St/Kahekili Hwy & Piihana Rd													Same as NO IMPROVEMENTS Conditions					
NB LT	9.4	0.04	A	7.9	0.04	A	10.0	0.05	A	8.1	0.04	A						
EB LT/TH/RT	18.7	0.17	C	11.9	0.09	B	22.6	0.21	C	13.0	0.12	B						
WB LT/TH/RT	44.6	0.44	E	29.4	0.26	D	79.3	0.63	F	45.3	0.39	E						
SB LT	7.9	0.00	A	8.9	0.01	A	8.1	0.01	A	9.3	0.01	A						
OVERALL	3.5	-	-	2.3	-	-	5.1	-	-	2.9	-	-						
7: Waiehu Beach Rd & Eha St/Nukuwai Pl.													Same as NO IMPROVEMENTS Conditions					
NB LT	105.2	0.87	F	15.4	0.29	B	105.5	0.87	F	18.0	0.32	B						
NB TH/RT	5.8	0.29	A	19.6	0.78	B	6.1	0.33	A	25.3	0.87	C						
EB LT/TH	106.4	0.71	F	30.0	0.70	C	106.5	0.71	F	35.7	0.74	D						
EB RT	85.6	0.02	F	18.8	0.05	B	85.3	0.02	F	21.8	0.05	C						
WB LT/TH/RT	86.3	0.08	F	18.4	0.01	B	86.1	0.08	F	21.4	0.01	C						
SB LT	5.1	0.00	A	0.0	0.00	A	5.4	0.00	A	0.0	0.00	A						
SB TH	79.7	1.07	F*	23.9	0.58	C	133.7	1.21	F*	27.6	0.64	C						
SB RT	9.1	0.35	A	19.1	0.29	B	9.5	0.36	A	20.9	0.31	C						
OVERALL	52.2	-	D	22.5	-	C	76.1	-	E	27.1	-	C						
8: Lower Main St/Kahului Beach Rd & Waiehu Beach Rd													Same as NO IMPROVEMENTS Conditions					
EB LT	16.0	0.24	B	16.9	0.29	B	28.9	0.42	C	30.6	0.46	C						
EB TH	11.2	0.39	B	6.7	0.37	A	17.0	0.41	B	8.5	0.38	A						
WB TH	24.8	0.80	C	19.3	0.80	B	29.2	0.79	C	20.0	0.76	B						
WB TH/RT	25.5	0.81	C	22.8	0.85	C	30.2	0.81	C	25.9	0.86	C						
SB LT/RT	29.8	0.82	C	37.5	0.77	D	45.2	0.85	D	69.1	0.87	E						
OVERALL	22.9	-	C	19.7	-	B	31.4	-	C	27.4	-	C						
9: Market St & Mill St.													Same as NO IMPROVEMENTS Conditions					
WB LT	191.8	0.75	F	64.3	0.40	F	378.6	1.18	F*	129.7	0.68	F						
WB RT	12.5	0.25	B	36.3	0.78	E	13.5	0.30	B	83.8	1.02	F*						
SB LT	10.8	0.43	B	11.1	0.30	B	11.4	0.45	B	12.2	0.34	B						
OVERALL	8.3	-	-	10.6	-	-	12.8	-	-	21.4	-	-						

Intersection	Existing 2021 Conditions						Base Year 2030 NO Imi Kala St. Extension Conditions No Improvements						Base Year 2030 NO Imi Kala St. Extension Conditions With Improvements					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
10: Central Ave & Mill St.													Same as NO IMPROVEMENTS Conditions					
NB LT/RT	19.9	0.42	C	35.1	0.66	E	23.2	0.48	C	57.7	0.82	F						
WB LT	10.4	0.29	B	9.2	0.24	A	10.9	0.32	B	9.6	0.26	A						
OVERALL	4.9	-	-	7.8	-	-	5.3	-	-	11.6	-	-						
11: Kaniela St. & Mill St.													Same as NO IMPROVEMENTS Conditions					
NB LT/RT	16.6	0.19	C	17.9	0.20	C	18.5	0.22	C	20.9	0.24	C						
WB LT	8.8	0.04	A	8.4	0.02	A	9.0	0.04	A	8.6	0.03	A						
OVERALL	1.4	-	-	1.4	-	-	1.4	-	-	1.4	-	-						
12: Mission St. & Mill St.													Same as NO IMPROVEMENTS Conditions					
NB LT/RT	15.9	0.27	C	19.8	0.33	C	17.6	0.30	C	23.8	0.39	C						
WB LT	8.8	0.07	A	8.6	0.08	A	9.0	0.07	A	8.9	0.09	A						
OVERALL	2.2	-	-	2.6	-	-	2.2	-	-	2.8	-	-						
13: Imi Kala St. & Eha St.													Same as NO IMPROVEMENTS Conditions					
NB LT	10.1	0.20	B	8.9	0.06	A	10.1	0.21	B	8.9	0.07	A						
NB TH/RT	8.7	0.22	A	9.4	0.32	A	8.8	0.22	A	9.6	0.33	A						
EB LT/TH/RT	8.2	0.11	A	8.1	0.11	A	8.2	0.11	A	8.1	0.11	A						
WB LT/TH/RT	10.4	0.33	B	9.8	0.27	A	10.5	0.34	B	9.9	0.28	A						
SB LT/TH/RT	8.2	0.02	A	8.3	0.02	A	8.2	0.02	A	8.3	0.02	A						
OVERALL	9.5	-	A	9.3	-	A	9.6	-	A	9.4	-	A						
14: Mill St. & Imi Kala St.													Mitigation: Monitor and install signal if warranted by future traffic growth					
EB LT	8.8	0.30	A	8.8	0.29	A	9.0	0.31	A	9.0	0.31	A	-	-	-	-	-	-
EB LT/TH	-	-	-	-	-	-	-	-	-	-	-	-	5.1	0.66	A	6.3	0.69	A
WB TH/RT	-	-	-	-	-	-	-	-	-	-	-	-	2.4	0.21	A	2.9	0.23	A
SB LT	59.2	0.42	F	129.0	0.91	F	69.3	0.46	F	194.7	1.09	F*	15.4	0.37	B	16.8	0.55	B
SB RT	12.3	0.35	B	15.5	0.54	C	12.8	0.37	B	16.6	0.57	C	14.2	0.18	B	14.7	0.24	B
OVERALL	7.4	-	-	16.0	-	-	7.6	-	-	20.2	-	-	5.1	-	A	6.8	-	A
15: Market St & Vineyard St													Same as NO IMPROVEMENTS Conditions					
NB LT/TH/RT	18.8	0.55	C	43.1	0.86	E	22.8	0.61	C	74.4	0.99	F						
EB LT	17.9	0.48	C	28.6	0.70	D	21.6	0.56	C	61.7	0.93	F						
EB TH	11.0	0.10	B	13.4	0.27	B	11.9	0.12	B	16.4	0.38	C						
WB TH/RT	15.5	0.39	C	17.5	0.42	C	18.4	0.46	C	22.5	0.51	C						
SB LT	11.1	0.12	B	12.4	0.12	B	11.7	0.14	B	13.6	0.14	B						
SB RT	25.0	0.75	C	19.4	0.58	C	59.8	0.97	F	35.9	0.79	E						
OVERALL	19.7	-	C	27.5	-	D	35.6	-	E	48.0	-	E						
16: Main St & High St													Same as NO IMPROVEMENTS Conditions					
NB LT	12.7	0.09	B	14.2	0.14	B	14.0	0.10	B	16.5	0.19	B						
NB TH	14.0	0.37	B	16.4	0.55	B	16.2	0.50	B	18.8	0.60	B						
NB RT	12.9	0.18	B	13.7	0.16	B	14.4	0.24	B	15.4	0.20	B						
EB LT	15.0	0.02	B	17.3	0.04	B	15.7	0.03	B	21.1	0.06	C						
EB TH/RT	17.6	0.46	B	19.9	0.48	B	18.8	0.53	B	25.0	0.58	C						
WB LT	10.6	0.45	B	12.0	0.59	B	11.2	0.51	B	15.0	0.70	B						
WB TH/RT	7.1	0.11	A	8.0	0.17	A	7.2	0.13	A	9.4	0.20	A						
SB LT/TH/RT	16.3	0.61	B	18.1	0.66	B	17.9	0.64	B	21.4	0.72	C						
OVERALL	13.9	-	B	15.2	-	B	15.1	-	B	18.0	-	B						
17: Church St. & Main St													Same as NO IMPROVEMENTS Conditions					
EB LT	-	-	-	-	-	-	45.9	0.46	D	47.7	0.45	D						
EB TH/RT	-	-	-	-	-	-	7.8	0.42	A	11.8	0.51	B						
WB LT	8.3	0.04	A	8.4	0.02	A	42.8	0.60	D	43.4	0.52	D						
WB TH/RT	-	-	-	-	-	-	7.9	0.49	A	11.5	0.52	B						
SB LT	20.0	0.11	C	23.2	0.30	C	-	-	-	-	-	-						
SB TH/RT	14.0	0.33	B	12.4	0.20	B	-	-	-	-	-	-						
SB LT/TH/RT	-	-	-	-	-	-	37.2	0.82	D	36.6	0.86	D						
OVERALL	3.2	-	-	3.2	-	-	14.5	-	B	18.9	-	B						
18: Market St & Main St													Same as NO IMPROVEMENTS Conditions					
NB LT/TH	70.1	0.82	E	64.7	0.80	E	69.9	0.83	E	64.2	0.81	E						
NB RT	56.2	0.01	E	52.3	0.01	D	55.3	0.01	E	51.6	0.01	D						
EB LT	3.0	0.13	A	3.1	0.18	A	3.9	0.17	A	3.8	0.22	A						
EB TH	2.7	0.26	A	2.9	0.30	A	3.1	0.31	A	3.7	0.43	A						
WB TH	5.4	0.35	A	5.3	0.33	A	6.4	0.44	A	6.1	0.41	A						
WB RT	3.8	0.07	A	4.1	0.10	A	4.1	0.08	A	4.3	0.11	A						
OVERALL	11.3	-	B	10.2	-	B	11.3	-	B	9.9	-	A						
19: Main St & Central Ave													Same as NO IMPROVEMENTS Conditions					
EB LT	12.6	0.13	B	11.1	0.17	B	16.8	0.19	B	14.9	0.32	B						
EB TH	12.0	0.30	B	10.8	0.43	B	14.6	0.37	B	14.4	0.61	B						
WB TH	18.3	0.46	B	19.2	0.64	B	23.9	0.61	C	29.1	0.84	C						
WB RT	14.1	0.17	B	12.5	0.17	B	16.2	0.20	B	13.8	0.18	B						
SB LT	65.2	0.92	E	40.9	0.90	D	64.6	0.92	E	43.8	0.92	D						
SB RT	39.0	0.04	D	18.5	0.07	B	36.6	0.07	D	17.5	0.08	B						
OVERALL	30.3	-	C	22.4	-	C	32.1	-	C	26.9	-	C						
20: Waiehu Beach Rd & Wailupe Dr/Lower Waiehu Beach Rd													Same as NO IMPROVEMENTS Conditions					
NB LT	8.3	0.10	A	8.6	0.18	A	8.4	0.10	A	8.8	0.19	A						
EB LT/TH	23.1	0.20	C	37.9	0.16	E	26.4	0.23	D	45.1	0.19	E						
EB RT	12.5	0.32	B	11.3	0.21	B	13.3	0.35	B	11.7	0.23	B						
WB LT/TH	90.6	0.82	F	149.0	0.90	F	136.9	0.97	F	219.3	1.07	F*						
WB RT	9.8	0.02	A	10.8	0.01	B	9.9	0.02	A	11.2	0.01	B						
SB LT	7.9	0.00	A	8.4	0.02	A	7.9	0.00	A	8.6	0.02	A						
OVERALL	13.9	-	-	12.7	-	-	17.8	-	-	16.0	-	-						
21: Kahekili Hwy & Imi Kala St Ext													Same as NO IMPROVEMENTS Conditions					
WB LT	-	-	-	-	-	-	-	-	-	-	-	-						
WB RT	-	-	-	-	-	-	-	-	-	-	-	-						
SB LT	-	-	-	-	-	-	-	-	-	-	-	-						
OVERALL	-	-	-	-	-	-	-	-	-	-	-	-						

* denotes overcapacity conditions

Base Year 2030 Analysis (WITH Imi Kala Street Extension & Bridge Improvements)

It is anticipated that a portion of regional vehicles (to/from Wailuku and Kahului) currently using the Kahekili Highway/Market Street and Waiehu Beach Road/Kahului Beach Road routes — will reroute to the Imi Kala Street Extension. The percentage of vehicles that will be rerouted were based partly upon capacity balancing across the three roadways, i.e., the Waiehu Beach Road, Kahekili Highway, and Imi Kala Bridge Extension.

It is also anticipated that a portion of trips to/from the Wailuku Millyard or various residences/businesses off Eha Street will reroute to the Imi Kala Street Extension. In total, it is anticipated that 369 southbound vehicles and 126 northbound vehicles will be rerouted to the Imi Kala Street Extension during the AM peak hour. While, in total, 173 southbound vehicles and 282 northbound vehicles during the PM peak hour.

In general, the improved conditions along the Waiehu Beach Road corridor and Kahekili Hwy/Market Street corridor between Puuohala Road and Mill Street — will be the result of the Imi Kala Street Extension. However, congestion will likely increase along roadways and intersections along Imi Kala Street and Eha Street.

1. Kahekili Highway/Waiehu Beach Road

With the Imi Kala Street Extension & Bridge Improvement, it is anticipated that a portion of regional southbound left-turn trips from Waihee turning left onto Waiehu Beach Road will instead reroute and continue through on Kahekili Highway to use the Imi Kala Street Extension.

As a result of the reroute, the LOS of the westbound approach improved from LOS F during the AM peak hour without the Imi Kala Street Extension & Bridge Improvement to acceptable LOS D with the Imi Kala Street Extension & Bridge Improvement.

Since all movement LOS improves to LOS D or better, mitigation is not required. However, consider widening of the westbound approach to provide exclusive left-turn and right-turn lanes and widening of southbound approach to provide an exclusive left-turn lane.

2. Kahekili Highway/Makaala Drive

It is anticipated that a number of vehicles bound for Wailuku will be rerouted from Waiehu Beach Road to Makaala Drive to access the Imi Kala Street Extension. As a result of the

reroute, the westbound left-turn movement is anticipated to operate at LOS F and overcapacity conditions during the AM peak hour.

Similar to the Base Year Without Imi Kala Extension & Bridge Improvement, a signal would only be warranted under the 70 percent factor. In lieu of a signal, a median refuge lane could be provided to facilitate two-stage turns for left-turners from Makaala Drive turning onto Kahekili Highway.

The median refuge lane allows westbound left-turn Makaala Drive traffic to turn into the refuge lane after finding a gap in the northbound traffic and then merge into southbound traffic — requiring drivers to yield to only one direction of mainline Kahekili Highway traffic at time. With a median refuge lane, the westbound left-turn movement will improve to LOS E and below capacity conditions during the AM peak hour. The intersection should be monitored if/when the Imi Kala Extension & Bridge Improvement is constructed to determine if a signal is warranted/needed at this intersection.

3. Waiehu Beach Road/Makaala Drive

With trips being rerouted away from Waiehu Beach Road onto Imi Kala Street Extension via Kahekili Highway/Makaala Drive intersection — it is anticipated that operations will improve for the eastbound right-turn movement from LOS F and overcapacity conditions with Base Year conditions without the Imi Kala Street Extension & Bridge Improvement — to LOS C conditions with the Imi Kala Street Extension & Bridge Improvement.

6. Market Street/Kahekili Highway/Piihana Road

The Imi Kala Street Extension & Bridge Improvement is anticipated to reduce volumes along the mainline Kahekili Highway/Market Street by approximately 230 vehicles during the AM peak hours and 300 during the PM peak hours.

As a result, the westbound approach — which is anticipated to operate at LOS F during the AM peak hours and LOS E during the PM peak hours without the Imi Kala Street Extension & Bridge Improvement — will experience an improvement in delay of approximately 40 seconds to LOS E and 20 seconds to LOS C, during the AM and PM peak hours, respectively.

All other movements will continue to operate at LOS C or better across both peak hours.

7. Waiehu Beach Road/Eha Street/Nukuwai Place

Due to capacity balancing as previously explained, it is anticipated that Waiehu Beach Road will experience a decrease in volumes as trips are rerouted to the Imi Kala Street Extension.

On the critical southbound approach during the AM peak hour, approximately 162 southbound through vehicles and 81 southbound right-turn vehicles are anticipated to be rerouted to the Imi Kala Street Extension. The reduction in vehicles is anticipated to help reduce the queue lengths and duration of queues along Waiehu Beach Road and improve operations at the Waiehu Beach Road/Eha Street/Nukuwai Place intersection.

Turning movements during the AM peak hour, including the eastbound shared left-turn/through movement and the westbound approach, are anticipated to operate at LOS E/F. The critical southbound approach during the AM peak hour is anticipated to improve to LOS D and under capacity conditions. All other movements are anticipated to operate at LOS C or better across both peak hours. Overall, the intersection is anticipated to operate at LOS C both during the AM and PM peak hours.

9. Market Street/Mill Street

The southbound left-turn volume and the westbound right-turn movement are anticipated to experience a significant decrease in volumes — as trips are rerouted to the Imi Kala Extension. As a result, the westbound approach is anticipated to experience a decrease in delay over Existing conditions, though the westbound left-turn movement is anticipated to continue to operate at LOS F but improve to under capacity conditions during both peak hours.

10. Mill Street/Central Avenue

This intersection is anticipated to experience a decrease in mainline Mill Street trips as vehicles are rerouted away from Mill Street via Market Street and onto the Imi Kala Street Extension. However, there is anticipated to be an increase in volumes on the westbound left-turn movement and the northbound right-turn movement — as vehicles utilize this intersection to travel between the regional Main Street and the Imi Kala Street Extension. As a result, the westbound left-turn volume is anticipated to be relatively high both during the AM and PM peak hours; however, all movements at this intersection will operate at LOS C or better across both peak hours.

11 & 12. Kaniela Street/Mill Street and Mission Street/Mill Street

During the AM peak hour, it is anticipated that the volumes of rerouted vehicles from the Imi Kala Street Extension traveling back to Mill Street via Central Avenue or other parallel streets will result in a net increase of approximately 120 to130 vehicles during the AM peak hour on the westbound approach.

It is anticipated that 50 to 60 eastbound vehicles which formerly used Mill Street to travel to destinations further east will use the Imi Kala Street Extension instead, resulting in a net decrease in volumes.

Low volumes along Kaniela Street and Mission Street will be rerouted away from using Market Street to travel northward and instead using the Imi Kala Street Extension. At both intersections, all movements operate at LOS C or better across both peak hours.

21. Imi Kala Street/Wili Pa Loop/Eha Street

As an all-way stop controlled intersection, all movements will operate adequately at LOS C or better.

14. Imi Kala Street/Mill Street

A signal is warranted with Base Year 2030 conditions without the Imi Kala Street Extension and will continue to be warranted in this scenario. If there are no improvements to the intersection, it is anticipated that the southbound left-turn movement will operate at LOS F during the AM peak hour and LOS F and overcapacity conditions during the PM peak hour. If a signal is installed, it is anticipated that all movements will operate acceptably at LOS B or better across both peak hours.

15. Market Street/Vineyard Street

The Imi Kala Street Extension is not anticipated to reroute any vehicles to this intersection. Therefore, operations are anticipated to be the same as the Base Year Without Imi Kala Street Extension & Bridge Improvement scenario.

16, 17, & 18. Main Street/High Street, Church Street/Main Street, and Market Street/Main Street

The Imi Kala Street Extension is not anticipated to reroute any vehicles at this intersection. Therefore, operations are anticipated to be the same as the Base Year Without Imi Kala Street Extension & Bridge Improvement scenario.

19. Main Street/Central Avenue

Due to the regional nature of this intersection facilitating regional traffic to/from Main Street/Kaahumanu Avenue, it is anticipated that approximately 162 southbound vehicles during the AM peak hours and 24 during the PM peak hours — and a lower volume of 9 northbound volumes during the AM peak hours and 16 during the PM peak hours — will reroute to this intersection via the Imi Kala Street Extension.

The intersection is anticipated to operate similarly to Base Year Without the Imi Kala Street Extension & Bridge Improvement, with the southbound left-turn movement operating at LOS E during the AM peak hour and LOS D or better across both peak hours at all other movements.

21. Kahekili Highway/Imi Kala Street Extension

At the northern terminus of the Imi Kala Street Extension where it intersects with Kahekili Highway, dedicated turn lanes are recommended along Kahekili Highway for turns onto the Imi Kala Street Extension, and along the westbound Imi Kala Street Extension approach.

As previously explained, the Imi Kala Street Extension is anticipated to reroute trips from Kahekili Highway and Waiehu Beach Road to balance capacities and operations across the three connections to Wailuku. In total, it is anticipated that 369 trips during AM peak hours and 137 during PM peak hours will turn left from southbound Kahekili Highway onto the Imi Kala Street Extension. In addition, approximately 126 trips during AM peak hours and 282 during PM peak hours will turn right from the westbound Imi Kala Street Extension onto northbound Kahekili Highway. All movements at this intersection will operate at LOS B or better across both peak hours.

Table 7 below summarizes the Base Year 2030 LOS (WITH Imi Kala Bridge Extension) at the study intersections compared to existing conditions.

Table 7. Summary of Base Year 2030 LOS (WITH Imi Kala Bridge Extension)

Intersection	Existing 2021 Conditions						Base Year 2030 WITH Imi Kala St. Extension Conditions No Improvements						Base Year 2030 WITH Imi Kala St. Extension Conditions With Improvements					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kahekili Hwy & Waiehu Beach Rd													Mitigation: Widen to provide westbound right-turn and left-turn lanes, and southbound left-turn lane					
WB LT	-	-	-	-	-	-	-	-	-	-	-	-	39.2	0.32	E	26.4	0.25	D
WB LT/RT	23.4	0.64	C	17.6	0.57	C	30.5	0.74	D	29.7	0.76	D	-	-	-	-	-	-
WB RT	-	-	-	-	-	-	-	-	-	-	-	-	12.4	0.39	B	15.3	0.51	C
SB LT	8.5	0.25	A	8.6	0.20	A	8.3	0.17	A	8.8	0.19	A	8.3	0.17	A	8.8	0.19	A
OVERALL	8.6	-	-	8.4	-	-	8.9	-	-	11.6	-	-	5.3	-	-	7.3	-	-
2: Kahekili Hwy & Makaala Dr													Mitigation: Provide median refuge lane for westbound left-turners					
WB LT	21.6	0.41	C	13.5	0.18	B	137.1	1.12	F*	18.7	0.32	C	46.1	0.79	E	14.8	0.25	B
WB RT	9.5	0.06	A	10.2	0.01	B	9.8	0.07	A	11.1	0.05	B	9.8	0.07	A	11.1	0.05	B
SB LT	7.9	0.07	A	8.2	0.01	A	8.0	0.08	A	8.6	0.02	A	8.0	0.08	A	8.6	0.02	A
OVERALL	5.0	-	-	2.1	-	-	29.9	-	-	2.9	-	-	10.8	-	-	2.4	-	-
3: Waiehu Beach Rd & Makaala Dr													Same as NO IMPROVEMENTS Conditions					
NB LT	9.3	0.11	A	10.0	0.32	B	9.0	0.10	A	10.1	0.31	B						
EB LT	16.7	0.02	C	30.4	0.10	D	16.1	0.02	C	31.5	0.11	D						
EB RT	55.5	0.94	F	15.1	0.38	C	24.4	0.67	C	15.4	0.37	C						
OVERALL	16.8	-	-	4.1	-	-	6.7	-	-	3.7	-	-						
4: Kahekili Hwy & Kamaile St.													Same as NO IMPROVEMENTS Conditions					
NB LT	8.5	0.02	A	7.8	0.03	A	9.8	0.03	A	8.2	0.04	A						
EB LT/RT	13.1	0.11	B	12.1	0.08	B	19.5	0.19	C	14.6	0.11	B						
OVERALL	1.1	-	-	1.2	-	-	1.1	-	-	1.0	-	-						
5: Kahekili Hwy & Puuohala Rd													Same as NO IMPROVEMENTS Conditions					
NB LT	8.9	0.06	A	8.0	0.09	A	8.8	0.06	A	8.0	0.09	A						
EB LT/RT	15.5	0.30	C	10.9	0.11	B	15.0	0.30	C	10.6	0.11	B						
OVERALL	2.7	-	-	1.9	-	-	3.0	-	-	2.4	-	-						
6: Market St/Kahekili Hwy & Piihana Rd													Same as NO IMPROVEMENTS Conditions					
NB LT	9.4	0.04	A	7.9	0.04	A	9.4	0.04	A	7.9	0.04	A						
EB LT/TH/RT	18.7	0.17	C	11.9	0.09	B	17.8	0.16	C	11.2	0.09	B						
WB LT/TH/RT	44.6	0.44	E	29.4	0.26	D	39.5	0.41	E	24.1	0.23	C						
SB LT	7.9	0.00	A	8.9	0.01	A	7.8	0.00	A	8.5	0.01	A						
OVERALL	3.5	-	-	2.3	-	-	3.6	-	-	2.6	-	-						
7: Waiehu Beach Rd & Eha St/Nukuwai Pl.													Same as NO IMPROVEMENTS Conditions					
NB LT	105.2	0.87	F	15.4	0.29	B	49.5	0.62	D	14.5	0.29	B						
NB TH/RT	5.8	0.29	A	19.6	0.78	B	5.3	0.32	A	19.6	0.82	B						
EB LT/TH	106.4	0.71	F	30.0	0.70	C	89.7	0.69	F	32.7	0.70	C						
EB RT	85.6	0.02	F	18.8	0.05	B	68.7	0.01	E	20.7	0.05	C						
WB LT/TH/RT	86.3	0.08	F	18.4	0.01	B	69.5	0.09	E	20.4	0.01	C						
SB LT	5.1	0.00	A	0.0	0.00	A	3.3	0.00	A	0.0	0.00	A						
SB TH	79.7	1.07	F*	23.9	0.58	C	38.0	0.96	D	22.5	0.59	C						
SB RT	9.1	0.35	A	19.1	0.29	B	5.2	0.24	A	16.2	0.20	B						
OVERALL	52.2	-	D	22.5	-	C	28.9	-	C	22.4	-	C						
8: Lower Main St/Kahului Beach Rd & Waiehu Beach Rd													Same as NO IMPROVEMENTS Conditions					
EB LT	16.0	0.24	B	16.9	0.29	B	20.4	0.30	C	30.2	0.42	C						
EB TH	11.2	0.39	B	6.7	0.37	A	12.4	0.38	B	8.4	0.37	A						
WB TH	24.8	0.80	C	19.3	0.80	B	24.2	0.77	C	19.3	0.75	B						
WB TH/RT	25.5	0.81	C	22.8	0.85	C	25.0	0.79	C	24.0	0.84	C						
SB LT/RT	29.8	0.82	C	37.5	0.77	D	42.7	0.83	D	73.5	0.86	E						
OVERALL	22.9	-	C	19.7	-	B	26.3	-	C	27.1	-	C						
9: Market St & Mill St.													Same as NO IMPROVEMENTS Conditions					
WB LT	191.8	0.75	F	64.3	0.40	F	128.2	0.64	F	70.3	0.48	F						
WB RT	12.5	0.25	B	36.3	0.78	E	11.7	0.11	B	19.8	0.37	C						
SB LT	10.8	0.43	B	11.1	0.30	B	10.1	0.32	B	11.3	0.24	B						
OVERALL	8.3	-	-	10.6	-	-	5.9	-	-	5.0	-	-						

Intersection	Existing 2021 Conditions						Base Year 2030 WITH Imi Kala St. Extension Conditions No Improvements						Base Year 2030 WITH Imi Kala St. Extension Conditions With Improvements					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
10: Central Ave & Mill St.													Same as NO IMPROVEMENTS Conditions					
NB LT/RT	19.9	0.42	C	35.1	0.66	E	21.1	0.46	C	19.5	0.50	C						
WB LT	10.4	0.29	B	9.2	0.24	A	12.2	0.51	B	9.4	0.29	A						
OVERALL	4.9	-	-	7.8	-	-	7.4	-	-	6.9	-	-						
11: Kaniela St. & Mill St.													Same as NO IMPROVEMENTS Conditions					
NB LT/RT	16.6	0.19	C	17.9	0.20	C	17.6	0.20	C	16.0	0.18	C						
WB LT	8.8	0.04	A	8.4	0.02	A	8.8	0.05	A	8.6	0.03	A						
OVERALL	1.4	-	-	1.4	-	-	1.3	-	-	1.3	-	-						
12: Mission St. & Mill St.													Same as NO IMPROVEMENTS Conditions					
NB LT/RT	15.9	0.27	C	19.8	0.33	C	16.8	0.29	C	18.4	0.31	C						
WB LT	8.8	0.07	A	8.6	0.08	A	8.9	0.08	A	8.9	0.09	A						
OVERALL	2.2	-	-	2.6	-	-	2.0	-	-	2.5	-	-						
13: Imi Kala St. & Eha St.													Same as NO IMPROVEMENTS Conditions					
NB LT	10.1	0.20	B	8.9	0.06	A	11.3	0.21	B	9.4	0.07	A						
NB TH/RT	8.7	0.22	A	9.4	0.32	A	12.5	0.41	B	17.7	0.65	C						
EB LT/TH/RT	8.2	0.11	A	8.1	0.11	A	10.7	0.16	B	10.1	0.15	B						
WB LT/TH/RT	10.4	0.33	B	9.8	0.27	A	14.4	0.45	B	12.3	0.39	B						
SB LT/TH/RT	8.2	0.02	A	8.3	0.02	A	19.1	0.66	C	10.9	0.26	B						
OVERALL	9.5	-	A	9.3	-	A	15.1	-	C	14.2	-	B						
14: Mill St. & Imi Kala St.													**Mitigation: Monitor and install signal if warranted by future traffic growth**					
EB LT	8.8	0.30	A	8.8	0.29	A	8.7	0.29	A	8.9	0.33	A	-	-	-	-	-	-
EB LT/TH	-	-	-	-	-	-	-	-	-	-	-	-	5.4	0.64	A	6.4	0.69	A
WB TH/RT	-	-	-	-	-	-	-	-	-	-	-	-	2.8	0.19	A	2.8	0.17	A
SB LT	59.2	0.42	F	129.0	0.91	F	78.0	0.62	F	301.5	1.37	F*	14.0	0.39	B	18.1	0.63	B
SB RT	12.3	0.35	B	15.5	0.54	C	17.3	0.62	C	13.9	0.46	B	13.4	0.28	B	14.7	0.20	B
OVERALL	7.4	-	-	16.0	-	-	11.1	-	-	30.5	-	-	5.9	-	A	7.4	-	A
15: Market St & Vineyard St													Same as NO IMPROVEMENTS Conditions					
NB LT/TH/RT	18.8	0.55	C	43.1	0.86	E	22.8	0.61	C	74.4	0.99	F						
EB LT	17.9	0.48	C	28.6	0.70	D	21.6	0.56	C	61.7	0.93	F						
EB TH	11.0	0.10	B	13.4	0.27	B	11.9	0.12	B	16.4	0.38	C						
WB TH/RT	15.5	0.39	C	17.5	0.42	C	18.4	0.46	C	22.5	0.51	C						
SB LT	11.1	0.12	B	12.4	0.12	B	11.7	0.14	B	13.6	0.14	B						
SB RT	25.0	0.75	C	19.4	0.58	C	59.8	0.97	F	35.9	0.79	E						
OVERALL	19.7	-	C	27.5	-	D	35.6	-	E	48.0	-	E						
16: Main St & High St													Same as NO IMPROVEMENTS Conditions					
NB LT	12.7	0.09	B	14.2	0.14	B	14.0	0.10	B	16.5	0.19	B						
NB TH	14.0	0.37	B	16.4	0.55	B	16.2	0.50	B	18.8	0.60	B						
NB RT	12.9	0.18	B	13.7	0.16	B	14.2	0.21	B	15.4	0.20	B						
EB LT	15.0	0.02	B	17.3	0.04	B	15.7	0.03	B	21.1	0.06	C						
EB TH/RT	17.6	0.46	B	19.9	0.48	B	18.8	0.53	B	25.0	0.58	C						
WB LT	10.6	0.45	B	12.0	0.59	B	11.2	0.51	B	15.0	0.70	B						
WB TH/RT	7.1	0.11	A	8.0	0.17	A	7.2	0.13	A	9.4	0.20	A						
SB LT/TH/RT	16.3	0.61	B	18.1	0.66	B	17.9	0.64	B	21.4	0.72	C						
OVERALL	13.9	-	B	15.2	-	B	15.1	-	B	18.0	-	B						
17: Church St. & Main St													Same as NO IMPROVEMENTS Conditions					
EB LT	-	-	-	-	-	-	45.9	0.46	D	47.7	0.45	D						
EB TH/RT	-	-	-	-	-	-	7.8	0.42	A	11.8	0.51	B						
WB LT	8.3	0.04	A	8.4	0.02	A	42.8	0.60	D	43.4	0.52	D						
WB TH/RT	-	-	-	-	-	-	7.9	0.49	A	11.5	0.52	B						
SB LT	20.0	0.11	C	23.2	0.30	C	-	-	-	-	-	-						
SB TH/RT	14.0	0.33	B	12.4	0.20	B	-	-	-	-	-	-						
SB LT/TH/RT	-	-	-	-	-	-	37.2	0.82	D	36.6	0.86	D						
OVERALL	3.2	-	-	3.2	-	-	14.5	-	B	18.9	-	B						
18: Market St & Main St													Same as NO IMPROVEMENTS Conditions					
NB LT/TH	70.1	0.82	E	64.7	0.80	E	69.9	0.83	E	64.2	0.81	E						
NB RT	56.2	0.01	E	52.3	0.01	D	55.3	0.01	E	51.6	0.01	D						
EB LT	3.0	0.13	A	3.1	0.18	A	3.9	0.17	A	3.8	0.22	A						
EB TH	2.7	0.26	A	2.9	0.30	A	3.1	0.31	A	3.7	0.43	A						
WB TH	5.4	0.35	A	5.3	0.33	A	6.3	0.44	A	6.1	0.41	A						
WB RT	3.8	0.07	A	4.1	0.10	A	4.0	0.08	A	4.3	0.11	A						
OVERALL	11.3	-	B	10.2	-	B	11.3	-	B	9.9	-	A						
19: Main St & Central Ave													Same as NO IMPROVEMENTS Conditions					
EB LT	12.6	0.13	B	11.1	0.17	B	25.7	0.27	C	15.6	0.34	B						
EB TH	12.0	0.30	B	10.8	0.43	B	22.7	0.43	C	15.2	0.62	B						
WB TH	18.3	0.46	B	19.2	0.64	B	37.3	0.74	D	31.6	0.86	C						
WB RT	14.1	0.17	B	12.5	0.17	B	24.3	0.24	C	14.5	0.19	B						
SB LT	65.2	0.92	E	40.9	0.90	D	64.9	0.95	E	46.2	0.94	D						
SB RT	39.0	0.04	D	18.5	0.07	B	27.7	0.07	C	16.9	0.08	B						
OVERALL	30.3	-	C	22.4	-	C	41.7	-	D	28.7	-	C						
20: Waiehu Beach Rd & Wailupe Dr/Lower Waiehu Beach Rd													Same as NO IMPROVEMENTS Conditions					
NB LT	8.3	0.10	A	8.6	0.18	A	8.0	0.09	A	8.6	0.18	A						
EB LT/TH	23.1	0.20	C	37.9	0.16	E	20.4	0.18	C	39.4	0.17	E						
EB RT	12.5	0.32	B	11.3	0.21	B	11.2	0.29	B	11.2	0.21	B						
WB LT/TH	90.6	0.82	F	149.0	0.90	F	58.9	0.68	F	160.3	0.93	F						
WB RT	9.8	0.02	A	10.8	0.01	B	9.9	0.02	A	11.1	0.01	B						
SB LT	7.9	0.00	A	8.4	0.02	A	7.9	0.00	A	8.5	0.02	A						
OVERALL	13.9	-	-	12.7	-	-	10.9	-	-	13.1	-	-						
21: Kahekili Hwy & Imi Kala St Ext													Same as NO IMPROVEMENTS Conditions					
WB LT	-	-	-	-	-	-	0.0	-	A	0.0	-	A						
WB RT	-	-	-	-	-	-	10.0	0.16	B	13.9	0.43	B						
SB LT	-	-	-	-	-	-	8.6	0.29	A	8.3	0.12	A						
OVERALL	-	-	-	-	-	-	3.8	-	-	5.4	-	-						

* denotes overcapacity conditions

Future Year 2023 Traffic Conditions

The proposed project is anticipated to be completed by 2030. Access to the proposed project will be provided via two driveways off of Kahekili Highway. The proposed project South Driveway will be a T-intersection approximately 1,100 feet north of the existing Kahekili Highway/Makaala Drive intersection. The proposed project's North Driveway is approximately 900 feet south of the Kahekili Highway/Waiehu Beach Road intersection and will line up with the proposed access to the planned Waiehu Affordable Housing project on the east side of Kahekili Highway, ultimately forming a 4-legged intersection.

Trip Generation

The Institute of Transportation Engineers (ITE) publishes a book based on empirical data compiled from a body of more than 4,250 trip generation studies — submitted by public agencies, developers, consulting firms, and associations. This publication, titled *Trip Generation Manual, 10th Edition* — provides trip rates and/or formulae based on graphs that correlate vehicular trips with independent variables.

The independent variables can range from Dwelling Units (DU) for single and multi-family attached homes to Square-foot Gross Leasable Area (SF GLA) for commercial development. These trip rates/formulae and their associated directional distributions were used to estimate the increase in vehicular trips generated by the proposed Project. The rates selected were based on the land use description. **See** Tables 8 and 9 for Trip Generation formula and projections for the proposed project.

Based on the *ITE Trip Generation Handbook, 3rd Edition*, internal capture and pass-by trip reductions were applied to the vehicular trips generated by the proposed project and described further below.

- **Internal Capture Reduction**

  The ITE Handbook describes internal trips as the interaction of trips made between two or more land uses on-site. Based on ITE methodology, approximately 1.9 percent and 7.0 percent vehicle reductions were applied to overall new regional project trips based on the interactions between the retail and residential uses during the weekday AM and PM peak hours of traffic, respectively.

- **Pass-by Trip Reduction**

  The ITE Handbook describes a pass-by trip as an existing trip that is currently traveling along the proposed project's adjacent roads and makes an intermediate stop to the proposed project site on the way from an origin to a primary destination. The ITE

Handbook shows a 34 percent pass-by rate for Shopping Centers (ITE 820) during the PM peak hour. ITE does not provide a pass-by rate for the AM peak hour due to lack of data; however, it is anticipated that pass-by operations will be similar between the AM and PM peak hours. Therefore, to remain conservative, a lower 20 percent pass-by reduction was applied to retail/shopping center trips during the AM and PM peak hours. See Tables 8 and 9 for Trip Generation formulae and projections for the proposed project.

Table 8. Trip Generation Rates

Land Use (ITE Code)	Independent Variable	AM Peak Hour		PM Peak Hour	
		% Enter	Trip Rate	% Enter	Trip Rate
Single-Family Detached Housing (210)	DU	25%	[a]	63%	[b]
Multifamily Housing Low-Rise (220)	DU	23%	[c]	63%	[d]
Shopping Center (820)	1000 SF GLA	62%	[e]	48%	[f]
Public Park (411)	Acres	59%	0.02	55%	[g]

Notes:
DU = Dwelling Unit
GLA = Gross Leasable Area

[a] T = 0.71(X) + 4.80
[b] T = EXP(0.96Ln(X) + 0.20)
[c] T = EXP(0.95Ln(X) - 0.51)
[d] T = EXP(0.89Ln(X) - 0.02)
[e] T = 2.76(X) + 77.28
[f] T = EXP(0.72LN(X) + 3.02)
[g] T = 0.06(X) + 22.60

Table 9. Project-Generated Trips

Land Use (ITE Code)	Quantity	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
		(vph)					
Single-Family Detached Housing (210)	568 DU	102	307	409	340	199	539
Multifamily Housing Low-Rise (220)	184 DU	20	66	86	64	38	102
Shopping Center (820)	17.4 kSF	68	58	126	81	81	161
Public Park (411)	6.3 Acres	-	-	-	13	10	23
SUBTOTAL		**190**	**431**	**621**	**497**	**328**	**825**
Internal Capture Reduction		*-6*	*-6*	*-12*	*-29*	*-29*	*-58*
Pass-By Trip Reduction		*-11*	*-11*	*-22*	*-12*	*-12*	*-24*
TOTAL NEW EXTERNAL TRIPS		**173**	**414**	**587**	**456**	**287**	**743**

Trip Distribution and Assignment

Traffic generated by the proposed project was added to the forecast Base Year 2030 traffic volumes within the vicinity of the proposed project to constitute the traffic volumes for the Future Year 2030 traffic conditions.

Trips generated by the proposed project were assigned throughout the study area based upon regional origins and destinations as well as existing travel patterns within the vicinity of the project site.

In general, Project traffic was distributed based on the patterns below:

- 45 percent to/from Kahului via Waiehu Beach Road-Kahului Beach Road route
- 25 percent to/from Wailuku Industrial Park area via Waiehu Beach Road-Eha Street route
- 20 percent to/from Happy Valley & Wailuku via Kahekili Highway-Market Street route
- 10 percent to/from Waihee via Kahekili Highway

Future Year 2030 Analysis (WITHOUT Imi Kala Street Extension & Bridge Improvement)

1. Kahekili Highway/Waiehu Beach Road

Without improvements, the westbound approach at this intersection will operate at LOS F and overcapacity conditions during both the AM and PM peak hours. In Base Year conditions, the widening of the southbound approach to provide a left-turn lane and widening of the westbound approach to provide a left-turn and right-turn lane — and widening of the southbound approach to provide a left-turn lane was recommended and will continue to be recommended for Future Year 2030 conditions.

The proposed project is anticipated to add 276 trips (during the AM peak hours) and 349 trips (during the PM peak hours) at this intersection — with 54 entering project trips turning left from Waiehu Beach Road onto Kahekili Highway at the intersection during the AM peak hours and 150 during the PM peak hours.

The 59 entering westbound left-turn trips (during the AM peak hours) and the 168 (during the PM peak hours) — correspond to approximately 32 percent of total entering project trips.

Based on Future Year 2030 trips, a signal is anticipated to be warranted under 100 percent factor. The intersection should be monitored to determine if a signal or roundabout would be warranted based on actual volumes.

Operationally, if a signal is installed, all movements will operate at LOS C or better across both peak hours. If a roundabout is installed, all movements are anticipated to operate at LOS A across both peak hours.

2. Kahekili Highway/Makaala Drive

With Future Year conditions, the westbound left-turn movement is anticipated to operate at LOS F and overcapacity conditions during the AM peak hour. While the proposed project does not add any trips to this westbound left-turn movement, the increase in project trips along Kahekili Highway leads to increased delay. All other movements operate at LOS D or better across both peak hours. Similar to Base Year conditions, a signal would only be warranted under the 70 percent factor.

In lieu of a signal, a median refuge lane could be provided to facilitate two-stage turns for left turners from Makaala Drive turning onto Kahekili Highway as previously recommended for Base Year 2030 conditions WITH Imi Kala Street Extension & Bridge Improvements scenario. With a median refuge lane, the westbound left-turn movement will operate at LOS E and below capacity conditions during the AM peak hour.

3. Waiehu Beach Road/Makaala Drive

With project traffic, it is anticipated that the eastbound right-turn movement will continue to operate at LOS F and overcapacity conditions during the AM peak hour, consistent with operations for Base Year conditions. During the PM peak hour, the eastbound left-turn movement is anticipated to lower from LOS E with Base Year conditions to LOS F, despite the movement will continue to operate significantly under capacity.

4 & 5. Kahekili Highway/Kamaile Street and Kahekili Highway/Puuohala Road

The proposed project is anticipated to add approximately 82 vehicles along the mainline Kahekili Highway during the AM peak hours and 106 during the PM peak hours — at these two intersections. All movements at both intersections are anticipated to continue to operate at LOS C or better across both peak hours.

6. Market Street/Kahekili Highway/Piihana Road

With Future Year conditions, it is anticipated that all movements at this intersection operate at LOS D or better across both peak hours. However, the westbound approach which is anticipated to operate at LOS F during both peak hours.

The westbound approach is anticipated to serve approximately 50 to 70 vehicles during the AM and PM peak hours — or approximately 1 vehicle per minute on average — and will continue to operate significantly under capacity during both peak hours.

7. Waiehu Beach Road/Eha Street/Nukuwai Place

During the AM peak hour, it is anticipated that the turning movements will continue to operate at LOS F similar to Base Year conditions. The southbound through movement is anticipated to continue to operate at LOS F and overcapacity conditions due to reasons outlined in the Existing Intersection Conditions.

The proposed project is anticipated to add 97 new southbound right-turn and 171 new southbound through trips along Waiehu Beach Road during the AM peak hours — and 63 and 120 during the PM peak hours.

During the PM peak hour, the northbound through movement is anticipated to operate at LOS F and overcapacity conditions due to the increased 59 project-related vehicles during the AM peak hours and 199 during the PM peak hours. The eastbound shared left-turn movement is anticipated to operate at LOS E.

The Imi Kala Street Extension is anticipated to alleviate some of these capacity issues by shifting traffic away from Waiehu Beach Road to Imi Kala Extension.

8. Lower Main Street/Kahului Beach Road/Waiehu Beach Road

With Future Year conditions, during the PM peak hour, the eastbound left-turn and the westbound shared through/right-turn volume is anticipated to operate at LOS E — while southbound left-turn operates at LOS F.

9. Market Street/Mill Street

It is anticipated that westbound left-turn will continue to operate at LOS F and over capacity during the AM peak hour and LOS F and under capacity during the PM peak hour, similar to Base Year conditions.

As observed during the AM peak hour, it is anticipated that lengthy southbound congestion will continue to occur along Market Street, in part, due to a significant volume of

southbound left-turn volumes and a relatively short turn lane, resulting in southbound left-turn and through volumes in the same queue, causing spillback.

10. Central Avenue/Mill Street
During the PM peak hour, the northbound movement is anticipated to continue to operate at LOS F as it did with Base Year conditions.

14. Imi Kala Street/Mill Street
The proposed project is anticipated to add 19 vehicles to the intersection during the AM peak hours and 29 during the PM peak hours. A signal is warranted with Base Year 2030 conditions and will continue to be warranted with Future Year conditions. If a signal is installed, it is anticipated that all movements will operate at LOS B or better across both peak hours.

15. Market Street/Vineyard Street
During the AM peak hour, the southbound right-turn movement is anticipated to operate at LOS F and over capacity. During the PM peak hour, the northbound approach is anticipated to experience an increase of approximately 18 seconds of delay and will operate at LOS F and over capacity conditions compared to the Base Year conditions, which is anticipated to operate at LOS F and near-capacity conditions.

The eastbound left-turn movement is anticipated to experience an increase of approximately 7 seconds in delay and will continue to operate at LOS F as it did with the Base Year conditions. A signal is warranted with Base and Future Year 2030 volumes, however based on discussions with Maui County, a signal may be infeasible give narrow roadway widths and limited right-of-way.

16 & 17. Main Street/High Street and Church Street/Main Street
With the addition of Project trips, all movements at this intersection are anticipated to continue to operate at LOS D or better across both peak hours.

18 & 19. Market Street/Main Street and Main Street/Central Avenue
With Future Year Conditions, all movements are anticipated to operate similarly to Base Year conditions with some movements continuing to operate at LOS E conditions.

20. Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road
With Future Year conditions, it is anticipated that the shared eastbound left-turn/through movement will operate at LOS E during the AM peak hours and LOS F during the PM peak

hours — and under capacity during both peak hours. In addition, the westbound shared left-turn through movement is anticipated to operate at LOS F and overcapacity conditions during both peak hours.

22. Kahekili Highway/North Project Driveway

The Kahekili Highway/North Project Driveway is planned to be a 4-legged intersection located directly across of the central access of the proposed Waiehu Affordable Housing Project. As of the writing of this report, construction has not yet begun on the Waiehu Affordable Housing Project, but it anticipates construction of an entering northbound right-turn and entering southbound left-turn lane into its site.

The North Project Driveway is anticipated to serve a portion of the residential uses as well as its retail uses due to its proximity to the driveway. As an unsignalized intersection, the eastbound shared left-turn/through movement is anticipated to operate at LOS F during the AM peak hours and LOS E during the PM peak hours — despite under capacity.

All other movements are anticipated to operate at LOS D or better across both peak hours. With projected volumes, it is anticipated that a signal would be warranted with the 70 percent warrant. An exclusive northbound left-turn lane and southbound right-turn lane is recommended. The intersection should be monitored to determine if a signal or roundabout will be warranted.

23. Kahekili Highway/South Project Driveway

The Kahekili Highway/South Project Driveway is planned to be a T-intersection serving residential uses. An exclusive northbound left-turn lane, southbound right-turn lane, and median refuge lane for the eastbound left-turn movement is recommended. A traffic signal is not warranted at this intersection.

Future Year 2030 Intersection Analysis (WITH Imi Kala Street Extension and Bridge Improvement)

With the Imi Kala Street Extension & Bridge Improvement, it is anticipated that 59 southbound trips during the AM peak hours and 24 during the PM peak hours — as well as the 17 northbound Project trips during the AM peak hours and 58 during the PM peak hours — will utilize the Imi Kala Street Extension.

1. Kahekili Highway/Waiehu Beach Road

Without improvements, the westbound approach at this intersection will operate at LOS F and overcapacity conditions during both the AM and PM peak hours. As previously

discussed, exclusive westbound left-turn and right-turn lanes and a southbound left-turn lane is recommended. Based on Future Year 2030 trips, a signal is anticipated to be warranted under 100 percent factor. The intersection should be monitored to determine if a signal or roundabout would be warranted based on actual volumes.

Operationally, if a signal is installed, all movements will operate at LOS C or better across both peak hours. If a roundabout is installed, all movements are anticipated to operate at LOS A across both peak hours.

2. Kahekili Highway/Makaala Drive

As previously discussed, a median refuge lane is recommended. However, with Imi Kala Extension, the westbound left-turn movement will worsen to LOS F and over-capacity conditions. Similar to Base Year conditions, a signal would only be warranted under the 70% factor. The intersection should be monitored during occupancy of the proposed project to determine if a signal would be warranted by actual volumes.

3. Waiehu Beach Road/Makaala Drive

With Project traffic, it is anticipated that the eastbound right-turn movement will continue to operate at LOS F and overcapacity conditions during the AM peak hour. However, with the Imi Kala Extension, the capacity will reduce to levels similar to the Base Year 2030 without Imi Kala Extension & Bridge Improvements scenario.

7. Waiehu Beach Road/Eha Street/Nukuwai Place

Project impacts are mitigated with the Imi Kala Street Extension, since the critical southbound through movement will operate with lower delay than Existing conditions.

8. Lower Main Street/Kahului Beach Road/Waiehu Beach Road

The proposed project will increase traffic through this intersection with or without the Imi Kala Street Extension. As a result, the southbound left-turn movement will worsen from LOS D to LOS F conditions however, all movements will operate below capacity.

9. Market Street/Mill Street

Project-related impacts are mitigated with the Imi Kala Extension since the critical southbound left-turn movement is significantly reduced. The proposed project adds about 58 southbound vehicles at this intersection during the AM peak hours and 39 during the PM peak hours — however, the addition is offset by the 126 southbound left-turn vehicles during the AM peak hours and 69 during the PM peak hours as they are rerouted to the Imi Kala Street Extension.

10. Central Avenue/Mill Street

Traffic along Mill Street will reduce with Imi Kala Extension, thereby improving the northbound approach, which will operate adequately at LOS C or better across both peak hours.

13. Imi Kala Street/Eha Street

As an all-way stop controlled intersection, all movements will operate adequately at LOS D or better across both peak hours.

14. Imi Kala Street/Mill Street

The proposed project is anticipated to add 52 vehicles to the intersection during the AM peak hours and 35 during the PM peak hours. A signal is warranted with Base Year 2030 conditions and will continue to be warranted with this scenario. If a signal is installed, it is anticipated that all movements will operate at LOS C or better across both peak hours.

15. Market Street/Vineyard Street

This intersection is anticipated to operate the same as Future Year Without Imi Kala Street Extension & Bridge Improvement scenario with various LOS E/F and over-capacity conditions.

19. Main Street/Central Avenue

It is anticipated that southbound project-related trips — that are rerouted to the Imi Kala Street Extension will use Central Avenue to access Main Street for regional travel — will add approximately 43 vehicles to the southbound left-turn during the critical AM peak hour. With the added trips, all movements are anticipated to operate at LOS D or better across both peak hours with the exception of the southbound left-turn movement which operates at LOS E during the AM peak hour as it did with the Existing and Base Year conditions.

21. Kahekili Highway/Imi Kala Street

This intersection is anticipated to be the northern terminus of the Imi Kala Street Extension. Dedicated turn lanes are recommended along Kahekili Highway for turns onto the Imi Kala Street Extension, and along the westbound Imi Kala Street Extension approach. All movements at this intersection are anticipated to operate at LOS C or better across both peak hours.

Tables 5.3 and 5.4 of the TIAR contain LOS Summary Tables for the Existing, Base Year, and Future Year Conditions with the following scenarios.

- WITHOUT Imi Kala Street Extension, WITH and WITHOUT Improvements (Table 5.3 of the TIAR); and
- WITH Imi Kala Street Extension, WITH and WITHOUT Improvements (Table 5.4 of the TIAR).

Conclusions

The project site will be accessed via two driveways off of Kahekili Highway. The project's South Driveway will be a T-intersection located approximately 1,100 feet north of the existing Kahekili Highway/Makaala Drive intersection.

Conclusions: Base Year 2030 WITHOUT Imi Kala Street Extension & Bridge Improvements

The ambient traffic growth and trips generated by background developments are anticipated to increase traffic by approximately 110 vehicles along Kahekili Highway — and approximately 150 to 200 vehicles along Waiehu Beach Road during each of the AM and PM peak hours in the vicinity of the project site. Based on these increases, AM queueing along both Kahekili Highway and Waiehu Beach Road is expected to persist through the Base Year Condition.

At the Kahekili Highway/Waiehu Beach Road intersection, the westbound movement is anticipated to worsen from LOS C(C) to LOS F(D) in the AM peak hour, despite the movement will continue to operate under capacity. If separate right and left-turn lanes were installed, the critical westbound left-turn movement would be anticipated to continue operating at LOS F(D) — however, will remove left-turn vehicles from the heavier right-turn flows and provide more capacity along the westbound approach. In addition, a southbound left-turn lane is warranted based on volumes and is recommended.

At the Waiehu Beach Road intersections with Wailupe Drive, Makaala Drive, and Eha Street as well as at the Market Street/Mill Street intersection — the critical movements will continue to operate at LOS F at near-to or overcapacity conditions during the congested AM peak period, similar to existing conditions. The Imi Kala Street Extension is planned to alleviate some of the congestion along the Kahekili Highway and Waiehu Beach Road corridors, thereby mitigating some of the capacity issues.

At the Mill Street/Imi Kala Street, with the increased volumes with Base Year conditions, the southbound left-turn is anticipated to lower to LOS F and overcapacity conditions over

Existing conditions during the PM peak hour. A signal is warranted with Base Year 2030 volumes. If a signal is installed, it is anticipated that all movements will operate at LOS B or better across both peak hours.

At the Market Street/Vineyard Street all-way stop controlled (AWSC) intersection, various movements will worsen to LOS E/F conditions. A signal is warranted with Base Year 2030 volumes, however based on discussions with Maui County, a signal may be infeasible give narrow roadway widths and limited right-of-way.

Conclusions: Base Year 2030 WITH Imi Kala Street Extension & Bridge Improvements

The Imi Kala Street Extension & Bridge Improvement will provide a third connection between Waiehu and Wailuku/Kahului as well as alleviate some existing congestion along Kahekili Highway and Waiehu Beach Road. It is anticipated that a portion of regional vehicles (to/from Wailuku and Kahului) currently using the Kahekili Highway/Market Street and Waiehu Beach Road/Kahului Beach Road routes — will reroute to the Imi Kala Street Extension. In total, it is anticipated that approximately 369 southbound vehicles and 126 northbound vehicles during the AM peak hours — 173 and 282 during the PM peak hour — will be rerouted to the Imi Kala Street Extension.

In general, conditions along the Waiehu Beach Road corridor and Kahekili Highway/Market Street corridor between Puuohala Road and Mill Street improved as a result of the Imi Kala Street Extension. However, traffic will likely increase along the roadways and intersections along Imi Kala Street and Eha Street in addition to heavier westbound left-turn volume at the Kahekili Highway/Makaala Drive intersection — as more Wailuku/Kahului bound vehicles may opt to use Kahekili Highway-Imi Kala Extension route instead of Waiehu Beach Road.

At the Kahekili Highway/Waiehu Beach Road intersection, a portion of regional southbound left turn trips from Waihee turning left onto Waiehu Beach Road will instead reroute and continue through on Kahekili Highway to use the Imi Kala Street Extension. It is anticipated that 40 percent of the southbound left-turn volume would reroute to the Imi Kala Street Extension during the AM peak hours of traffic — and 19 percent during the PM peak hours. As a result, the LOS of the westbound approach improved from LOS F during the AM peak hours without the Imi Kala Street Extension & Bridge Improvement — to acceptable LOS D with the Imi Kala Street Extension & Bridge Improvement. Since all movement LOS improves to LOS D or better — mitigation is not required — however,

widening of the westbound approach to provide exclusive left-turn and right-turn lanes and widening of southbound approach to provide an exclusive left-turn lane may still be considered.

At the Kahekili Highway/Makaala Drive intersection, a number of vehicles bound for Wailuku/Kahului will be rerouted from Waiehu Beach Road to Makaala Drive to access the Imi Kala Street Extension. In addition to the 140 rerouted southbound regional trips along Kahekili Highway during the AM peak hours and 47 during the PM peak hours — 103 vehicles were rerouted to the Makaala Drive westbound left-turn movement during the AM peak hours and 21 during the PM peak hour. As a result, the westbound left-turn movement is anticipated to operate at LOS F and overcapacity conditions during the AM peak hour. A median refuge lane could be provided to facilitate two-stage turns for left-turners from Makaala Drive turning onto Kahekili Highway — which will improve the westbound left-turn movement to LOS E and below capacity conditions.

Due to capacity balancing as previously explained, it is anticipated that Waiehu Beach Road will experience a decrease in volumes as trips are rerouted to the Imi Kala Street Extension. At the Waiehu Beach Road/Eha Street/Nukuwai Place intersection, the critical southbound approach during the AM peak hour, approximately 162 southbound through vehicles and 81 southbound right-turn vehicles are anticipated to be rerouted to the Imi Kala Street Extension. The reduction in vehicles is anticipated to help reduce the queue lengths and duration of queues along Waiehu Beach Road and improve operations at the Waiehu Beach Road/Eha Street/Nukuwai Place intersection.

At the Mill Street/Imi Kala Street intersection, a signal will continue to be warranted for Base Year conditions with Imi Kala Street Extension.

Conclusions: Future Year 2030

In total, it is anticipated that the proposed Waiehu Residential Community project will generate a total of 587 trips during the AM peak hours and 743 during the PM peak hours. This trip generation includes internal capture trip and pass-by trip reductions — representing trips that will be between residential and retail uses within the site and trips that already exist on the adjacent streets that will be redirected to visit the site. Both types of trips will not generate new trips at Study Intersections. Project-generated trips were assigned throughout the study area based upon regional origins as well as existing travel patterns within the vicinity of the project site.

Conclusions: Future Year 2030 WITH and WITHOUT Imi Kala Street Extension and Bridge Improvement

At the Kahekili Highway/Waiehu Beach Road intersection without improvements, the westbound approach at this intersection will operate at LOS F and overcapacity conditions during both the AM and PM peak hours. In the Base Year conditions, the widening of the southbound approach to provide a left-turn lane and widening of the westbound approach to provide a left-turn and right-turn lane was recommended and will continue to be recommended for Future Year 2030 conditions. In addition, project-related traffic may increase traffic to warrant a signal under the 100 percent factor with or without the Imi Kala Extension. The intersection should be monitored to determine if a signal or roundabout would be warranted based on actual volumes.

The increase of project-related traffic at the Kahekili Highway/Makaala Drive intersection will result in the westbound left-turn movement operating at LOS F and overcapacity conditions during the AM peak hour even with a median refuge lane. Similar to base year condition, a signal would only be warranted under the 70 percent factor with or without Imi Kala Extension. A median refuge lane will improve westbound left-turn operations to improve to LOS E and below capacity without Imi Kala Extension — however, will worsen back to LOS F with Imi Kala Extension. The intersection, with Imi Kala Extension, should be monitored to determine if a signal would be warranted based on actual volumes.

At the Waiehu Beach Road intersections with Wailupe Drive, Makaala Drive and Eha Street — the critical movements will continue to operate at LOS F conditions during the heavy AM peak hour — however, with delays similar to the Base Year 2030 condition without Imi Kala Street Extension. Some side street movements may experience lengthier delays and LOS F conditions during the PM peak hour; however, increased PM trips rerouted to Imi Kala Extension could reduce these movement delays.

At the Market Street/Mill Street intersection, all overcapacity movements will be mitigated with the Imi Kala Extension. Overall, the LOS between the Base Year 2030 condition without Imi Kala Street Extension compared to the Future Year 2030 condition with Imi Kala Street Extension — indicate that the regional Imi Kala Street Extension generally mitigates project-related traffic increases/impacts to operate similar to Base Year conditions. The proposed project will contribute its fair share towards the regional Imi Kala Street Extension Improvement to satisfy its regional impacts in the study area.

At the Mill Street/Imi Kala Street intersection, a signal will continue to be warranted similar to Base Year 2030 conditions.

The Kahekili Highway/North Project Driveway is planned to be a 4-legged intersection located directly across of the central access of the proposed Waiehu Affordable Housing Project. The North Project Driveway is anticipated to serve a portion of the residential uses as well as its retail uses due to the proximity to the driveway. As an unsignalized intersection, the eastbound shared left-turn/through movement will operate at LOS F during the AM peak hours and LOS E during the PM peak hours, despite under capacity. All other movements are anticipated to operate at LOS D or better across both peak hours. Based on the projected volumes, it is anticipated that a signal would only be warranted with the 70 percent warrant. Turn lanes are recommended on all approaches.

The Kahekili Highway/South Project Driveway is planned to be a T-intersection serving residential uses. An exclusive northbound left-turn lane, southbound right-turn lane, and median refuge lane are recommended. A traffic signal is not anticipated to be warranted at this intersection.

Recommendations: Base Year 2030 without Project

1. Kahekili Highway/Waiehu Beach Road (WITHOUT Imi Kala Extension)

The following mitigation efforts may still be considered with Imi Kala Extension.

- Widen westbound Waiehu Beach Road approach to provide exclusive westbound left-turn and right turn lanes; and
- Widen southbound Kahekili Highway approach to provide an exclusive southbound left-turn lane.

2. Kahekili Highway/Makaala Drive (WITH Imi Kala Extension Only)

Provide median refuge lane along Kahekili Highway to assist westbound left-turn vehicles.

14. Mill Street/Imi Kala Street (WITH or WITHOUT Imi Kala Extension)

Monitor and install a traffic signal if warranted by future traffic growth. This TIAR forecasts that signal may be warranted with 100 percent factor.

Conclusions: Future Year 2030 with Proposed Waiehu Residential Community Project

The proposed project will contribute its fair share towards the regional Imi Kala Street Extension Improvement. The Imi Kala Extension will alleviate some congestion along both

Kahekili Highway and Waiehu Beach Road — with numerous intersections forecast to improve or operate with similar levels of service to Base Year 2030 conditions WITHOUT the proposed project. The following are additional mitigations that should be considered with the proposed project.

1. Kahekili Highway/Waiehu Beach Road (WITH or WITHOUT Imi Kala Extension)
Monitor and install a traffic signal or roundabout if warranted by the future traffic growth with regards to the proposed project. This TIAR forecasts that a signal may be warranted with 100 percent factor.

2. Kahekili Highway/Makaala Drive (WITH Imi Kala Extension Only)
Monitor and install a traffic signal or roundabout if warranted by the future traffic growth. This TIAR forecasts that a signal would be warranted with 70 percent factor.

22. Kahekili Highway/North Project Driveway (WITH or WITHOUT Imi Kala Extension)

- Provide an unsignalized 4-legged intersection with turn lanes along all approaches; and
- Monitor and install a traffic signal or roundabout if warranted to accommodate future traffic growth. This TIAR forecasts that a signal would be warranted with 70 percent factor.

23. Kahekili Highway/South Project Driveway (WITH or WITHOUT Imi Kala Extension)

- Provide an unsignalized T-intersection with stop control on the South Project Driveway approach;
- Provide exclusive southbound right-turn and northbound left-turn lanes to accommodate entering traffic generated by the proposed project; and
- Provide a median refuge lane along Kahekili Highway to assist exiting eastbound left-turn vehicles.

2.4.3 Water

Existing Conditions. According to the PER, the subject property lies within the Iao Aquifer Groundwater Management Area and the Na Wai Eha Surface Water Management Area — both are under the control of the State of Hawai'i Department of Land and Natural Resources, Commission on Water Resource Management (CWRM). The proposed

development does not have sufficient water rights or capacity allocation from the CWRM. Therefore, the proposed project will have to depend on the Maui County Department of Water Supply (DWS) for potable water. The proposed development is located within a portion of the DWS' Central Maui service area — where DWS' existing water source, storage, and distribution systems do not have sufficient capacity to serve the project demand without significant improvements.

Potential Impacts and Mitigation Measures. It is anticipated that domestic consumption by the proposed development will be between 367,000 and 490,000 gallons of potable water per day.

The proposed project will also require a fire protection system to protect the multi-family and neighborhood commercial areas within the development. The system is expected to have the capacity of delivering a fire flow of 2,000 gallons per minute (gpm) for as long as 2 hours. Duplex and single-family residential areas will require a sustained fire flow of 1,250 gpm and 1,000 gpm, respectively.

The proposed project does not have sufficient water rights to enable any development of new water sources. Therefore, the proposed project will have to depend on the Maui County DWS for potable water. The potable water is expected to come from the DWS' existing groundwater wells located in upper Waiehu and North Waihee with groundwater source from the Iao and Waihee aquifers.

According to the PER, County DWS has indicated that they are currently drawing an amount of water from their existing wells in the Iao and Waihee aquifers — reaching the maximum pumpage recommended by CWRM. While there are strategies that Maui County has identified to develop new source capacity or free existing capacity for the other uses, such strategies will take time to pursue — so, there may not be a sufficient quantity of water at the outset to build out the entire development. Consequently, development of the proposed project has to be phased and the build-out has to be timed to reflect the availability of water source capacity.

The proposed project will include the construction of a new water storage tank with 1.0-million-gallon (MG) capacity. This proposed storage reservoir will be located at an elevation fully compatible with the Waiehu Heights 0.3 MG and Waiehu Kou 0.5 MG water storage tanks owned by the DWS. The new 1.0 MG tank will be configured in order to be filled primarily from the DWS' Central Maui Water Transmission System, or alternately from the DWS' Waiehu wells for added reliability and will be dedicated to

DWS upon completion. Figure 4-1 of the PER exhibits a map of the proposed improvements on the potable water system.

A primary distribution loop consisting of County-standard waterlines with 12-inch diameter — will be extended into the development area from the existing 16-inch transmission main used by DWS to serve the Waiehu Heights subdivision. Each of the residential areas comprising the proposed Waiehu Residential Community will, in turn, draw water for domestic use and fire protection through this primary distribution loop.

Fire hydrants will be installed along the internal streets throughout the development at a minimum spacing of 250 feet in the multi-family and neighborhood commercial areas, and a minimum spacing of 350 feet in the duplex and single-family residential areas.

2.4.4 Wastewater

Existing Conditions. The subject property does not have any existing sewer services. However, the nearby urban areas to the east are served by the County of Maui's sewerage system. This system collects wastewater and conveys it through a series of pumping stations and large capacity transmission lines to the Kahului Wastewater Reclamation Facility (KWWRF) for treatment and disposal. Therefore, it is expected that the subject property can obtain sewer service by making the improvements necessary to extend the existing County wastewater collection system to the subject property.

Potential Impacts and Mitigation Measures. The proposed Waiehu Residential Community is anticipated to generate approximately 255,000 gallons of wastewater per day.

New gravity sewer pipes with branch network will be installed within the internal streets to collect wastewater from the various buildings within the proposed development. This system will later convey wastewater into a sewer pumping station — located at the low point in the wastewater collection system at the northern end of the development area. New pressurized force main will take one of two alternate routes to make a connection to the existing County wastewater collection system. The following are alternatives of wastewater collection routes.

- **Alternative 1:** A northward route of an approximately 4,000 feet long connected to the County's 12-inch gravity main on Waiehu Beach Road; or

- **Alternative 2:** A southward route of an approximately 5,500 feet long running along Kahekili Highway and connected to the end of the 8-inch gravity main on Makaala Drive within the Waiehu Terrace Subdivision.

Both alternatives converge at an existing County Pumping Station along Waiehu Beach Road which, in turn, conveys wastewater to the Kahului Wastewater Treatment Facility for disposal. Figure 5-1 of the PER exhibits a map the proposed improvements on the sanitary sewer.

Currently, average daily wastewater flows received at the County's Kahului Wastewater Reclamation Facility (KWWRF) is approximately 5.7 million gallons per day (MGD) — translated into roughly 72 percent of the plant's 7.9 MGD capacity. The current remaining treatment capacity of the KWWRF appears to be able to accommodate the 0.25 MGD of wastewater that Waiehu Development is expected to generate at build-out.

Hawai'i Administrative Rules (HAR), Title 11, Chapter 62 (Wastewater Systems) Section 23.1, requires County of Maui to initiate a treatment facility expansion plan when actual wastewater flows reach 90 percent of the plant capacity. This statutory mandate — that treatment capacity be programmed to keep pace with regional demand — should enable the proposed Waiehu Residential Community to rely on the County system as they continue to provide sustainable and sufficient treatment capacity as the project develops. The following Table 10 shows the calculation of wastewater flows expected for the proposed project.

Table 10. Wastewater Flows Expected for the Proposed Waiehu Residential Community

Description	Quantity	Units	Average Day Demand	Unit	Total Wastewater Contribution (gpd)
Townhomes	108	units	255	gpd/unit	27,540
Duplex	76	units	350	gpd/unit	26,600
Single-family	568	units	350	gpd/unit	198,800
Commercial	17,400	square feet	0.10	gpd/s.f.	1,740
Total					**254,680***

**According to the PER, final number is rounded off into 255,000.*

Based on the foregoing, there should be ample treatment capacity available to accommodate the approximately 255,000-gallon daily wastewater flow — which the

proposed Waiehu Residential Community project is expected to generate. The Applicant understands that wastewater system capacity cannot be ensured until the issuance of building permits.

2.4.5 Other Utility Lines

Existing Conditions. Existing overhead utility lines are available along the *mauka* side of the Kahekili Highway and belong to Hawaiian Telcom. These utility lines do not include any facilities owned by Hawaiian Electric (HECO) or Spectrum. The nearest HECO or Spectrum facilities are located along Kahekili Highway at the Makaala Drive and Waiehu Beach Road intersections.

HECO will likely require that its primary overhead infrastructure be extended from the intersection of Makaala Drive and Kahekili Highway, along the project frontage, to its existing facilities near the intersection of Waiehu Beach Road and Kahekili Highway — where its small substation is located. This substation and its associated facilities may need to be upgraded or expanded to accommodate the additional loading required by the proposed Waiehu Residential Community. The substation upgrade or expansion will unlikely prevent the project from proceeding; however, it may need to be in place prior to the completion of the proposed project.

Spectrum will also likely need to upgrade their overhead infrastructure along the same route as Hawaiian Electric. County requirements normally require overhead utilities along the frontage of an urban development project be installed underground, except when exempted.

Potential Impacts and Mitigation Measures. The following discussion about necessary utility improvements to accommodate the proposed project is divided into three sections.

- **Hawaiian Electric Company (HECO)**
  HECO's preferred configuration for the project's onsite distribution system will likely involve an underground extension from both project entrances on Kahekili Highway to complete a loop within the interior of the project. The onsite electrical system will comprise of both three-phase and single-phase underground distribution as required by Maui County, except when a variance is received.

The three-phase system will be used mainly to connect switching equipment and service the commercial area of the project. The single-phase system will serve all of the residential units and power street lighting.

Pad-mounted switchgear and transformers will be required onsite. Underground distribution facilities (underground conduit, handholes and equipment pads) will be installed by the Applicant. Other parts of the system (electrical conductors, pad-mounted transformers, switchgear and street lights) will be installed by HECO. Distribution facilities will be installed as part of the site work; however, service requests for each individual unit will need to be submitted to HECO separately during construction.

Easements will be required to contain handholes, ducts, equipment pads, and other facilities located in private property and ensure vehicular access for their maintenance. Easements will also be needed to cover Hawaiian Telcom's fiber pads and Spectrum's power supply pads. Table 11 summarizes a preliminary estimate of the project's electrical demand load.

Table 11. Estimated Electrical Demand Load for the Proposed Waiehu Residential Community

Unit Type	Number	HECO Estimate		NEC Estimate (kW)
		kW/Lot	Total kW	
Townhouses	108	5	540	2,700
Duplex	76	5	380	2,280
Motor Courts	126	5	630	3,780
Bungalow	134	5	670	4,020
SFD Small Lots	149	5	894	4,470
SFD Small Lots	101	5	606	3,030
SFD Lot	58	6	348	1,740
Total	**752**		**4,068**	**22,020**
Commercial	**LS**			**1,009**

Figure 6-1 of the PER exhibits a map of existing and new overhead utility lines as well as the new underground utility lines.

- **Hawaiian Telcom**

Hawaiian Telcom provides telephone and Digital Subscriber Line (DSL) services in the area. No television service is currently available.

Hawaiian Telcom's existing telephone plant serving this area is not sufficient to accommodate the proposed project; therefore, fiber optic equipment including a number of fiber distribution hubs (FDH) will be installed to provide telecommunication services. The FDH equipment will act as a hub for the distribution of all Hawaiian Telcom's telecommunication services for the proposed project.

The required telephone support structures will depend upon the easement locations for the FDH and Hawaiian Telcom's preferred route of entry from Kahekili Highway. Telephone cables will be installed at Hawaiian Telcom's expense with customers responsible for service connections and monthly rental fees. The distribution path will follow the Hawaiian Electric facilities.

Preferred easement location for FDH equipment will be transmitted upon receipt of information from its planning department when detailed plans are available.

- **Spectrum**

  Spectrum is the regulated cable television provider on Maui while also provides telephone and internet connectivity. Spectrum currently maintains existing overhead facilities along Kahekili Highway at Makaala Drive and Malaihi Road intersections. The path of its new distribution system along the Kahekili Highway project frontage and project interior will follow the Hawaiian Electric facilities. The Applicant will need to coordinate the installation of all required onsite and offsite infrastructure (i.e., ducts, boxes, power supple pad, etc.) with Spectrum at its own expense.

  Spectrum will require a 4-inch conduit for their main runs along the streets and street crossings with 2-inch service stub-outs. They will also need a number of power supply pads within the project site. The cost of installing the power supply equipment and all related cabling will be Spectrum's expense. As with the other utilities, it will be the responsibility of the individual homeowner to submit his/her own service request for the desired service connection, rental equipment, installation and monthly fees to Spectrum.

  Easements will be required to contain any underground facilities located in private property and provide vehicular access for maintenance.

Site Improvements. The proposed utility improvements will involve the installation of underground service distribution system infrastructure for Hawaiian Electric, Hawaiian Telcom, and Spectrum will be needed. Generally, the Applicant will be responsible to install basic infrastructure (i.e., handholes, conduit, and concrete pads for transformers, switchgear, and communication equipment), while the Utility Companies will be responsible to pull cable and install their equipment after the basic infrastructure has been installed and accepted. Applicant will also install the necessary infrastructure to provide street lighting, i.e., conduit, handholes, and concrete light bases. HECO will provide light fixtures for all roads that will be dedicated to the County of Maui. In addition, the Applicant will also furnish and install private light fixtures.

All exterior lighting will be full cut-off fixtures compliant with Maui County's Outdoor Lighting Ordinance. Public street lights will be installed at a 20-foot height following HECO and Maui County Standards. If streets remain private, metered pole-mounted street lights may be used for area and street lighting.

Physical space for the required utility facilities within the project site may become a potential concern — as the proposed house lots in some parts of the project area are very small. If space does not allow for handhole placement, or if project does not have curbs and gutters, the use of manholes or traffic-rated handholes may be required.

3. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES, AND CONTROLS

3.1 Chapter 343 Hawai'i Revised Statutes

This EIS has been prepared in accordance with the provisions of Chapter 343, HRS, (Environmental Impact Statement Law) and Title 11, Chapter 200, HAR, Environmental Impact Statement Rules.

Section 343.5 HRS, establishes nine "triggers" that require the preparation of an Environmental Assessment (EA) or EIS. The trigger for the Waiehu Residential Community includes proposal to amend the Wailuku-Kahului Community Plan from Agricultural to Urban use and Off-site infrastructure work affecting State and County rights-of-way along Kahekili Highway.

This document has been prepared in accordance with the following significance criteria specified in Section 11-200-12 of the Department of Health rules relating to Environmental Impact Statements:

A. *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.*
Analysis. As documented in this report, there are no significant cultural or natural resources on the property. The lands underlying the subject property are currently vacant.

B. *Curtails the range of beneficial uses of the environment.*
Analysis. The proposed project does not introduce an incompatible use to the area; therefore, the project will not curtail the range of beneficial uses of the environment in the project vicinity.

C. *Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.*
Analysis. The project is being developed in compliance with the state's long term environmental goals. As documented in this report, adequate mitigation measures will be implemented to minimize the potential for negative impacts to the environment.

D. Substantially affects the economic or social welfare of the community or state.

Analysis. As documented in this report, significant negative long-term impacts to the socio-economic environment are not anticipated as a result of the proposed action.

E. Substantially affects public health.

Analysis. There are no special or unique aspects of the project which will have a negative impact on public health.

F. Involves substantial secondary impacts, such as population changes or effects on public facilities.

Analysis. The proposed project will not lead to an impact on population levels since there is no residential component. As documented in this report, the project will not result in a significant negative impact on public facilities.

G. Involves a substantial degradation of environmental quality.

Analysis. The Applicant has proposed a series of mitigation measures to limit the impact to the environment and will respond to issues raised during the review and approval process.

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

Analysis. The project does not involve a commitment for larger actions on behalf of the applicant or any public agency.

I. Substantially affects a rare, threatened, or endangered species, or its habitat.

Analysis. There are no known rare, threatened, or endangered species or habitat identified at the project site.

J. Detrimentally affects air or water quality or ambient noise levels.

Analysis. As documented, there will be short term impacts on air and water quality and ambient noise levels during construction; however, mitigation measures will be employed to minimize these impacts. Adverse long-term impacts are not anticipated.

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

Analysis. The project site is not located within any flood plain and is not in the coastal area. The subject property is in Zone X, an area outside the 0.2% annual chance floodplain. Compliance with County grading requirements will be met.

L. Substantially affects scenic vistas and view planes identified in county or state plans or studies.

Analysis. The Proposed Action is not anticipated to substantially affect scenic vistas or view planes identified in county or state plans or studies.

M. Requires substantial energy consumption.

Analysis. Construction of proposed structure will comply with Chapter 16.26.1300, "Energy Conservation", Maui County Code. Where practical and economically feasible, the proposed structure will meet or exceed the building efficiency standard for the State of Hawai'i.

3.2 State Land Use

Chapter 205, Hawai'i Revised Statutes, relating to the Land Use Commission (LUC), establishes four (4) major land use districts in which all lands in the state are placed. These districts are designated as *Urban*, *Rural*, *Agricultural*, and *Conservation*. The lands underlying the proposed Waiehu Residential Community are predominantly designated State Agricultural District. Only a small area situated east of the western property boundary is designated State Rural District. (**See**: Figure 6, State Land Use District Map)

Pursuant to Chapter 15-15, Hawai'i Administrative Rules, any and all uses permitted by local (County) government, either by ordinances or rules, may be allowed in the *State Urban District*, subject to any conditions imposed by the State Land Use Commission.

Sec 15-15-24, Hawai'i Administrative Rules. Permissible uses within the "U" Urban District.

Pending the State Land Use District Boundary Amendment from Agricultural to Urban, the proposed Waiehu Residential Community would become in compliance with section 15-15-24 HAR.

3.3 Hawai'i State Plan

The Hawai'i State Plan (Chapter 226, HRS) establishes a set of goals, objectives, and policies that serve to guide the long-term growth and development of the State. The Plan consists of three (3) parts. Part I includes its Overall Theme, Goals, Objectives, and Policies; Part II encompasses Planning, Coordination, and Implementation; and Part III establishes Priority Guidelines. Since Part II of the State Plan covers its administrative structure and implementation process, comments relating to the applicability of Part II to the proposed project are not appropriate. In addition to sections of the State Plan that are applicable to the proposed project, a discussion of how the project conforms to the State Plan is included below.

Hawai'i State Plan, Chapter 226, HRS Part 1. Overall Themes, Goals, Objectives and Policies **Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable**	**S**	**N/S**	**N/A**
HRS 226-1: Findings and Purpose			
HRS 226-2: Definitions			
HRS 226-3: Overall Theme			
HRS 226-4: State Goals. In order to guarantee, for the present and future generations, those elements of choice and mobility that insure that individuals and groups may approach their desired levels of self-reliance and self determination, it shall be the goal of the State to achieve: 1. A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai'i's present and future generations. 2. A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well being of the people. 3. Physical, social, and economic well-being, for individuals and families in Hawai'i, that nourishes a sense of community responsibility, of caring, and of participation in community life.			
Analysis: **The proposed 100% affordable Waiehu Residential Community achieves the above-referenced goals by 1) fulfilling the need for affordable housing in Wailuku and 2) creating a small-scale commercial center for employment opportunities for residents, thereby providing greater opportunity for self-reliance and self-determination.**			
Chapter 226-5, HRS, Objective and Policies for Population			
Objective: It shall be the objective in planning for the state's population to guide population			

growth to be consistent with the achievement of physical, economic and social objectives contained in this chapter.			
Policies:	**S**	**N/S**	**N/A**
(1) Manage population growth statewide in a manner that provides increased opportunities for Hawai'i's people to pursue their physical, social, and economic aspirations while recognizing the unique needs of each county.	✓		
(2) Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.	✓		
(3) Promote increased opportunities for Hawai'i's people to pursue their socio-economic aspirations throughout the islands.	✓		
(4) Encourage research activities and public awareness programs to foster an understanding of Hawai'i's limited capacity to accommodate population needs and to address concerns resulting from an increase in Hawai'i's population.			✓
(5) Encourage federal actions and coordination among major governmental agencies to promote a more balanced distribution of immigrants among the states, provided that such actions do not prevent the reunion of immediate family members.			✓
(6) Pursue an increase in federal assistance for states with a greater proportion of foreign immigrants relative to their state's population.			✓
(7) Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area. [L 1978, c 100, pt of §2; am L 1986, c 276, §4; am L 1988, c 70, §3; am L 1993, c 213, §3]	✓		
Analysis: **The proposed Waiehu Residential Community is located in an area designated by the Maui Island Plan for future urban growth and will contribute to a strong, viable economy on Maui, by not only generating a small employment center closer to the workforce who may reside in. The result will be an increase in economic activities and employment opportunities, which will promote increased opportunities for Hawai'i.**			
Chapter 226-6, HRS, Objectives and Policies for the Economy – in General			
Objectives: Planning for the State's economy in general shall be directed toward achievement of the following objectives:			

Objectives:		**S**	**N/S**	**N/A**
(1)	Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai'i's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.	✓		
(2)	A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.	✓		
Policies:		**S**	**N/S**	**N/A**
(1)	Promote and encourage entrepreneurship within Hawai'i by residents and nonresidents of the State.	✓		
(2)	Expand Hawai'i's national and international marketing, communication, and organizational ties, to increase the State's capacity to adjust to and capitalize upon economic changes and opportunities occurring outside the State.	✓		
(3)	Promote Hawai'i as an attractive market for environmentally and socially sound investment activities that benefit Hawai'i's people.	✓		
(4)	Transform and maintain Hawai'i as a place that welcomes and facilitates innovative activity that may lead to commercial opportunities	✓		
(5)	Promote innovative activity that may pose initial risks, but ultimately contribute to the economy of Hawai'i.			✓
(6)	Seek broader outlets for new or expanded Hawai'i business investments.	✓		
(7)	Expand existing markets and penetrate new markets for Hawai'i's products and services.			✓
(8)	Assure that the basic economic needs of Hawai'i's people are maintained in the event of disruptions in overseas transportation.	✓		
(9)	Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.	✓		
(10)	Encourage the formation of cooperatives and other favorable marketing arrangements at the local or regional level to assist	✓		

	Hawai'i's small scale producers, manufacturers, and distributors.			
(11)	Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility.	✓		
(12)	Encourage innovative activities that may not be labor-intensive, but may otherwise contribute to the economy of Hawai'i.	✓		
(13)	Foster greater cooperation and coordination between the government and private sectors in developing Hawai'i's employment and economic growth opportunities.	✓		
(14)	Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.	✓		
(15)	Maintain acceptable working conditions and standards for Hawai'i's workers.	✓		
(16)	Provide equal employment opportunities for all segments of Hawai'i's population through affirmative action and nondiscrimination measures.			✓
(17)	Stimulate the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.			✓
(18)	Encourage businesses that have favorable financial multiplier effects within Hawai'i's economy, particularly with respect to emerging industries in science and technology.			✓
(19)	Promote and protect intangible resources in Hawai'i, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.	✓		
(20)	Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future employment needs in general, and requirements of new, potential growth industries in particular.			✓
(21)	Foster a business climate in Hawai'i — including attitudes, tax and regulatory policies, and financial and technical assistance programs — that is conducive to the expansion of existing enterprises and the creation and attraction of new business and industry.	✓		
Analysis: **As discussed in Section 2.2.2 (Economy), employment from construction will generate direct jobs during the construction phase. The construction of the Waiehu**				

Residential Community is expected to contribute taxes for Maui County and for the state of Hawai'i. The effect of these expenditures will have positive direct, indirect, and induced beneficial impacts on the economy of the County of Maui. During its operations phase, the Waiehu Residential Community will create small scale employment opportunities and economic stimulus for the region. The proposed project will provide direct employment opportunities for Maui residents and contribute to economic diversification and growth for both Maui and the State.			
Chapter 226-7 Objectives and policies for the economy-agriculture			
Objectives: Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:			
Objectives:	**S**	**N/S**	**N/A**
(1) Viability of Hawai'i's sugar and pineapple industries.			✓
(2) Growth and development of diversified agriculture throughout the State.			✓
(3) An agriculture industry that continues to constitute a dynamic and essential component of Hawai'i's strategic, economic, and social well-being.			✓
Policies:	**S**	**N/S**	**N/A**
(1) Establish a clear direction for Hawai'i's agriculture through stakeholder commitment and advocacy.			✓
(2) Encourage agriculture by making best use of natural resources.			✓
(3) Provide the governor and the legislature with information and options needed for prudent decision making for the development of agriculture.			✓
(4) Establish strong relationships between the agricultural and visitor industries for mutual marketing benefits.	✓		
(5) Foster increased public awareness and understanding of the contributions and benefits of agriculture as a major sector of Hawai'i's economy.			✓
(6) Seek the enactment and retention of federal and state legislation that benefits Hawai'i's agricultural industries.			✓
(7) Strengthen diversified agriculture by developing an effective			✓

	promotion, marketing, and distribution system between Hawai'i's food producers and consumers in the State, nation, and world.			
(8)	Support research and development activities that strengthen economic productivity in agriculture, stimulate greater efficiency, and enhance the development of new products and agricultural by-products.			✓
(9)	Enhance agricultural growth by providing public incentives and encouraging private initiatives.			✓
(10)	Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.			✓
(11)	Increase the attractiveness and opportunities for an agricultural education and livelihood.			✓
(12)	In addition to the State's priority on food, expand Hawai'i's agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.			✓
(13)	Promote economically competitive activities that increase Hawai'i's agricultural self-sufficiency, including the increased purchase and use of Hawai'i-grown food and food products by residents, businesses, and governmental bodies as defined under section 103D-104.			✓
(14)	Promote and assist in the establishment of sound financial programs for diversified agriculture.			✓
(15)	Institute and support programs and activities to assist the entry of displaced agricultural workers into alternative agricultural or other employment.			✓
(16)	Facilitate the transition of agricultural lands in economically nonfeasible agricultural production to economically viable agricultural uses.			✓
(17)	Perpetuate, promote, and increase use of traditional Hawaiian farming systems, such as the use of loko iʻa, māla, and irrigated loʻi, and growth of traditional Hawaiian crops, such as kalo, ʻuala, and ʻulu.			✓
(18)	Increase and develop small-scale farms.			✓
Analysis: **As discussed in Section 2.1.11 (Agricultural Resources), the LSB and ALISH**				

classification systems indicate that the lands underlying the project site possess soil with soil ratings for productive agricultural uses. However, the previously approved Hale Mua project was determined to be an appropriate urban development for the area and the project site is designated for future urban development in the Maui Island Plan. As such, the utilization of the project site for urban use and development is appropriate.			
Chapter 226-8 Objective and policies for the economy-visitor industry			
Objectives: Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawai'i's economy.			
Policies:	**S**	**N/S**	**N/A**
(1) Support and assist in the promotion of Hawai'i's visitor attractions and facilities.			✓
(2) Ensure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawai'i's people.			✓
(3) Improve the quality of existing visitor destination areas by utilizing Hawai'i's strengths in science and technology.			✓
(4) Encourage cooperation and coordination between the government and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.			✓
(5) Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawai'i's people.			✓
(6) Provide opportunities for Hawai'i's people to obtain job training and education that will allow for upward mobility within the visitor industry.			✓
(7) Foster a recognition of the contribution of the visitor industry to Hawai'i's economy and the need to perpetuate the aloha spirit.			✓
(8) Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawai'i's cultures and values.			✓
Analysis: **The Waiehu Residential Community will not directly support the visitor industry therefore this objective is not applicable.**			
Chapter 226-9 Objective and policies for the economy-federal expenditures			
Objective: Planning for the State's economy with regard to federal expenditures shall be			

directed towards achievement of the objective of a stable federal investment base as an integral component of Hawai'i 's economy.			
Policies:	**S**	**N/S**	**N/A**
(1) Encourage the sustained flow of federal expenditures in Hawai'i that generates long-term government civilian employment.			✓
(2) Promote Hawai'i's supportive role in national defense in a manner consistent with Hawai'i's social, environmental, and cultural goals by building upon dual-use and defense applications to develop thriving ocean engineering, aerospace research and development, and related dual-use technology sectors in Hawai'i's economy.			✓
(3) Promote the development of federally supported activities in Hawai'i that respect state-wide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawai'i's environment.			✓
(4) Increase opportunities for entry and advancement of Hawai'i's people into federal government service.			✓
(5) Promote federal use of local commodities, services, and facilities available in Hawai'i.			✓
(6) Strengthen federal-state-county communication and coordination in all federal activities that affect Hawai'i.			✓
(7) Pursue the return of federally controlled lands in Hawai'i that are not required for either the defense of the nation or for other purposes of national importance, and promote the mutually beneficial exchanges of land between federal agencies, the State, and the counties.			✓
Analysis: **The Waiehu Residential Community will not use federal funds or land, nor will it require additional federal expenditures in the State. Therefore, Chapter 226-9 does not apply to the proposed project.**			
Chapter 226-10 Objective and policies for the economy-potential growth activities			
Objective: Planning for the State's economy with regard to potential growth activities shall be directed towards achievement of the objective of development and expansion of potential growth activities that serve to increase and diversify Hawai'i's economic base.			
Policies:	**S**	**N/S**	**N/A**
(1) Facilitate investment and employment growth in economic activities that have the potential to expand and diversify Hawai'i's economy, including but not limited to diversified agriculture, aquaculture,			✓

	renewable energy development, creative media, health care, and science and technology-based sectors.			
(2)	Facilitate investment in innovative activity that may pose risks or be less labor-intensive than other traditional business activity, but if successful, will generate revenue in Hawai'i through the export of services or products or substitution of imported services or products.			✓
(3)	Encourage entrepreneurship in innovative activity by academic researchers and instructors who may not have the background, skill, or initial inclination to commercially exploit their discoveries or achievements.			✓
(4)	Recognize that innovative activity is not exclusively dependent upon individuals with advanced formal education, but that many self-taught, motivated individuals are able, willing, sufficiently knowledgeable, and equipped with the attitude necessary to undertake innovative activity.			✓
(5)	Increase the opportunities for investors in innovative activity and talent engaged in innovative activity to personally meet and interact at cultural, art, entertainment, culinary, athletic, or visitor-oriented events without a business focus.			✓
(6)	Expand Hawai'i's capacity to attract and service international programs and activities that generate employment for Hawai'i's people.			✓
(7)	Enhance and promote Hawai'i's role as a center for international relations, trade, finance, services, technology, education, culture, and the arts.			✓
(8)	Accelerate research and development of new energy-related industries based on wind, solar, ocean, and underground resources and solid waste.			✓
(9)	Promote Hawai'i's geographic, environmental, social, and technological advantages to attract new or innovative economic activities into the State.			✓
(10)	Provide public incentives and encourage private initiative to attract new industries that best support Hawai'i's social, economic, physical, and environmental objectives.			✓
(11)	Increase research and the development of ocean-related economic activities such as mining, food production, and scientific research.			✓

(12)	Develop, promote, and support research and educational and training programs that Recognize and promote health care and health care information technology as growth industries will enhance Hawai'i's ability to attract and develop economic activities of benefit to Hawai'i.			✓
(13)	Foster a broader public recognition and understanding of the potential benefits of new or innovative growth-oriented industry in Hawai'i.			✓
(14)	Encourage the development and implementation of joint federal and state initiatives to attract federal programs and projects that will support Hawai'i's social, economic, Recognize and promote health care and health care information technology as growth industries physical, and environmental objectives.			✓
(15)	Increase research and development of businesses and services in the telecommunications and information industries.			✓
(16)	Foster the research and development of nonfossil fuel and energy efficient modes of transportation.			✓
(17)	Recognize and promote health care and health care information technology as growth industries.			✓
Analysis: **The Proposed residential community is not anticipated to result in the development and expansion of potential growth activities that serve to increase and diversify Hawai'i's economic base, therefore this objective is not applicable.**				
Chapter 226-10.5 Objectives and policies for the economy-information industry				
Objective: Planning for the State's economy with regard to telecommunications and information technology shall be directed toward recognizing that broadband and wireless communication capability and infrastructure are foundations for an innovative economy and positioning Hawai'i as a leader in broadband and wireless communications and applications in the Pacific Region.				
Policies:		**S**	**N/S**	**N/A**
(1)	Promote efforts to attain the highest speeds of electronic and wireless communication within Hawai'i and between Hawai'i and the world, and make high speed communication available to all residents and businesses in Hawai'i;			✓

(2)	Encourage the continued development and expansion of the telecommunications infrastructure serving Hawai'i to accommodate future growth and innovation in Hawai'i's economy;			✓
(3)	Facilitate the development of new or innovative business and service ventures in the information industry which will provide employment opportunities for the people of Hawai'i;			✓
(4)	Encourage mainland-and foreign-based companies of all sizes, whether information technology-focused or not, to allow their principals, employees, or contractors to live in and work from Hawai'i, using technology to communicate with their headquarters, offices, or customers located out-of-state;			✓
(5)	Encourage greater cooperation between the public and private sectors in developing and maintaining a well-designed information industry;			✓
(6)	Ensure that the development of new businesses and services in the industry are in keeping with the social, economic, and physical needs and aspirations of Hawai'i's people;			✓
(7)	Provide opportunities for Hawai'i's people to obtain job training and education that will allow for upward mobility within the information industry;			✓
(8)	Foster a recognition of the contribution of the information industry to Hawai'i's economy; and			✓
(9)	Assist in the promotion of Hawai'i as a broker, creator, and processor of information in the Pacific.			✓
Analysis: **Not applicable.**				
Chapter 226-11, HRS, Objectives and Policies for the Physical Environment – Land Based, Shoreline, and Marine Resources				
(a)	Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:			
Objectives:		**S**	**N/S**	**N/A**
(1)	Prudent use of Hawai'i's land-based, shoreline, and marine resources.	✓		
(2)	Effective protection of Hawai'i's unique and fragile environmental resources.	✓		

Policies:				
(1)	Exercise an overall conservation ethic in the use of Hawai'i's natural resources.	✓		
(2)	Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.	✓		
(3)	Take into account the physical attributes of areas when planning and designing activities and facilities.	✓		
(4)	Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.	✓		
(5)	Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.	✓		
(6)	Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai'i.	✓		
(7)	Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.	✓		
(8)	Pursue compatible relationships among activities, facilities, and natural resources.	✓		
(9)	Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.			✓
Analysis: **The Waiehu Residential Community is not within the Hawai'i Coastal Zone Management Area nor within the Special Management Area for the island of Maui. No listed or endangered species of flora and fauna were identified on the property. During the construction and operational phases of the project, Best Management Practices (BMPs) will be implemented to mitigate non-point source pollution to natural resources and mitigate the effects of fugitive dust.**				
Chapter 226-12, HRS, Objective and Policies for the Physical Environment – Scenic, Natural Beauty, and Historic Resources				
Objective: Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawai'i's scenic assets, natural beauty, and multi-cultural/historical resources.				
Policies:		**S**	**N/S**	**N/A**

(1)	Promote the preservation and restoration of significant natural and historic resources.	✓		
(2)	Provide incentives to maintain and enhance historic, cultural, and scenic amenities.	✓		
(3)	Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.	✓		
(4)	Protect those special areas, structures, and elements that are an integral and functional part of Hawai'i's ethnic and cultural heritage.	✓		
(5)	Encourage the design of developments and activities that complement the natural beauty of the islands.	✓		

Analysis: **The Applicant's Archaeologist has consulted with the State Historic Preservation Division and the previously approved archaeological survey results indicated that no significant materials or cultural remains were located on this previously disturbed land.**

As discussed in Section 2.2.3 (Cultural Resources), the cultural impact statement (CIA) which was prepared for the proposed project reported that there were no visible cultural resources, (*i.e.*, medicinal plants, shoreline resources, religious sites, or archeological resources) observed on the property. From a cultural practices and beliefs perspective, the subject property bears no apparent signs of cultural practices or any gatherings currently taking place on the site. The oral history interviews did not reveal any known gathering places on the subject property nor did any access concerns surface as a result of the proposed Action.

As discussed in Section 2.1.10 (Visual Resources) the Waiehu Residential Community is not anticipated to have significant impacts on views from Kahekili Highway toward The West Maui Mountains. The property is setback substantially from Kahekili Highway and building height is staggered from one-story to two-stories. The proposed project will complement the architectural character of other developed properties in the area.

Chapter 226-13, Hawai'i Revised Statutes, Objectives and Policies for the Physical Environment – Land, Air, and Water Quality

Objectives:		**S**	**N/S**	**N/A**
(1)	Maintenance and pursuit of improved quality in Hawai'i's land, air,	✓		

	and water resources.			
(2)	Greater public awareness and appreciation of Hawai'i's environmental resources.	✓		
Policies:		**S**	**N/S**	**N/A**
(1)	Foster educational activities that promote a better understanding of Hawai'i's limited environmental resources.			✓
(2)	Promote the proper management of Hawai'i's land and water resources.	✓		
(3)	Promote effective measures to achieve desired quality in Hawai'i's surface, ground, and coastal waters.	✓		
(4)	Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawai'i's people.	✓		
(5)	Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.	✓		
(6)	Encourage design and construction practices that enhance the physical qualities of Hawai'i's communities.	✓		
(7)	Encourage urban developments in close proximity to existing services and facilities.	✓		
(8)	Foster recognition of the importance and value of the land, air, and water resources to Hawai'i's people, their cultures and visitors.	✓		

Analysis: **Potential impacts of runoff from the Proposed Action during the construction and operational phases of the project will be mitigated by Best Management Practices (BMPs) to reduce non-point source pollution to natural resources and mitigate the effects of fugitive dust.**

From a site planning perspective, the design and layout of the project involved an evaluation of existing topographic conditions in order to create a viable development plan which would minimize potential impacts to the land form. To the extent practicable, the layout and orientation of future buildings will strive to preserve view planes.

As discussed in Section 2.1.7 (Air Quality), appropriate mitigation measures will be implemented during construction to minimize any temporary impacts on air quality. The proposed project will be developed in accordance with applicable Federal and/or State air quality standards.

As discussed in Section 2.1.3 (Natural Hazards), the development of the Waiehu Residential Community will not increase the possibility of natural hazards such as flooding, tsunami inundation, hurricanes, and earthquakes. The Waiehu Residential Community will be constructed in compliance with County, State and Federal standards.

Chapter 226-14 Objective and policies for facility systems-in general

Objective: Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.

Policies:		**S**	**N/S**	**N/A**
(1)	Accommodate the needs of Hawai'i's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.			✓
(2)	Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.			✓
(3)	Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.			✓
(4)	Pursue alternative methods of financing programs and projects and cost saving techniques in the planning, construction, and maintenance of facility systems.			✓

Analysis: **The proposed Waiehu Residential Community does not involve planning for the State's facility systems; therefore, these objectives and policies are not applicable.**

Chapter 226-15, Hawai'i Revised Statutes, Objectives and Policies for Facility Systems - Solid and Liquid Waste

Objectives: Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.

Objectives:		**S**	**N/S**	**N/A**
(1)	Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.	✓		
(2)	Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility,	✓		

and other areas.			
Policies:	**S**	**N/S**	**N/A**
(1) Encourage the adequate development of sewerage facilities that complement planned growth.	✓		
(2) Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.	✓		
(3) Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes.			✓
Analysis: **As discussed in Section 2.4.4 (Wastewater), the property is proposing to connect to the County wastewater system and as of this report the County has a sufficient capacity to accommodate the expected wastewater generated by the Proposed Action. In addition, a new onsite sewer system will collect sewer flow generated from the project.** **As discussed in Section 2.3.5 (Solid Waste), the Waiehu Residential Community will develop strategies for reducing solid waste delivered to the County landfill by providing options for recycling and promoting recycling practices.**			
Chapter 226-16, Hawai'i Revised Statutes, Objectives and Policies for Facility Systems - Water			
Objective: Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.			
Policies:	**S**	**N/S**	**N/A**
(1) Coordinate development of land use activities with existing and potential water supply.	✓		
(2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.	✓		
(3) Reclaim and encourage the productive use of runoff water and wastewater discharges.	✓		
(4) Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.	✓		
(5) Support water supply services to areas experiencing critical water problems.	✓		
(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate	✓		

water to meet long-term needs. [L 1978, c 100, pt of §2; am L 1986, c 276, §15]			

Analysis: **As discussed in Section 2.4.3 (Water), the drinking water source for the Waiehu Residential Community is from the County of Maui water system for domestic consumption and irrigation water for the project's landscaped areas.**

The project's onsite domestic water distribution system which will be connected to the DWS system will be designed and constructed to not only provide water for domestic consumption but also for fire protection.

In addition, the developer is committed to water conservation strategies for reducing consumption, conserving resources, and minimizing water demands, and implementing the water conservation measures of the DWS.

Chapter 226-17 Objectives and policies for facility systems-transportation.

Objectives: Planning for the State's facility systems with regard to transportation shall be directed towards the achievement of the following objectives:

Objectives:	**S**	**N/S**	**N/A**
(1) An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.	✓		
(2) A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.	✓		
Policies:			
(1) Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter;	✓		
(2) Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives;	✓		
(3) Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties;	✓		
(4) Provide for improved accessibility to shipping, docking, and storage facilities;			✓
(5) Promote a reasonable level and variety of mass transportation services that adequately meet statewide and community needs;	✓		

(6)	Encourage transportation systems that serve to accommodate present and future development needs of communities;	✓		
(7)	Encourage a variety of carriers to offer increased opportunities and advantages to interisland movement of people and goods;			✓
(8)	Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment and storage needs;			✓
(9)	Encourage the development of transportation systems and programs which would assist statewide economic growth and diversification;	✓		
(10)	Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawai'i's natural environment;	✓		
(11)	Encourage safe and convenient use of low-cost, energy-efficient, non-polluting means of transportation;	✓		
(12)	Coordinate intergovernmental land use and transportation planning activities to ensure the timely delivery of supporting transportation infrastructure in order to accommodate planned growth objectives; and	✓		
(13)	Encourage diversification of transportation modes and infrastructure to promote alternate fuels and energy efficiency. [L 1978, c 100, pt of §2; am L 1986, c 276, §16; am L 1993, c 149, §1; am L 1994, c 96, §3]	✓		
Analysis: **As discussed in the DEIS, the proposed project will incorporate future bus stop locations for the Maui Bus to increase public transportation options in Waiehu. In addition, the project site plan incorporates sidewalks, trails and bike lanes throughout the site and along Kahekili Highway fronting the project site.**				
Chapter 226-18, Hawai'i Revised Statutes, Objectives and Policies for Facility Systems - Energy				
Objectives: Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all:				
Objectives:		**S**	**N/S**	**N/A**
(1)	Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;	✓		
(2)	Increased energy security and self-sufficiency through the reduction and ultimate elimination of Hawai'i's dependence on imported fuels for electrical generation and ground transportation;	✓		

(3)	Greater energy security and diversification in the face of threats to Hawai'i's energy supplies and systems; and	✓		
(4)	Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use; and	✓		
(5)	Utility models that make the social and financial interests of Hawai'i's utility customers a priority.	✓		
Policies:		**S**	**N/S**	**N/A**
(1)	Support research and development as well as promote the use of renewable energy sources;	✓		
(2)	Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth;	✓		
(3)	Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least-cost is determined by a reasonably comprehensive, quantitative, and qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits;	✓		
(4)	Promote all cost-effective conservation of power and fuel supplies through measures, including:	✓		
	(A) Development of cost-effective demand-side management programs;	✓		
	(B) Education; and	✓		
	(C) Adoption of energy-efficient practices and technologies;	✓		
	(D) Increasing energy efficiency and decreasing energy use in public infrastructure;	✓		
(5)	Ensure, to the extent that new supply-side resources are needed, that the development or expansion of energy systems uses the least-cost energy supply option and maximizes efficient technologies;	✓		
(6)	Support research, development, demonstration, and use of energy efficiency, load management, and other demand-side management programs, practices, and technologies;	✓		
(7)	Promote alternate fuels and transportation energy efficiency;	✓		
(8)	Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications;	✓		

(9)	Support actions that reduce, avoid, or sequester Hawai'i's greenhouse gas emissions through agriculture and forestry initiatives; and	✓		
(10)	Provide priority handling and processing for all state and county permits required for renewable energy projects.	✓		
(11)	Ensure that liquefied natural gas is used only as a cost-effective transitional, limited-term replacement of petroleum for electricity generation and does not impede the development and use of other cost-effective renewable energy sources; and	✓		
(12)	Promote the development of indigenous geothermal energy resources that are located on public trust land as an affordable and reliable source of firm power for Hawai'i.	✓		

Analysis: **As discussed, the Applicant is exploring conservation measures to encourage the use of energy-efficient technology throughout the project, specifically in areas involving lighting, air-conditioning, and building materials.**

In addition, the proposed project individually will not result in significant impacts to the trends attributable to climate change. Cumulatively, the proposed project will contribute to the trends attributable to climate change. However, the cumulative impacts from developments will be associated with the total GHG emissions for the State — which have been anticipated in emission inventories for the State and are expected to be offset by even greater reductions in emissions produced by energy industries.

Chapter 226-18.5 Objectives and policies for facility systems-telecommunications

Objective: Planning for the State's telecommunications facility systems shall be directed towards the achievement of dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people.

Policies: To achieve the telecommunications objective, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable telecommunications services to accommodate demand. To further achieve the telecommunications objective, it shall be the policy of this State to:		**S**	**N/S**	**N/A**
(1)	Facilitate research and development of telecommunications systems and resources;			✓
(2)	Encourage public and private sector efforts to develop means for adequate, ongoing telecommunications planning;			✓

(3) Promote efficient management and use of existing telecommunications systems and services; and			✓
(4) Facilitate the development of education and training of telecommunications personnel.			✓
Analysis: **The Waiehu Residential Community does not involve any planning for the State's telecommunication systems; therefore, this objective and policies are not applicable.**			
Chapter 226-19 Objectives and policies for socio-cultural advancement-housing			
Objectives: Planning for the State's socio-cultural advancement with regard to housing shall be directed toward the achievement of the following objectives:			
Objectives:	**S**	**N/S**	**N/A**
(1) Greater opportunities for Hawai'i's people to secure reasonably priced, safe, sanitary, and livable homes, located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals, through collaboration and cooperation between government and nonprofit and for-profit developers to ensure that more affordable housing is made available to very low-, low- and moderate-income segments of Hawai'i's population.	✓		
(2) The orderly development of residential areas sensitive to community needs and other land uses.	✓		
(3) The development and provision of affordable rental housing by the State to meet the housing needs of Hawai'i's people.			✓
Policies:	**S**	**N/S**	**N/A**
(1) Effectively accommodate the housing needs of Hawai'i's people.	✓		
(2) Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income, and gap-group households.	✓		
(3) Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.	✓		
(4) Promote appropriate improvement, rehabilitation, and maintenance of existing housing units and residential areas.			✓
(5) Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and	✓		

	surrounding areas.			
(6)	Facilitate the use of available vacant, developable, and underutilized urban lands for housing.	✓		
(7)	Foster a variety of lifestyles traditional to Hawai'i through the design and maintenance of neighborhoods that reflect the culture and values of the community.	✓		
(8)	Promote research and development of methods to reduce the cost of housing construction in Hawai'i. [L 1978, c 100, pt of §2; am L 1986, c 276, §18; am L 1992, c 27, §2]	✓		
Analysis: **The Proposed Action is development of the 100% affordable Waiehu Residential Community that directly satisfies this objective. The Applicant will comply with Maui County Code, Chapter 2.96 (Residential Workforce Housing Policy) to ensure that affordable homes are available for full-time Maui residents.**				
Chapter 226-20 Objectives and policies for socio-cultural advancement-health				
Objectives: Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives:				
Objectives:		**S**	**N/S**	**N/A**
(1)	Fulfillment of basic individual health needs of the general public.	✓		
(2)	Maintenance of sanitary and environmentally healthful conditions in Hawai'i's communities.	✓		
Analysis: **The Applicant is supportive of advances in healthcare; however, the Waiehu Residential Community does not involve or require the advancement of a State initiative or program with regard to health. Based on the preceding, these objectives are not applicable.**				
Chapter 226-21, Hawai'i Revised Statutes, Objectives for Socio-Cultural Advancement - Education				
Objective: Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.				
Analysis: **As discussed in Section 2.3.4 (Schools), the Waiehu Residential Community is subject to the public-school facilities impact fees therefore this objective is directly supported by the proposed project.**				

Chapter 226-22 Objective and policies for socio-cultural advancement-social services.			
Objective: Planning for the State's socio-cultural advancement with regard to social services shall be directed towards the achievement of the objective of improved public and private social services and activities that enable individuals, families, and groups to become more self-reliant and confident to improve their well-being.			
Analysis: **The Proposed Action does not require, nor does it involve any State initiative or program for the advancement of social services. Therefore, this objective is not applicable.**			
Chapter 226-23, Hawai'i Revised Statutes, Objectives for Socio-Cultural Advancement – Leisure			
Objective: Planning for the State's socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.			
Policies:	**S**	**N/S**	**N/A**
(1) Foster and preserve Hawai'i's multi-cultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.			✓
(2) Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.			✓
(3) Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.			✓
(4) Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.			✓
(5) Ensure opportunities for everyone to use and enjoy Hawai'i's recreational resources.			✓
(6) Assure the availability of sufficient resources to provide for future cultural, artistic, and recreational needs.			✓

(7) Provide adequate and accessible physical fitness programs to promote the physical and mental well-being of Hawai'i's people.			✓
(8) Increase opportunities for appreciation and participation in the creative arts, including the literary, theatrical, visual, musical, folk, and traditional art forms.			✓
(9) Encourage the development of creative expression in the artistic disciplines to enable all segments of Hawai'i's population to participate in the creative arts.			✓
(10) Assure adequate access to significant natural and cultural resources in public ownership.			✓

Analysis: **Not applicable.**

Chapter 226-24 Objective and policies for socio-cultural advancement-individual rights and personal well-being

Objective: Planning for the State's socio-cultural advancement with regard to individual rights and personal well-being shall be directed towards achievement of the objective of increased opportunities and protection of individual rights to enable individuals to fulfill their socio-economic needs and aspirations.

Analysis: **Not applicable. The proposed project does not require or involve any State initiatives or programs for socio-cultural advancement relative to individual rights and personal well-being.**

Chapter 226-25, Hawai'i Revised Statutes, Objectives for Socio-Cultural Advancement – Culture

Objective: Planning for the State's socio-cultural advancement with regard to culture shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawai'i's people.

Analysis: **The Waiehu Residential Community does not require, nor does it involve any State initiatives or programs for socio-cultural advancement with regard to culture. Accordingly, this objective is not applicable.**

Chapter 226-26 Objectives and policies for socio-cultural advancement-public safety

Objectives:	**S**	**N/S**	**N/A**
(1) Assurance of public safety and adequate protection of life and property for all people.	✓		

(2)	Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic well-being of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances.	✓		
(3)	Promotion of a sense of community responsibility for the welfare and safety of Hawai'i's people.	✓		
Analysis: **The proposed project does not require or involve any State initiatives or programs for public safety; therefore, these objectives are not applicable.**				
Chapter 226-27 Objectives and policies for socio-cultural advancement-government				
Objectives: Planning the State's socio-cultural advancement with regard to government shall be directed towards the achievement of the following objectives:				
(1)	Efficient, effective, and responsive government services at all levels in the State.	✓		
(2)	Fiscal integrity, responsibility, and efficiency in the state government and county governments.	✓		
Analysis: **The Applicant supports government responsibility and efficiency; however, the proposed project does not involve planning for the State's socio-cultural advancement with regard to government. In light of the foregoing, these objectives are not applicable.**				

Part III. Priority Guidelines

The priority guidelines of the Hawai'i State Plan establish overall priority guidelines which address areas of State-wide concern. The Hawai'i State Plan notes that the State shall strive to improve the quality of life for Hawai'i's present and future population through the pursuit of desirable courses of action in five (5) major areas of Statewide concern which merit priority attention: 1) economic development; 2) population growth 3) affordable housing; 4) crime and criminal justice; and 5) quality education (§226-102). The priority guidelines applicable to the Waiehu Residential Community are discussed below.

Hawai'i State Plan, Chapter 226, HRS Part III. Priority Guidelines **Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable**	**S**	**N/S**	**N/A**
HRS 226-101: Purpose. The purpose of this part is to establish overall priority guidelines to address areas of statewide concern			
HRS 226-102: Overall Direction. The State shall strive to improve the quality of life for Hawai'i's present and future population through the pursuit of desirable courses of action in			

five major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, and quality education. [L 1978, c 100, pt of §2; am L 1986, c 276, §29]				
HRS 226-103: Economic Priority Guidelines.				
(a) Priority Guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawai'i's people and achieve a stable and diversified economy;				
Priority Guidelines:			**S**	**N/S**	**N/A**
(1)	Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.				✓
(A)	Encourage investments which:				
	(i)	Reflect long term commitments to the State;	✓		
	(ii)	Rely on economic linkages within the local economy;	✓		
	(iii)	Diversify the economy;	✓		
	(iv)	Reinvest in the local economy;	✓		
	(v)	Are sensitive to community needs and priorities; and	✓		
	(vi)	Demonstrate a commitment to provide management opportunities to Hawai'i residents.	✓		
(B)	Encourage investments in innovative activities that have a nexus to the State, such as				
	(i)	Present or former residents acting as entrepreneurs or principals			✓
	(ii)	Academic support from an institution of higher education in Hawai'i			✓
	(iii)	Investment interest from Hawai'i residents;			✓
	(iv)	Resources unique to Hawai'i that are required for innovative activity; and			✓
	(v)	Complementary or supportive industries or government programs or projects.			✓
(2)	Encourage the expansion of technological research to assist industry development and support the development and commercialization of				✓

	technological advancements.			
(3)	Improve the quality, accessibility, and range of services provided by government to business, including data and reference services and assistance in complying with governmental regulations.			✓
(4)	Seek to ensure that state business tax and labor laws and administrative policies are equitable, rational, and predictable.			✓
(5)	Streamline the building and development permit and review process, and eliminate or consolidate other burdensome or duplicative governmental requirements imposed on business, where public health, safety and welfare would not be adversely affected.	✓		
(6)	Encourage the formation of cooperatives and other favorable marketing or distribution arrangements at the regional or local level to assist Hawai'i's small-scale producers, manufacturers, and distributors.			✓
(7)	Continue to seek legislation to protect Hawai'i from transportation interruptions between Hawai'i and the continental United States.			✓
(8)	Provide public incentives and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics:			✓
	(A) An industry that can take advantage of Hawai'i's unique location and available physical and human resources.			✓
	(B) A clean industry that would have minimal adverse effects on Hawai'i's environment.			✓
	(C) An industry that is willing to hire and train Hawai'i's people to meet the industry's labor needs at all levels of employment.			✓
	(D) An industry that would provide reasonable income and steady employment.			✓
(9)	Support and encourage, through educational and technical assistance programs and other means, expanded opportunities for employee ownership and participation in Hawai'i business.			✓
(10)	Enhance the quality of Hawai'i's labor force and develop and maintain career opportunities for Hawai'i's people through the following actions:			✓
	(A) Expand vocational training in diversified agriculture, aquaculture, information industry, and other areas where growth is desired and feasible.			✓
	(B) Encourage more effective career counseling and guidance in			✓

	high schools and post-secondary institutions to inform students of present and future career opportunities.			
(C)	Allocate educational resources to career areas where high employment is expected and where growth of new industries is desired.			✓
(D)	Promote career opportunities in all industries for Hawai'i's people by encouraging firms doing business in the State to hire residents.	✓		
(E)	Promote greater public and private sector cooperation in determining industrial training needs and in developing relevant curricula and on- the-job training opportunities.			✓
(F)	Provide retraining programs and other support services to assist entry of displaced workers into alternative employment.			✓
(b) Priority guidelines to promote the economic health and quality of the visitor industry:				
Priority Guidelines:		**S**	**N/S**	**N/A**
(1)	Promote visitor satisfaction by fostering an environment which enhances the Aloha Spirit and minimizes inconveniences to Hawai'i's residents and visitors.			✓
(2)	Encourage the development and maintenance of well-designed, adequately serviced hotels and resort destination areas which are sensitive to neighboring communities and activities and which provide for adequate shoreline setbacks and beach access.			✓
(3)	Support appropriate capital improvements to enhance the quality of existing resort destination areas and provide incentives to encourage investment in upgrading, repair, and maintenance of visitor facilities.			✓
(4)	Encourage visitor industry practices and activities which respect, preserve, and enhance Hawai'i's significant natural, scenic, historic, and cultural resources.			✓
(5)	Develop and maintain career opportunities in the visitor industry for Hawai'i's people, with emphasis on managerial positions.			✓
(6)	Support and coordinate tourism promotion abroad to enhance Hawai'i's share of existing and potential visitor markets.			✓
(7)	Maintain and encourage a more favorable resort investment climate consistent with the objectives of this chapter.			✓

(8)	Support law enforcement activities that provide a safer environment for both visitors and residents alike.			✓
(9)	Coordinate visitor industry activities and promotions to business visitors through the state network of advanced data communication techniques.			✓
(c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:				
(1)	Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.			✓
(2)	Continue efforts to maintain federal support to provide stable sugar prices high enough to allow profitable operations in Hawai'i.			✓
(3)	Support research and development, as appropriate, to improve the quality and production of sugar and pineapple crops.			✓
(d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:				
(1)	Identify, conserve, and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands.			✓
(2)	Assist in providing adequate, reasonably priced water for agricultural activities.			✓
(3)	Encourage public and private investment to increase water supply and to improve transmission, storage, and irrigation facilities in support of diversified agriculture and aquaculture.			✓
(4)	Assist in the formation and operation of production and marketing associations and cooperatives to reduce production and marketing costs.			✓
(5)	Encourage and assist with the development of a waterborne and airborne freight and cargo system capable of meeting the needs of Hawai'i's agricultural community.			✓
(6)	Seek favorable freight rates for Hawai'i's agricultural products from interisland and overseas transportation operators.			✓
(7)	Encourage the development and expansion of agricultural and aquacultural activities which offer long-term economic growth potential and employment opportunities.			✓
(8)	Continue the development of agricultural parks and other programs to assist small independent farmers in securing agricultural lands and			✓

	loans.			
(9)	Require agricultural uses in agricultural subdivisions and closely monitor the uses in these subdivisions.			✓
(10)	Support the continuation of land currently in use for diversified agriculture.			✓
(11)	Encourage residents and visitors to support Hawai'i's farmers by purchasing locally grown food and food products.			✓
(e) Priority guidelines for water use and development:				
Priority Guidelines:		**S**	**N/S**	**N/A**
(1)	Maintain and improve water conservation programs to reduce the overall water consumption rate.	✓		
(2)	Encourage the improvement of irrigation technology and promote the use of non-drinking water for agricultural and landscaping purposes.	✓		
(3)	Increase the support for research and development of economically feasible alternative water sources.	✓		
(4)	Explore alternative funding sources and approaches to support future water development programs and water system improvements.	✓		
(f) Priority guidelines for energy use and development:				
Priority Guidelines:		**S**	**N/S**	**N/A**
(1)	Encourage the development, demonstration, and commercialization of renewable energy sources.			✓
(2)	Initiate, maintain, and improve energy conservation programs aimed at reducing energy waste and increasing public awareness of the need to conserve energy.	✓		
(3)	Provide incentives to encourage the use of energy conserving technology in residential, industrial, and other buildings.	✓		
(4)	Encourage the development and use of energy conserving and cost-efficient transportation systems.	✓		
(g) Priority guidelines to promote the development of the information industry:				
Priority Guidelines:		**S**	**N/A**	**N/A**
(1)	Establish an information network, with an emphasis on broadband and			✓

	wireless infrastructure and capability, that will serve as the foundation of and catalyst for overall economic growth and diversification in Hawai'i.			
(2)	Encourage the development of services such as financial data processing, products and services exchange, foreign language translations, telemarketing, teleconferencing, a twenty-four-hour international stock exchange, international banking, and a Pacific Rim management center.			✓
(3)	Encourage the development of small businesses in the information field such as software development, the development of new information systems and peripherals, data conversion and data entry services, and home or cottage services such as computer programming, secretarial, and accounting services.			✓
(4)	Encourage the development or expansion of educational and training opportunities for residents in the information and telecommunications fields.			✓
(5)	Encourage research activities, including legal research in the information and telecommunications fields.			✓
(6)	Support promotional activities to market Hawai'i's information industry services.			✓
(7)	Encourage the location or co-location of telecommunication or wireless information relay facilities in the community, including public areas, where scientific evidence indicates that the public health, safety, and welfare would not be adversely affected.			✓

Analysis: **The Waiehu Residential Community will include a small commercial component that will not significantly expand Maui's employer base.**

As discussed in Section 2.4.3 (Water), the 100% affordable project will utilize the Maui County water source to provide potable and non-potable water for the project. Section 2.4.5 (Electrical) the Waiehu Residential Community will include energy-efficient design and conservation measures. Specifically, the Applicant will encourage the use of energy efficient technology throughout the project, specifically, in lighting, air-conditioning, and building materials.

As discussed in Section 2.2.2 (Economy), employment from construction is estimated to generate direct jobs during the construction phase. The construction of the Waiehu

Residential Community is expected to contribute taxes for Maui County and for the state of Hawai'i. The effect of these expenditures will have positive direct, indirect, and induced beneficial impacts on the economy of the County of Maui. During its operations phase, the Waiehu Residential Community will increase the level of capital investment in the region which will create employment opportunities and economic stimulus for the region. The proposed project will provide direct employment opportunities for Maui residents and contribute to economic diversification and growth for both Maui and the State.

Chapter 226-104, HRS, Population Growth and Land Resources Priority Guidelines

(a) Priority guidelines to effect desired statewide growth and distribution:

Priority Guidelines:		**S**	**N/S**	**N/A**
(1)	Encourage planning and resource management to insure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawai'i's people.			✓
(2)	Manage a growth rate for Hawai'i's economy that will parallel future employment needs for Hawai'i's people.			✓
(3)	Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.	✓		
(4)	Encourage major state and federal investments and services to promote economic development and private investment to the neighbor islands, as appropriate.	✓		
(5)	Explore the possibility of making available urban land, low-interest loans, and housing subsidies to encourage the provision of housing to support selective economic and population growth on the neighbor islands.			✓
(6)	Seek federal funds and other funding sources outside the State for research, program development, and training to provide future employment opportunities on the neighbor islands.			✓
(7)	Support the development of high technology parks on the neighbor islands.			✓

(b) Priority guidelines for regional growth distribution and land resource utilization:

Priority Guidelines:		**S**	**N/S**	**N/A**
(1)	Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures, and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.	✓		
(2)	Make available marginal or nonessential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.	✓		
(3)	Restrict development when drafting of water would result in exceeding the sustainable yield or in significantly diminishing the recharge capacity of any groundwater area.	✓		
(4)	Encourage restriction of new urban development in areas where water is insufficient from any source for both agricultural and domestic use.	✓		
(5)	In order to preserve green belts, give priority to state capital-improvement funds which encourage location of urban development within existing urban areas except where compelling public interest dictates development of a noncontiguous new urban core.			✓
(6)	Seek participation from the private sector for the cost of building infrastructure and utilities, and maintaining open spaces.	✓		
(7)	Pursue rehabilitation of appropriate urban areas.			✓
(8)	Support the redevelopment of Kakaako into a viable residential, industrial, and commercial community.			✓
(9)	Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimized.	✓		
(10)	Identify critical environmental areas in Hawai'i to include but not be limited to the following: watershed and recharge areas; wildlife habitats (on land and in the ocean); areas with endangered species of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources.	✓		
(11)	Identify all areas where priority should be given to preserving rural character and lifestyle.			✓

(12)	Utilize Hawai'i's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations.	✓		
(13)	Protect and enhance Hawai'i's shoreline, open spaces, and scenic resources.	✓		

Analysis: **The Proposed Action is situated on land designated for future urban development and will result in limited employment opportunities in Waiehu. While the Proposed Action involves development of land for 100% affordable housing and the property is not designated a critical environmental area, conservation land, shoreline or other limited resource area.**

No listed or endangered species of flora and fauna were identified on the subject property. During the construction and operational phases of the project, Best Management Practices (BMPs) will be implemented to mitigate non-point source pollution to coastal resources and mitigate the effects of fugitive dust.

Chapter 226-105 Crime and criminal justice.

Priority guidelines in the area of crime and criminal justice:		**S**	**N/S**	**N/A**
(1)	Support law enforcement activities and other criminal justice efforts that are directed to provide a safer environment.			✓
(2)	Target state and local resources on efforts to reduce the incidence of violent crime and on programs relating to the apprehension and prosecution of repeat offenders.			✓
(3)	Support community and neighborhood program initiatives that enable residents to assist law enforcement agencies in preventing criminal activities.			✓
(4)	Reduce overcrowding or substandard conditions in correctional facilities through a comprehensive approach among all criminal justice agencies which may include sentencing law revisions and use of alternative sanctions other than incarceration for persons who pose no danger to their community.			✓
(5)	Provide a range of appropriate sanctions for juvenile offenders, including community-based programs and other alternative sanctions.			✓

(6) Increase public and private efforts to assist witnesses and victims of crimes and to minimize the costs of victimization. [L 1978, c 100, pt of §2; am L 1984, c 236, §17; am L 1986, c 276, §32]			✓
Analysis: **The priority guidelines for crime and criminal justice are not applicable to the Waiehu Residential Community project.**			
Chapter 226-106 Affordable housing. Priority guidelines for the provision of affordable housing:			
Priority guidelines for the provision of affordable housing:	**S**	**N/S**	**N/A**
(1) Seek to use marginal or nonessential agricultural land and public land to meet housing needs of low- and moderate-income and gap-group households.			✓
(2) Encourage the use of alternative construction and development methods as a means of reducing production costs.	✓		
(3) Improve information and analysis relative to land availability and suitability for housing.			✓
(4) Create incentives for development which would increase home ownership and rental opportunities for Hawai'i's low- and moderate-income households, gap-group households, and residents with special needs.	✓		
(5) Encourage continued support for government or private housing programs that provide low interest mortgages to Hawai'i's people for the purchase of initial owner- occupied housing.	✓		
(6) Encourage public and private sector cooperation in the development of rental housing alternatives.	✓		
(7) Encourage improved coordination between various agencies and levels of government to deal with housing policies and regulations.	✓		
(8) Give higher priority to the provision of quality housing that is affordable for Hawai'i's residents and less priority to development of housing intended primarily for individuals outside of Hawai'i.	✓		
Analysis: **As discussed in Section 2.2.1 (Population and Housing), the 100% Waiehu Residential Community will comply with Maui County Code, Chapter 2.96 (Residential Workforce Housing Policy). Workforce homes will be subject to the requirements of Chapter 2.96, MCC to ensure that affordable homes are available for full-time Maui**			

residents, therefore the project supports this priority guideline.			
Chapter 226-107 Quality education.			
Priority guidelines to promote quality education:			
Priority Guidelines:	**S**	**N/S**	**N/A**
(1) Pursue effective programs which reflect the varied district, school, and student needs to strengthen basic skills achievement;			✓
(2) Continue emphasis on general education "core" requirements to provide common background to students and essential support to other university programs;			✓
(3) Initiate efforts to improve the quality of education by improving the capabilities of the education work force;			✓
(4) Promote increased opportunities for greater autonomy and flexibility of educational institutions in their decision making responsibilities;			✓
(5) Increase and improve the use of information technology in education by the availability of telecommunications equipment for:			✓
(A) The electronic exchange of information;			✓
(B) Statewide electronic mail; and			✓
(C) Access to the Internet.			✓
Encourage programs that increase the public's awareness and understanding of the impact of information technologies on our lives;			✓
(6) Pursue the establishment of Hawai'i's public and private universities and colleges as research and training centers of the Pacific;			✓
(7) Develop resources and programs for early childhood education;			✓
(8) Explore alternatives for funding and delivery of educational services to improve the overall quality of education; and			✓
(9) Strengthen and expand educational programs and services for students with special needs.			✓
Analysis: **Not Applicable.**			
Chapter 226-108 Sustainability			

Priority guidelines to promote sustainability shall include:			
Priority Guidelines:	**S**	**N/S**	**N/A**
(1) Encouraging balanced economic, social, community, and environmental priorities;	✓		
(2) Encouraging planning that respects and promotes living within the natural resources and limits of the State	✓		
(3) Promoting a diversified and dynamic economy;	✓		
(4) Encouraging respect for the host culture;	✓		
(5) Promoting decisions based on meeting the needs of the present without compromising the needs of future generations	✓		
(6) Considering the principles of the ahupuaa system; and	✓		
(7) Emphasizing that everyone, including individuals, families, communities, businesses, and government, has the responsibility for achieving a sustainable Hawai'i.			✓
Analysis: **The Proposed Action is for a 100% affordable residential development in Waiehu. The project location has been planned for urban development to support light industrial and commercial growth in Kahului. Focusing future development in planned urban areas identified in the Maui Island Plan and with available infrastructure and services will promote a sustainable pattern of future development.**			
Chapter 226-109 Climate change adaptation priority.			
Priority guidelines to prepare the State to address the impacts of climate change, including impacts to the areas of agriculture; conservation lands; coastal and nearshore marine areas; natural and cultural resources; education; energy; higher education; health; historic preservation; water resources; the built environment, such as housing, recreation, transportation; and the economy shall:			
Priority Guidelines:	**S**	**N/S**	**N/A**
(1) Ensure that Hawai'i's people are educated, informed, and aware of the impacts climate change may have on their communities;			✓
(2) Encourage community stewardship groups and local stakeholders to participate in planning and implementation of climate change policies;			✓

(3)	Invest in continued monitoring and research of Hawai'i's climate and the impacts of climate change on the State;			✓
(4)	Consider native Hawaiian traditional knowledge and practices in planning for the impacts of climate change;			✓
(5)	Encourage the preservation and restoration of natural landscape features, such as coral reefs, beaches and dunes, forests, streams, floodplains, and wetlands, that have the inherent capacity to avoid, minimize, or mitigate the impacts of climate change;	✓		
(6)	Explore adaptation strategies that moderate harm or exploit beneficial opportunities in response to actual or expected climate change impacts to the natural and built environments;			✓
(7)	Promote sector resilience in areas such as water, roads, airports, and public health, by encouraging the identification of climate change threats, assessment of potential consequences, and evaluation of adaptation options;			✓
(8)	Foster cross-jurisdictional collaboration between county, state, and federal agencies and partnerships between government and private entities and other nongovernmental entities, including nonprofit entities;			✓
(9)	Use management and implementation approaches that encourage the continual collection, evaluation, and integration of new information and strategies into new and existing practices, policies, and plans; and			✓
(10)	Encourage planning and management of the natural and built environments that effectively integrate climate change policy. [L 2012, c 286, §2			✓
Analysis: **Sea level rise will have adverse effects on all shoreline communities, our economies, and our natural and cultural resources. The findings of the Hawai'i Sea Level Rise Vulnerability and Adaptation Report 2017, identify an expected 3.2 feet rise in sea level across the main Hawaiian Islands. The report identifies the towns of Waiheʻe, Hāna, Lāhainā, Kīhei and Sprecklesville that are most vulnerable to sea level rise. The project site is not located along a shoreline and therefore it is not anticipated that the proposed project site will be affected by sea level rise over the next 30-70 years.**				

3.4 Hawai'i State Functional Plans

The Hawai'i State Plan directs State agencies to prepare functional plans for their respective program areas. The Applicant is not a State Agency and therefore the Functional Plans are not applicable. There are fourteen (14) State Functional Plans that serve as the primary implementing vehicle for the goals, objectives, and policies of the Hawai'i State Plan. The functional plans which are pertinent to the proposed project, along with each plan's applicable objectives, policies, and actions are discussed below.

Hawai'i State Functional Plans **Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable**		**S**	**N/S**	**N/A**
State Functional Plan – Agriculture				
Objectives:		**S**	**N/S**	**N/A**
Objective A:	Achievement of increased agricultural production and growth through cultural and management practices.			✓
Objective B:	Achievement of an orderly agricultural marketing system through product promotion and industry organization.			✓
Objective C:	Achievement of increased consumption of and demand for Hawai'i's agricultural products through consumer education and product quality.			✓
Objective D:	Achievement of optimal contribution by agriculture to the State's economy.			✓
Objective E:	Achievement of adequate capital, and knowledge of its proper management, for agricultural development.			✓
Objective F:	Achievement of increased agricultural production and growth through pest and disease controls.			✓
Objective G:	Achievement of effective protection and improved quality of Hawai'i's land, water, and air.	✓		
Objective H:	Achievement of productive agricultural use of lands most suitable and needed for agriculture.			✓
Objective I:	Achievement of efficient and equitable provision of adequate water for agricultural use.			✓
Objective J:	Achievement of maximum degree of public understanding and support of agriculture in Hawai'i.			✓
Objective K:	Achievement of adequate supply of properly trained labor for agricultural needs.			✓
Objective L:	Achievement of adequate transportation services and facilities to meet agricultural needs.			✓
Objective M:	Achievement of adequate support services and infrastructure to meet agricultural needs.			✓
Analysis: **The project site is located in an area designated within an urban growth boundary of the Maui Island Plan and therefore appropriate for urban development.**				

State Functional Plan – Conservation Lands			
Objectives:	**S**	**N/S**	**N/A**
1a. Establishment of data bases for inventories of existing lands and resources.			✓
1b. Establishment of criteria for management of land and natural resources.			✓
2a. Establishment of plans for natural resources and land management.			✓
2b. Protection of fragile or rare natural resources.			✓
2c. Enhancement of natural resources.			✓
2d. Appropriate development of natural resources designated for commercial development.			✓
2e. Promotion and marketing of appropriate natural resources designated for commercial development.			✓
2f. Increase enforcement of land and natural resource use laws and regulations.			✓
3a. Develop and implement conservation education programs for the general public and visitors.			✓
3b. Increase access to land and natural resources data by the public and increase cooperation between agencies by making access to land and natural resource information more efficient.			✓
Analysis: **Not applicable. The Waiehu Residential Community is not located within the State Conservation District.**			
State Functional Plan – Education			
Objectives:	**S**	**N/S**	**N/A**
A1. Academic Excellence. Emphasize quality educational programs in Hawai'i's institutions to promote academic excellence.			✓
A2. Basic Skills. Promote programs and activities that facilitate the acquisition of basic skills, such as reading, writing, computing, listening, speaking, and reasoning. Pursue effective programs which reflect the varied district, school, and student needs to strengthen basic skills achievement.			✓
A3. Education Workforce. Initiate efforts to improve the quality of education by improving the capabilities of the education workforce.			✓
A4. Services and Facilities. Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.	✓		
B1. Alternatives for funding and delivery. Explore alternatives for funding and delivery of educational services to improve the overall quality of education.			✓

B2.	Autonomy and flexibility. Promote increased opportunities for greater autonomy and flexibility of educational institutions in their decision making responsibilities.			✓
B3.	Increase use of Technology. Increase and improve the use of information technology in education and encourage programs which increase the public's awareness and understanding of the impact of information technologies on our lives.			✓
B4.	Personal Development. Support education programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.			✓
B5.	Students with Special Needs. Provide appropriate educational opportunities for groups with special needs.			✓
C1.	Early Childhood Education. Develop resources and programs for early childhood education.			✓
C2.	Hawai'i's Cultural Heritage. Promote educational programs which enhance understanding of Hawai'i's cultural heritage.			✓
C3.	Research programs and (Communication) Activities. Support research programs and activities that enhance the education programs of the State.			✓
Analysis: **Not applicable. The Proposed residential community will contribute the required school impact fee to the Department of Education in order to provide future services and facilities to meet the community's needs.**				
State Functional Plan – Employment				
Objectives:		**S**	**N/S**	**N/A**
a.	Improve the qualifications of entry-level-workers and their transition to employment.			✓
b.	Develop and deliver education, training and related services to ensure and maintain a quality and competitive workforce.			✓
c.	Improve labor exchange.			✓
d.	Improve the quality of life for workers and families.			✓
e.	Improve planning of economic development, employment and training activities.			✓
Analysis: **Not applicable.**				
State Functional Plan – Energy				
Objectives:		**S**	**N/S**	**N/A**
a.	Moderate the growth in energy demand through conservation and energy efficiency.	✓		
b.	Displace oil and fossil fuels through alternate and renewable energy resources.	✓		

c. Promote energy education and legislation.			✓
d. Support and develop an integrated approach to energy development and management.	✓		
e. Ensure State's ability to implement energy emergency actions immediately in event of fuel supply disruptions. Ensure essential public services are maintained and provisions are made to alleviate economic and personal hardships which may arise.			✓
Analysis: **As discussed, the Waiehu Residential Community will include conservation measures to encourage the use of energy-efficient technology throughout the project, specifically in areas involving lighting, air-conditioning, and building materials.**			
State Functional Plan – Health			
Objectives:	**S**	**N/S**	**N/A**
1. Health promotion and disease prevention. Reduction in the incidence, morbidity and morality associated with the preventable and controllable conditions.			✓
2. Prevention and control of communicable diseases. Reduction in the incidence, morbidity, and mortality associated with infectious and communicable diseases.			✓
3. Health needs of special populations with impaired access to health care. Increased availability and accessibility of health services for groups with impaired access to health care programs.			✓
4. Community hospitals system. Development of a community hospital system which is innovative, responsive and supplies high quality care to the constituencies it serves.			✓
5. Environmental programs to protect and enhance the environment. Continued development of new environmental protection and health services programs to protect, monitor, and enhance the quality of life in Hawai'i.			✓
6. DOH leadership. To improve the Department of Health's ability to meet the public health need of the State of Hawai'i in the most appropriate, beneficial and economical way possible.			✓
Analysis: **The Waiehu Residential Community does not propose the creation of any medical or health programs; therefore, this Functional Plan is not applicable.**			
State Functional Plan – Higher Education			
Objectives:	**S**	**N/S**	**N/A**
A. A number and variety of postsecondary education institutions sufficient to provide the diverse range of programs required to satisfy individual and societal needs and interests.			✓
B. The highest level of quality, commensurate with its mission and objectives, of each educational, research, and public service program			✓

	offered in Hawai'i by an institution of higher education.			
C.	Provide appropriate educational opportunities for all who are willing and able to benefit from postsecondary education.			✓
D.	Provide financing for postsecondary education programs sufficient to ensure adequate diversity, high quality, and wide accessibility.			✓
E.	Increase program effectiveness and efficiency through better coordination of education resources.			✓
Analysis: **The Waiehu Residential Community does not propose the creation of higher education programs; therefore, this Functional Plan is not applicable.**				
State Functional Plan – Historic Preservation				
Objectives:		**S**	**N/S**	**N/A**
A.	Identification of historic properties.	✓		
B.	Protection of historic properties.	✓		
C.	Management and treatment of historic properties.	✓		
D.	Provision of adequate facilities to preserve historic resources.			✓
E.	The establishment of programs to collect and conserve historic records, artifacts, and oral histories and to document and perpetuate traditional arts, skills, and culture.			✓
F.	Provision of better access to historic information.	✓		
G.	Enhancement of skills and knowledge needed to preserve historical resources.			✓
Analysis: **The Applicant's Archaeologist has consulted with the State Historic Preservation Division and the previous archaeological survey results indicated that no significant materials or cultural remains were located on this previously disturbed land.** **As discussed in Section 2.2.3 (Cultural Resources) the cultural impact statement (CIA) which was prepared for the proposed project reported that there were no visible cultural resources, (*i.e.*, medicinal plants, shoreline resources, religious sites, or archeological resources) observed on the property. From a cultural practices and beliefs perspective, the subject property bears no apparent signs of cultural practices or any gatherings currently taking place on the site. The oral history interviews did not reveal any known gathering places on the subject property nor did any access concerns surface as a result of the proposed Action.**				
State Functional Plan – Housing				
Objectives and Policies:		**S**	**N/S**	**N/A**
A.	Increase and sustain the supply of permanent rental housing that is affordable and accessible to Hawai'i residents, particularly those with			✓

	incomes at or below 80% AMI. Attain the legislative goal of 22,500 rental housing units by 2026.			
B.	Increase the homeownership rate.	✓		
C.	Address barriers to residential development.	✓		
D.	Maintain a statewide housing data system for use by public and private agencies engaged in the provision of housing.	✓		
Analysis: **The 100% affordable Waiehu Residential Community is a for sale project and supports this State Functional Plan and will comply with the County's Residential Workforce Housing Policy set forth in Chapter 2.96, MCC.**				
State Functional Plan – Human Services				
Objectives and Policies:		**S**	**N/S**	**N/A**
A.	To sustain and improve current elder abuse and neglect services.			✓
B.	To increase cost-effective, high quality home and community based services.			✓
C.	To increase home-based services to keep children in their homes and to increase placement resources for those children who must be temporarily or permanently removed from their homes, due to abuse or neglect.			✓
D.	To address factors that contribute to child abuse and other forms of family violence.			✓
E.	To provide affordable, accessible, and quality child care.			✓
F.	To maximize efforts of self-sufficiency through provision of transitional medical care services.			✓
G.	To provide AFDC recipients with a viable opportunity to become independent of the welfare system.			✓
H.	To facilitate client access to human services.			✓
I.	To eliminate organizational barriers which limit client access to human services.			✓
Analysis: **The Waiehu Residential Community does not include the creation of human service programs; therefore, this Functional Plan is not applicable.**				
State Functional Plan – Recreation				
Objectives and Policies:		**S**	**N/S**	**N/A**
1a.	Address the problem of saturation of the capacity of beach parks and nearshore waters.			✓
1b.	Reduce the incidence of ocean recreation accidents.			✓
1c.	Resolve conflicts between different activities at heavily used ocean recreation areas.			✓

1d.	Provide adequate boating facilities. Balance the demand for boating facilities against the need to protect the marine environment from potential adverse impacts.			✓
2a.	Plan, develop, and promote recreational activities and facilities in *mauka* and other areas to provide a wide range of alternatives.	✓		
2b.	Meet special recreation needs of the elderly, the disabled, woman, single-parent families, immigrants, and other groups.			✓
2c.	Improve and expand the provision of recreation facilities in urban areas and local communities.	✓		
3a.	Prevent the loss of access to shoreline and upland recreation areas due to new developments.			✓
3b.	Resolve the problem of landowner liability that seriously hampers public access over private lands.			✓
3c.	Increase access to State Forest Reserve lands over federal property, leased State lands, and other government lands.			✓
3d.	Acquire, develop, and manage additional public access ways.	✓		
4a.	Promote a conservation ethic in the use of Hawai'i's recreational resources.			✓
4b.	Prevent degradation of the marine environment.			✓
4c.	Improve the State's enforcement capabilities.			✓
4d.	Mitigate adverse impacts of tour helicopters on the quality of recreational experiences in wilderness areas.			✓
5a.	Properly maintain existing park and recreation areas.	✓		
5b.	Promote interagency coordination and cooperation to facilitate sharing of resources, joint development efforts, clarification of responsibilities and jurisdictions, and improvements in enforcement capabilities.			✓
5c.	Assure adequate support for priority outdoor recreation programs and facilities.			✓
6a.	Increase recreational access and opportunities in Hawai'i's wetlands.			✓
6b.	Develop and adequate information base to assist the County planning departments and other regulatory agencies in making decisions regarding the wetlands.			✓
6c.	Assure the protection of the most valuable wetlands in the State.			✓
Analysis: **The Proposed Action includes several neighborhood parks and central greenway that will provide recreational activities *mauka* of the special management area. Therefore, the proposed project supports this state functional plan.**				
State Functional Plan – Tourism				
Objectives:		**S**	**N/S**	**N/A**
1a.	Development, implementation and maintenance of policies and actions	✓		

	which support the steady and balanced growth of the visitor industry.			
2a.	Development and maintenance of well-designed visitor facilities and related developments which are sensitive to the environment, sensitive to neighboring communities and activities, and adequately serviced by infrastructure and support services.	✓		
3a.	Enhancement of respect and regard for the fragile resources which comprise Hawai'i's natural and cultural environment. Increased preservation and maintenance efforts.	✓		
4a.	Support of Hawai'i's diverse range of lifestyles and natural environment.	✓		
4b.	Achievement of mutual appreciation among residents, visitors, and the visitor industry.	✓		
5a.	Development of a productive workforce to maintain a high quality visitor industry.	✓		
5b.	Enhancement of career and employment opportunities in the visitor destination in specific desired market segments.	✓		
6a.	Maintenance of a high customer awareness of Hawai'i as a visitor destination in specific desired market segments.	✓		
Analysis: **The Proposed Action is a 100% affordable residential community, and therefore this State Functional Plan's objective is not applicable.**				
State Functional Plan – Transportation				
Objectives:		**S**	**N/S**	**N/A**
1a.	Expansion of transportation system.	✓		
1b.	Reduction of travel demand through zoning and decentralization initiatives.			✓
1c.	Management of existing transportation systems through a program of transportation systems management (TSM).			✓
1d.	Identification and reservation of lands and right-of-way required for future transportation improvements.	✓		
1e.	Planning and designing State highways to enhance inter-regional mobility.	✓		
1f.	Improving and enhancing transportation safety.	✓		
1g.	Improved transportation maintenance programs.			✓
1h.	Ensure that transportation facilities are accessible to people with disabilities.	✓		
2a.	Development of a transportation infrastructure that supports economic development initiatives.			✓
3a.	Expansion of revenue bases for transportation improvements.	✓		
4a.	Providing educational programs.			✓

Analysis: **Not applicable. These objectives are applicable to the State Department of Transportation. However, coordination is occurring with the State Department of Transportation on the proposed road widening improvements.**			
State Functional Plan – Water Resources Development			
Objectives:	**S**	**N/S**	**N/A**
a. Enunciate State water policy and improve management framework.			✓
b. Maintain the long-term availability of freshwater supplies, giving consideration to the accommodation of important environmental values.			✓
c. Improve management of floodplains.			✓
d. Assure adequate municipal water supplies for planned urban growth.			✓
e. Assure the availability of adequate water for agriculture.			✓
f. Encourage and coordinate with other water programs the development of self-supplied industrial water and the production of water-based energy.			✓
g. Provide for the protection and enhancement of Hawai'i's freshwater and estuarine environment.			✓
h. Improve State grant and loan procedures for water program and projects.			✓
i. Pursue water resources data collection and research to meet changing needs.			✓
Analysis: **Not applicable. These objectives are intended for the State Department of Land and Natural Resources (Commission of Water Resources Management, Engineering Division) and County of Maui Departments of Water Supply and Public Works.**			

3.4 Maui County General Plan

The General Plan of the County of Maui refers to a hierarchy of planning documents that together set forth future growth and policy direction in the County. The General Plan is comprised of the following documents: 1) Countywide Policy Plan; 2) Maui Island Plan; and 3) nine community plans.

The Countywide Policy Plan (CPP) was adopted in March 2010 and is a broad policy document that identifies a vision for the future of Maui County. It establishes a set of guiding principles and provides comprehensive goals, objectives, policies and implementing actions that portray the

desired direction of the County's future. The CPP provides the policy framework for the development of the Maui Island Plan and nine Community Plans.

The Maui Island Plan functions as a regional plan and addresses the policies and issued that are not confined to just one community plan area, including regional systems such as transportation, utilities and growth management, for the Island of Maui. Together, the Island and Community Plans develop strategies with respect to population density, land use maps, land use regulations, transportation systems, public and community facility locations, water and sewage systems, visitor destinations, urban design and other matters related to development.

3.4.1 Countywide Policy Plan

The Countywide Policy Plan (CPP) establishes a list (below) of county-wide goals, objectives, policies, and implementing actions related to key strategies. As previously discussed, the CPP was adopted by the Maui County Council on March 19, 2010. The CPP provides a long-term vision, principles, goals, policies, and objectives directed toward improving living conditions in the County. The CPP provides the policy framework for the development of the *Maui Island Plan* and the nine Community Plans. The following Themes, Objectives and Policies are applicable to the proposed project:

Section II: Maui County Today:

B. Land Use and Development Patterns:

1. *Land Use* ***A fair amount of the land on all of the islands is permanently designated as land within the State Conservation District; however, a large percentage of the land within other designations could be developed (see Table 1). This makes it extremely important to evaluate what type of development is appropriate and where it should be located through the General Plan process. The State of Hawai`i is unique in that both the State and the County regulate land uses for all properties.***

2. *Sprawl* ***Sprawl segregates people by income level and relies upon automobile-scaled development and cheap fossil fuel. Sprawl occurs when rural and agricultural lands are developed into large-lot subdivisions or when new population or economic centers are built away from the existing infrastructure grid that still has available capacity.***

3.	*Smart Growth*	***Smart Growth is development that serves the economy, the community, and the environment. Smart growth is about being good stewards of our communities and of our rural lands, parks, and forests. In short, Smart Growth is based on development designed at a scale to be comfortable to pedestrian, not an automobile.***

Analysis. As discussed in Section 2.1.1 of this FEA, the project is proposed to be developed on vacant land populated by overgrown vegetation. Located within the CDP of Waihee-Waiehu, the project site is in close proximity to existing residential subdivisions on its *makai* side (i.e., the Ocean View Estates and Waiehu Kou Subdivision). Other subdivisions can be found on the south side of Waiehu Beach Road (i.e., the Paukukalo Homestead and Waiehu Terrace Residential Subdivision). Other future residential development is planned to occur east of the subject property near the Wailuku River at the Pi'ihana Project District 3. Rural settlements can be found abutting the *mauka* side of the property, while agricultural settlements exist along the north side of Malaihi Road. The subject property is situated within 2 miles from the town center of Wailuku. Furthermore, areas within the vicinity of the project site are serviced with roadways, public transit, and utilities. Therefore, the proposed project is in alignment with the above-referenced Countywide Policy Plan (CPP) for land use and development patterns.

Countywide Goals, Objectives, Policies, and Actions:

A. Protect the Natural Environment

Goal:	***Maui County's natural environment and distinctive open spaces will be preserved, managed, and cared for in perpetuity.***
Objective:	
1.	***Improve the opportunity to experience the natural beauty and native biodiversity of the islands for present and future generations.***
Policy:	
g.	*Preserve and provide ongoing care for important scenic vistas, view planes, landscapes, and open-space resources.*
Objective:	
3.	***Improve the stewardship of the natural environment.***
Policy:	

c. *Evaluate development to assess potential short-term and long-term impacts on land, air, aquatic, and marine environments.*

Analysis. As discussed in Section 1.3 of the FEA, the purpose of the project is to develop an approximately 158-acre portion of the total acreage on the subject property into Waiehu Residential Community — a 100% affordable housing project consisting of approximately 752 dwelling units, retail space of an approximately 17,400 square feet, and three (3) parks totaling 6.3 acres. Meanwhile, the remaining 80 acres of land (approximate) within the subject property is planned to be preserved as a buffer between the five (5) smaller parcels enveloped on the west side and the proposed Waiehu Residential Community. This preservation is also aimed to maintain a significant open space ~~contributing to the existing greeneries~~ in Waiehu-Waihee ~~CDP~~.

B. Preserve Local Cultures and Traditions

Goal: ***Maui County will foster a spirit of pono and protect, perpetuate, and reinvigorate its residents' multi-cultural values and traditions to ensure that current and future generations will enjoy the benefits of their rich island heritage.***

Objective:

1. ***Perpetuate the Hawaiian culture as a vital force in the lives of residents.***

Policy:

b. *Prohibit inappropriate development of cultural lands and sites that are important for traditional Hawaiian cultural practices, and establish mandates for the special protection of these lands in perpetuity.*

Objective:

4. ***Preserve and restore significant historic architecture, structures, cultural sites, cultural districts, and cultural landscapes.***

Policies:

b. *Promote the rehabilitation and adaptive reuse of historic sites, buildings, and structures to perpetuate a traditional sense of place.*

d. *Protect and preserve lands that are culturally or historically significant.*

Analysis. As discussed in Section 2.2.3 (Cultural Resources) the cultural impact statement (CIA) which was prepared for the proposed project reported that there were no visible cultural resources, (*i.e.*, medicinal plants, shoreline resources, religious sites, or archeological resources) observed on the property. From a cultural practices and beliefs perspective, the subject property bears no apparent signs of cultural practices or any gatherings currently taking place on the site. The oral history interviews did not reveal any known gathering places on the subject property nor did any access concerns surface as a result of the proposed Action.

E. Expand Housing Opportunities for Residents

Goal:	***Quality, island-appropriate housing will be available to all residents.***
Objective:	
1.	***Reduce the affordable housing deficit for residents.***
Policies:	
a.	*Ensure that an adequate and permanent supply of affordable housing, both new and existing units, is made available for purchase or rental to our resident and/or workforce population, with special emphasis on providing housing for low- to moderate-income families, and ensure that all affordable housing remains affordable in perpetuity.*
c.	*Seek innovative methods to secure land for the development of low- and moderate-income housing.*
k.	*Ensure residents are given priority to obtain affordable housing units developed in their communities, consistent with all applicable regulations.*
m.	*Develop neighborhoods with a mixture of accessible and integrated community facilities and services.*
Objective:	
2.	***Increase the mix of housing types in towns and neighborhoods to promote sustainable land use planning, expand consumer choice, and protect the County's rural and smalltown character.***
Policies:	
b.	*Design neighborhoods to foster interaction among neighbors.*

d.	*Promote infill housing in urban areas at scales that capitalize on existing infrastructure, lower development costs, and are consistent with existing or desired patterns of development.*
e.	*Encourage the building industry to use environmentally sustainable materials, technologies, and site planning.*
g.	*Provide incentives to developers and owners who incorporate green building practices and energy-efficient technologies into their housing developments.*
Objective:	
3.	***Increase and maintain the affordable housing inventory.***
Policies:	
b.	*Recognize housing as a basic human need, and work to fulfill that need.*
c.	*Prioritize available infrastructure capacity for affordable housing.*
f.	*Streamline the review process for high-quality, affordable housing developments that implement the goals, objectives, and policies of the General Plan.*
h.	*Encourage long-term residential use of existing and future housing to meet residential needs.*

Analysis: As previously discussed, the project is proposed to develop an approximately 158-acre portion of the total acreage on the subject property into Waiehu Residential Community — a 100% affordable housing project consisting of approximately 752 dwelling units, retail space of approximately 17,400 square feet, and three (3) parks totaling 6.3 acres. The proposed development is situated within 2 miles from the town center of Wailuku, within 1 mile from the nearest public beach park (i.e., Waiehu Beach Park), accessible by the Maui Bus, serviced by roadways, and surrounded by residential communities.

In addition, the future occupants of the proposed 100% affordable housings in this community will benefit from the proximity and the scenic views toward the mountain and the ocean. The proposed Waiehu Residential Community benefits from the existing roadways, public transit, and other infrastructure serving the area within the vicinity of the project site. Therefore, the project fulfills the above-referenced CPP goal by proposing a significant opportunity to achieve housing provisions with affordability and appropriateness of the location.

F. Strengthen the local economy

Goal:	***Maui County's economy will be divers, sustainable, and supportive of community values.***
Objective:	
1.	***Promote an economic climate that will encourage diversification of the County's economic base and a sustainable rate of economic growth.***
Policies:	
a.	*Support economic decisions that create long-term benefits.*
c.	*Invest in infrastructure, facilities, and programs that foster economic diversification.*
e.	*Support programs that assist industries to retain and attract more local labor and facilitate the creation of jobs that offer a living wage.*
f.	*Encourage work environments that are safe, rewarding, and fulfilling to employees.*
j.	*Support efforts to improve conditions that foster economic vitality in our historic small towns.*
l.	*Support public and private entities that assist entrepreneurs in establishing locally operated businesses.*
Objective:	
4.	***Expand economic sectors that increase living-wage job choices and are compatible with community values.***

Analysis. The proposed project will contribute to the provision of additional employment opportunities through short-term construction jobs and long-term retail jobs. In addition, the proposed 100% affordable housing will be an important component of fulfilling the above-referenced CPP goal — by ensuring employees and their family to have the opportunity to access affordable housing and live in the Wailuku area where proximity to the town center of Wailuku and business hub of Kahului is convenient.

3.4.2 Maui Island Plan

The Maui Island Plan, December 2012, serves as the regional plan for the Island of Maui. The Plan is comprised of the following ten elements: 1) Population; 2) Heritage Resources; 3) Natural Hazards; 4) Economic Development; 5) Housing; 6) Infrastructure and Public

Facilities; 7) Land Use; 8) Directed Growth Plan; 9) Long Range Implementation Plan; and 10) Monitoring and Evaluation. Each element contains goals, objectives, policies and implementing actions. The Directed Growth Plan identifies the location of future development through 2030. The Directed Growth Plan is intended to guide the location and general character of future urban development and will direct future zoning changes and guide the development of the County's short-term and long-term capital improvement plan budgets.

The Maui Island Plan is used to guide the growth and development of Maui County. As indicated by the Planning Department's proposed Directed Growth Maps, the Waiehu Residential Community lies within the limits of the proposed Urban Growth Boundary for Kahului. (**See:** Figure 9, Maui Island Plan Map)

The Maui Island Plan determines the appropriateness of discretionary development proposals. The following Goals, Objectives and Policies of the Maui Island Plan are applicable to the proposed project:

HERITAGE RESOURCES

Scenic Resources

Goal:	
4.1	***Maui will have a balanced economy composed of a variety of industries that offer employment opportunities and well-paying jobs and a business environment that is sensitive to resident needs and the island's unique natural and cultural resources.***
Objective:	
2.5.1	***A greater level of protection for scenic resources.***
Policy:	
2.5.1.a	*Protect views to include, but not be limited to, Haleakalā, `Īao Valley, the Mauna Kahalawai (West Maui Mountains), Pu`u Ō`la`i, Kaho`olawe, Molokini, Moloka`i, and Lāna`i, Mauna Kea, Mauna Loa, sea stacks, the Pacific Ocean, and significant water features, ridgelines, and landforms.*

Analysis. The proposed project will comply with the regulated building heights within the Maui County Code (MCC) for housings and retail space. Views toward the West Maui

Mountain and the Pacific Ocean will not be disturbed by the proposed Waiehu Residential Community.

ECONOMIC DEVELOPMENT

Economic Diversification

Goal:	
4.1	***Maui will have a balanced economy composed of a variety of industries that offer employment opportunities and well-paying jobs and a business environment that is sensitive to resident needs and the island's unique natural and cultural resources.***
Objective:	
4.1.1	***A more diversified economy.***
Policies:	
4.1.1.b	*Support the creation of new jobs and industries that provide a living wage.*
4.1.2.b	*Encourage and support local businesses.*

Analysis. Aside from the 100% affordable housings, the proposed Waiehu Residential Community includes the development of approximately 17,400 square feet of retail space. This component of the proposed Waiehu Residential Community is in alignment with the above-referenced goal of Maui Island Plan. While optimizing the expansive vacant land available for constructing affordable housings — the project also serves the long-term goal of supporting the creation of additional businesses and employment opportunities within the Wailuku region and in proximity to Kahului, the economic center of Maui.

ECONOMIC DEVELOPMENT

Small Business Development

Goal:	
4.5	***Small business will play a key role in Maui's Economy.***
Objective:	
4.5.1	***Increase the number of and revenue generated by small businesses and decrease the percentage of small business failures.***
Policy:	
4.5.1.c	*Reduce barriers to small business development.*

Analysis. The retail space included within the proposed Waiehu Residential Community will support this Maui Island Plan goal by providing additional space for small businesses to operate.

HOUSING

Goal:	
5.1	***Maui will have safe, decent, appropriate, and affordable housing for all residents developed in a way that contributes to strong neighborhoods and a thriving island community.***
Objective:	
5.1.1	***More livable communities that provide for a mix of housing types, land uses, income levels, and age.***
Policies:	
5.1.1.a	*Promote livable communities (compact/walkable/bikeable, access to transit) that provide for a mix of housing types and land uses, including parks, open space, and recreational areas.*
5.1.1.b	*Promote planning approaches that provide a mix of multifamily and single-family housing units to expand housing choices.*
5.1.1.c	*Use planning and regulatory approaches to provide higher housing densities.*
Objective:	
5.1.3	***Provide affordable housing, rental or in fee, to the broad spectrum of our island community.***
Policy:	
5.1.3.a	*Consider regulations that can help keep affordable housing available at affordable rents.*
Objective:	
5.1.4	***Provide infrastructure in a more timely manner to support the development of affordable housing.***
Policies:	
5.1.4.a	*Prioritize the development of infrastructure that supports the development of affordable housing.*
5.1.4.c	*Tailor infrastructure requirements to correspond with appropriate level-of-service standards to help control housing costs and to maintain safety.*

Objective:	
5.1.6	***Reduce the cost to developers of providing housing that is affordable to families with household incomes 160 percent and below of annual median income.***
Policies:	
5.1.6.a	*Support fast-track processing procedures for the following housing-related entitlements: affordable housing projects/units; indigenous Hawaiian housing/units; and special-needs housing units (seniors, disabled, homeless, etc.).*

Analysis. As previously discussed, the proposed Waiehu Residential Community is a 100% affordable housing project consisting of approximately 752 dwelling units, retail space of approximately 17,400 square feet, and three (3) parks totaling 6.3 acres. Kahekili Highway runs on the east to the northwest of the subject property and intersects with Waiehu Beach Road on the northeast of the subject property. Three (3) bus routes, i.e., Routes 01, 02, and 08 serve the area where the project site is situated. The nearest bus stops accessible from the project site are Kahekili Highway/Hoauna Street on the north and Maka'ala Drive/Makamua Street on the southeast. The town center is located approximately within 2 miles of the project site. In addition, necessary infrastructure including drainage, water, wastewater, and utility lines will be included within the proposed project. Therefore, the proposed Waiehu Residential Community strongly supports the above-referenced Maui Island Plan.

LAND USE

Urban Areas

Goal:	
7.3	***Maui will have livable human scale urban communities, and efficient and sustainable land use patter, and sufficient housing and services for Maui residents.***
Objective:	
7.3.1	***Facilitate and support a more compact, efficient, human-scale urban development pattern.***
Policy:	
7.3.1.a	*Ensure higher-density compact urban communities, infill, and redevelopment of underutilized urban lots within Urban Growth*

Boundaries.

Analysis. Approximately 113 acres of the total acreage of the subject property is included within the Maui Island Plan Urban Growth Boundaries (UGB). The entire UGB area within the subject property is proposed to be developed as part of the Waiehu Residential Community. As the proposed project will total in 158-acre development of the subject property, the remaining acreage needed to fulfill the objectives of the Waiehu Residential Community utilizes the north and south of the UGB area. (**See**: Figure 9, Maui Island Plan Map)

The proposed community follows the compact, efficient, and human-scale urban development pattern — by creating a high-density compact urban community on an available expansive vacant land within UGB. Therefore, the proposed project strongly supports the above-referenced Maui Island Plan goal.

DIRECTED GROWTH PLAN

Urban and Small Town Growth Area Goal and Polices

Goal:

8.1 ***Maui will have well-serviced, complete, and vibrant urban communities and traditional small towns through sound planning and clearly defined development expectations.***

Policy:

8.1.d *The unique character and function of existing small towns shall be protected to retain and preserve their sense of place.*

8.1.i *The County will promote (through incentives, financial participation, expedited project review, infrastructure/public facilities support, etc.) appropriate urban infill, redevelopment and the efficient use of buildable land within UGBs to avoid the need to expand the UGBs.*

Analysis. As previously discussed, the proposed project site is located within the Urban Growth Boundaries and included within the Wailuku region. The small town center of Wailuku is situated within 2 miles of the project site and three (3) bus routes currently serving the area in the vicinity of the project site. The proposed Waiehu Residential Community includes not only 100% affordable housing units but also retail space. Such development is proposed to be compact and high density — appropriately planned for the

directed urban growth in Maui. Building heights and details of the development plan will comply with the applicable Maui County Codes while maintaining the compatibility with the existing character of the Waihee-Waiehu area. Therefore, the proposed Waiehu Residential Community is in strong alignment with the above-referenced Maui Island Plan goal.

3.5 Wailuku-Kahului Community Plan

Within Maui County, there are nine (9) community plan regions. From a General Plan implementation standpoint, each region is governed by a Community Plan which sets forth desired land use patterns, as well as goals, objectives, policies, and implementing actions for a number of functional areas including infrastructure-related parameters.

Nine community plan regions have been established in Maui County. Each region's growth and development are guided by a community plan, which contains objectives and policies in accordance with the Maui County General Plan. The purpose of the community plan is to outline a relatively detailed agenda for carrying out these objectives.

The subject property is located within the Wailuku-Kahului Community Plan. The Community Plan was first adopted in 1987, updated in 1992, and currently adopted through Ordinance No. 3061 in 2002.

The current Community Plan designation on the subject property is "AG" Agriculture. The project proposed uses, i.e., residential, a small commercial space, public parks, and open space. Based on the foregoing, the proposed project requires a Community Plan Amendment (CPA) for the subject property — which triggers the preparation of this ~~Draft~~ Final Environmental Assessment (FEA). The CPA will be from "AG" Agriculture to "SF" Single-family, "MF". However, since the proposed project is a 100% affordable housing development, the Applicant is requesting an exemption from a CPA through the 201H Process.

Hawai'i Revised Statutes, Section 201H-38 — Housing development; exemption from statutes, ordinances, charter provisions, and rules — is excerpted as follows.

"(a) The corporation may develop on behalf of the State or with an eligible developer, or may assist under a government assistance program in the development of, housing projects that shall be exempt from all statutes, ordinances, charter provisions, and rules of any government agency relating to planning, zoning, construction standards for subdivisions,

development and improvement of land, and the construction of dwelling units thereon; provided that:

(1) The corporation finds the housing project is consistent with the purpose and intent of this chapter, and meets minimum requirements of health and safety;

(2) The development of the proposed housing project does not contravene any safety standards, tariffs, or rates and fees approved by the public utilities commission for public utilities or of the various boards of water supply authorized under chapter 54;

(3) The legislative body of the county in which the housing project is to be situated shall have approved the project with or without modifications:

(A) The legislative body shall approve, approve with modification, or disapprove the project by resolution within forty-five days after the corporation has submitted the preliminary plans and specifications for the project to the legislative body. If on the forty-sixth day a project is not disapproved, it shall be deemed approved by the legislative body;

(B) No action shall be prosecuted or maintained against any county, its officials, or employees on account of actions taken by them in reviewing, approving, modifying, or disapproving the plans and specifications; and

(C) The final plans and specifications for the project shall be deemed approved by the legislative body if the final plans and specifications do not substantially deviate from the preliminary plans and specifications. The final plans and specifications for the project shall constitute the zoning, building, construction, and subdivision standards for that project. For purposes of sections 501-85 and 502-17, the executive director of the corporation or the responsible county official may certify maps and plans of lands connected with the project as having complied with applicable laws and ordinances relating to consolidation and subdivision of lands, and the maps and plans shall be accepted for registration or recordation by the land court and registrar; and

(4) The land use commission shall approve, approve with modification, or disapprove a boundary change within forty-five days after the corporation has submitted a petition to the commission as provided in section 205-4. If, on the forty-sixth day, the petition is not disapproved, it shall be deemed approved by the commission.

(b) For the purposes of this section, "government assistance program" means a housing program qualified by the corporation and administered or operated by the corporation or the United States or any of their political subdivisions, agencies, or instrumentalities,

corporate or otherwise.

The following Goals, Objectives and Policies of the Wailuku-Kahului Community Plan are applicable to the proposed project:

ECONOMIC ACTIVITY

Goal:	***A stable and viable economy that provides opportunities for growth and diversification to meet long-term community and regional needs and in a manner that promotes agricultural activity and preserves agricultural lands and open space resources.***
Objective and Policy:	
5.	*Recognize the importance of small businesses to the region's economy.*

Analysis: As previously discussed, the proposed project includes provision of approximately 17,400 square feet of retail space apart from developing affordable housing units. Such retail space will create opportunities for small businesses to operate in an area closed to residents who can be potential customers — as well as for the business owners/operators/employees to access nearby commercial hubs (i.e., Wailuku and Kahului). Therefore, the proposed Waiehu Residential Community supports the above-referenced goal of the Wailuku-Kahului Community Plan by recognizing the importance of small businesses to the region's economy.

CULTURAL RESOURCES

Goal:	***Identification, protection, preservation, enhancement, and where appropriate, use of cultural practices and sites, historic sites and structures, and cultural landscapes and view planes that:*** ***1. Provide a sense of history and define a sense of place for the Wailuku-Kahului region; and*** ***2. Preserve and protect native Hawaiian rights and practices customarily and traditionally exercised for subsistence, cultural and religious purposes in accordance with Article XII, Section 7, of the Hawai'i State Constitution, and the Hawai'i Supreme Court's PASH opinion, 79 HAW. 425 (1995).***
Objective and Policy:	

5. *Require development projects to identify all cultural resources located within the project area as part of initial project studies. Further, require that all proposed activity include recommendations to mitigate potential adverse impacts on cultural resources.*

Analysis: A Cultural Impact Assessment has been prepared by CKM Cultural Resources and Honua Consulting for the proposed project. As discussed in Section 2.2.3 (Cultural Resources) the cultural impact statement (CIA) which was prepared for the proposed project reported that there were no visible cultural resources, (i.e., medicinal plants, shoreline resources, religious sites, or archeological resources) observed on the property. From a cultural practices and beliefs perspective, the subject property bears no apparent signs of cultural practices or any gatherings currently taking place on the site. The oral history interviews did not reveal any known gathering places on the subject property nor did any access concerns surface because of the proposed Action.

LAND USE

Goal: ***An attractive, well-planned community with a mixture of compatible land uses in appropriate areas to accommodate the future needs of residents and visitors in a manner that provides for the social and economic well-being of residents and the preservation and enhancement of the region's environmental resources and traditional towns and villages.***

Objective and Policy:

6. *Establish an adequate supply of urban land use designations to meet the needs of the community over the next 20 years.*

Analysis: The project site is currently designated "AG" Agriculture within the Wailuku-Kahului Community Plan. However, the Maui Island Plan designates a substantial portion of the property as an Urban Growth Boundary.

HOUSING

Goal: ***A sufficient supply and choice of attractive, sanitary and affordable housing accommodations for the broad cross section of residents, including the elderly.***

Objective and Policy:

2. *Provide sufficient land areas for new residential growth which relax constraints on the housing market and afford variety in type, price, and location of units. Opportunities for the provision of housing are presently constrained by a lack of expansion areas. This condition should be relieved by a choice of housing in a variety of locations, both rural and urban in character.*

3. *Seek alternative residential growth areas within the planning region, with high priority given to the Wailuku and Kahului areas. This action should recognize that crucial issues of maintaining important agricultural lands, achieving efficient patterns of growth, and providing adequate housing supply and choice of price and location must be addressed and resolved.*

Analysis: As previously discussed, the proposed project will utilize approximately 158-acre portion of the total acreage available within the subject property to develop 100% affordable housing. The proposed project includes approximately 752 dwelling units, retail space of approximately 17,400 square feet, and three (3) parks totaling 6.3 acres.

The subject property was situated on a land formerly used for sugar cane agriculture and more recently for macadamia nut production. However, the land has lain fallow for well over a decade and is overgrown with remnant trees and dense tall grassland.

URBAN DESIGN

Goal: ***An attractive and functionally integrated urban environment that enhances neighborhood character, promotes quality design, defines a unified landscape planting and beautification theme along major public roads and highways, watercourses and at major public facilities, and recognizes the historic importance and traditions of the region.***

Objective and Policy:

2. *Maintain a design quality for commercial and public projects and large-scale master planned developments.*

Analysis: The proposed project provides two alternative site plans with one of them as the preferable one. The design quality for the large-scale master planned development of Waiehu

Residential Community will be ensured throughout the design process. (**See**: Figure 4, "Conceptual Site Plan [Preferred Alternative]"; Figure 5, "Conceptual Site Plan Alternate 2", and Appendix 2, Waiehu Residential Community Design Documents)

3.6 County Zoning

The comprehensive zoning provisions for the County of Maui are set forth in Article II of Title 19 of the Maui County Code. The purpose and intent of comprehensive zoning is to regulate the utilization of land in a manner encouraging orderly development in accordance with the land use directives of the Hawai'i Revised Statutes, the charter of the County of Maui, and the general plan and community plans of the County, as well as to promote and protect the health, safety, and welfare of the people of the County.

The applicant is pursuing the 100% affordable housing development through the 201H process which allows for exemptions from Zoning, Community Plans and the Maui Island Plan. The Applicant requesting an exemption from Change in Zoning (CIZ) from Agricultural District Standards. (**See**: Appendix 10, Draft 201H Exemption List)

3.7 Coastal Zone Management

The Federal Coastal Zone Management Act of 1972 was adopted in response to competing development and preservation interests in U.S. coastal areas. Population growth and development in coastal areas were impacting marine resources, open space, view sheds, wildlife, and other important ecological, cultural, and historic resources. In response to this concern, Congress created a framework for managing and regulating the coastal zone and appropriated funds for State-run coastal zone management programs (CZMP). The State's acceptance of the Federal funds necessitated compliance with federal CZMP standards.

The boundaries of Hawai'i's coastal zone management program are defined by coastal waters and adjacent coastlands that are strongly influenced by each other. Coastal areas which require special consideration due to their unique values or characteristics are called Special Management Areas (SMA) and must be designated by a management plan. Any development within these areas is subject to a special assessment process. This protocol provides a means to preserve, protect, and when possible, restore the natural resources of the coastal zone by controlling

development with shoreline areas in order to avoid the permanent loss of valuable resources. As required by State law, maps showing the limits of the SMA have been prepared by each County.

Analysis: The subject property is not located within the Special Management Area (SMA) for the island of Maui. Therefore, Coastal Zone Management is not applied to the proposed project. (**See**: Figure 19, Special Management Area Map)

4. CONTEXTUAL ISSUES

4.1 Relationship between Short-term Uses and Maintenance of Long-term Productivity

Short-term uses and long-term productivity consist of short-term construction activities related to the build-out of the Waiehu Residential Community and the long-term benefits of these activities.

Construction activities would result in short-term impacts involving temporary and permanent alteration of land for grading, site work, infrastructure, and building. Localized degradation of air quality and increased noise levels would also occur in the short-term due to construction-related activities. Many short-term impacts can be avoided or mitigated by implementation of construction BMP's. Applicable BMP's include implementing erosion control measures, directing storm water run-off to detention/retention basins, and preventing the release of fuel or other contaminants. The tradeoffs among these short-term impacts are the increase in employment and immediate economic benefits of construction-related activities. These short-term impacts and benefits are documented in the EA.

In the long-term, the operation and building construction associated with the Waiehu Residential Community will create limited employment and would contribute towards Maui's economy. Economic diversification and the creation of "living wage jobs" are key objectives of the Maui Island Plan and County-wide Policy Plan.

Ultimately, the long-term build-out of the Waiehu Residential Community will produce impacts that must be weighed against the proposed project's benefits. Increased development will lead to an increase in traffic in immediate area, whether in the form of residents living at and commuting to the Waiehu Residential Community during regular business hours. With the project, the volume of traffic coming in and out of the Waiehu Residential Community will increase. This will affect regional traffic conditions by increasing volumes on the region's existing roadway network. As documented in Section 2.4.1 of the FEA.

Likewise, a new residential community will produce demands upon the island's drinking water resources and public services such police and fire. These impacts and the necessary mitigation measures are documented in Sections 2.3 and 2.4 of the FEA.

With regard to long-term productivity, this proposed 100% affordable residential project is expected to help alleviate the housing shortage that is present in Central Maui.

The proposed Waiehu Residential Community project will create jobs both temporary construction jobs and limited permanent long-term employment. The economic impacts associated with the short and long-term implementation of the Waiehu Residential Community are documented in Section 2.2.2 of the FEA.

4.2 Irreversible and Irretrievable Commitments of Resources

Implementation of the development will result in the irreversible and irretrievable commitment of certain natural and fiscal resources. Major resource commitments include the land and capital, construction materials, non-renewable resources, labor, and energy required for the Plan's implementation. Impacts represented by the commitment of these resources must be weighed against the positive socio-economic benefits that could be derived from the project versus the consequences of either taking no action or pursuing another less beneficial use of the area.

When fully built out, the development will be updated into an integrated and vibrant community with a small-scale commercial center, parks, trails, and a central open space greenway.

As with any construction activity, nonrenewable resources such as fossil fuel and construction material will be irrevocably committed. Labor will be required for planning, engineering, and construction. New uses will generate increases in the demand for water, electricity, and sewer services. Similar types of developments proposed on other parts of Maui will also generate demand for these resources. Chapter 2 of the FEA documents the proposed project's short- and long-term impacts.

4.3 Cumulative and Secondary Impacts

Cumulative impacts are defined as the impact on the environment, which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions.

Secondary impacts are those that have the potential to occur later in time or farther in the future, but which are reasonably foreseeable. They can be viewed as actions of others that are taken because of the presence of the project. Secondary impacts from highway projects, for example, can occur because they can induce development by removing transportation impediments to growth.

The build-out of the Waiehu Residential Community is likely to affect the businesses and residents of Waiehu and Wailuku. Implementation of the project, when added to other adopted and proposed projects, may have a significant effect on a regional scale.

As described in the FEA, the entire property is designated Agricultural (Ag) by the Wailuku-Kahului Community Plan. Most of the proposed project area is located within the Maui Island Plan's Urban Growth Boundary. The Wailuku-Waiehu area is expected to receive a portion of the island's population and employment over the next 20 years.

There are several other projects planned for the Wailuku area over the next decade, some of which are in close proximity of the proposed project.

To better manage the island's growth and its related impacts, the County's Maui Island Plan identifies appropriate locations for development to occur. The project site is located in the Maui Island Plan Urban Growth Boundary.

As a precursor to preparing the Maui Island Plan, the County of Maui prepared the following infrastructure and public facility technical studies: Infrastructure and Public Facilities Issue Paper (September 2007), Public Facilities Assessment Update (March 2007) and Infrastructure Assessment Update (May 2003). These studies assess the impact of population growth on the island's infrastructure and public facility systems. In general, the studies conclude that on-going public and private sector investment will be necessary to accommodate growth through 2030.

This section identifies secondary and cumulative impacts that may result from the development of the Waiehu Residential Community:

Impacts to Natural and Environmental Resources. Assuming all BMPs and mitigation measures documented in this final EA are implemented and all permit-induced requirements are complied with; no cumulative or secondary impacts are anticipated on the natural environment.

Flora and Fauna. Development of the Waiehu Residential Community, together with other area projects, could have cumulative and/or secondary impacts on rare or endangered species of flora and fauna if natural habitats and/or species are directly or indirectly disturbed. As documented in Section 2.1.6 of the FEA, the proposed project will not impact rare or endangered flora and fauna species. Adjacent proposed developments are likely to be required to conduct flora and fauna surveys prior to development. These surveys will be reviewed by the U.S. Fish and Wildlife Service and mitigation countermeasures will be required if warranted. In consideration of existing State and Federal regulations to protect rare and endangered species, there should be no significant cumulative and/or secondary impacts to flora and fauna resources arising from planned growth of the Waiehu residential community.

Coastal Water Quality. Development of the project, together with other area projects, could have significant cumulative impacts to coastal water quality if BMPs are not strictly adhered to. During the construction phase, BMP's must be implemented to mitigate runoff of bare soils and other construction contaminants into drainageways and culverts. If not properly mitigated, the cumulative impact of these contaminants could impact coastal water quality.

During the proposed project's operation phase, any increase in runoff will be maintained on site as required by the County's drainage rules (**See**: Section 2.4.2 of the FEA) Maintaining runoff on-site, together with filtration of contaminants from runoff, will mitigate the proposed project's impact to coastal waters. Likewise, future developments in the area will be required to implement similar mitigation measures as part of their operation phase BMP's. Therefore, the proposed project, together with other planned projects in the area, should not have a significant cumulative impact on coastal water quality if construction and operation phase BMPs are strictly adhered to.

Agricultural Lands. As documented in Section 2.1.11 of the FEA, the Waiehu Residential Community is located on State designated Agricultural land, therefore, the project is not expected to have a significant cumulative impact upon the long-term viability or growth of agriculture on Maui.

Regarding secondary impacts, urban development can impact agricultural land uses. In certain circumstances, urbanization of agricultural lands can cause agricultural lands prices to go higher making it more cost prohibitive for farmers to buy or lease land to farm. Second, urban development can create use conflicts between farmers and urban residents. The establishment of Urban Growth Boundaries in the Maui Island Plan create more predictable development patterns,

and this will create more certainty in the urban and agricultural land markets; thereby, mitigating the escalation of agricultural land values. In addition, the Waiehu Residential Community will establish landscape planting around the perimeter of the property with a buffer to mitigate potential agricultural use conflicts. The proposed project will result in a loss of agricultural land. The previously approved project proposed to utilize the entire property. This project is proposing to leave 80 acres of the project site as agricultural. This 80 acres will buffer existing residents from the new community and may provide an opportunity to support future agricultural use on the property.

Drinking Water Resources. The development of the Waiehu Residential Community, together with other area projects, will increase the demand for drinking water. The project proposes to use water from the County of Maui, Department of Water Supply (DWS) system for potable and non-potable water sources.

With the recent increase in water allocation from the Iao Aquifer to the County of Maui, significant cumulative and/or secondary impacts are not anticipated to threaten the long-term sustainability of the County's water resources.

Air Quality. The cumulative impact of the build-out of the Waiehu Residential Community, together with other developments in Wailuku, will increase the amount pollutants entering the atmosphere. These pollutants will be generated by an increase in demand for energy in the form of transportation fuels for automobiles and carbon-based fuels to power the Maalaea Power Plant.

Impacts to the Socio-Cultural Environment

The development of the Waiehu Residential Community, together with other developments in Wailuku, will increase population, create jobs, and generate tax revenues. Together, these projects will also increase the demand for housing and place increasing demands on infrastructure and public facility systems both locally and island wide.

The continued redevelopment of Wailuku will also change the area's urban design character and sense of place. Today, Wailuku is the government hub of the island however there are number of undeveloped infill parcels intermixed with lower and medium-density residential, commercial, industrial, hotel and public facility uses. In the coming years, pursuant to the land-use policies contained in the Maui Island Plan and Wailuku-Kahului Community Plan, Kahului-Wailuku will evolve to become a more unified and cohesive urban settlement. Urban development will likely become more compact, mixed-use and interconnected.

Infrastructure and Public Facilities

The build-out of the Waiehu Residential Community, together with other developments in Wailuku, will increase the demand for infrastructure and public facility systems, including water, wastewater, and roadways; solid waste, schools, and parks; and medical facilities, public transit and government offices.

Property taxes generated by the development, together with other planned projects in the area, will help fund County operations and capital improvement projects.

4.4 Unresolved Issues

The various planning processes being pursued by the Applicant, including preparation of this DEA and community outreach efforts, have been conducted based on best available information and expertise of those knowledgeable in the design and construction of the types of facilities associated with the proposed Waiehu residential community. Unresolved issues for the proposed project at the time of filing this FEA by the Applicant are summarized below along with a discussion of how the issues will be resolved prior to commencement of project construction and/or operation.

4.4.1 Project-Specific Land Use Entitlements and Permitting

Following the acceptance of a Final Environmental Assessment (FEA), a State Land Use District Boundary Amendment (DBA) will be processed in order to request the necessary amendment to allow for the development of the proposed project.

The Applicant will request an exemption from The Maui Island Plan (MIP) to allow development to occur outside the existing urban growth boundary located within the subject parcel remains an unresolved issue.

The subject property is designated for Agricultural uses by the Wailuku-Kahului Community Plan (WKCP). The Applicant intends to request an exemption from an Amendment to the WKCP in order to develop the proposed 100% affordable project.

The subject property zoning is Agricultural. The Applicant intends to request an exemption

from a change to a residential zoning category in order to develop the proposed project.

In addition, when sufficient design details are available, separate and specific permit approvals beyond those discussed within this DEA may need to be obtained by the Applicant.

4.4.2 HRS Chapter 6E Compliance

Sections 2.1.9 and 2.2.3 of this Final EA concern archaeological, cultural, and historic resources. In 2004, the Department of Land & Natural Resources, State Historic Preservation Division (SHPD) concluded that no further work was warranted for the Project Site for the previously proposed residential development.

The FEA includes supplemental archaeological study and cultural inventory assessment encompassing the entire Project Site — which fully consider existing archaeological documentation, a full field inspection, and geological and depositional characteristics. The discussions concerning archaeological and cultural resources set forth sufficient information to enable DAGS and the public to broadly consider potential impacts on historic and cultural resources as required under HRS 343 and HAR Chapter 200.1.

It shall be the responsibility of the Developer to fulfill any additional requirements set forth by SHPD needed to obtain notice to proceed with construction. This may include additional archaeological studies and/or an archaeological monitoring plan. SHPD may require archaeological monitoring for construction work through the Project Site.

4.4.3 COVID-19 Pandemic Conditions

Pandemic conditions due to the unprecedented spread of the novel COVID-19 virus have continued to impact the functions of daily life on a global level since 2020. The pandemic has had far-reaching consequences beyond efforts to stop the spread of the disease itself and to isolate it. Pandemic conditions have significantly contributed to the global economic recession due to the strict policy to control the spread of the virus.

At the time of the preparation of this FEA, there is no consensus or prognosis for when global pandemic conditions will subside. Nonetheless, it is anticipated that the County and

the project developer may need to and consider the implications of changing pandemic conditions on the approach, construction, and occupancy of the proposed residential development.

4.4.4 Proposed Water Source

The proposed project will utilize potable and non-potable water from the County system. However, at this time there may not be enough water supply for the full build out. The full explanation of the existing water system and the proposed project are discussed in Section 2.4.3 of this FEA (Water). At the time of the preparation of this FEA, a potable and non-potable water source has not been finalized.

5. CONSULTATION AND REVIEW

5.1 Early Consultation

Prior to the preparation of the DEA, consultation on the project was undertaken with the following agencies:

2020 Early Consultation Letter sent out to various agencies, see below.

Early Consultation meeting with DHHC

Affordable Housing Maui Nui Meeting with various County agencies and the Mayor's office.

2021 Consultation meetings with Maui County Department of Planning to discuss land use, proposed densities.

Consultation meetings with Maui County Department of Transportation to discuss the Maui Bus and potential bus stop locations.

Consultation meetings with Maui County Department of Public Works to discuss drainage and infrastructure location.

Consultation with DOE to discuss impact fees and future school site needs in Wailuku.

5.2 Early Consultation Letter Distribution

The Early Consultation letter was transmitted to the following agencies and organizations for review and comment. The Agencies and individuals with an asterisk * provided comments (**See**: Appendix 3, Early Consultation Comment Letters with Responses)

Federal Agencies

U.S. Department of Agriculture, Natural Resources Conservation Service

U.S. Army Engineer Division

U.S. Fish and Wildlife Service

State Agencies

Department of Agriculture
Department of Accounting and General Services*
Department of Business, Economic Development & Tourism (DBEDT)
DBEDT – Office of Planning
Department of Education*
Department of Hawaiian Home Lands
Department of Health- Environmental Planning Office
Department of Health- Clean Water Branch
Department of Health- Safe Drinking Water Branch
Department of Health- Clean Air Branch
Department of Health- Wastewater Branch
Department of Health- Maui District*
Department of Human Services
Department of Labor and Industrial Relations
Department of Land and Natural Resources (DLNR) – Land Division*
DLNR – State Historic Preservation Division (SHPD)
DLNR- Engineering Division*
DLNR- Commission on Water Resource Management*
DLNR – Maui Land Agent*
DLNR – Forestry and Wildlife*
Department of Transportation*
Hawai'i Housing Financing and Development Corporation
Office of Hawaiian Affairs

Maui County Agencies

Department of Environmental Management
Department of Fire and Public Safety
Department of Housing and Human Concerns*
Department of Parks and Recreation*
Department of Planning*
Department of Public Works*
Department of Transportation*
Department of Water Supply
Police Department*

5.3 Draft EA Consultation

The Draft EA was transmitted to the following agencies and organizations for review and comment. The Agencies and individuals with an asterisk * provided comments (**See**: Appendix 11, DEA Comment Letters with Responses)

Federal Agencies

U.S. Department of Agriculture, Natural Resources Conservation Service
U.S. Army Engineer Division
U.S. Fish and Wildlife Service

State Agencies

Department of Agriculture
Department of Accounting and General Services*
Department of Business, Economic Development & Tourism (DBEDT)
DBEDT – Office of Planning
Department of Education*
Department of Hawaiian Home Lands
Department of Health- Environmental Planning Office
Department of Health- Clean Water Branch
Department of Health- Safe Drinking Water Branch
Department of Health- Clean Air Branch*
Department of Health- Wastewater Branch
Department of Health- Maui District*
Department of Human Services
Department of Labor and Industrial Relations
Department of Land and Natural Resources (DLNR) – Land Division*
DLNR – State Historic Preservation Division (SHPD)
DLNR- Engineering Division*
DLNR- Commission on Water Resource Management*
DLNR – Maui Land Agent*
DLNR – Forestry and Wildlife*
Department of Transportation*
Hawai'i Housing Financing and Development Corporation
Office of Hawaiian Affairs*

Maui County Agencies

Mayor's Office
County Council Members
Department of Environmental Management
Department of Fire and Public Safety*
Department of Housing and Human Concerns
Department of Parks and Recreation*
Department of Planning (MPC and UDRB)*
Department of Public Works
Department of Transportation
Department of Water Supply*
Police Department

Others

Hawaiian Electric
Maui News and other Media outlets

Upon completion of the Draft EA Consultation meetings or calls where conducted with neighboring property owners, government agencies and the mayor's office. The Applicant is committed to continue outreach with the community as we move forward through the planning process.

6. REFERENCES

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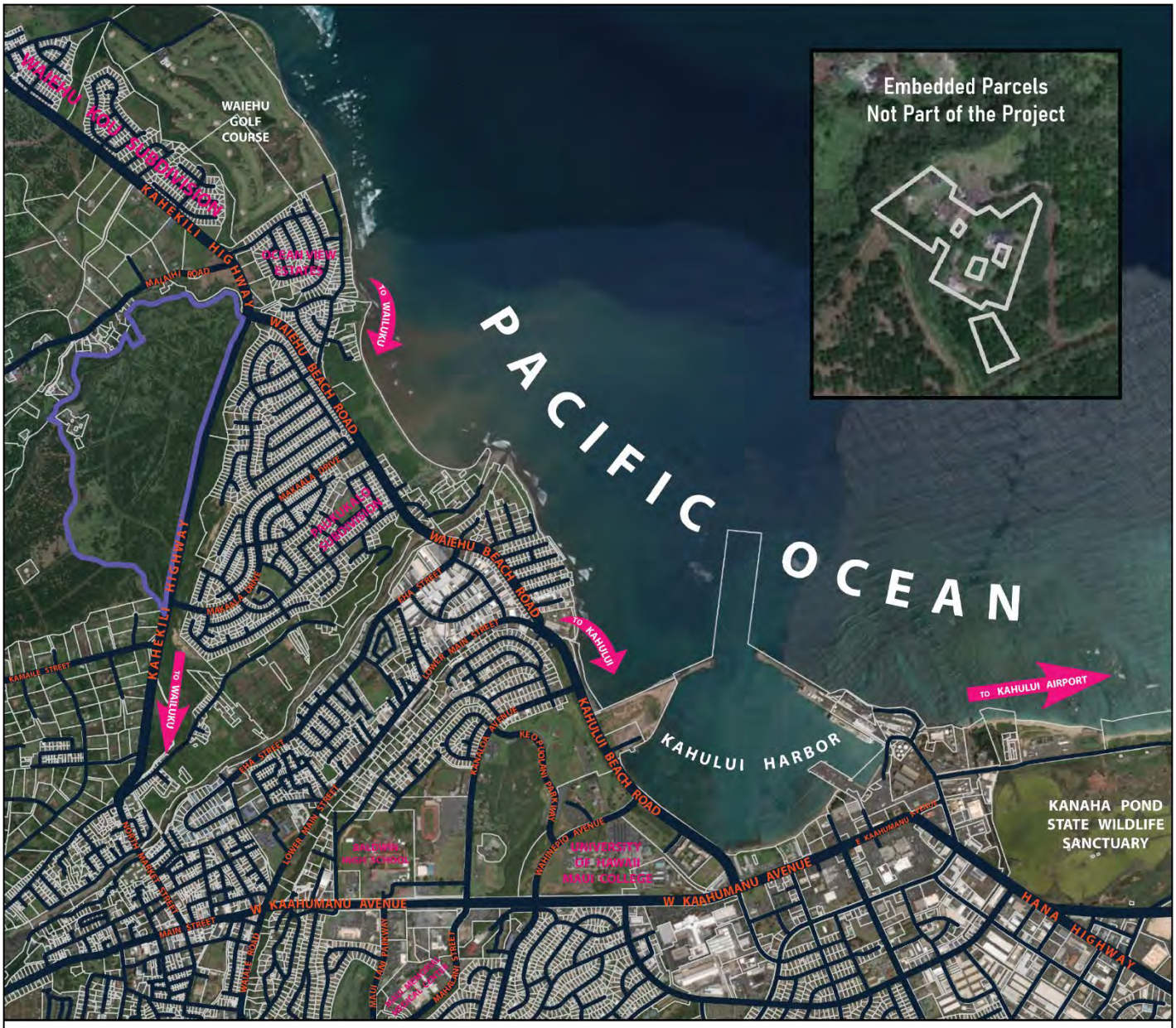
Figures



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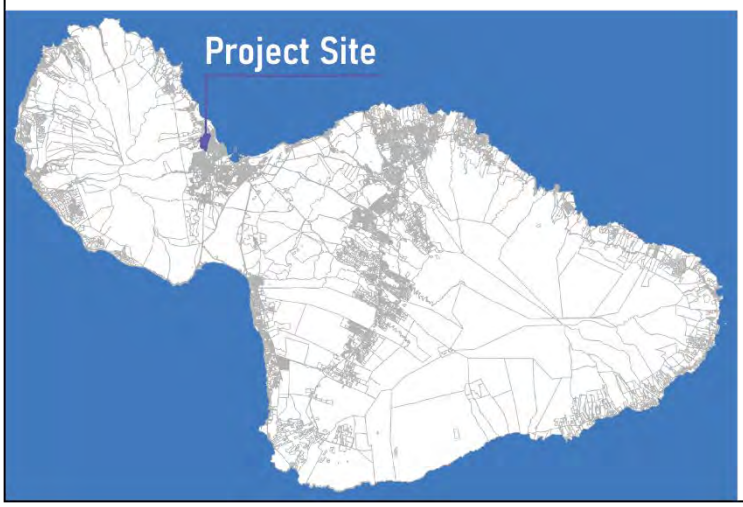


0 2,000 4,000 6,000 8,000 Feet

Project Site Parcels

FIGURE 1
Location Map

Waiehu Residential Community
Source: ESRI

CHRIS HART & PARTNERS, INC.

Not to Scale

0 1,000 2,000 3,000 4,000 Feet

Project Site Parcels

FIGURE 2

Tax Map Key

Waiehu Residential Community

Source: ESRI, County of Maui

CHRIS HART & PARTNERS, INC.

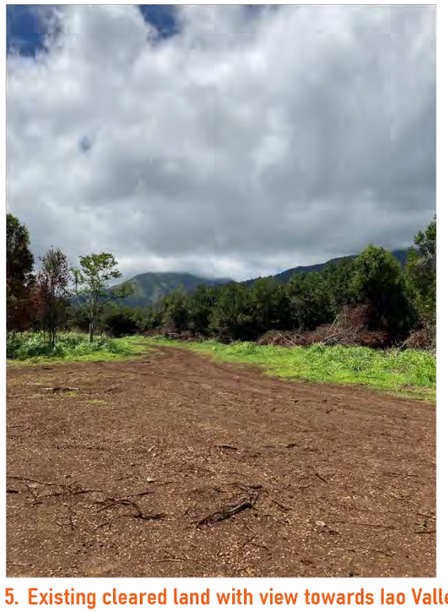
1. Looking west towards Waiehu Stream at existing Bridge.

2. Existing Dirt Road looking south towards Iao Valley.

Note: Approximate direction and location of photograph taken.

3. Existing vegetation on the site.

4. Macadamia nut Trees from former agricultural operation.



5. Existing cleared land with view towards Iao Valley.

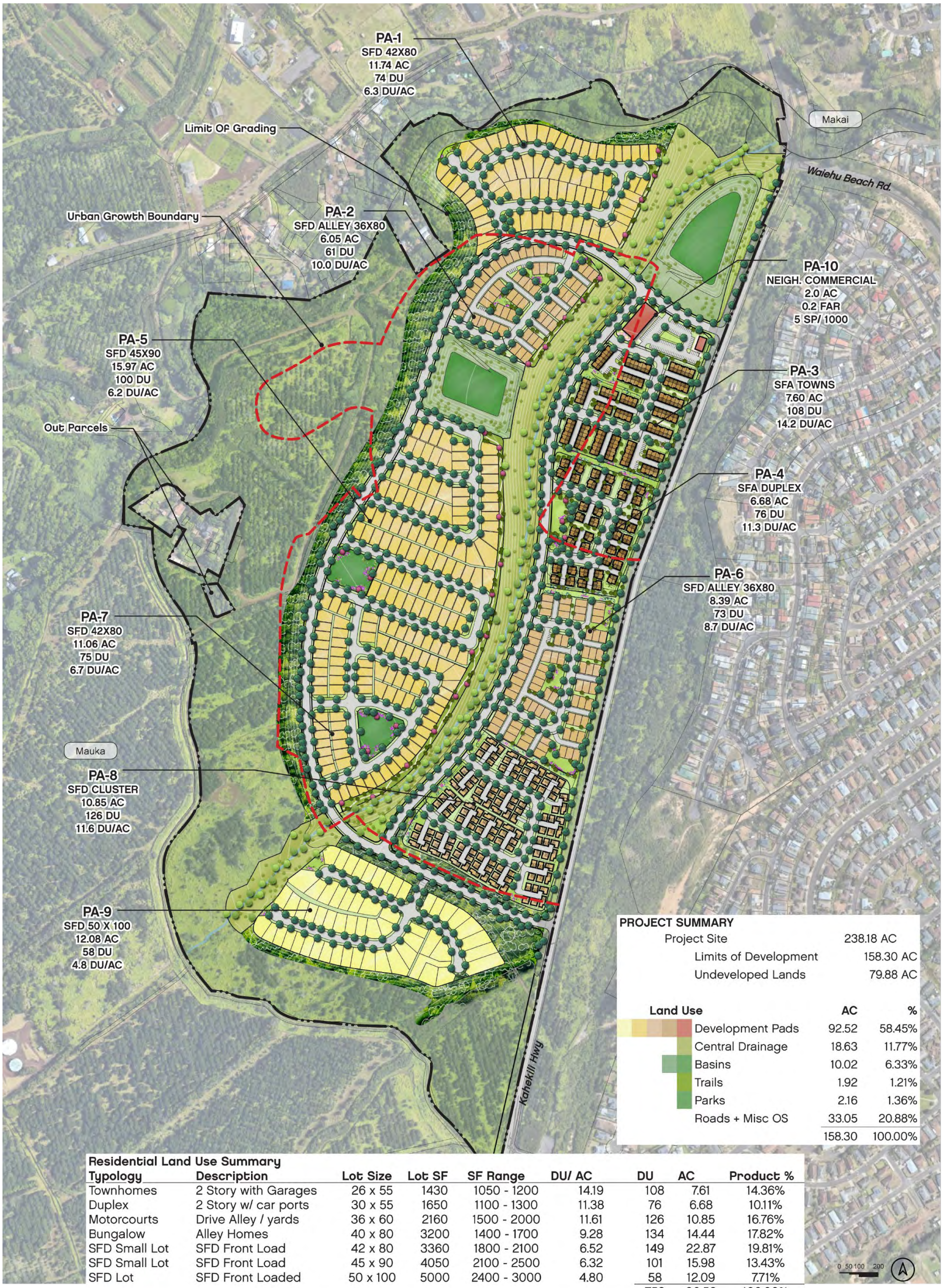
6. Existing Security Gate to access property. (Note: Future entrance to the project site)

Photographs taken on April 15, 2021.

FIGURE 3
Site Photographs

Waiehu Residential Community

CHRIS HART & PARTNERS, INC.



PROJECT SUMMARY

Project Site	238.18 AC
Limits of Development	158.30 AC
Undeveloped Lands	79.88 AC

Land Use	AC	%
Development Pads	92.52	58.45%
Central Drainage	18.63	11.77%
Basins	10.02	6.33%
Trails	1.92	1.21%
Parks	2.16	1.36%
Roads + Misc OS	33.05	20.88%
	158.30	100.00%

Residential Land Use Summary

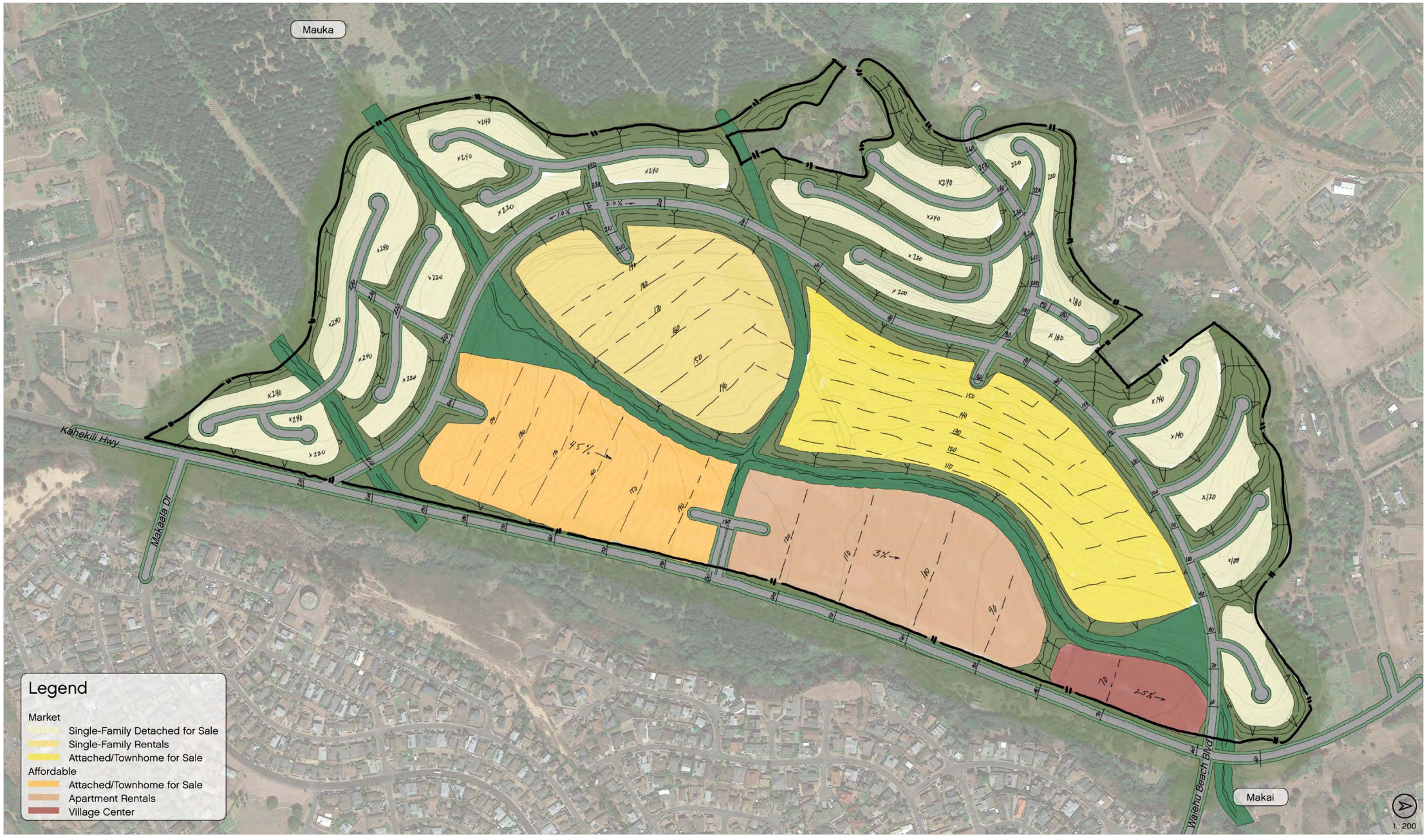
Typology	Description	Lot Size	Lot SF	SF Range	DU/ AC	DU	AC	Product %
Townhomes	2 Story with Garages	26 x 55	1430	1050 - 1200	14.19	108	7.61	14.36%
Duplex	2 Story w/ car ports	30 x 55	1650	1100 - 1300	11.38	76	6.68	10.11%
Motorcourts	Drive Alley / yards	36 x 60	2160	1500 - 2000	11.61	126	10.85	16.76%
Bungalow	Alley Homes	40 x 80	3200	1400 - 1700	9.28	134	14.44	17.82%
SFD Small Lot	SFD Front Load	42 x 80	3360	1800 - 2100	6.52	149	22.87	19.81%
SFD Small Lot	SFD Front Load	45 x 90	4050	2100 - 2500	6.32	101	15.98	13.43%
SFD Lot	SFD Front Loaded	50 x 100	5000	2400 - 3000	4.80	58	12.09	7.71%
						752	90.52	100.00%

WAIEHU
MASTER PLAN

FIGURE 4
Conceptual Site Plan
(Preferred Alternative)

Waiehu Residential Community
Source: Genova, WHA

CHRIS HART & PARTNERS, INC.



WAIEHU
MASTER PLAN

FIGURE 5.1
Conceptual Site Plan Alternate 2

Waiehu Residential Community
Source: Genova, WHA

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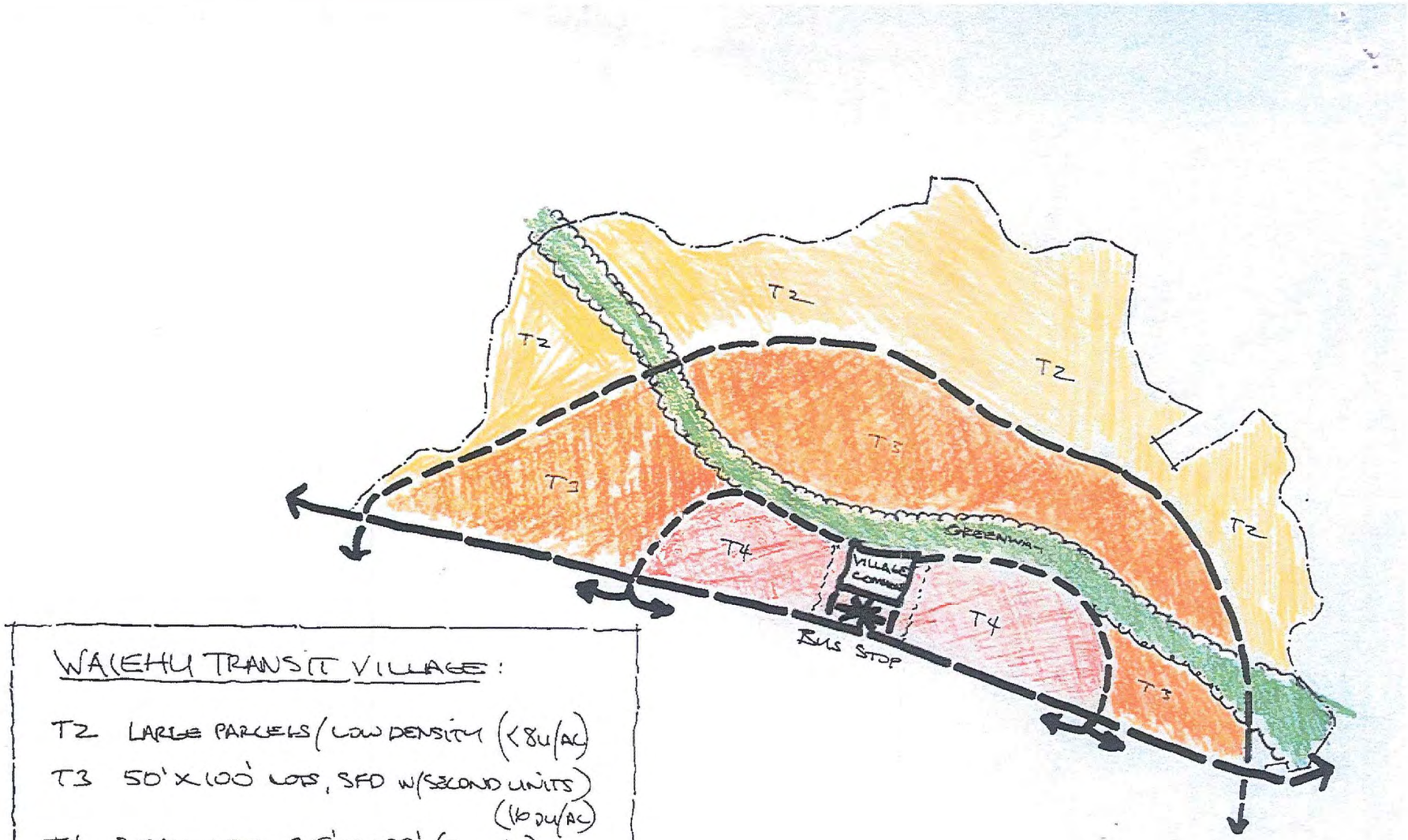


FIGURE 5.2
Conceptual Site Plan Alternate 3

Waiehu Residential Community
Source: Maui County Planning Department Comment Letter Dated June 30, 2021

CHRIS HART & PARTNERS, INC.

Not to Scale

0 1,200 2,400 3,600 4,800 Feet

Agricultural

Rural

Conservation

Urban

Project Site

Parcels

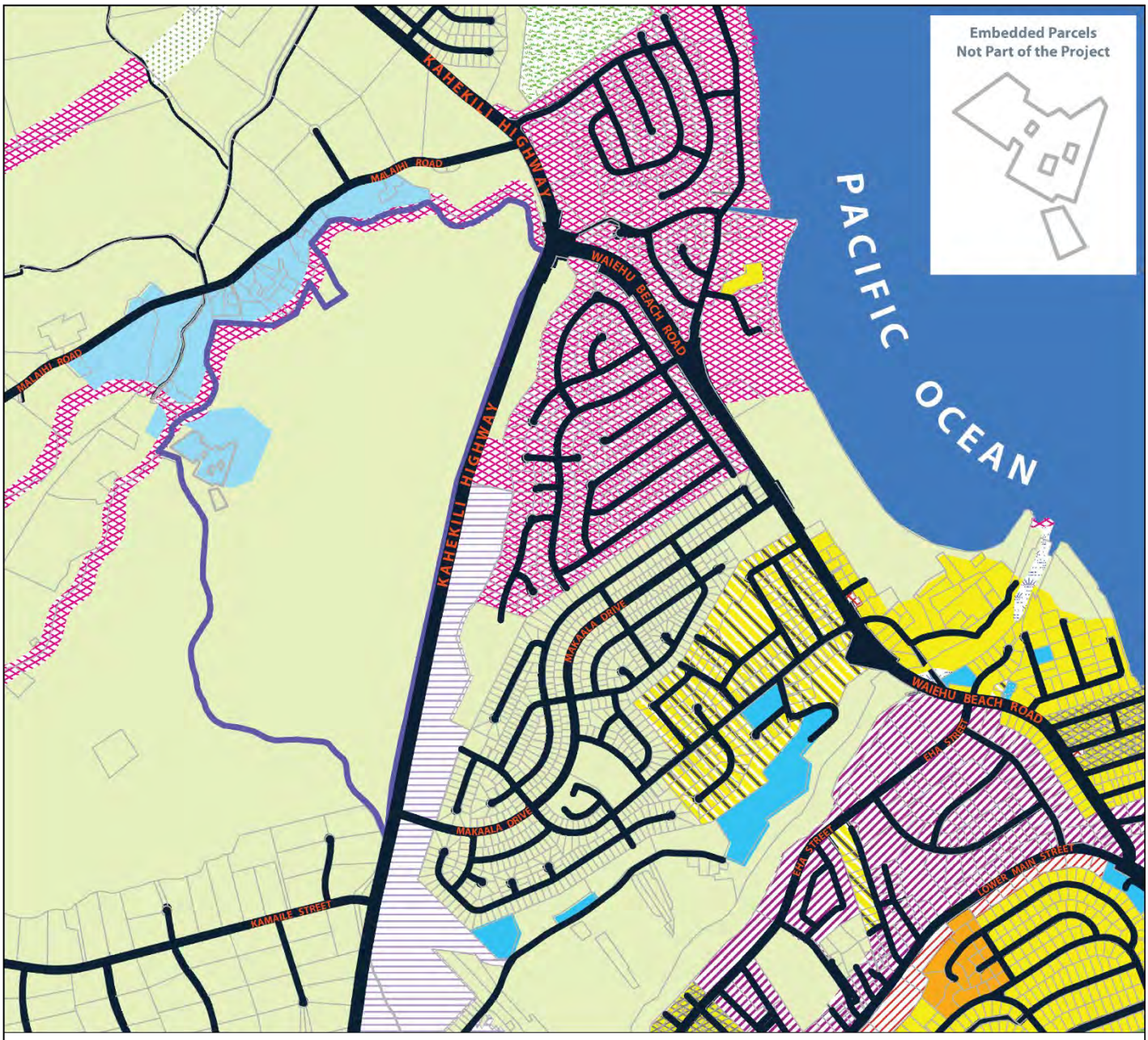
FIGURE 6

State Land Use District Map

Waiehu Residential Community

Source: ESRI, State of Hawaii LUC

CHRIS HART & PARTNERS, INC.



Not to Scale

0 850 1,700 2,500 3,400 Feet

- A-2 Apartment
- AG Agriculture
- B-1 Business - Neighborhood
- B-2 Business - Community
- DR Drainage
- INT Interim
- M-1 Light Industrial
- OS-2 Open Space Active
- P-1 Public/Quasi-Public
- PD Project District
- PK(GC) Park-Golf Course
- R-1 Residential
- R-2 Residential
- R-3 Residential
- RU-0.5 Rural - 1/2 Acre

Project Site Parcels

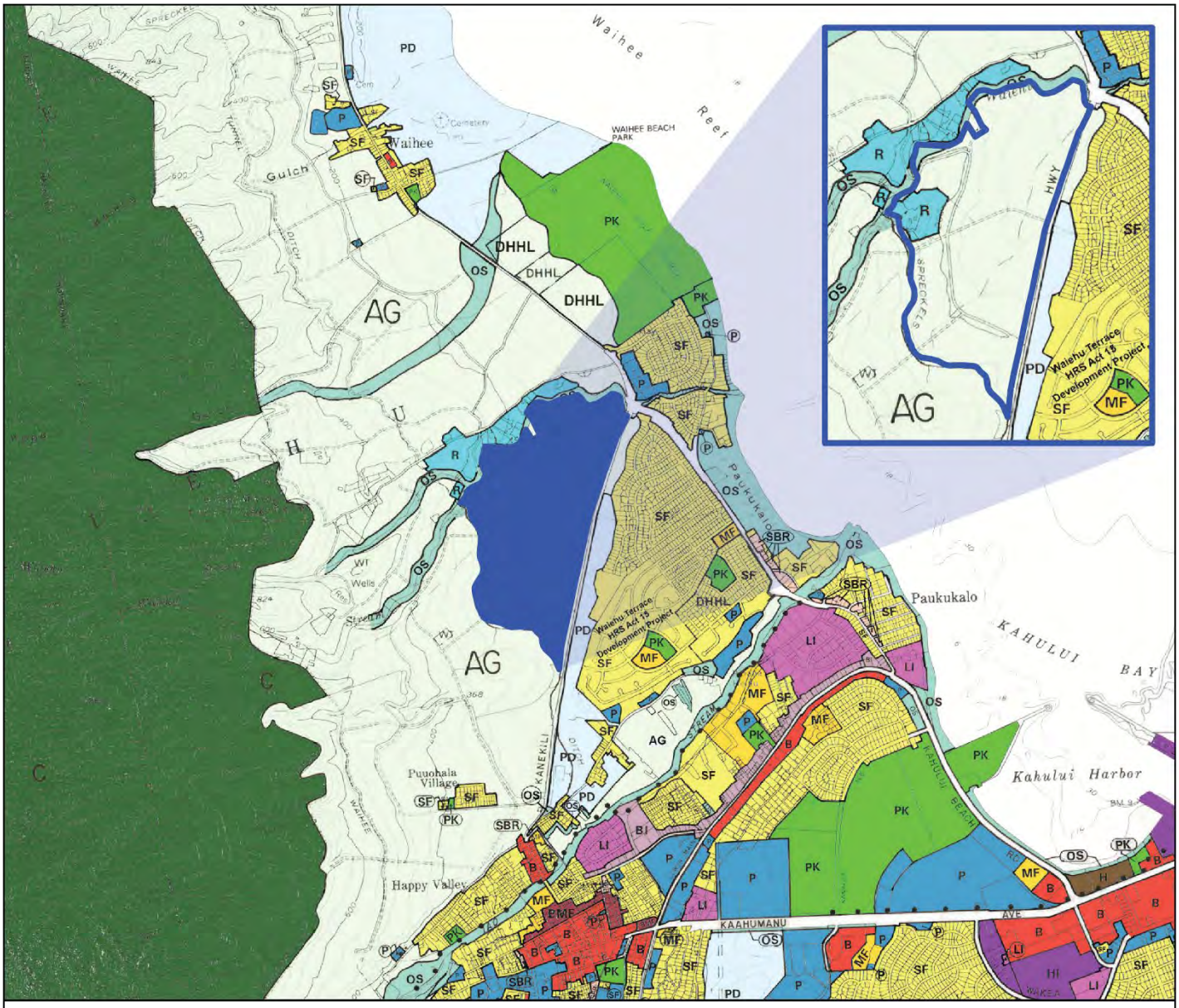
FIGURE 7

Maui County Zoning Map

Waiehu Residential Community

Source: ESRI, County of Maui

CHRIS HART & PARTNERS, INC.



AG	Agriculture
R	Rural
SF	Single Family Residential
MF	Multi-Family Residential
B	Business/Commercial
BMF	Business/Multi-Family
SBR	Service Business Residential
BI	Business/Industrial
RLI	Rural Light Industrial
LI	Light Industrial
HI	Heavy Industrial
H	Hotel
P	Public/Quasi-Public
PK	Park (GC) Golf Course
OS	Open Space
PD	Project District
A	Airport
C	Conservation
FGR	Future Growth Reserve
• • • •	BICYCLE ROUTE
60	AIRPORT SPECIAL CONTROL DISTRICT

Not to Scale

Project Site

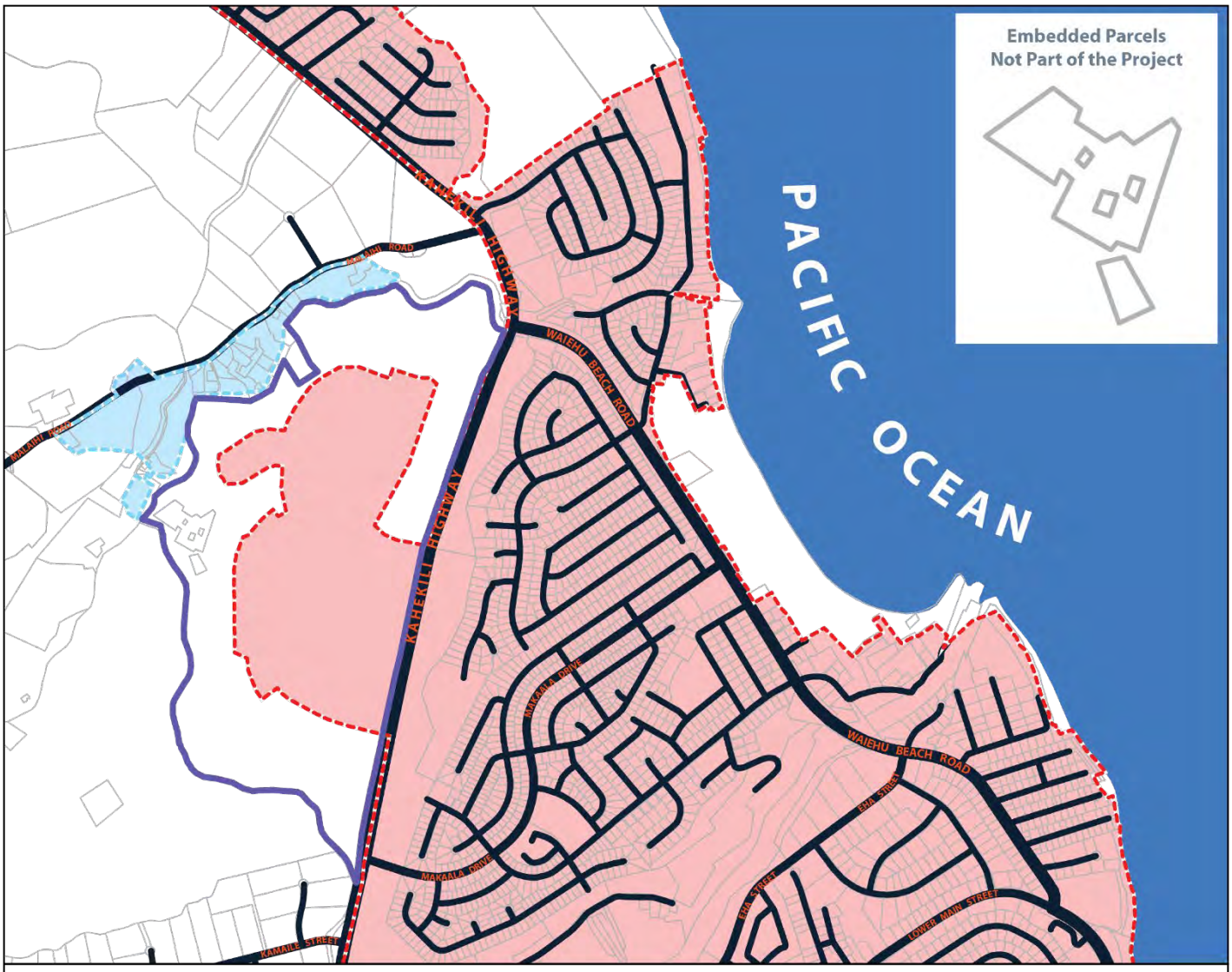
FIGURE 8

Community Plan Map

Waiehu Residential Community

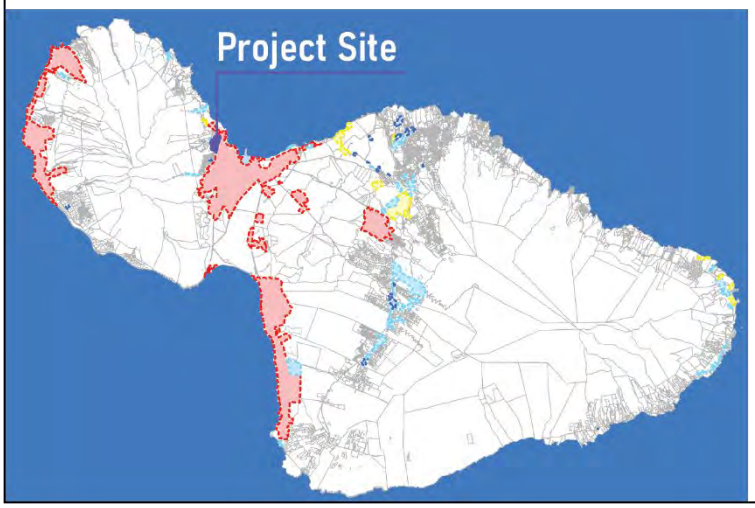
Source: Maui County Planning Department

CHRIS HART & PARTNERS, INC.



Not to Scale

0 1,200 2,400 3,600 4,800 Feet



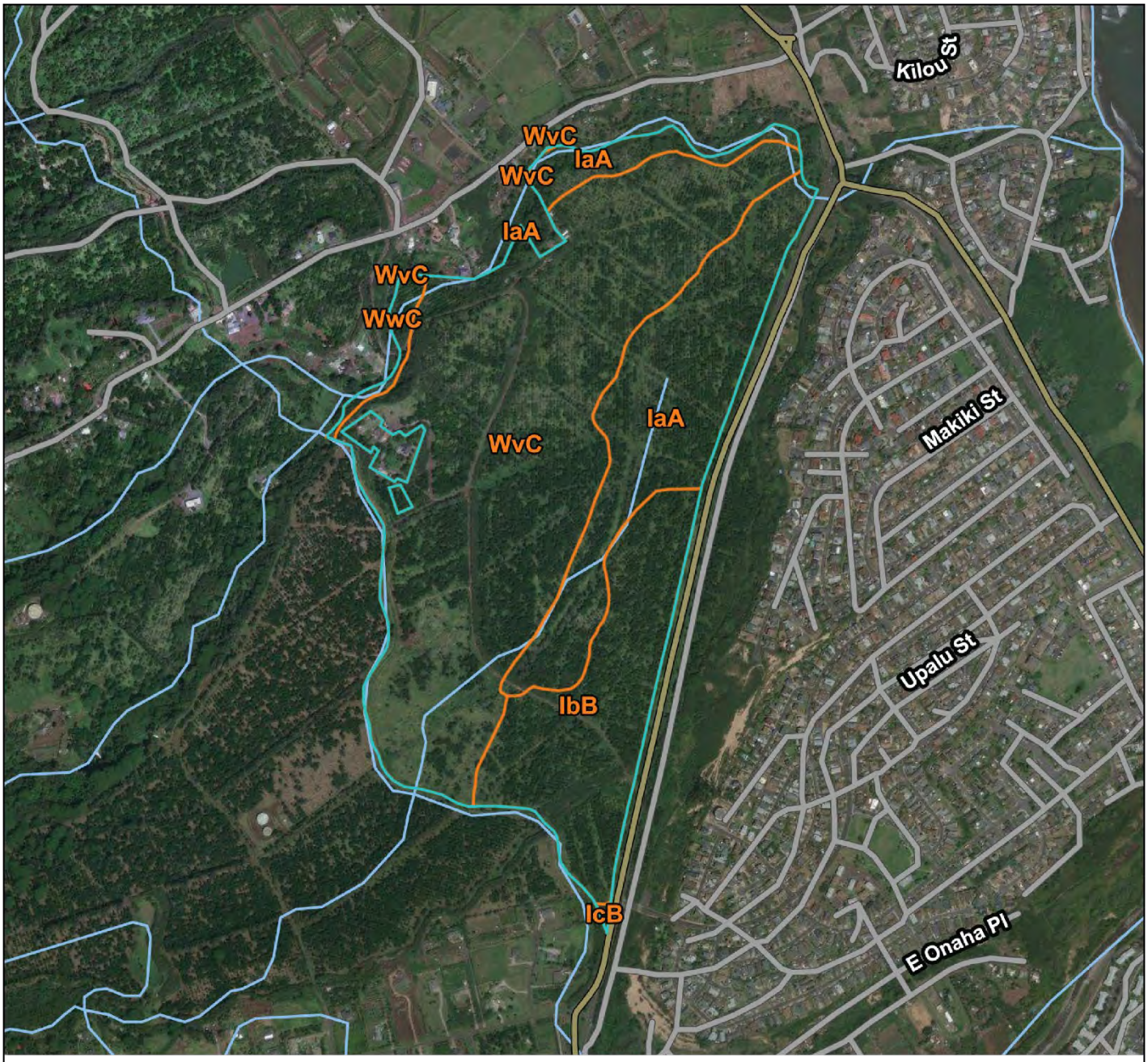
- Urban Growth Boundary
- Rural Growth Boundary
- Country Town
- Rural Service Center

Project Site Parcels

FIGURE 9
Maui Island Plan Map

Waiehu Residential Community
Source: ESRI, County of Maui

CHRIS HART & PARTNERS, INC.



IaA

Iao silty clay, 0 to 3 percent slopes, MLRA 163

IbB

Iao cobbly silty clay, 3 to 7 percent slopes

IcB

Iao clay, 3 to 7 percent slopes

WvC

Wailuku silty clay, 7 to 15 percent slopes

WwC

Wailuku cobbly silty clay, 7 to 15 percent slopes

Not to Scale

0 675 1,350 2,025 2,700 Feet

Project Site | Soil Map Unit

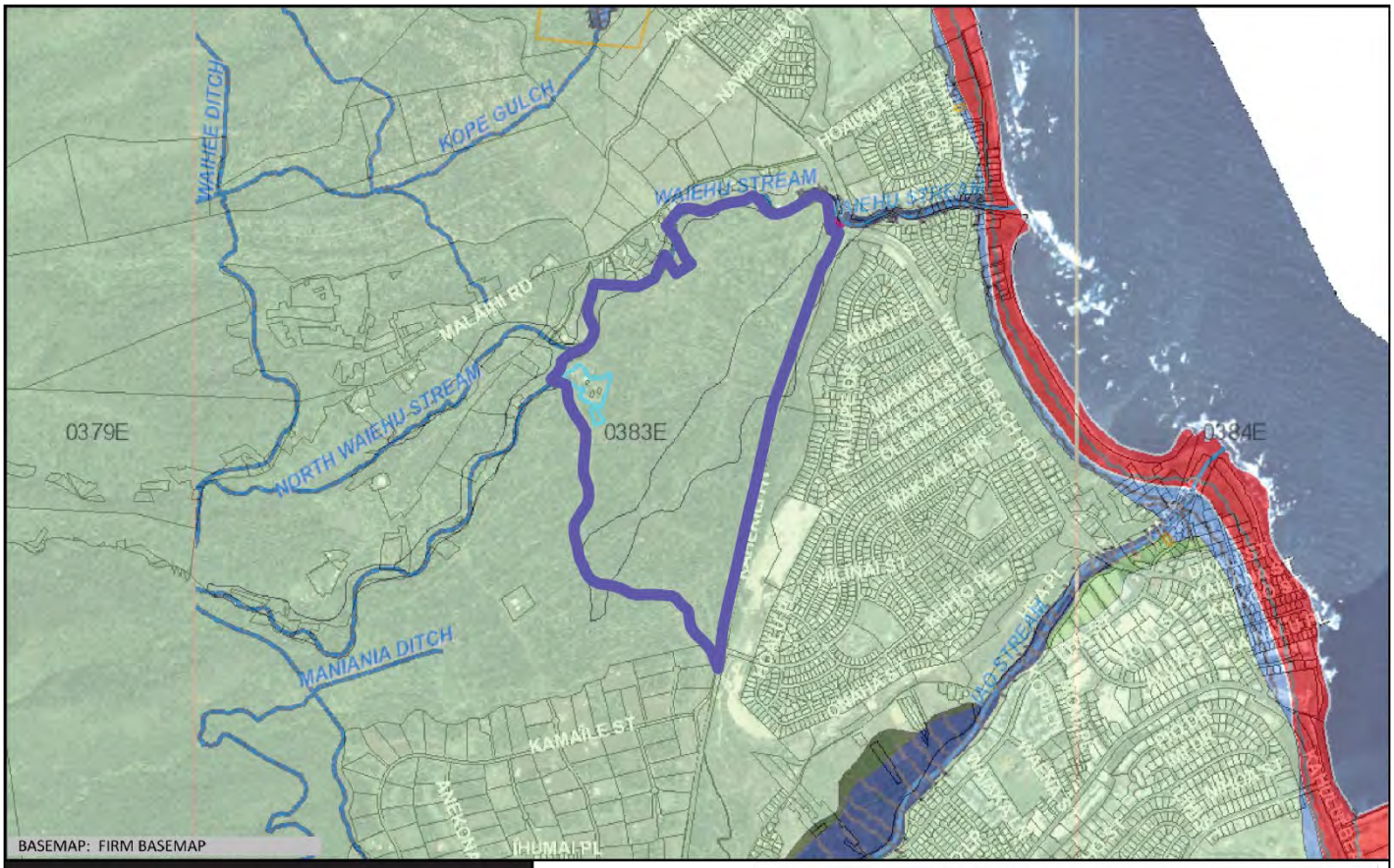
FIGURE 10

Soil Map

Waiehu Residential Community

Source: USDA Web Soil Survey

CHRIS HART & PARTNERS, INC.



FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(Note: legend does not correspond with NFHL)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

	Zone A: No BFE determined.
	Zone AE: BFE determined.
	Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
	Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
	Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
	Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
	Zone AEF: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

	Zone XS (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
	Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

	Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.

Flood Hazard Assessment Report

www.hawaiinfip.org

Property Information

COUNTY:	MAUI
TMK NO:	(2) 3-3-002:031
WATERSHED:	WAIEHU
PARCEL ADDRESS:	ADDRESS NOT DETERMINED WAILUKU, HI 96793

Notes:

Flood Hazard Information

FIRM INDEX DATE:	NOVEMBER 04, 2015
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL:	1500030383E
PANEL EFFECTIVE DATE:	SEPTEMBER 25, 2009

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: NO
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

N

0 0.30 0.60 mi

Project Site

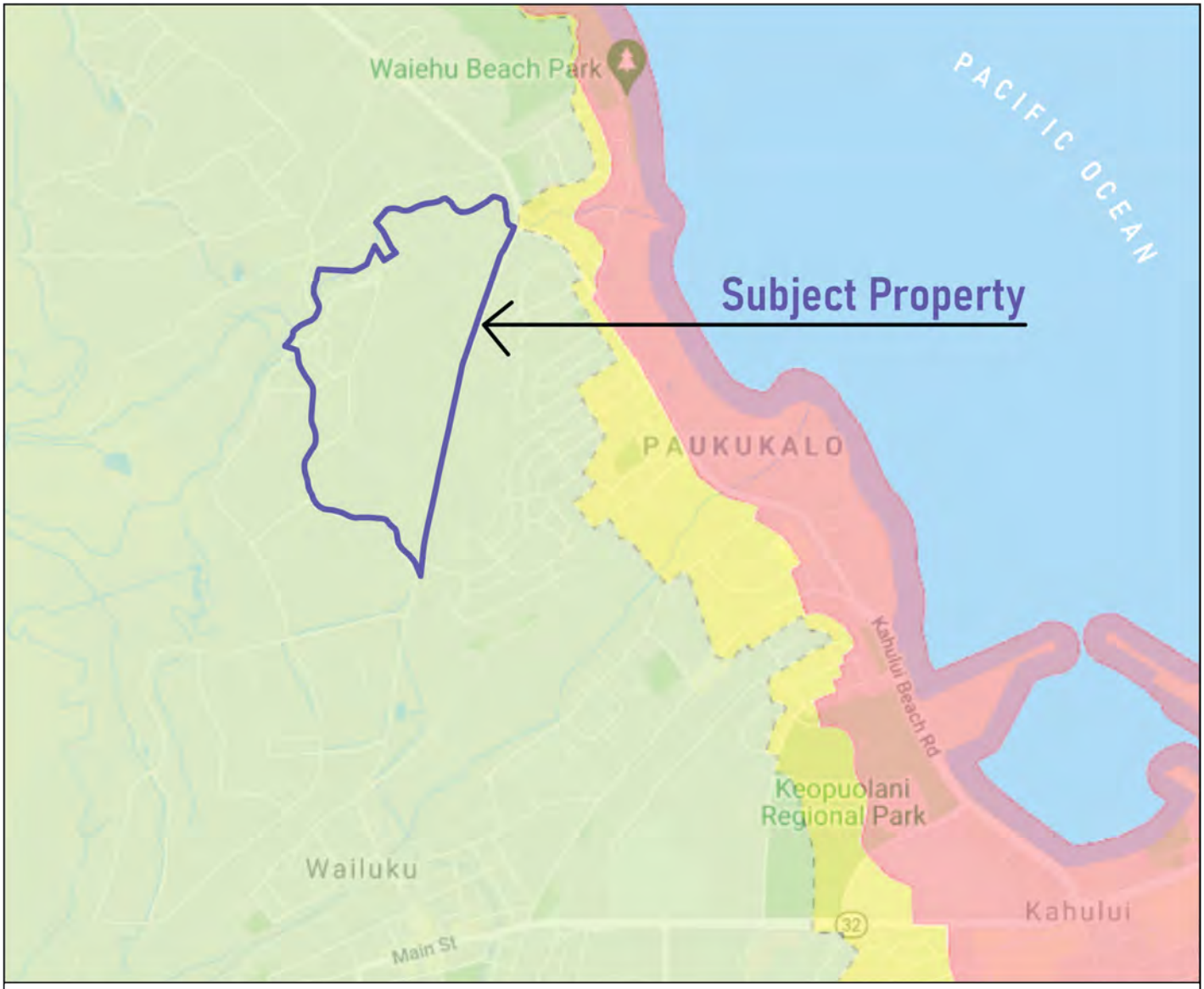
FIGURE 11

Flood Hazard Assessment Map

Waiehu Residential Community

Source: National Flood Insurance Program

CHRIS HART & PARTNERS, INC.



Not to Scale

Tsunami Evacuation Zone

Extreme Tsunami Evacuation Zone

Safe Zone

Subject Property

FIGURE 12

Tsunami Zone Evacuation Map

Waiehu Residential Community

Source: NOAA Office for Coastal Management

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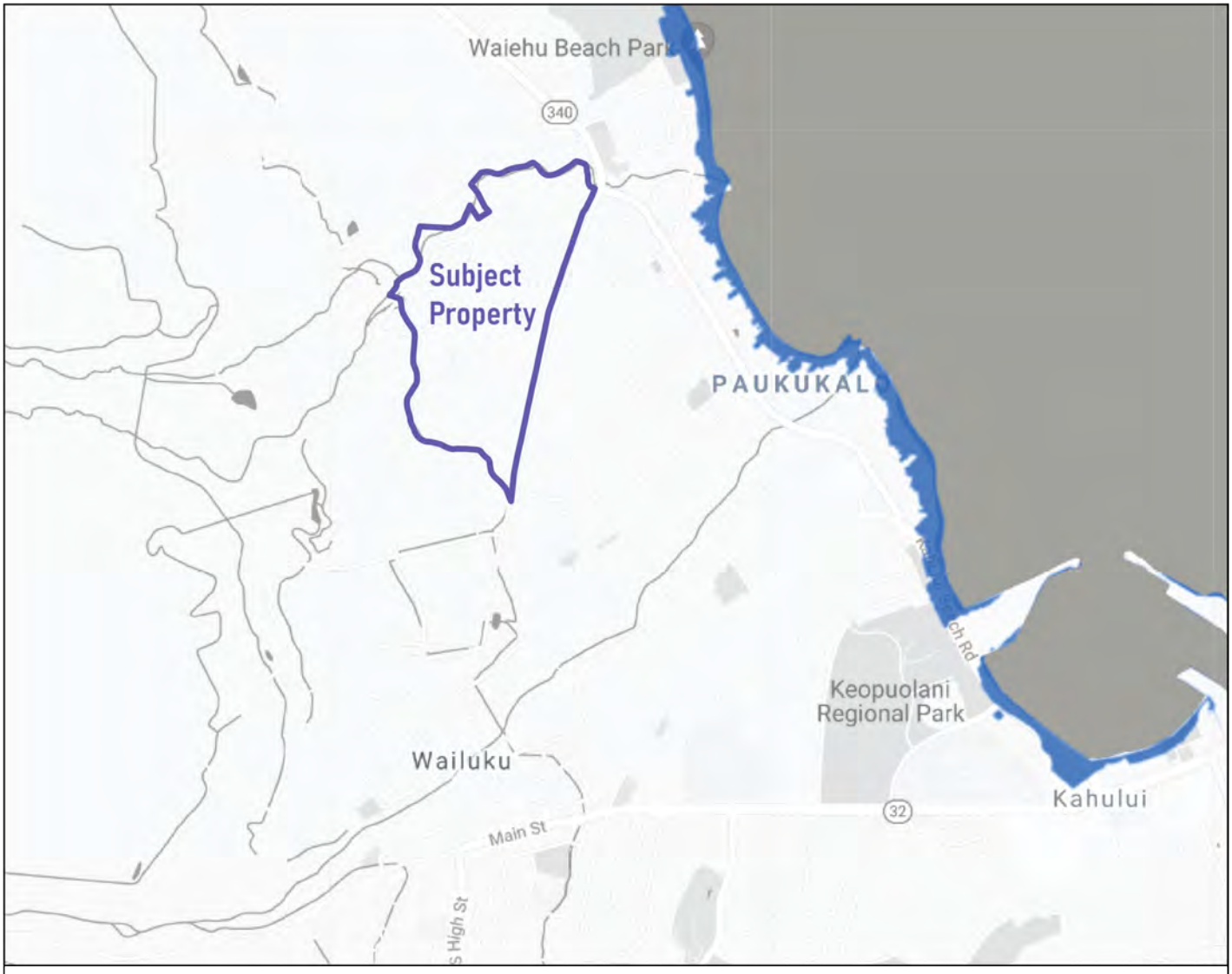

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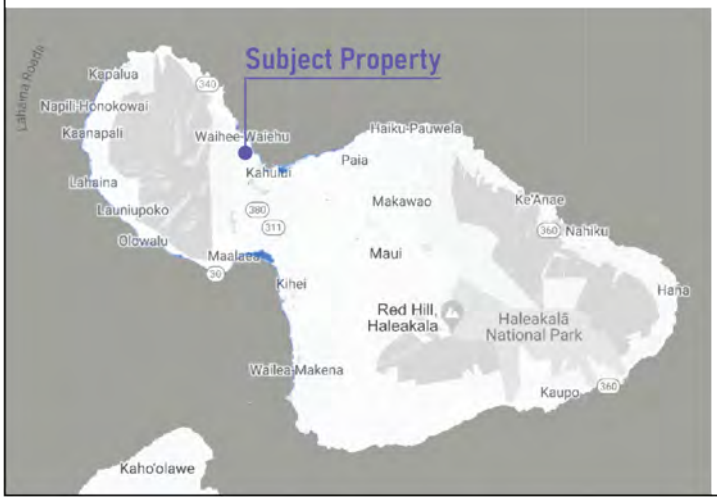


Subject Property

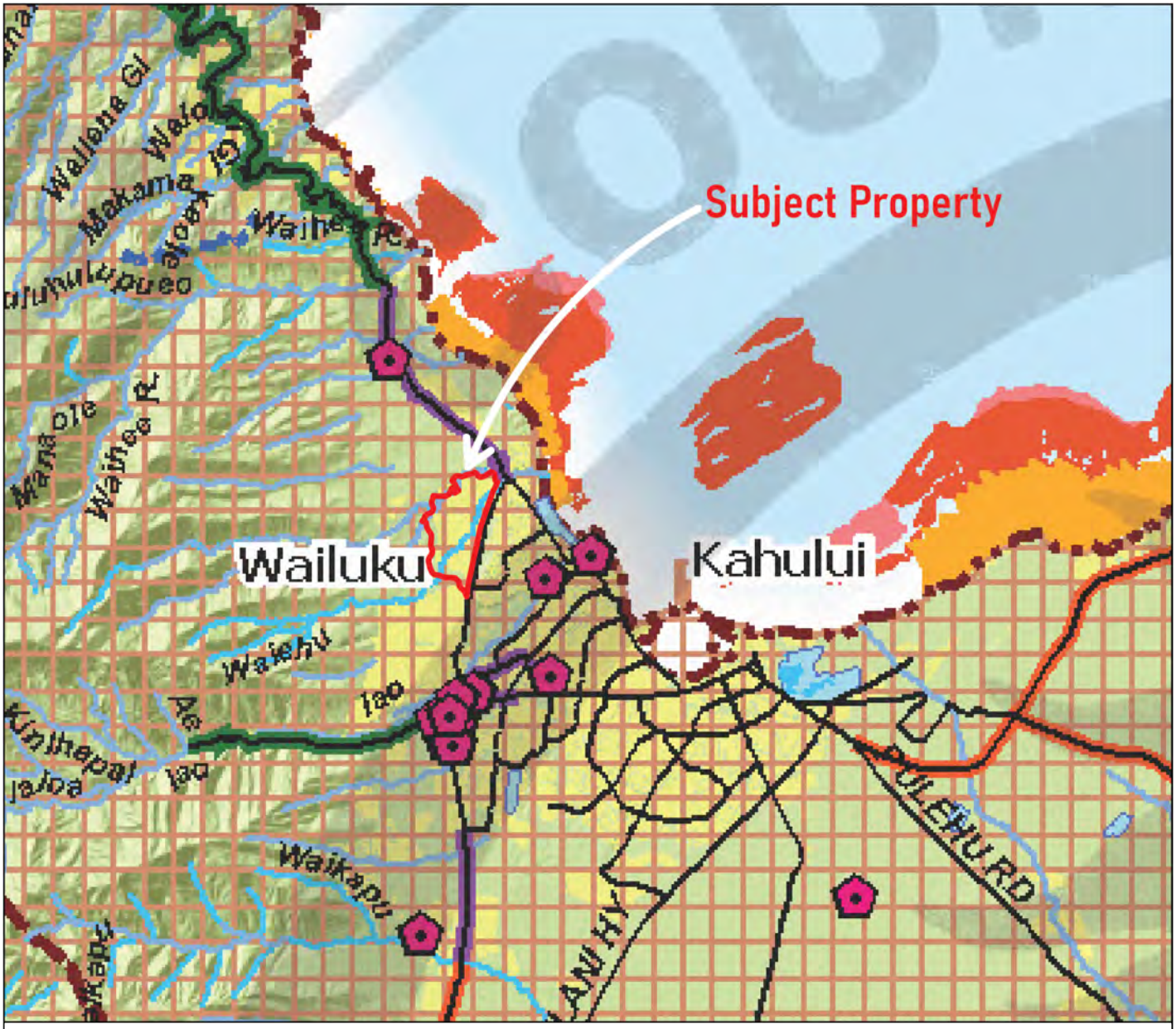
FIGURE 13

Sea Level Rise Map

Waiehu Residential Community

Source: Pacific Islands Ocean Observing System (PacIOOS)

CHRIS HART & PARTNERS, INC.



- Primary Road
- Na Ala Hele Hiking Trail
- Stream
- Cultural Resources Stream
- Residential/Commercial Area
- Registered Historic Site
- Registered Historic Parcel
- Proposed Heritage Area
- Moku Boundary
- Historic Pond or Fishpond
- Wetland, Pond or Reservoir
- Marine Natural Area Reserve
- Marine Life Conservation District
- Continuous Coral
- Patchy Coral 50-90%
- Sparse Coral 10-50%

Scenic Corridor
- Exceptional
- High
- Medium

Not to Scale

Subject Property

FIGURE 14
Scenic Resources Map

Waiehu Residential Community
Source: County of Maui, Planning Department

CHRIS HART & PARTNERS, INC.

Not to Scale

0 1,500 3,000 4,500 6,000 Feet

Productivity Rating	Index Percentages
A	85 - 100
B	70 - 84
C	55 - 69
D	30 - 54
E	0 - 30

Project Site Parcels

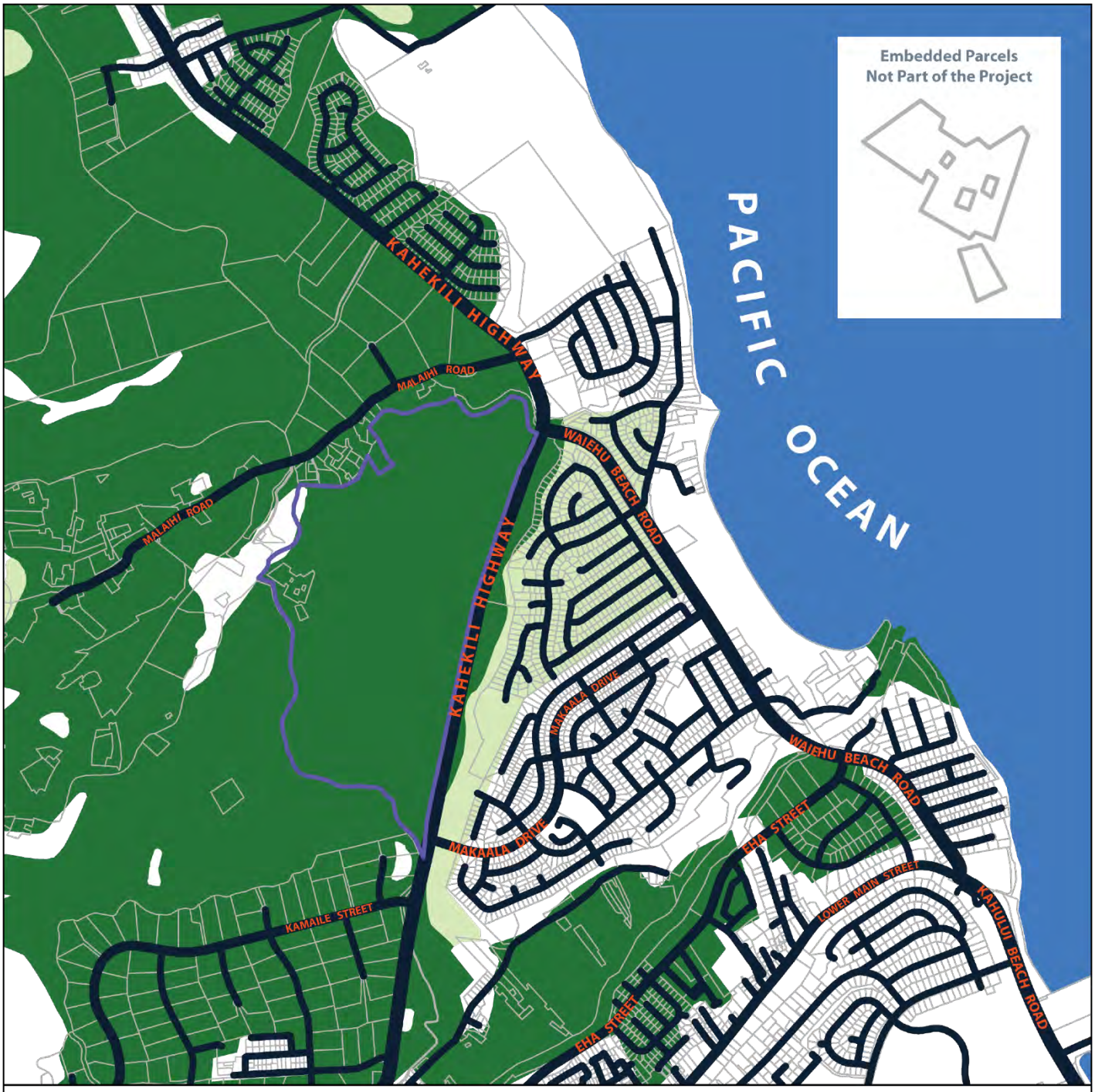
FIGURE 15

Land Study Bureau (LSB) Map

Waiehu Residential Community

Source: ESRI, HDOA

CHRIS HART & PARTNERS, INC.



Not to Scale

0 1,500 3,000 4,500 6,000 Feet

Agricultural Lands of Importance to the State of Hawaii (ALISH)

- Prime Lands
- Other Lands
- Unique Lands
- Unclassified Lands

Project Site Parcels

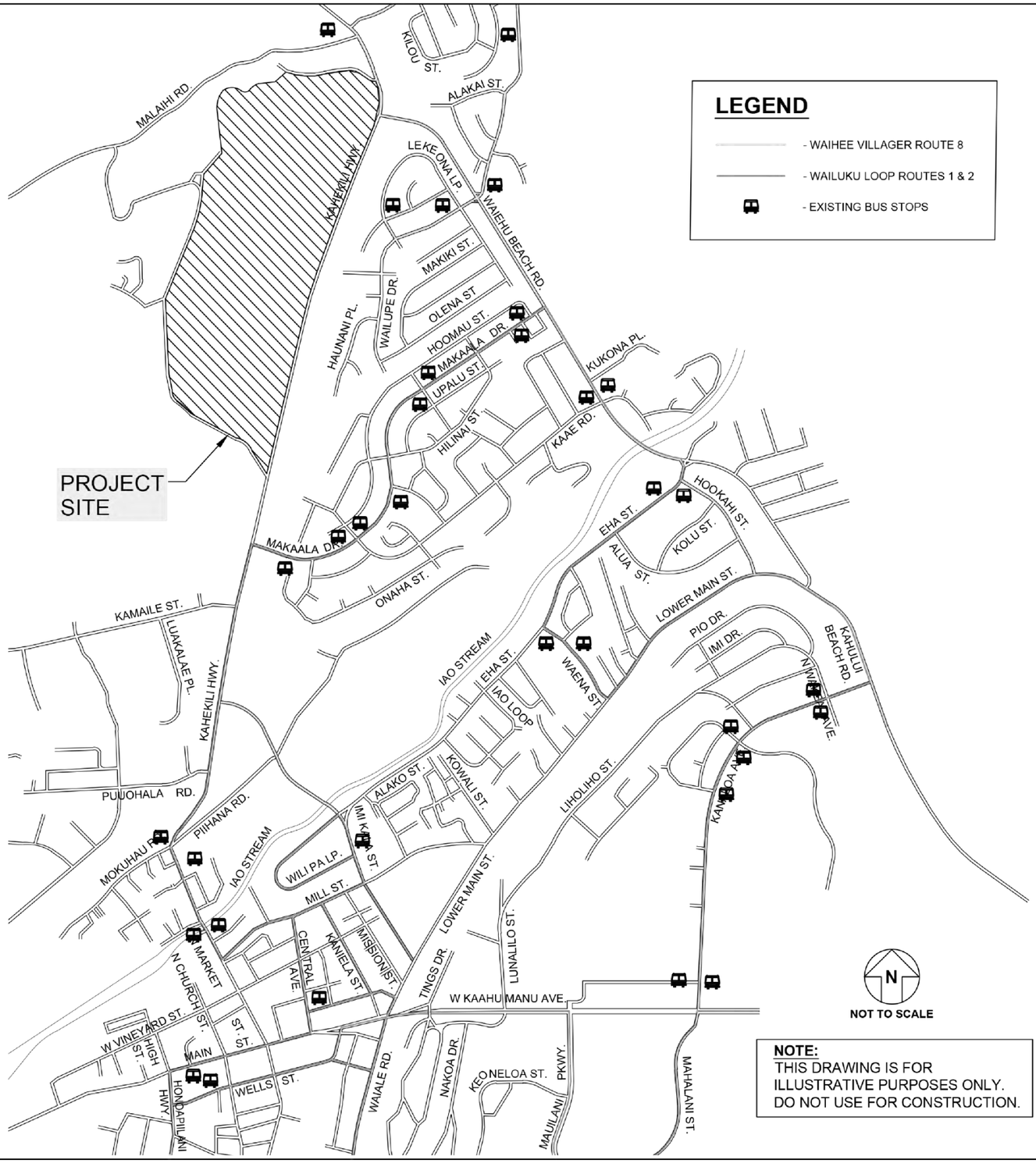
FIGURE 16

ALISH Map

Waiehu Residential Community

Source: ESRI, HDOA

CHRIS HART & PARTNERS, INC.



Project Site

FIGURE 17
Existing Transit Facilities Map

Waiehu Residential Community
Source: ATA

CHRIS HART & PARTNERS, INC.

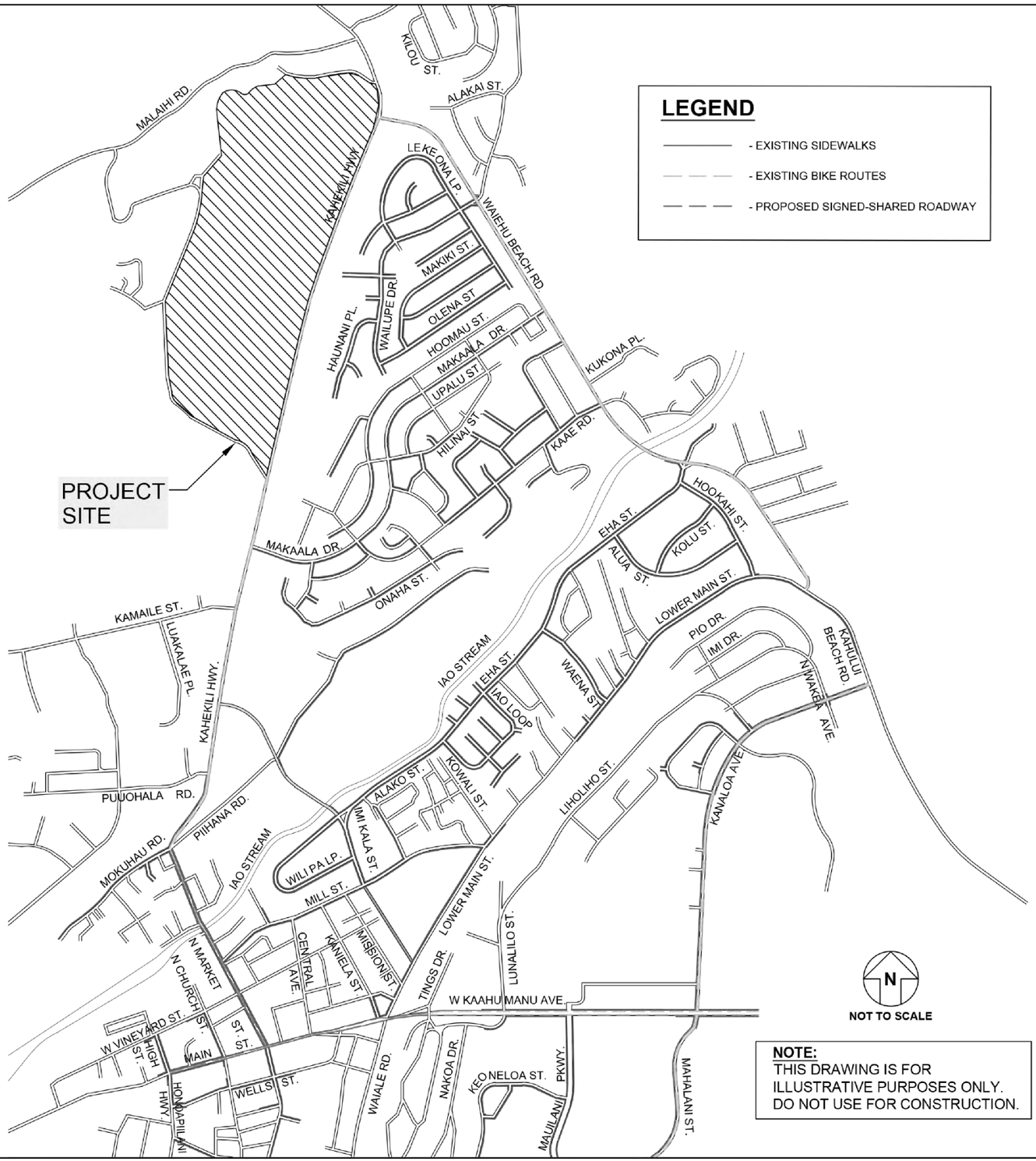


FIGURE 18

Existing Pedestrian and Bicycle Facilities

Waiehu Residential Community

Source: ATA

CHRIS HART & PARTNERS, INC.

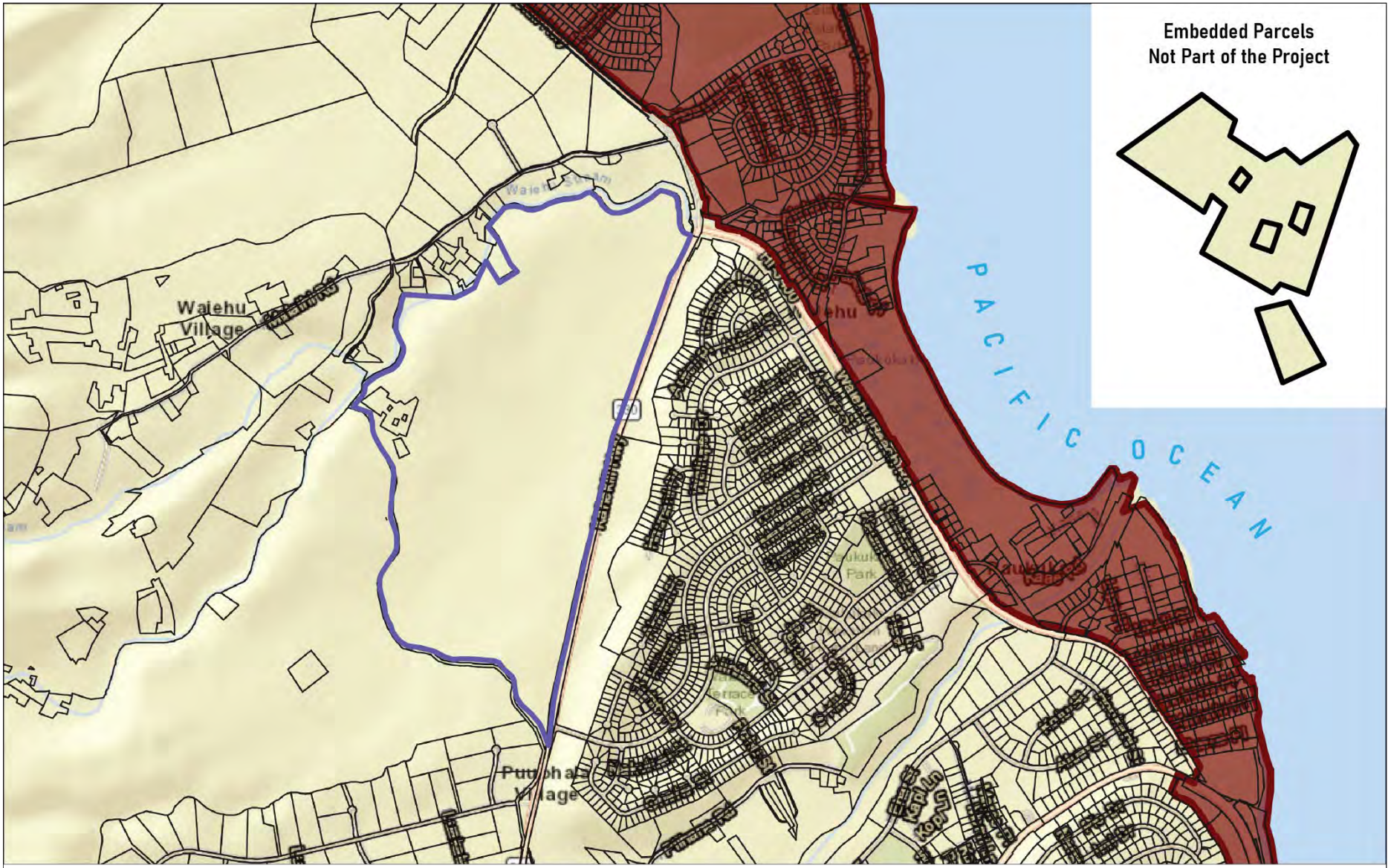


FIGURE 19

Special Management Area Map

Waiehu Residential Community

Source: Hawaii SMA Locator

CHRIS HART & PARTNERS, INC.

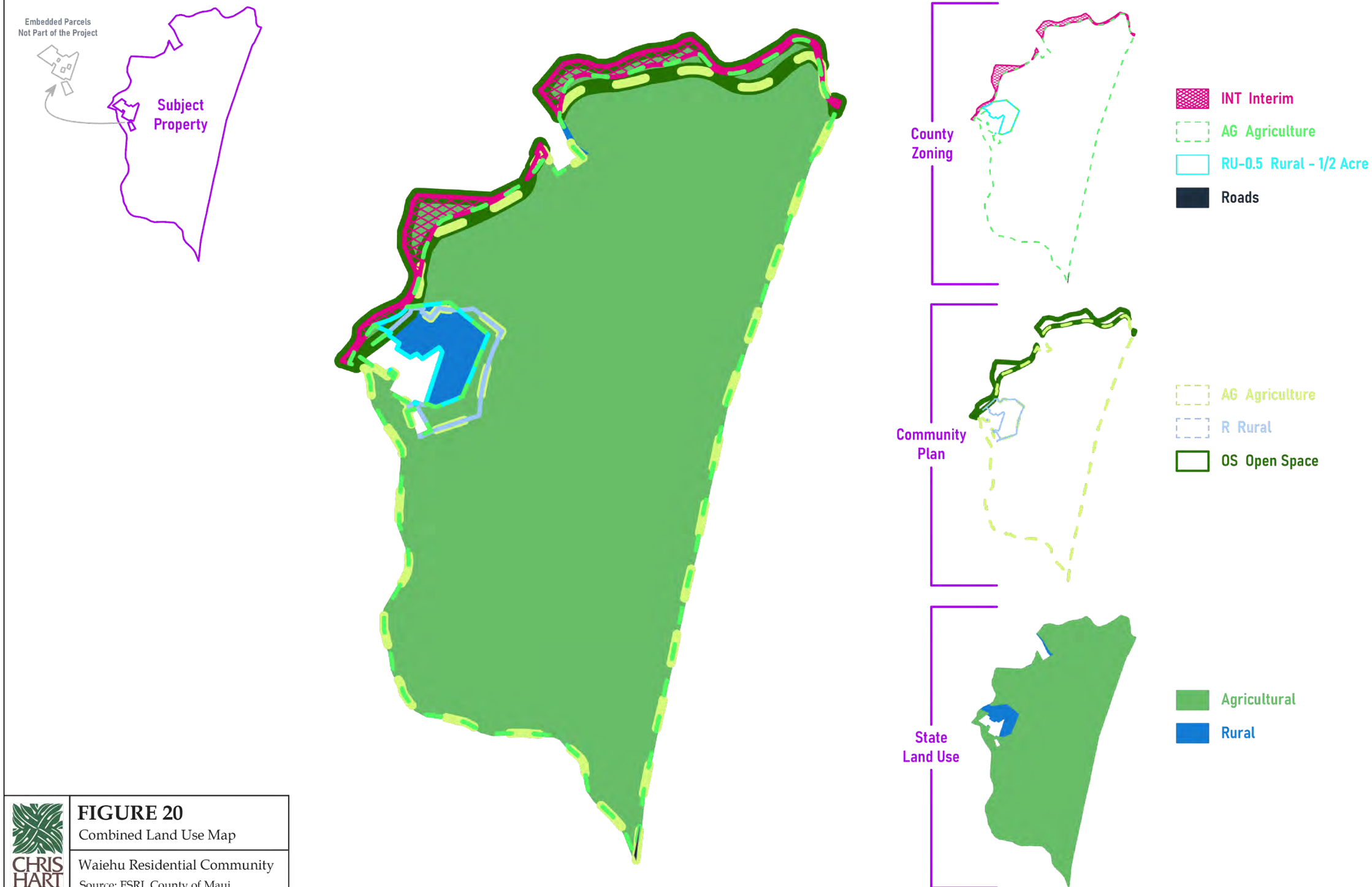


FIGURE 20
Combined Land Use Map

Waiehu Residential Community
Source: ESRI, County of Maui

Appendices

Appendix 1

Ownership Documents

CHICAGO TITLE INSURANCE COMPANY

COMMITMENT FOR TITLEINSURANCE ISSUED BY CHICAGO TITLE INSURANCE COMPANY

NOTICE

IMPORTANT—READ CAREFULLY: THIS COMMITMENT IS AN OFFER TO ISSUE ONE OR MORE TITLE INSURANCE POLICIES. ALL CLAIMS OR REMEDIES SOUGHT AGAINST THE COMPANY INVOLVING THE CONTENT OF THIS COMMITMENT OR THE POLICY MUST BE BASED SOLELY IN CONTRACT.

THIS COMMITMENT IS NOT AN ABSTRACT OF TITLE, REPORT OF THE CONDITION OF TITLE, LEGAL OPINION, OPINION OF TITLE, OR OTHER REPRESENTATION OF THE STATUS OF TITLE. THE PROCEDURES USED BY THE COMPANY TO DETERMINE INSURABILITY OF THE TITLE, INCLUDING ANY SEARCH AND EXAMINATION, ARE PROPRIETARY TO THE COMPANY, WERE PERFORMED SOLELY FOR THE BENEFIT OF THE COMPANY, AND CREATE NO EXTRACONTRACTUAL LIABILITY TO ANY PERSON, INCLUDING A PROPOSED INSURED.

THE COMPANY'S OBLIGATION UNDER THIS COMMITMENT IS TO ISSUE A POLICY TO A PROPOSED INSURED IDENTIFIED IN SCHEDULE A IN ACCORDANCE WITH THE TERMS AND PROVISIONS OF THIS COMMITMENT. THE COMPANY HAS NO LIABILITY OR OBLIGATION INVOLVING THE CONTENT OF THIS COMMITMENT TO ANY OTHER PERSON.

COMMITMENT TO ISSUE POLICY

Subject to the Notice; Schedule B, Part I—Requirements; Schedule B, Part II—Exceptions; and the Commitment Conditions, Chicago Title Insurance Company, a Florida Corporation (the "Company"), commits to issue the Policy according to the terms and provisions of this Commitment. This Commitment is effective as of the Commitment Date shown in Schedule A for each Policy described in Schedule A, only when the Company has entered in Schedule A both the specified dollar amount as the Proposed Policy Amount and the name of the Proposed Insured.

If all of the Schedule B, Part I—Requirements have not been met within 180 Days after the Commitment Date, this Commitment terminates and the Company's liability and obligation end.

Issued by:

Title Guaranty of Hawaii, LLC
235 Queen Street
Honolulu Hawaii 96813
Telephone (808) 533-6261
Fax (808) 521-0221
Email title@tghawaii.com

CHICAGO TITLE INSURANCE COMPANY

By:

ATTEST President

Secretary

This page is only a part of a 2016 ALTA® Commitment for Title Insurance issued by Chicago Title Insurance Company. This Commitment is not valid without the Notice; the Commitment to Issue Policy; the Commitment Conditions; Schedule A; Schedule B, Part I—Requirements; and Schedule B, Part II—Exceptions; and a counter-signature by the Company or its issuing agent that may be in electronic form.

COMMITMENT CONDITIONS

1. DEFINITIONS

(a) "Knowledge" or "Known": Actual or imputed knowledge, but not constructive notice imparted by the Public Records.

(b) "Land": The land described in Schedule A and affixed improvements that by law constitute real property. The term "Land" does not include any property beyond the lines of the area described in Schedule A, nor any right, title, interest, estate, or easement in abutting streets, roads, avenues, alleys, lanes, ways, or waterways, but this does not modify or limit the extent that a right of access to and from the Land is to be insured by the Policy.

(c) "Mortgage": A mortgage, deed of trust, or other security instrument, including one evidenced by electronic means authorized by law.

(d) "Policy": Each contract of title insurance, in a form adopted by the American Land Title Association, issued or to be issued by the Company pursuant to this Commitment.

(e) "Proposed Insured": Each person identified in Schedule A as the Proposed Insured of each Policy to be issued pursuant to this Commitment.

(f) "Proposed Policy Amount": Each dollar amount specified in Schedule A as the Proposed Policy Amount of each Policy to be issued pursuant to this Commitment.

(g) "Public Records": Records established under state statutes at the Commitment Date for the purpose of imparting constructive notice of matters relating to real property to purchasers for value and without Knowledge.

(h) "Title": The estate or interest described in Schedule A.

2. If all of the Schedule B, Part I—Requirements have not been met within the time period specified in the Commitment to Issue Policy, this Commitment terminates and the Company's liability and obligation end.

3. The Company's liability and obligation is limited by and this Commitment is not valid without:

(a) the Notice;
(b) the Commitment to Issue Policy;
(c) the Commitment Conditions;
(d) Schedule A;
(e) Schedule B, Part I—Requirements; and
(f) Schedule B, Part II—Exceptions; and
(g) a counter-signature by the Company or its issuing agent that may be in electronic form.

4. COMPANY'S RIGHT TO AMEND

The Company may amend this Commitment at any time. If the Company amends this Commitment to add a defect, lien, encumbrance, adverse claim, or other matter recorded in the Public Records prior to the Commitment Date, any liability of the Company is limited by Commitment Condition 5. The Company shall not be liable for any other amendment to this Commitment.

5. LIMITATIONS OF LIABILITY

(a) The Company's liability under Commitment Condition 4 is limited to the Proposed Insured's actual expense incurred in the interval between the Company's delivery to the Proposed Insured of the Commitment and the delivery of the amended Commitment, resulting from the Proposed Insured's good faith reliance to:

(i) comply with the Schedule B, Part I—Requirements;
(ii) eliminate, with the Company's written consent, any Schedule B, Part II—Exceptions; or
(iii) acquire the Title or create the Mortgage covered by this Commitment.

This page is only a part of a 2016 ALTA® Commitment for Title Insurance issued by Chicago Title Insurance Company. This Commitment is not valid without the Notice; the Commitment to Issue Policy; the Commitment Conditions; Schedule A; Schedule B, Part I—Requirements; and Schedule B, Part II—Exceptions; and a counter-signature by the Company or its issuing agent that may be in electronic form.

(b) The Company shall not be liable under Commitment Condition 5(a) if the Proposed Insured requested the amendment or had Knowledge of the matter and did not notify the Company about it in writing.
(c) The Company will only have liability under Commitment Condition 4 if the Proposed Insured would not have incurred the expense had the Commitment included the added matter when the Commitment was first delivered to the Proposed Insured.
(d) The Company's liability shall not exceed the lesser of the Proposed Insured's actual expense incurred in good faith and described in Commitment Conditions 5(a)(i) through 5(a)(iii) or the Proposed Policy Amount.
(e) The Company shall not be liable for the content of the Transaction Identification Data, if any.
(f) In no event shall the Company be obligated to issue the Policy referred to in this Commitment unless all of the Schedule B, Part I—Requirements have been met to the satisfaction of the Company.
(g) In any event, the Company's liability is limited by the terms and provisions of the Policy.

6. LIABILITY OF THE COMPANY MUST BE BASED ON THIS COMMITMENT

(a) Only a Proposed Insured identified in Schedule A, and no other person, may make a claim under this Commitment.
(b) Any claim must be based in contract and must be restricted solely to the terms and provisions of this Commitment.
(c) Until the Policy is issued, this Commitment, as last revised, is the exclusive and entire agreement between the parties with respect to the subject matter of this Commitment and supersedes all prior commitment negotiations, representations, and proposals of any kind, whether written or oral, express or implied, relating to the subject matter of this Commitment.
(d) The deletion or modification of any Schedule B, Part II—Exception does not constitute an agreement or obligation to provide coverage beyond the terms and provisions of this Commitment or the Policy.
(e) Any amendment or endorsement to this Commitment must be in writing and authenticated by a person authorized by the Company.
(f) When the Policy is issued, all liability and obligation under this Commitment will end and the Company's only liability will be under the Policy.

7. IF THIS COMMITMENT HAS BEEN ISSUED BY AN ISSUING AGENT

The issuing agent is the Company's agent only for the limited purpose of issuing title insurance commitments and policies. The issuing agent is not the Company's agent for the purpose of providing closing or settlement services.

8. PRO-FORMA POLICY

The Company may provide, at the request of a Proposed Insured, a pro-forma policy illustrating the coverage that the Company may provide. A pro-forma policy neither reflects the status of Title at the time that the pro-forma policy is delivered to a Proposed Insured, nor is it a commitment to insure.

9. ARBITRATION

The Policy contains an arbitration clause. All arbitrable matters when the Proposed Policy Amount is $2,000,000 or less shall be arbitrated at the option of either the Company or the Proposed Insured as the exclusive remedy of the parties. A Proposed Insured may review a copy of the arbitration rules at <http://www.alta.org/arbitration>.

This page is only a part of a 2016 ALTA® Commitment for Title Insurance issued by Chicago Title Insurance Company. This Commitment is not valid without the Notice; the Commitment to Issue Policy; the Commitment Conditions; Schedule A; Schedule B, Part I—Requirements; and Schedule B, Part II—Exceptions; and a counter-signature by the Company or its issuing agent that may be in electronic form.

Issuing Agent: Title Guaranty of Hawaii, LLC
Commitment No. 72C165B-98700001
Agent's No.: 201835143C

SCHEDULE A

ALTA Commitment For Title Insurance 08-01-2016
---

1. **Commitment Date: December 27, 2018 at 8:00 a.m.**

2. **Policy to be issued:**

   CHICAGO TITLE INSURANCE COMPANY,
   Hawaii Standard Owner's Policy (11/1/10)

   Proposed Insured: SOUTHWEST 7, LLC, a Colorado limited liability company

   Proposed Policy Amount: $6,000,000.00

3. **The estate or interest in the Land described or referred to in this Commitment is:**

   FEE SIMPLE

4. **The Title is, at the Commitment Date, vested in:**

   SOUTHWEST 7, LLC, a Colorado limited liability company, as Fee Owner

5. **The land is described as follows:**

   See Schedule C.

SCHEDULE B, PART I

REQUIREMENTS

All of the following Requirements must be met:

1. **The Proposed Insured must notify the Company in writing of the name of any party not referred to in this Commitment who will obtain an interest in the Land or who will make a loan on the Land. The Company may then make additional Requirements or Exceptions.**

2. **Pay the agreed amount for the estate or interest to be insured.**

3. **Pay the premiums, fees, and charges for the Policy to the Company.**

4. **Documents satisfactory to the Company that convey the Title or create the Mortgage to be insured, or both, must be properly authorized, executed, delivered, and recorded in the Public Records.**

5. **Necessary closing documents in insurable form which must be executed, delivered and duly filed for record.**

6. **Evidence of authority regarding the execution of all documents pertaining to the transaction. This includes corporate resolutions, partnership agreements, operating agreements and powers of attorney.**

235 QUEEN ST., HONOLULU, HAWAII 96813, PH: (808) 533-6261

7. **Evidence of the formation, existence and registration of the proposed insured.**

8. **Payment of real property taxes, charges and assessments, if any are due and payable, or authority to show same as an exception in Schedule B of the policy to be issued.**

9. **Evidence that there are no persons residing on or otherwise in possession of the land or any portion thereof.**

10. **Disclosure to the Company of the exact nature and structure of the transaction hereunder. Furnish copies of all instruments to this transaction for review by the Company prior to closing. This commitment is subject to additional requirements and/or exceptions as may be deemed necessary by the Company upon review of said documents and upon full disclosure of all facts of this transaction.**

11. **In addition to the matters shown in Schedule B-Section II herein, the policy, when issued, will except from the coverage afforded any defect, lien, encumbrance or other matter affecting the estate or interest covered by the policy which shall have intervened or occurred, or become for the first time disclosed to the Company, between the date this commitment was prepared and the date of the policy unless the same are disposed of to the satisfaction of the Company.**

12. **Confirmation of the amount of insurance prior to the issuance of the policy.**

13. **Payment of the premium in an amount to be mutually agreed upon between the insurer and insured prior to the issuance of the policy.**

14. **Authorization from our underwriter to issue a policy or policies of title insurance and approval of the final form of the policy or policies.**

15. The cover of the Hawaii Standard Owner's Policy is attached to this Title Commitment, as shown in Exhibit A.

SCHEDULE B, PART II

EXCEPTIONS

THIS COMMITMENT DOES NOT REPUBLISH ANY COVENANT, CONDITION, RESTRICTION, OR LIMITATION CONTAINED IN ANY DOCUMENT REFERRED TO IN THIS COMMITMENT TO THE EXTENT THAT THE SPECIFIC COVENANT, CONDITION, RESTRICTION, OR LIMITATION VIOLATES STATE OR FEDERAL LAW BASED ON RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, GENDER IDENTITY, HANDICAP, FAMILIAL STATUS, OR NATIONAL ORIGIN.

The Policy will not insure against loss or damage resulting from the terms and provisions of any lease or easement identified in Schedule A, and will include the following Exceptions unless cleared to the satisfaction of the Company:

1. **Any defect, lien, encumbrance, adverse claim, or other matter that appears for the first time in the Public Records or is created, attaches, or is disclosed between the Commitment Date and the date on which all of the Schedule B, Part I-Requirements are met.**

2. **Real Property Taxes, if any, that may be due and owing.**

   Tax Key: (2) 3-3-002-031 Area Assessed: 240.087 acres

   -Note:- Attention is invited to the fact that the premises covered herein may be subject to possible rollback or retroactive property taxes.

3. **Mineral and water rights of any nature.**

4. **Location of the boundary of Waiehu Stream and the effect, if any, upon the area of the land described herein, and the free flowage thereof.**

5. Matters arising out of the failure of a patent to have issued on Land Commission Award 8559-B, Apana 20 to W.C. Lunalilo, and any matters that may be set forth in any such patent. The Company assumes no obligation to procure any patent or to pay commutation, if any, which may be owed thereon.

6. -AS TO ROYAL PATENT NUMBER 6327, LAND COMMISSION AWARD NUMBER 3275-X TO PUULA:-

GRANT

TO : WAILUKU SUGAR COMPANY, a Hawaii corporation, now known as C. BREWER AND COMPANY, LIMITED

DATED : December 31, 1898
RECORDED : Liber 178 Page 409
GRANTING : a right of way to build, erect, and otherwise complete and maintain a ditch or flume or both ditch and flume across Land Commission Award 3275 to Puula a distance of 400 feet long and 10 feet wide, more or less

7. -AS TO APANA 3 OF ROYAL PATENT NUMBER 6073, LAND COMMISSION AWARD NUMBER 1806 TO MAKALAWELAWE:-

Perpetual easement and right-of-way for the Waiehu conduit, including ditch and tunnel, with a grant of a dam site at Waiehu, passing over, across and/or under or located upon the following described parcel of land as set forth in DEED OF EXCHANGE dated June 23, 1924, recorded in Liber 740 at Page 134. Said easement described as follows:

A strip of land (3-feet wide) for a ditch or other suitable conduit, from the Waiehu Weir in Old Waihee Ditch, along the mauka bank of said Ditch and crossing said Ditch to the present open concrete ditch on Lot 2 next hereunder described; being portion of Apana 20 of L. C. A. 8559-B to W. C. Lunalilo, and portion of Apana 3 of L. C. A. 1806 to Makalawelawe; the center line thereof being described as follows:

Beginning at a point in the center of the present Conduit, on the line of the crest of Waiehu Weir, the coordinates of which point referred to Government Survey Triangulation Station "LUKE" are 11,149.50 feet north and 3,624.00 feet west; also said point is azimuth and distance 130° 27' 31.95 feet from Government Survey Triangulation Station "CAESAR" (see Lot 13, Old Waihee Ditch, for description of "CAESAR" Trig. Station) and running by true azimuths:

1.	159°	31'	36.2	feet;
2.	158°	37'	27.7	feet to point of curve;
3.	Thence along a curve to the left with a radius of 111.1 feet and tangents of 13.00 feet, to point tangent, the long chord of which curve is azimuth and distance:			
	151°	56' 30"	25.8	feet;
4.	145°	16'	78.1	feet;
5.	151°	10'	126.1	feet;
6.	160°	27'	52.0	feet;
7.	154°	50'	56.3	feet to the point of curve;
8.	Thence along a curve to the right with a radius of 81.7 feet, and tangents of 16.0 feet to point tangent; the long chord of which curve is azimuth and distance:			
	165°	21' 30"	31.4	feet;
9.	176°	26'	48.5	feet;
10.	179°	28'	69.2	feet;
11.	176°	40'	9.8	feet;
12.	172°	59'	9.9	feet;
13.	168°	35'	15.2	feet;

14. 161° 20' 9.8 feet;

15. 151° 33' 11.7 feet;

16. 142° 20' 25.7 feet;

17. 141° 34' 31.0 feet and extending partly underground under the Road to point of curve;

18. Thence along a curve to the left, with a radius of 29.75 feet and tangents of 24.8 feet, underground to the present open cemented ditch; the long chord of which curve is azimuth and distance:

101° 45' 38.1 feet and containing an area of 0.05 acre, more or less.

8. The terms and provisions contained in the following:

INSTRUMENT : DEED

DATED : June 23, 1924
RECORDED : Liber 740 Page 134

Said above instrument was amended by CORRECTION EXCHANGE DEED dated March 24, 1937, recorded in Liber 1371 at Page 227, and further amended by unrecorded instrument dated March 21, 1939 and by unrecorded Temporary Water Agreement dated December 28, 1994 by and between A & B HAWAII, INC. and WAILUKU AGRIBUSINESS CO., INC. as disclosed in ASSIGNMENT OF DEED OF EXCHANGE effective October 1, 2005, recorded as Document No. 2005-229076, wherein WAILUKU AGRIBUSINESS CO., INC., a Hawaii corporation, assigned its right in and to the above Exchange Deed & Agreement to WAILUKU WATER COMPANY, LLC, a Hawaii limited liability company, doing business as Wailuku Water Company.

9. Water rights as conveyed in DEED of WAILUKU SUGAR COMPANY, a Hawaii corporation, dated January 17, 1968, recorded in Liber 5998 at Page 451, to ALEXANDER & BALDWIN, INC., a Hawaii corporation.

10. Restrictions of abutter's rights of vehicle access into and from WAIEHU BEACH ROAD, Federal Aid Secondary Project No. S-0341 (2), (Kahekili Highway Realignments) as set forth in STIPULATION AMENDING COMPLAINT AND LIS PENDENS, AND STIPULATED JUDGMENT dated December 18, 1973, filed in the Circuit Court of the Second Circuit, State of Hawaii, in Civil No. 879 on December 18, 1973, and recorded in the Bureau of Conveyances in Liber 9903 at Page 370 on May 17, 1974.

11. The terms and provisions contained in the following:

INSTRUMENT : AGREEMENT

DATED : March 29, 1976
RECORDED : Liber 11357 Page 584
PARTIES : ALEXANDER & BALDWIN, INC., a Hawaii corporation, "Licensor", and the BOARD OF WATER SUPPLY OF THE COUNTY OF MAUI, a board duly created and existing under the laws of the State of Hawaii, "Licensee"
RE : granting a perpetual right and easement to construct, reconstruct, repair, maintain, operate and remove an 8" diameter pipeline for purposes of carrying overflow from and cleanout of that certain water storage tank to within the Spreckels Ditch right of way, etc.

12. GRANT

TO : BOARD OF WATER SUPPLY OF THE COUNTY OF MAUI

DATED : January 19, 1977
RECORDED : Liber 12285 Page 50

GRANTING : a nonexclusive easement for waterline and road purposes to construct, reconstruct, maintain, operate, repair and remove a water pipeline or pipelines, pressure break tanks, pressure reducers and regulators and manholes with equipment and appurtenances, over, under across and through Easements B & C, for waterline and road, etc.

13. The terms and provisions contained in the following:

INSTRUMENT : RIGHT OF ENTRY AND AGREEMENT

DATED : September 27, 1977
RECORDED : Liber 12815 Page 281
PARTIES : WAILUKU SUGAR COMPANY, a Hawaii corporation, "Owner", and BOARD OF WATER SUPPLY OF THE COUNTY OF MAUI, "Grantee"
RE : non-exclusive right, power and privilege, for a period of three (3) years from the date hereof, to enter upon, occupy and use for all purposes relating to the construction and installation of a water transmission line, as shown on map attached thereto

14. GRANT

TO : MAUI ELECTRIC COMPANY, LIMITED, a Hawaii corporation, and HAWAIIAN TELEPHONE COMPANY, a Hawaii corporation, now known as HAWAIIAN TELCOM, INC.

DATED : January 5, 1987
RECORDED : Liber 20331 Page 23
GRANTING : nonexclusive right and easement for utility purposes as shown on map attached thereto

15. The terms and provisions contained in the following:

INSTRUMENT : AGREEMENT TO DEFER THE CONSTRUCTION OF SUBDIVISION IMPROVEMENTS

DATED : October 3, 1988
RECORDED : Liber 22626 Page 32
PARTIES : WAILUKU AGRIBUSINESS CO., INC., a Hawaii corporation, "Subdivider", and the COUNTY OF MAUI and its DEPARTMENT OF WATER SUPPLY, "County"

16. The terms and provisions contained in the following:

INSTRUMENT : FARM DWELLING AGREEMENT

DATED : December 5, 1988
RECORDED : Liber 22650 Page 96
PARTIES : WAILUKU AGRIBUSINESS CO., INC., "Applicant", and the COUNTY OF MAUI, through its Department of Public Works, "Department"

17. The terms and provisions contained in the following:

INSTRUMENT : MEMORANDUM CONCERNING GRANT OF VARIOUS PROPERTY RIGHTS

DATED : August 18, 1999
RECORDED : Document No. 99-189645
PARTIES : HAWAII LAND & FARMING COMPANY, INC., C. BREWER AND COMPANY, LIMITED, WAILUKU AGRIBUSINESS CO., INC., MAUNA KEA AGRIBUSINESS CO., INC. and KILAUEA AGRONOMICS, INC.
RE : location and conveyance to HAWAII LAND & FARMING COMPANY, INC. without additional consideration, a drainage channel and basin, Iao drainage easement and Imi Kala easement

18. The terms and provisions contained in the following:

INSTRUMENT : DECLARATION OF COVENANTS AT CLOSING BETWEEN WAILUKU AGRIBUSINESS CO., INC. AND CGM, LLC

DATED : ------- (acknowledged August 19, 2002)
RECORDED : Document No. 2002-146580

Said above DECLARATION was assigned by ASSIGNMENT OF DECLARATIONS OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS dated effective October 1, 2005, recorded as Document No. 2005-229075, by WAILUKU AGRIBUSINESS CO., INC., a Hawaii corporation, to WAILUKU WATER COMPANY, LLC, a Hawaii limited liability company, doing business as Wailuku Water Company

Said above DECLARATION was amended by AMENDMENT OF DECLARATION OF COVENANTS AT CLOSING BETWEEN WAILUKU AGRIBUSINESS CO., INC. AND CGM, LLC dated December 26, 2002, recorded as Document No. 2003-020592; and assigned by ASSIGNMENT OF DECLARATIONS OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS dated effective October 1, 2005, recorded as Document No. 2005-229075, by WAILUKU AGRIBUSINESS CO., INC., a Hawaii corporation, to WAILUKU WATER COMPANY, LLC, a Hawaii limited liability company, doing business as Wailuku Water Company.

Said above DECLARATION was corrected by CORRECTION TO ASSIGNMENT OF DECLARATION OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS dated August 27, 2007, recorded as Document No. 2007-157854.

19. GRANT

TO : HOOMALU LIMITED PARTNERSHIP, a Hawaii limited partnership

DATED : November 26, 2003
RECORDED : Document No. 2003-259899
GRANTING : a perpetual non-exclusive easement over and across EASEMENT B-1 for pedestrian and vehicular ingress and egress and for utility purposes more particularly described therein

20. GRANT

TO : MAUI ELECTRIC COMPANY, LIMITED and VERIZON HAWAII INC.

DATED : March 23, 2004
RECORDED : Document No. 2004-068719
GRANTING : an easement for utility purposes over Easement "3", more particularly described therein

21. The terms and provisions contained in the following:

INSTRUMENT : DECLARATION OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS

DATED : May 12, 2004
RECORDED : Document No. 2004-102438

Said above DECLARATION was assigned by ASSIGNMENT OF DECLARATIONS OF COVENANTS, CONDITIONS, EASEMENTS, RESERVATIONS AND RESTRICTIONS dated effective October 1, 2005, recorded as Document No. 2005-229075, by WAILUKU AGRIBUSINESS CO., INC., a Hawaii corporation, to WAILUKU WATER COMPANY, LLC, a Hawaii limited liability company, doing business as Wailuku Water Company

22. The terms and provisions contained in the following:

INSTRUMENT : QUITCLAIM DEED

DATED : May 12, 2004
RECORDED : Document No. 2004-102439

23. The terms and provisions contained in the following:

INSTRUMENT : EASEMENT AGREEMENT

DATED : September 8, 2005
RECORDED : Document No. 2005-179295
PARTIES : HALE MUA PROPERTIES, LLC, a Hawaii limited liability company ("Hale Mua"), and CGM, LLC, a Hawaii limited liability company ("CGM")
RE : non-exclusive easement in favor of Lots 1 to 207, inclusive as shown on File Plan No. 2367 for the use and maintenance of the Storm Drain Improvements described therein

24. The terms and provisions contained in the following:

INSTRUMENT : ASSIGNMENT OF IN GROSS RESERVATIONS

DATED : October 1, 2005
RECORDED : Document No. 2005-229077
PARTIES : WAILUKU AGRIBUSINESS CO., INC., a Hawaii corporation ("Assignor"); and WAILUKU WATER COMPANY, LLC, a Hawaii limited liability company, doing business as Wailuku Water Company ("Assignee")
RE : "Assignor" sells, assigns, transfers and sets over to the "Assignee" all "in gross" reservations and grants, personal to Assignor relating to real properties

25. The terms and provisions contained in the following:

INSTRUMENT : UNILATERAL AGREEMENT

DATED : September 13, 2005
RECORDED : Document No. 2006-106454
PARTIES : HALE MUA PROPERTIES, LLC, a Hawaii limited liability company, "DECLARANT"
RE : submission of application for the development of the proposed Hale Mua Affordable Housing Subdivision to the County of Maui, Department of Housing and Human Concerns

Said above ASSIGNMENT OF IN GROSS RESERVATIONS was assigned by J. ALAN KUGLE, Trustee in Dissolution for C. Brewer and Company, Limited, a dissolved Hawaii corporation, in ASSIGNMENT OF IN GROSS RESERVATIONS dated October 17, 2014, recorded as Document No. A-54130023, to WAILUKU WATER COMPANY, LLC, a Hawaii limited liability company.

26. GRANT

TO : MAUI ELECTRIC COMPANY, LIMITED, a Hawaii corporation, and HAWAIIAN TELCOM, INC., a Hawaii corporation

DATED : August 17, 2006
RECORDED : Document No. 2006-235816
GRANTING : perpetual right and easement to build, construct, reconstruct, rebuild, repair, maintain and operate pole and wire lines and underground power lines, etc. for the transmission of electricity over, across, through and under that portion of the Grantor's land located in Waiehu, District of Wailuku

27. The terms and provisions contained in the following:

INSTRUMENT : NOTICE OF IMPOSITION OF CONDITIONS BY THE LAND USE COMMISSION

DATED : February 16, 2007
RECORDED : Document No. 2007-031188
PARTIES : HALE MUA PROPERTIES, LLC ("Petitioner")
RE : State Land Use Commission Docket No. A05-755 by Findings of Fact, Conclusions of Land and Decision and Order for a State Land Use District Boundary Amendment filed February 12, 2007, reclassified a portion of the Petition Area, consisting of 117.293 acres

28. The terms and provisions contained in the following:

INSTRUMENT : DECLARATION OF CONDITIONS APPLICABLE TO AN AMENDMENT OF DISTRICT BOUNDARY FROM AGRICULTURAL TO URBAN

DATED : November 25, 2008
RECORDED : Document No. 2008-182476

29. The terms and provisions contained in the following:

INSTRUMENT : UNILATERAL AGREEMENT

DATED : May 22, 2009
RECORDED : Document No. 2009-096441
PARTIES : HALE MUA PROPERTIES, LLC, a Hawaii limited liability company, ("DECLARANT") and COUNTY OF MAUI, Department of Parks and Recreation (the Parks Department")

30. The terms and provisions contained in the following:

INSTRUMENT : AGREEMENT REGARDING FINAL CONSTRUCTION PLAN APPROVAL

DATED : November 17, 2009
RECORDED : Document No. 2010-003446
PARTIES : HALE MUA PROPERTIES, LLC, a Hawaii limited liability company, ("DEVELOPER") and COUNTY OF MAUI, by and through its DEPARTMENT OF WATER SUPPLY ("COUNTY")

31. Matters arising out of, including but not limited to any access and utility rights in favor of any kuleana parcel not owned by HALE MUA PROPERTIES, LLC located within the land described in Schedule C.

32. **Any and all transmission lines in favor of MAUI ELECTRIC COMPANY, LIMITED, and HAWAIIAN TELEPHONE COMPANY, now known as HAWAIIAN TELCOM, INC., and distribution lines in favor of MAUI ELECTRIC COMPANY, LIMITED.**

33. **Any and all existing trails, roads, easements, rights of way, flumes, irrigation ditches, heiau, gravesites and any other historic and prehistoric sites.**

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

35. **Discrepancies, conflicts in boundary lines, shortage in area, encroachments or any other matters which a correct survey or archaeological study would disclose.**

36. **Any unrecorded leases and matters arising from or affecting the same.**

END OF SCHEDULE B

SCHEDULE C

The Land is described as follows:

All of that certain parcel of land (portion(s) of the lands described in and covered by Deed of Kamehameha IV to C. Brewer and Company, James Robinson and Company, Thomas Cummins and Josiah Fuller dated April 21, 1863 and recorded in Liber 16 at Page 374; and Royal Patent Number (none), Land Commission Award Number 8559-B, Apana 20 (Boundary Certificate No. 204) to Wm. C. Lunalilo; and all of those certain parcels of land described in and covered by all of Apana 1, portion of Apana 3 and all of Apana 4 of Royal Patent Number 6073, Land Commission Award 1806 to Makalawelawe; all of Royal Patent Number 6362, Land Commission Award 2426 to Kaiwi; portion of Royal Patent Number 6164, Land Commission Award 2447 to Kaawa; all of Apana 1 of Royal Patent Number 5978, Land Commission Award 2451 to Kaelepulu; all of Apana 1 of Royal Patent Number 6167, Land Commission Award 2526 to Makanui; all of Apana 2, Mahele 1 of Royal Patent Number 8051, Land Commission Award 2572 to Naheana; all of Royal Patent Number 5178, Land Commission Award 3275-T to Kahookano; all of Royal Patent Number 6126, Land Commission Award 3275-U to Kaiolani; all of Royal Patent Number 6327, Land Commission Award 3275-X to Puula; all of Royal Patent Number 6758, Land Commission Award 3275-V to Keaole; all of Apana 1 of Royal Patent Number 5444, Land Commission Award 3327 to Naialoalao; portion of Royal Patent Number 6756, Land Commission Award 3374 to Paele; all of Apana 1 and 2 of Royal Patent Number 5171, Land Commission Award 3432 to Kula; portion of Royal Patent Number 6094, Land Commission Award 3436 to Kapahi; all of Apana 1 and 2 of Royal Patent Number 6091, Land Commission Award 3437 to Kailiula; all of Apana 1 of Royal Patent Number 6092, Land Commission Award 3441 to Kapaula; all of Apana 2 of Royal Patent Number 6757, Land Commission Award 3444 to Kalopa) situate, lying at Waiehu, District of Wailuku, Island and County of Maui, State of Hawaii, being LOT C, of the "IAO VALLEY LARGE-LOT SUBDIVISION", more particularly described as follows:

Beginning at a 3/4 inch pipe in concrete monument at the southernmost corner of this lot and along the west side of Kahekili Highway, the coordinates of said point of beginning referred to Government Survey Triangulation Station "LUKE" being 8,271.09 feet north and 2,059.04 feet west and running by azimuths measured clockwise from true South:

1.	158°	50'	195.20	feet along 30 feet wide Spreckels Ditch to a point; thence,
2.	Along the same on a curve to the left with a radius of 252.80 feet and a central angle of 19° 50', the chord azimuth and distance being:			
	148°	55'	87.07	feet to a point; thence,
3.	139°	00'	248.00	feet along the same to a point; thence,
4.	Along the same on a curve to the right with a radius of 187.30 feet and a central angle of 46° 00', the chord azimuth and distance being:			
	162°	00'	146.37	feet to a point; thence,
5.	185°	00'	26.00	feet along the same to a point; thence,
6.	190°	38'	62.20	feet along the same to a point; thence,
7.	175°	16'	16.00	feet along the same to a point; thence,
8.	145°	25'	22.50	feet along the same to a point; thence,
9.	124°	20'	58.00	feet along the same to a point; thence,
10.	142°	35'	77.50	feet along the same to a point; thence,

SCHEDULE C CONTINUED

11.	130°	40'	76.50	feet along the same to a point; thence,
12.	Along the same on a curve to the left with a radius of 89.30 feet and a central angle of 39° 25', the chord azimuth and distance being:			
	110°	57' 30"	60.23	feet a point; thence,
13.	91°	15'	41.00	feet along the same to a point; thence,
14.	93°	10'	125.00	feet along the same to a point; thence,
15.	99°	40'	80.00	feet along the same to a point; thence,
16.	89°	50'	87.40	feet along the same to a point; thence,
17.	96°	10'	117.50	feet along the same to a point; thence,
18.	Along the same on a curve to the right with a radius of 231.70 feet and a central angle of 39° 10', the chord azimuth and distance being:			
	15°	45'	155.32	feet to a point;
19.	135°	20'	37.40	feet along the same to a point; thence,
20.	101°	45'	85.00	feet along the same to a point; thence,
21.	97°	20'	66.00	feet along the same to a point; thence,
22.	106°	25'	90.00	feet along the same to a point; thence,
23.	98°	10'	55.50	feet along the same to a point; thence,

24.	139°	50'	118.40	feet along the same to a point; thence,
25.	148°	00'	93.20	feet along the same to a point; thence,
26.	Along the same on a curve to the right with a radius of 441.40 feet and a central angle of 16° 30', the chord azimuth and distance being:			
	156°	15'	126.68	feet to a point; thence,
27.	164°	30'	94.20	feet along the same to a point; thence,
28.	169°	10'	183.40	feet along the same to a point; thence,
29.	174°	40'	51.00	feet along the same to a point; thence,
30.	Along the same on a curve to the right with a radius of 217.50 feet and a central angle of 39° 50', the chord azimuth and distance being:			
	194°	35'	148.18	feet to a point; thence,
31.	214°	30'	99.50	feet along the same to a point; thence,
32.	218°	25'	115.20	feet along the same to a point; thence,
33.	Along the same on a curve to the left with a radius of 111.15 feet and a central angle of 39° 35', the chord azimuth and distance being:			
	198°	12' 30"	76.79	feet to a point; thence,
34.	178°	50'	136.50	feet along the same to a point; thence,
35.	167°	50'	106.60	feet along the same to a point; thence,

36.	**163° 50'**	**121.80**	**feet along the same to a point; thence,**
37.	**175° 20'**	**73.80**	**feet along the same to a point; thence,**
38.	**185° 25'**	**100.80**	**feet along the same to a point; thence,**
39.	**197° 50'**	**68.50**	**feet along the same to a point; thence,**
40.	**187° 30'**	**65.00**	**feet along the same to a point; thence,**
41.	**177° 35'**	**63.00**	**feet along the same to a point; thence,**
42.	**170° 15'**	**60.30**	**feet along the same to a point; thence,**
43.	**52° 20'**	**11.30**	**feet along the same to a point; thence,**
44.	**166° 10'**	**27.30**	**feet along the same to a point; thence,**
45.	**232° 20'**	**12.00**	**feet along the same to a point; thence,**
46.	**166° 40'**	**25.20**	**feet along the same to a point; thence,**
47.	**160° 00'**	**65.75**	**feet along the same to a point; thence,**
48.	**144° 30'**	**116.00**	**feet along the same to a point; thence,**
49.	**151° 07'**	**91.00**	**feet along the same to a point; thence,**
50.	**156° 36'**	**109.25**	**feet along the same to a point; thence,**

51.	Along the same on a curve to the right with a radius of 200.00 feet and a central angle of 20° 31', the chord azimuth and distance being:				
	166°	51'	30"	71.23	feet along the same to a point; thence,
52.	177°	07'		119.46	feet along the same to a point; thence,
53.	99°	11'		155.69	feet along the same to a point; thence,
54.	183°	11'		161.47	feet along the lower bank of Waiehu Stream and the remainder of Royal Patent 6089, Land Commission Award 2433 to Kahikapa to a point; thence,
55.	Along the same on a curve to the right with a radius of 200.00 feet and a central angle of 43° 37', the chord azimuth and distance being:				
	204°	59'	30"	148.60	feet to a point; thence,
56.	226°	48'		16.90	feet along Royal Patent 77, Land Commission Award 204 to E. Miner to a point; thence,
57.	Along the same on a curve to the right with a radius of 150.00 feet and a central angle of 20° 38', the chord azimuth and distance being:				
	237°	07'		53.73	feet to a point; thence,
58.	247°	26'		209.03	feet along the same to a found 3/4 inch pipe; thence,
59.	Along the same on a curve to the left with a radius of 200.00 feet and a central angle of 72° 20', the chord azimuth and distance being:				

	211°	16'	236.05	feet to a found 3/4 inch pipe; thence,
60.	175°	06'	47.19	feet along the same to a found 3/4 inch pipe; thence,
61.	Along the same on a curve to the left with a radius of 200.00 feet and a central angle of 31° 22', the chord azimuth and distance being:			
	159°	25'	108.13	feet to a found 3/4 inch pipe; thence,
62.	143°	44'	11.37	feet along the same to a found 3/4 inch pipe; thence,
63.	Along the same on a curve to the right with a radius of 200.00 feet and a central angle of 41° 22', the chord azimuth and distance being:			
	164°	25'	141.28	feet to a found 3/4 inch pipe; thence,
64.	185°	06'	108.20	feet along the same to a found 3/4 inch pipe; thence,
65.	Along the same on a curve to the right with a radius of 125.00 feet and the central angle of 50° 36' 44" and the point of tangency azimuth from the radial point being: 145° 42' 44", the chord azimuth and distance being:			
	210°	24' 22'	106.86	feet to a point; thence,
66.	196°	19'	74.61	feet along the same and Royal Patent 3229, Land Commission Award 3528, Apana 1 to Naoopu to a found 3/4 inch pipe; thence,

67.	274°	00'		517.00	feet along Lot 1-B-2 (TMK: (2) 3-2-16:24), portion Land Commission Award 3437 (TMK: (2) 3-2-16:22) and Poalima Grant 5278 (TMK: (2) 3-2-16:23) to a point, thence,
68.	245°	18'		248.00	feet along Land Commission Award 3396 (TMK: (2) 3-2-16:12) and Poalima Grant 5278 (TMK: (2) 3-2-16:7) to a point; thence,
69.	206°	30'		356.70	feet along Poalima Grant 5278 and Land Commission Award 2419, Apana 1 (TMK: (2) 3-2-16:7) to a point; thence,
70.	331°	24'	28'	335.29	feet along the remainder of Royal Patent 6164, Land Commission Award 2447, Apana 1 to Kaawa to a point, thence,
71.	233°	24'	28'	207.85	feet along the same to a point; thence,
72.	135°	54'	28"	104.28	feet along the same to a point; thence,
73.	151°	24'	28"	315.48	feet along the same to a point; thence,
74.	136°	54'		182.81	feet along Poalima Grant 5278 (TMK: (2) 3-2-16:7) to a point; thence,
75.	220°	25'		234.97	feet along Royal Patent 6166 Land Commission Award 3434 (TMK: (2) 3-2-16:06), Remainder of Royal Patent 6166, Land Commission Award 3434 (TMK: (2) 3-2-16:21), Portion Lot 1 (TMK: (2)3-2-16:05) and Lot 2 (TMK: (2) 3-2-16:25) to a point; thence,

76.	324°	40'	31.55	feet along the remainder of Royal Patent 6756, Land Commission Award 3374 to Paele (TMK: (2) 3-2-16:04) to a point; thence,
77.	238°	00'	37.94	feet along the same to a point; thence,
78.	246°	55'	102.94	feet along the same to a point; thence,
79.	273°	45'	63.92	feet along the same to a point; thence,
80.	311°	44'	65.21	feet along the same to a found 3/4 inch pipe; thence,
81.	Along the same on a curve to the left with a radius of 110.00 feet and a central angle of 100° 48', the chord azimuth and distance being:			
	261°	20'	169.51	feet to a found 3/4 inch pipe; thence,
82.	210°	56'	13.21	feet along the same to a found 3/4 inch pipe; thence,
83.	239°	35'	50.44	feet along the same to a found 3/4 inch pipe; thence,
84.	Along the same and along the remainder of Royal Patent 6094, Land Commission Award 3436 to Kapahi on a curve to the right with a radius 400.00 feet and a central angle of 26° 00', the chord azimuth and distance being:			
	252°	35'	179.96	feet to a point; thence,
85.	265°	35'	107.71	feet along the remainder of Royal Patent 6094, Land Commission Award 3436 to Kapahi (TMK: (2) 3-2-16:04) to a point; thence,

86.	248° 00'	105.30	feet along the same to a point; thence,
87.	255° 25'	74.20	feet along the same to a point; thence,
88.	165° 25'	26.85	feet along the same to a point; thence,
89.	257° 55'	40.62	feet along the same (TMK: (2) 3-2-13:11) to a point; thence,
90.	Along the same on a curve to the right with a radius of 70.00 feet and a central angle of 75° 25', the chord azimuth and distance being:		
	295° 37' 30"	85.63	feet to a point; thence,
91.	333° 20'	143.60	feet along the same to a point; thence,
92.	286° 40'	94.44	feet along the same to a point; thence,
93.	Along the same on a curve to the left with a radius of 100.00 feet and a central angle of 40° 53', the chord azimuth and distance being:		
	266° 13' 30"	69.85	feet to a point; thence,
94.	245° 47'	145.28	feet along the same to a point; thence,
95.	226° 45'	264.76	feet along the same to a point; thence,
96.	Along the same and along the remainder of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo (TMK: (2) 3-2-13:11) on a curve to the right with a radius of 70.00 feet and central angle of 81° 15', the chord azimuth and distance being:		

235 QUEEN ST., HONOLULU, HAWAII 96813, PH: (808) 533-6261

	267°	22'	30"	91.15	feet to a point; thence,
97.	308°	00'		46.24	feet along the same to a point; thence,
98.	311°	20'		46.93	feet along the same to a point; thence,
99.	298°	00'		169.28	feet along the same to a point; thence,
100.	342°	10'		44.03	feet along Kahekili Highway (State of Hawaii) to a point; thence,

101. Along the same on a curve to the right with a radius of 478.84 feet and a central angle of 3° 25' 22", the point of curvature azimuth from the radial point being: 257° 31' 08", the chord azimuth and distance being:

	349°	13'	49"	28.60	feet to a point; thence
102.	350°	56'	30"	26.21	feet along the same to a point; thence,

103. Along the same on a curve to the right with a radius of 656.20 feet and a central angle of 2° 03' 08", the chord azimuth and distance being:

	351°	28'	04"	12.05	feet to a point;
104.	81°	59'	38"	50.00	feet along the same to a point; thence,
105.	349°	13'		130.35	feet along the same to a point; thence,
106.	273°	59'	38"	30.00	feet along the same to a point; thence,

107.	Along the same on a curve to the right with a radius of 656.20 feet and a central angle of 15° 59' 58", the chord azimuth and distance being:			
	11°	59'	37"	182.64 feet to a point; thence,
108.	289°	59'	36"	20.00 feet along the same to a point; thence,
109.	Along the same on a curve to the right with a radius of 676.20 feet and a central angle of 7° 02' 54", the chord azimuth and distance being:			
	23°	31'	03"	83.13 feet to a point; thence,
110.	27°	02'	30"	162.11 feet along the same to a point; thence,
111.	297°	02'	30"	21.03 feet along the same and end of State Highway to a point, thence,
112.	27°	02'	30"	55.63 feet along Kahekili Highway (County of Maui Section) to a point; thence,
113.	20°	30'		1,898.63 feet along the same to a point; thence,
114.	12°	44'		3,214.88 feet along the same to a point of beginning and containing an area of 241.633 acres, less the following Exclusion identified by TMK: (2) 3-3-02:11 (0.358 acre) and TMK: (2) 3-3-02:09 (3.094 acres), leaving a total net area of 238.181 acres, more or less.

TOGETHER WITH a strip of land 10.00 feet wide easement being more particularly described in Exchange Deed dated October 24, 1973, recorded in Liber 9654 at Page 326, to-wit:

An easement through Parcels 3 and 4 for the operation, maintenance and repair of a concrete culvert: being A strip of land 10.00 feet wide and extending 5.00 feet on each side of the following described centerline:

Beginning at the west end of this easement, and on the west boundary of Parcel 3, the coordinates of said point of beginning referred to Government Survey Triangulation Station "LUKE" being 7,948.98 feet north and 2,132.58 feet west, thence running by azimuths measured clockwise from the true south:

1.	**271°**	**53'**	**40.79**	**feet through Parcels 3 and 4 to the east boundary of Parcel 4 and containing an area of 408 square feet."**

Said above described parcel of land having been acquired by SOUTHWEST 7, LLC, a Colorado limited liability company, as follows:

1. **By COMMISSIONER'S DEED of GERALD T. JOHNSON, Commissioner, dated ------, 2012 (acknowledged January 31, 2012), recorded as Document No. A-44580933; and**

2. **By QUITCLAIM DEED of HALE MUA PROPERTIES, LLC, a Hawaii limited liability company, dated October 15, 2018, recorded as Document No. A-69150232.**

GENERAL NOTES

1. **There is hereby omitted from any covenants, conditions and reservations contained herein any covenant or restriction based on race, color, religion, sex, sexual orientation, familial status, marital status, disability, handicap, national origin, ancestry, or source of income, as set forth in applicable state or federal laws, except to the extent that said covenant or restriction is permitted by applicable law. Lawful restrictions under state or federal law on the age of occupants in senior housing or housing for older persons shall not be construed as restrictions based on familial status.**

DATE PRINTED: 1/04/2019

STATEMENT OF ASSESSED VALUES AND REAL PROPERTY TAXES DUE

TAX MAP KEY

DIVISION	ZONE	SECTION	PLAT	PARCEL	HPR NO.
(2)	3	3	002	031	0000

CLASS: AGRICULTURAL **AREA ASSESSED: 240.087 AC**

ASSESSED VALUES FOR CURRENT YEAR TAXES: 2018

The records of this division show the assessed values and taxes on the property designated by Tax Key shown above are as follows:

BUILDING	$	0	
EXEMPTION	$	0	
NET VALUE	$	0	
LAND	$	2,417,700	AGRICULTURAL USE VALUE
EXEMPTION	$	0	
NET VALUE	$	2,417,700	
TOTAL NET VALUE	$	2,417,700	

Installment (1 - due 8/20; 2 - due 2/20) Tax Info As Of - 8/20/2018

Tax Year	Installment	Tax Amount	Penalty Amount	Interest Amount	Other Amount	Total Amount	
2018	2	7,253.10				7,253.10	PAID
2018	1	7,253.10				7,253.10	PAID
2017	2	6,853.80				6,853.80	PAID
2017	1	6,853.81				6,853.81	PAID

The real property tax information provided is based on information furnished by the respective counties, is deemed reliable but not guaranteed, and no warranties are given express or implied. Billing and tax collection details may have changed. Please refer to the appropriate county real property tax offices for any further information or updates for the subject property.

EXHIBIT “A”

CHICAGO TITLE INSURANCE COMPANY

POLICY NO.: 7227111-_____

HAWAII STANDARD OWNER'S POLICY OF TITLE INSURANCE

ANY NOTICE OF CLAIM AND ANY OTHER NOTICE OR STATEMENT IN WRITING REQUIRED TO BE GIVEN TO THE COMPANY UNDER T COMPANY AT THE ADDRESS SHOWN IN SECTION 18 OF THE CONDITIONS.

COVERED RISKS

SUBJECT TO THE EXCLUSIONS FROM COVERAGE, THE EXCEPTIONS FROM COVERAGE CONTAINED IN SCHEDULE B, AND THE CONDITIONS, CHICAGO TITLE INSURANCE COMPANY, A FLORIDA CORPORATION (THE "COMPANY") INSURES, AS OF DATE OF POLICY AND, TO THE EXTENT S 10, AFTER DATE OF POLICY, AGAINST LOSS OR DAMAGE, NOT EXCEEDING THE AMOUNT OF INSURANCE, SUSTAINED OR INCURRED BY THE INSU

1. TITLE BEING VESTED OTHER THAN AS STATED IN SCHEDULE A.
2. ANY DEFECT IN OR LIEN OR ENCUMBRANCE ON THE TITLE. THIS COVERED RISK INCLUDES BUT IS NOT LIMITED TO INSURANCE AGAINS
   (A) A DEFECT IN THE TITLE CAUSED BY
      (I) FORGERY, FRAUD, UNDUE INFLUENCE, DURESS, INCOMPETENCY, INCAPACITY, OR IMPERSONATION;
      (II) FAILURE OF ANY PERSON OR ENTITY TO HAVE AUTHORIZED A TRANSFER OR CONVEYANCE;
      (III) A DOCUMENT AFFECTING TITLE NOT PROPERLY CREATED, EXECUTED, WITNESSED, SEALED, ACKNOWLEDGED, NOTARIZED, OR
      (IV) FAILURE TO PERFORM THOSE ACTS NECESSARY TO CREATE A DOCUMENT BY ELECTRONIC MEANS AUTHORIZED BY LAW;
      (V) A DOCUMENT EXECUTED UNDER A FALSIFIED, EXPIRED, OR OTHERWISE INVALID POWER OF ATTORNEY;
      (VI) A DOCUMENT NOT PROPERLY FILED, RECORDED, OR INDEXED IN THE PUBLIC RECORDS INCLUDING FAILURE TO PERFORM TH BY LAW; OR
      (VII) A DEFECTIVE JUDICIAL OR ADMINISTRATIVE PROCEEDING.
   (B) THE LIEN OF REAL ESTATE TAXES OR ASSESSMENTS IMPOSED ON THE TITLE BY A GOVERNMENTAL AUTHORITY DUE OR PAYABLE,
3. UNMARKETABLE TITLE.
4. NO RIGHT OF ACCESS TO AND FROM THE LAND.
5. THE VIOLATION OR ENFORCEMENT OF ANY LAW, ORDINANCE, PERMIT, OR GOVERNMENTAL REGULATION (INCLUDING THOSE REL REGULATING, PROHIBITING, OR RELATING TO
   (A) THE OCCUPANCY, USE, OR ENJOYMENT OF THE LAND;
   (B) THE CHARACTER, DIMENSIONS, OR LOCATION OF ANY IMPROVEMENT ERECTED ON THE LAND;
   (C) THE SUBDIVISION OF LAND; OR
   (D) ENVIRONMENTAL PROTECTION
   IF A NOTICE, DESCRIBING ANY PART OF THE LAND, IS RECORDED IN THE PUBLIC RECORDS SETTING FORTH THE VIOLATION OR INTENT VIOLATION OR ENFORCEMENT REFERRED TO IN THAT NOTICE.
6. AN ENFORCEMENT ACTION BASED ON THE EXERCISE OF A GOVERNMENTAL POLICE POWER NOT COVERED BY COVERED RISK 5 I DESCRIBING ANY PART OF THE LAND, IS RECORDED IN THE PUBLIC RECORDS, BUT ONLY TO THE EXTENT OF THE ENFORCEMENT REFER
7. THE EXERCISE OF THE RIGHTS OF EMINENT DOMAIN IF A NOTICE OF THE EXERCISE, DESCRIBING ANY PART OF THE LAND, IS RECORDED
8. ANY TAKING BY A GOVERNMENTAL BODY THAT HAS OCCURRED AND IS BINDING ON THE RIGHTS OF A PURCHASER FOR VALUE WITHO
9. TITLE BEING VESTED OTHER THAN AS STATED SCHEDULE A OR BEING DEFECTIVE
   (A) AS A RESULT OF THE AVOIDANCE IN WHOLE OR IN PART, OR FROM A COURT ORDER PROVIDING AN ALTERNATIVE REMEDY, OF A ANY INTEREST IN THE LAND OCCURRING PRIOR TO THE TRANSACTION VESTING TITLE AS SHOWN IN SCHEDULE A BECAUSE THAT PREFERENTIAL TRANSFER UNDER FEDERAL BANKRUPTCY, STATE INSOLVENCY, OR SIMILAR CREDITORS' RIGHTS LAWS; OR
   (B) BECAUSE THE INSTRUMENT OF TRANSFER VESTING TITLE AS SHOWN IN SCHEDULE A CONSTITUTES A PREFERENTIAL TRANSFER OR SIMILAR CREDITORS' RIGHTS LAWS BY REASON OF THE FAILURE OF ITS RECORDING IN THE PUBLIC RECORDS
      (I) TO BE TIMELY, OR
      (II) TO IMPART NOTICE OF ITS EXISTENCE TO A PURCHASER FOR VALUE OR TO A JUDGMENT OR LIEN CREDITOR.
10. ANY DEFECT IN OR LIEN OR ENCUMBRANCE ON THE TITLE OR OTHER MATTER INCLUDED IN COVERED RISKS 1 THROUGH 9 THAT HAS OR RECORDED IN THE PUBLIC RECORDS SUBSEQUENT TO DATE OF POLICY AND PRIOR TO THE RECORDING OF THE DEED OR OTHER IN THAT VESTS TITLE AS SHOWN IN SCHEDULE A.

THE COMPANY WILL ALSO PAY THE COSTS, ATTORNEYS' FEES, AND EXPENSES INCURRED IN DEFENSE OF ANY MATTER INSURED AGAINST BY T THE CONDITIONS.

IN WITNESS WHEREOF, CHICAGO TITLE INSURANCE COMPANY HAS CAUSED THIS POLICY TO BE SIGNED AND SEALED BY ITS DULY AUTHORIZED

Issued by:

Title Guaranty of Hawaii Inc
235 Queen Street
Honolulu Hawaii 96813
Telephone (808) 533-6261
Fax (808) 521-0221
Email title@tghawaii.com

CHICAGO TITLE INSURANCE COMPANY

By:

ATTEST President

Secretary

EXCLUSIONS FROM COVERAGE

THE FOLLOWING MATTERS ARE EXPRESSLY EXCLUDED FROM THE COVERAGE OF THIS POLICY, AND THE COMPANY WILL NOT PAY LOSS OR DA
ARISE BY REASON OF:

1. (A) ANY LAW, ORDINANCE, PERMIT, OR GOVERNMENTAL REGULATION (INCLUDING THOSE RELATING TO BUILDING AND ZONING) RESTRIC
   (I) THE OCCUPANCY, USE, OR ENJOYMENT OF THE LAND;
   (II) THE CHARACTER, DIMENSIONS OR LOCATION OF ANY IMPROVEMENT ERECTED ON THE LAND;
   (III) THE SUBDIVISION OF LAND; OR
   (IV) ENVIRONMENTAL PROTECTION;

   OR THE EFFECT OF ANY VIOLATION OF THESE LAWS, ORDINANCES, OR GOVERNMENTAL REGULATIONS. THIS EXCLUSION 1(A) DOES NOT M
COVERED RISK 5.

   (B) ANY GOVERNMENTAL POLICE POWER. THIS EXCLUSION 1(B) DOES NOT MODIFY OR LIMIT THE COVERAGE PROVIDED UNDER COVERED
2. RIGHTS OF EMINENT DOMAIN. THIS EXCLUSION DOES NOT MODIFY OR LIMIT THE COVERAGE PROVIDED UNDER COVERED RISK 7 OR 8.
3. DEFECTS, LIENS, ENCUMBRANCES, ADVERSE CLAIMS, OR OTHER MATTERS:
   (A) CREATED, SUFFERED, ASSUMED, OR AGREED TO BY THE INSURED CLAIMANT;
   (B) NOT KNOWN TO THE COMPANY, NOT RECORDED IN THE PUBLIC RECORDS AT DATE OF POLICY, BUT KNOWN TO THE INSURED CLAIM
   COMPANY BY THE INSURED CLAIMANT PRIOR TO THE DATE THE INSURED CLAIMANT BECAME AN INSURED UNDER THIS POLICY;
   (C) RESULTING IN NO LOSS OR DAMAGE TO THE INSURED CLAIMANT;
   (D) ATTACHING OR CREATED SUBSEQUENT TO DATE OF POLICY (HOWEVER, THIS DOES NOT MODIFY OR LIMIT THE COVERAGE PROVIDED U
   (E) RESULTING IN LOSS OR DAMAGE THAT WOULD NOT HAVE BEEN SUSTAINED IF THE INSURED CLAIMANT HAD PAID VALUE FOR THE TIT
4. ANY CLAIM, BY REASON OF THE OPERATION OF FEDERAL BANKRUPTCY, STATE INSOLVENCY, OR SIMILAR CREDITORS' RIGHTS LAWS, THA
   SCHEDULE A, IS
   (A) A FRAUDULENT CONVEYANCE OR FRAUDULENT TRANSFER; OR
   (B) A PREFERENTIAL TRANSFER FOR ANY REASON NOT STATED IN COVERED RISK 9 OF THIS POLICY.
5. ANY LIEN ON THE TITLE FOR REAL ESTATE TAXES OR ASSESSMENTS IMPOSED BY GOVERNMENTAL AUTHORITY AND CREATED OR ATTA
   RECORDING OF THE DEED OR OTHER INSTRUMENT OF TRANSFER IN THE PUBLIC RECORDS THAT VESTS TITLE AS SHOWN IN SCHEDULE A.
6. (A) TAXES OR ASSESSMENTS LEVIED OR IMPOSED BY A GOVERNMENT AUTHORITY ON THE TITLE THAT ARE NOT SHOWN AS EXISTING LIEN
   A PUBLIC AGENCY THAT MAY RESULT IN TAXES OR ASSESSMENTS, OR NOTICES OF SUCH PROCEEDINGS, WHETHER OR NOT SHOWN BY T
   RECORDS.
7. ANY FACTS, RIGHTS, INTERESTS OR CLAIMS WHICH ARE NOT RECORDED IN THE PUBLIC RECORDS AT DATE OF POLICY BUT WHICH COULD
   OR BY MAKING INQUIRY OF PERSONS IN POSSESSION THEREOF OR OF THE LESSORS IN ANY LEASE OF THE LAND.
8. EASEMENTS OR CLAIMS OF EASEMENTS WHICH ARE NOT RECORDED IN THE PUBLIC RECORDS AT DATE OF POLICY.
9. ANY ENCROACHMENT, ENCUMBRANCE, VIOLATION, VARIATION, OR ADVERSE CIRCUMSTANCE AFFECTING THE TITLE THAT WOULD BE
   SURVEY OR ARCHAEOLOGICAL STUDY OF THE LAND AND NOT SHOWN BY THE PUBLIC RECORDS.
10. CLAIMS ARISING OUT OF CUSTOMARY AND TRADITIONAL RIGHTS AND PRACTICES, INCLUDING WITHOUT LIMITATION THOSE EXERCISED
    GATHERING PURPOSES, AS PROVIDED FOR IN THE HAWAII CONSTITUTION OR THE HAWAII REVISED STATUTES.
11. RIGHTS OR CLAIMS OF PERSONS OR ENTITIES OTHER THAN THE INSURED INVOLVING OR ARISING OUT OF: MINERAL OR METALLIC MI
    COMMERCE OR NAVIGATION; CREATION OR LOSS OF THE LAND OR ANY PORTION THEREOF BY ACCRETION, AVULSION, EROSION OR ARTIFI
    POSSESSION OF THE LAND OR ANY PORTION THEREOF; TRAILS, ROADWAYS OR OTHER RIGHTS OF WAY, INCLUDING WITHOUT LIMITATION
    HAWAII REVISED STATUTES.
12. ANY LIEN (OR CLAIM OF LIEN) FOR SERVICES, LABOR OR MATERIAL ARISING FROM AN IMPROVEMENT OR WORK RELATED TO THE LAND
    POLICY AND REGARDLESS OF THE LEGAL EFFECTIVE DATE OF ANY SUCH LIEN OR CLAIM, UNLESS AT THE DATE OF POLICY SUCH LIEN OR
    FILED IN THE CIRCUIT COURT PURSUANT TO CHAPTER 507, HAWAII REVISED STATUTES.
13. ANY CLAIM ARISING AS A RESULT OF THE INABILITY OR FAILURE OF THE INSURED TO COMPLY WITH APPLICABLE DOING BUSINESS LAWS C

CONDITIONS

1. DEFINITION OF TERMS

THE FOLLOWING TERMS WHEN USED IN THIS POLICY MEAN:

(A) "AMOUNT OF INSURANCE": THE AMOUNT STATED IN SCHEDULE A, AS MAY BE INCREASED OR DECREASED BY ENDORSEMENT TO THIS POLICY, INCREASED BY SECTION 8(B), OR DECREASED BY SECTIONS 10 AND 11 OF THESE CONDITIONS.

(B) "DATE OF POLICY": THE DATE DESIGNATED AS "DATE OF POLICY" IN SCHEDULE A.

(C) "ENTITY": A CORPORATION, PARTNERSHIP, TRUST, LIMITED LIABILITY COMPANY OR OTHER SIMILAR LEGAL ENTITY.

(D) "INSURED": THE INSURED NAMED IN SCHEDULE A.

(I) THE TERM "INSURED" ALSO INCLUDES

(A) SUCCESSORS TO THE TITLE OF THE INSURED BY OPERATION OF LAW AS DISTINGUISHED FROM PURCHASE, INCLUDING HEIRS, DEVISEES, SURVIVORS, PERSONAL REPRESENTATIVES, OR NEXT OF KIN;

(B) SUCCESSORS TO AN INSURED BY DISSOLUTION, MERGER, CONSOLIDATION, DISTRIBUTION, OR REORGANIZATION;

(C) SUCCESSORS TO AN INSURED BY ITS CONVERSION TO ANOTHER KIND OF ENTITY;

(D) A GRANTEE OF AN INSURED UNDER A DEED DELIVERED WITHOUT PAYMENT OF ACTUAL VALUABLE CONSIDERATION CONVEYING THE TITLE

(1) IF THE STOCK, SHARES, MEMBERSHIPS, OR OTHER EQUITY INTERESTS OF THE GRANTEE ARE WHOLLY-OWNED BY THE NAMED INSURED,

(2) IF THE GRANTEE WHOLLY OWNS THE NAMED INSURED,

(3) IF THE GRANTEE IS WHOLLY-OWNED BY AN AFFILIATED ENTITY OF THE NAMED INSURED, PROVIDED THE AFFILIATED ENTITY AND THE NAMED INSURED ARE BOTH WHOLLY-OWNED BY THE SAME PERSON OR ENTITY, OR

(4) IF THE GRANTEE IS A TRUSTEE OR BENEFICIARY OF A TRUST OR WRITTEN INSTRUMENT ESTABLISHED BY THE INSURED NAMED IN SCHEDULE A FOR ESTATE PLANNING PURPOSES.

(II) WITH REGARD TO (A), (B), (C), AND (D) RESERVING, HOWEVER, ALL DEFENSES AS TO ANY SUCCESSOR THAT THE COMPANY WOULD HAVE HAD AGAINST ANY PREDECESSOR OR INSURED.

(E) "INSURED CLAIMANT": AN INSURED CLAIMING LOSS OR DAMAGE.

(F) "KNOWLEDGE" OR "KNOWN": ACTUAL KNOWLEDGE, NOT CONSTRUCTIVE KNOWLEDGE OR NOTICE THAT MAY BE IMPUTED TO AN INSURED BY REASON OF THE PUBLIC RECORDS OR ANY OTHER RECORDS THAT IMPART CONSTRUCTIVE NOTICE OF MATTERS AFFECTING THE LAND.

(G) "LAND": THE LAND DESCRIBED IN SCHEDULE A, AND AFFIXED IMPROVEMENTS THAT BY LAW CONSTITUTE REAL PROPERTY. THE TERM "LAND" DOES NOT INCLUDE ANY PROPERTY BEYOND THE LINES OF THE AREA DESCRIBED IN SCHEDULE A, NOR ANY RIGHT, TITLE, INTEREST, ESTATE OR EASEMENT IN ABUTTING STREETS, ROADS, AVENUES, ALLEYS, LANES, WAYS OR WATERWAYS, BUT THIS DOES NOT MODIFY OR LIMIT THE EXTENT THAT A RIGHT OF ACCESS TO AND FROM THE LAND IS INSURED BY THIS POLICY.

(H) "MORTGAGE": MORTGAGE, DEED OF TRUST, TRUST DEED, OR OTHER SECURITY INSTRUMENT, INCLUDING ONE EVIDENCED BY ELECTRONIC MEANS AUTHORIZED BY LAW.

(I) "PUBLIC RECORDS": RECORDS ESTABLISHED UNDER STATE STATUTES AT DATE OF POLICY FOR THE PURPOSE OF IMPARTING CONSTRUCTIVE NOTICE OF MATTERS RELATIVE TO VESTED, OR TITLE TO PURCHASERS FOR VALUE AND WITHOUT KNOWLEDGE. WITH RESPECT TO COVERED RISK 5(D), "PUBLIC RECORDS" SHALL ALSO INCLUDE ENVIRONMENTAL PROTECTION LIENS FILED IN THE RECORDS OF THE CLERK OF THE UNITED STATES DISTRICT COURT FOR THE DISTRICT IN WHICH THE LAND IS LOCATED.

(J) "TITLE": THE ESTATE OR INTEREST DESCRIBED IN SCHEDULE A.

(K) "UNMARKETABLE TITLE": TITLE AFFECTED BY AN ALLEGED OR APPARENT MATTER THAT WOULD PERMIT A PROSPECTIVE PURCHASER OR LESSEE OF THE TITLE OR LENDER ON THE TITLE TO BE RELEASED FROM THE OBLIGATION TO PURCHASE, LEASE, OR LEND IF THERE IS A CONTRACTUAL CONDITION REQUIRING THE DELIVERY OF MARKETABLE TITLE.

2. CONTINUATION OF INSURANCE

THE COVERAGE OF THIS POLICY SHALL CONTINUE IN FORCE AS OF DATE OF POLICY IN FAVOR OF AN INSURED, BUT ONLY SO LONG AS THE INSURED RETAINS AN ESTATE OR INTEREST IN THE LAND, OR HOLDS AN OBLIGATION SECURED BY A PURCHASE MONEY MORTGAGE GIVEN BY A PURCHASER FROM THE INSURED, OR ONLY SO LONG AS THE INSURED SHALL HAVE LIABILITY BY REASON OF WARRANTIES IN ANY TRANSFER OR CONVEYANCE OF THE TITLE. THIS POLICY SHALL NOT CONTINUE IN FORCE IN FAVOR OF ANY PURCHASER FROM THE INSURED OF EITHER (I) AN INTEREST IN THE LAND, OR (II) AN OBLIGATION SECURED BY A PURCHASE MONEY MORTGAGE GIVEN TO THE INSURED.

3. NOTICE OF CLAIM TO BE GIVEN BY INSURED CLAIMANT

THE INSURED SHALL NOTIFY THE COMPANY PROMPTLY IN WRITING (I) IN CASE OF ANY LITIGATION AS SET FORTH IN SECTION 5(A) OF THESE CONDITIONS, (II) IN CASE KNOWLEDGE SHALL COME TO AN INSURED HEREUNDER OF ANY CLAIM OF TITLE OR INTEREST THAT IS ADVERSE TO THE TITLE, AS INSURED, AND THAT MIGHT CAUSE LOSS OR DAMAGE FOR WHICH THE COMPANY MAY BE LIABLE BY VIRTUE OF THIS POLICY, OR (III) IF THE TITLE, AS INSURED, OR ANY PART THEREOF, IS REJECTED AS UNMARKETABLE TITLE. IF THE COMPANY IS PREJUDICED BY THE FAILURE OF THE INSURED CLAIMANT TO PROVIDE PROMPT NOTICE, THE COMPANY'S LIABILITY TO THE INSURED CLAIMANT UNDER THE POLICY SHALL BE REDUCED TO THE EXTENT OF THE PREJUDICE.

4. PROOF OF LOSS

IN THE EVENT THE COMPANY IS UNABLE TO DETERMINE THE AMOUNT OF LOSS OR DAMAGE, THE COMPANY MAY, AT ITS OPTION, REQUIRE AS A CONDITION OF PAYMENT THAT THE INSURED CLAIMANT FURNISH A SIGNED PROOF OF LOSS. THE PROOF OF LOSS MUST DESCRIBE THE DEFECT, LIEN, ENCUMBRANCE, OR OTHER MATTER INSURED AGAINST BY THIS POLICY THAT CONSTITUTES THE BASIS OF LOSS OR DAMAGE AND SHALL STATE, TO THE EXTENT POSSIBLE, THE BASIS OF CALCULATING THE AMOUNT OF THE LOSS OR DAMAGE.

5. DEFENSE AND PROSECUTION OF ACTIONS

(A) UPON WRITTEN REQUEST BY THE INSURED, AND SUBJECT TO THE OPTIONS CONTAINED IN SECTION 7 OF THESE CONDITIONS, THE COMPANY, AT ITS OWN COST AND WITHOUT UNREASONABLE DELAY, SHALL PROVIDE FOR THE DEFENSE OF AN INSURED IN LITIGATION IN WHICH ANY THIRD PARTY ASSERTS A CLAIM COVERED BY THIS POLICY ADVERSE TO THE INSURED. THE COMPANY'S OBLIGATION IS LIMITED TO ONLY THOSE STATED CAUSES OF ACTION ALLEGING MATTERS INSURED AGAINST BY THIS POLICY. THE COMPANY SHALL HAVE THE RIGHT TO SELECT COUNSEL OF ITS CHOICE (SUBJECT TO THE RIGHT OF THE INSURED TO OBJECT FOR REASONABLE CAUSE) TO REPRESENT THE INSURED AS TO THOSE STATED CAUSES OF ACTION. IT SHALL NOT BE LIABLE FOR AND WILL NOT PAY FEES OF ANY OTHER COUNSEL. THE COMPANY WILL NOT PAY ANY FEES, COSTS, OR EXPENSES INCURRED BY THE INSURED IN THE DEFENSE OF THOSE CAUSES OF ACTION THAT ALLEGE MATTERS NOT INSURED AGAINST BY THIS POLICY.

(B) THE COMPANY SHALL HAVE THE RIGHT, IN ADDITION TO THE OPTIONS CONTAINED IN SECTION 7 OF THESE CONDITIONS, AT ITS OWN COST, TO INSTITUTE AND PROSECUTE ANY ACTION OR PROCEEDING OR TO DO ANY OTHER ACT THAT IN ITS OPINION MAY BE NECESSARY OR DESIRABLE TO ESTABLISH THE TITLE, AS INSURED, OR TO PREVENT OR REDUCE LOSS OR DAMAGE TO THE INSURED. THE COMPANY MAY TAKE ANY APPROPRIATE ACTION UNDER THE TERMS OF THIS POLICY, WHETHER OR NOT IT SHALL BE LIABLE TO THE INSURED. THE EXERCISE OF THESE RIGHTS SHALL NOT BE AN ADMISSION OF LIABILITY OR WAIVER OF ANY PROVISION OF THIS POLICY. IF THE COMPANY EXERCISES ITS RIGHTS UNDER THIS SUBSECTION, IT MUST DO SO DILIGENTLY.

(C) WHENEVER THE COMPANY BRINGS AN ACTION OR ASSERTS A DEFENSE AS REQUIRED OR PERMITTED BY THIS POLICY, THE COMPANY MAY PURSUE THE LITIGATION TO A FINAL DETERMINATION BY A COURT OF COMPETENT JURISDICTION, AND IT EXPRESSLY RESERVES THE RIGHT, IN ITS SOLE DISCRETION, TO APPEAL FROM ANY ADVERSE JUDGMENT OR ORDER.

6. DUTY OF INSURED CLAIMANT TO COOPERATE

(A) IN ALL CASES WHERE THIS POLICY PERMITS OR REQUIRES THE COMPANY TO PROSECUTE OR PROVIDE FOR THE DEFENSE OF ANY ACTION OR PROCEEDING AND ANY APPEALS THEREIN, THE INSURED SHALL SECURE TO THE COMPANY THE RIGHT TO SO PROSECUTE OR PROVIDE DEFENSE IN THE ACTION OR PROCEEDING, INCLUDING THE RIGHT TO USE, AT ITS OPTION, THE NAME OF THE INSURED FOR THIS PURPOSE. WHENEVER REQUESTED BY THE COMPANY, THE INSURED, AT THE COMPANY'S EXPENSE, SHALL GIVE THE COMPANY ALL REASONABLE AID (I) IN SECURING EVIDENCE, OBTAINING WITNESSES, PROSECUTING OR DEFENDING THE ACTION OR PROCEEDING, OR EFFECTING SETTLEMENT, AND (II) IN ANY OTHER LAWFUL ACT THAT IN THE OPINION OF THE COMPANY MAY BE NECESSARY OR DESIRABLE TO ESTABLISH THE TITLE OR ANY OTHER MATTER AS INSURED. IF THE COMPANY IS PREJUDICED BY THE FAILURE OF THE INSURED TO FURNISH THE REQUIRED COOPERATION, THE COMPANY'S OBLIGATIONS TO THE INSURED UNDER THE POLICY SHALL TERMINATE, INCLUDING ANY LIABILITY OR OBLIGATION TO DEFEND, PROSECUTE, OR CONTINUE ANY LITIGATION, WITH REGARD TO THE MATTER OR MATTERS REQUIRING SUCH COOPERATION.

(B) THE COMPANY MAY REASONABLY REQUIRE THE INSURED CLAIMANT TO SUBMIT TO EXAMINATION UNDER OATH BY ANY AUTHORIZED REPRESENTATIVE OF THE COMPANY AND TO PRODUCE FOR EXAMINATION, INSPECTION, AND COPYING, AT SUCH REASONABLE TIMES AND PLACES AS MAY BE DESIGNATED BY THE AUTHORIZED REPRESENTATIVE OF THE COMPANY, ALL RECORDS, IN WHATEVER MEDIUM MAINTAINED, INCLUDING BOOKS, LEDGERS, CHECKS, MEMORANDA, CORRESPONDENCE, REPORTS, E-MAILS, DISKS, TAPES, AND VIDEOS WHETHER BEARING A DATE BEFORE OR AFTER DATE OF POLICY, THAT REASONABLY PERTAIN TO THE LOSS OR DAMAGE. FURTHER, IF REQUESTED BY ANY AUTHORIZED REPRESENTATIVE OF THE COMPANY, THE INSURED CLAIMANT SHALL GRANT ITS PERMISSION, IN WRITING, FOR ANY AUTHORIZED REPRESENTATIVE OF THE COMPANY TO EXAMINE, INSPECT, AND COPY ALL RECORDS IN THE CUSTODY OR CONTROL OF A THIRD PARTY THAT REASONABLY PERTAIN TO THE LOSS OR DAMAGE. ALL INFORMATION DESIGNATED AS CONFIDENTIAL BY THE INSURED CLAIMANT PROVIDED PURSUANT TO THIS SECTION SHALL NOT BE DISCLOSED TO OTHERS UNLESS, IN THE REASONABLE JUDGMENT OF THE COMPANY, IT IS NECESSARY IN THE ADMINISTRATION OF THE CLAIM. FAILURE OF THE INSURED CLAIMANT TO SUBMIT FOR EXAMINATION UNDER OATH, TO PRODUCE ANY REASONABLY REQUESTED INFORMATION, OR GRANT PERMISSION TO SECURE REASONABLY NECESSARY INFORMATION FROM THIRD PARTIES AS REQUIRED IN THIS SUBSECTION, UNLESS PROHIBITED BY LAW OR GOVERNMENTAL REGULATION, SHALL TERMINATE ANY LIABILITY OF THE COMPANY UNDER THIS POLICY AS TO THAT CLAIM.

7. OPTIONS TO PAY OR OTHERWISE SETTLE CLAIMS; TERMINATION OF LIABILITY

IN CASE OF A CLAIM UNDER THIS POLICY, THE COMPANY SHALL HAVE THE FOLLOWING ADDITIONAL OPTIONS:

(A) TO PAY OR TENDER PAYMENT OF THE AMOUNT OF INSURANCE.

TO PAY OR TENDER PAYMENT OF THE AMOUNT OF INSURANCE UNDER THIS POLICY TOGETHER WITH ANY COSTS, ATTORNEYS' FEES, AND EXPENSES INCURRED BY THE INSURED CLAIMANT, WHICH WERE AUTHORIZED BY THE COMPANY UP TO THE TIME OF PAYMENT OR TENDER OF PAYMENT AND WHICH THE COMPANY IS OBLIGATED TO PAY.

UPON THE EXERCISE BY THE COMPANY OF THIS OPTION, ALL LIABILITY AND OBLIGATIONS OF THE COMPANY TO THE INSURED UNDER THIS POLICY, OTHER THAN TO MAKE THE PAYMENT REQUIRED IN THIS SUBSECTION, SHALL TERMINATE, INCLUDING ANY LIABILITY OR OBLIGATION TO DEFEND, PROSECUTE, OR CONTINUE ANY LITIGATION.

(B) TO PAY OR OTHERWISE SETTLE WITH PARTIES OTHER THAN THE INSURED OR WITH THE INSURED CLAIMANT.

TO PAY OR OTHERWISE SETTLE WITH OTHER PARTIES FOR OR IN THE NAME OF THE INSURED CLAIMANT, ANY CLAIM INSURED AGAINST UNDER THIS POLICY, TOGETHER WITH ANY COSTS, ATTORNEYS' FEES, AND EXPENSES INCURRED BY THE INSURED CLAIMANT, WHICH WERE AUTHORIZED BY THE COMPANY UP TO THE TIME OF PAYMENT AND WHICH THE COMPANY IS OBLIGATED TO PAY; OR

(II) TO PAY OR OTHERWISE SETTLE WITH THE INSURED CLAIMANT THE LOSS OR DAMAGE, PROVIDED FOR UNDER THIS POLICY, TOGETHER WITH ANY COSTS, ATTORNEYS' FEES, AND EXPENSES INCURRED BY THE INSURED CLAIMANT THAT WERE AUTHORIZED BY THE COMPANY UP TO THE TIME OF PAYMENT AND THAT THE COMPANY IS OBLIGATED TO PAY.

UPON THE EXERCISE BY THE COMPANY OF EITHER OF THE OPTIONS PROVIDED FOR IN SUBSECTIONS (B)(I) OR (II), THE COMPANY'S OBLIGATIONS TO THE INSURED UNDER THIS POLICY FOR THE CLAIMED LOSS OR DAMAGE, OTHER THAN THE PAYMENTS REQUIRED TO BE MADE, SHALL TERMINATE, INCLUDING ANY LIABILITY OR OBLIGATION TO DEFEND, PROSECUTE, OR CONTINUE ANY LITIGATION.

8. DETERMINATION AND EXTENT OF LIABILITY

THIS POLICY IS A CONTRACT OF INDEMNITY AGAINST ACTUAL MONETARY LOSS OR DAMAGE SUSTAINED OR INCURRED BY THE INSURED CLAIMANT WHO HAS SUFFERED LOSS OR DAMAGE BY REASON OF MATTERS INSURED AGAINST BY THIS POLICY.

(A) THE EXTENT OF LIABILITY OF THE COMPANY FOR LOSS OR DAMAGE SHALL NOT EXCEED THE LESSER OF

(I) THE AMOUNT OF INSURANCE; OR

(II) THE DIFFERENCE BETWEEN THE VALUE OF THE TITLE AS INSURED AND THE VALUE OF THE INSURED RIGHT OR THE RISK INSURED AGAINST BY THIS POLICY.

(B) IF THE COMPANY PURSUES ITS RIGHTS UNDER SECTION 5 OF THESE CONDITIONS AND IS UNSUCCESSFUL IN ESTABLISHING THE TITLE, AS INSURED,

(I) THE AMOUNT OF INSURANCE SHALL BE INCREASED BY 10%, AND

(II) THE INSURED CLAIMANT SHALL HAVE THE RIGHT TO HAVE THE LOSS OR DAMAGE DETERMINED EITHER AS OF THE DATE THE CLAIM WAS MADE BY THE INSURED CLAIMANT OR AS OF THE DATE IT IS SETTLED AND PAID.

(C) IN ADDITION TO THE EXTENT OF LIABILITY UNDER (A) AND (B), THE COMPANY WILL ALSO PAY THOSE COSTS, ATTORNEYS' FEES, AND EXPENSES INCURRED IN THE MANNER AS PROVIDED IN SECTION 5 OF THESE CONDITIONS.

9. LIMITATION OF LIABILITY

(A) IF THE COMPANY ESTABLISHES THE TITLE, OR REMOVES THE ALLEGED DEFECT, LIEN OR ENCUMBRANCE, OR CURES THE LACK OF A RIGHT OF ACCESS TO OR FROM THE LAND, OR CURES THE UNMARKETABLE TITLE, ALL AS INSURED, IN A REASONABLY DILIGENT MANNER BY ANY METHOD, INCLUDING LITIGATION AND THE COMPLETION OF ANY APPEAL, IT SHALL HAVE FULLY PERFORMED ITS OBLIGATIONS WITH RESPECT TO THAT MATTER AND SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE CAUSED TO THE INSURED.

(B) IN THE EVENT OF ANY LITIGATION, INCLUDING LITIGATION BY THE COMPANY OR WITH THE COMPANY'S CONSENT, THE COMPANY SHALL HAVE NO LIABILITY FOR LOSS OR DAMAGE UNTIL THERE HAS BEEN A FINAL DETERMINATION BY A COURT OF COMPETENT JURISDICTION, AND DISPOSITION OF ALL APPEALS, ADVERSE TO THE TITLE, AS INSURED.

(C) THE COMPANY SHALL NOT BE LIABLE FOR LOSS OR DAMAGE TO THE INSURED FOR LIABILITY VOLUNTARILY ASSUMED BY THE INSURED IN SETTLING ANY CLAIM OR SUIT WITHOUT THE PRIOR WRITTEN CONSENT OF THE COMPANY.

10. REDUCTION OF INSURANCE; REDUCTION OR TERMINATION OF LIABILITY

ALL PAYMENTS UNDER THIS POLICY, EXCEPT PAYMENTS MADE FOR COSTS, ATTORNEYS' FEES, AND EXPENSES, SHALL REDUCE THE AMOUNT OF INSURANCE BY THE AMOUNT OF THE PAYMENT.

11. LIABILITY NONCUMULATIVE

THE AMOUNT OF INSURANCE SHALL BE REDUCED BY ANY AMOUNT THE COMPANY OFFERS OR PAYS UNDER ANY POLICY INSURING A MORTGAGE TO WHICH EXCEPTION IS TAKEN

TO WHICH THE INSURED HAS AGREED, ASSUMED, OR TAKEN SUBJECT, OR WHICH IS EXECUTED BY AN INSURED AFTER DATE OF POLICY AND WHICH IS A CHARGE OR LIEN ON THE TITLE, AND THE AMOUNT SO PAID SHALL BE DEEMED A PAYMENT TO THE INSURED UNDER THIS POLICY.

12. PAYMENT OF LOSS

WHEN LIABILITY AND THE EXTENT OF LOSS OR DAMAGE HAVE BEEN DEFINITELY FIXED IN ACCORDANCE WITH THESE CONDITIONS, THE PAYMENT SHALL BE MADE WITHIN 30 DAYS.

13. RIGHTS OF RECOVERY UPON PAYMENT OR SETTLEMENT

(A) WHENEVER THE COMPANY SHALL HAVE SETTLED AND PAID A CLAIM UNDER THIS POLICY, IT SHALL BE SUBROGATED AND ENTITLED TO THE RIGHTS OF THE INSURED CLAIMANT IN THE TITLE AND ALL OTHER RIGHTS AND REMEDIES IN RESPECT TO THE CLAIM THAT THE INSURED CLAIMANT HAS AGAINST ANY PERSON OR PROPERTY, TO THE EXTENT OF THE AMOUNT OF SUCH CLAIM, COSTS, ATTORNEYS' FEES, AND EXPENSES PAID BY THE COMPANY. IF REQUESTED BY THE COMPANY, THE INSURED CLAIMANT SHALL EXECUTE DOCUMENTS TO EVIDENCE IN THE NAME OF THE INSURED CLAIMANT THE TRANSFER OR THE RIGHTS AND REMEDIES. THE INSURED CLAIMANT SHALL PERMIT THE COMPANY TO SUE, COMPROMISE, OR SETTLE IN THE NAME OF THE INSURED CLAIMANT AND TO USE THE NAME OF THE INSURED CLAIMANT IN ANY TRANSACTION OR LITIGATION INVOLVING THESE RIGHTS AND REMEDIES.

IF A PAYMENT ON ACCOUNT OF A CLAIM DOES NOT FULLY COVER THE LOSS OF THE INSURED CLAIMANT, THE COMPANY SHALL DEFER THE EXERCISE OF ITS RIGHT TO RECOVER UNTIL AFTER THE INSURED CLAIMANT SHALL HAVE RECOVERED ITS LOSS.

(B) THE COMPANY'S RIGHT OF SUBROGATION INCLUDES THE RIGHTS OF THE INSURED TO INDEMNITIES, GUARANTIES, OTHER POLICIES OF INSURANCE, OR BONDS, NOTWITHSTANDING ANY TERMS OR CONDITIONS CONTAINED IN THOSE INSTRUMENTS THAT ADDRESS SUBROGATION RIGHTS.

14. ARBITRATION

PROVIDED THAT THIS DOES NOT SUPERSEDE HAWAII'S UNIFORM ARBITRATION ACT, HAWAII REVISED STATUTES, CHAPTER 658A, EITHER THE COMPANY OR THE INSURED MAY DEMAND THAT THE CLAIM OR CONTROVERSY SHALL BE SUBMITTED TO ARBITRATION PURSUANT TO THE TITLE INSURANCE ARBITRATION RULES OF THE AMERICAN LAND TITLE ASSOCIATION ("RULES"). EXCEPT AS PROVIDED IN THE RULES, THERE SHALL BE NO ADDITIONAL PARTIES PERMITTED TO THE ARBITRATION, AND NO CONSOLIDATION WITH CLAIMS OR CONTROVERSIES OF OTHER PERSONS. ARBITRABLE MATTERS MAY INCLUDE, BUT ARE NOT LIMITED TO, ANY CONTROVERSY OR CLAIM BETWEEN THE COMPANY AND THE INSURED ARISING OUT OF OR RELATING TO THIS POLICY, ANY SERVICE IN CONNECTION WITH ITS ISSUANCE OR THE BREACH OF A POLICY PROVISION, OR TO ANY OTHER CONTROVERSY OR CLAIM ARISING OUT OF THE TRANSACTION GIVING RISE TO THIS POLICY. ALL ARBITRABLE MATTERS WHEN THE AMOUNT OF INSURANCE IS $2,000,000 OR LESS SHALL BE ARBITRATED AT THE OPTION OF EITHER THE COMPANY OR THE INSURED. ALL ARBITRABLE MATTERS WHEN THE AMOUNT OF INSURANCE IS IN EXCESS OF $2,000,000 SHALL BE ARBITRATED ONLY WHEN AGREED TO BY BOTH THE COMPANY AND THE INSURED. SUBJECT TO THE PROVISIONS OF HAWAII REVISED STATUTES, CHAPTER 658A, ARBITRATION PURSUANT TO THIS POLICY AND UNDER THE RULES SHALL BE BINDING UPON THE PARTIES. JUDGMENT UPON THE AWARD RENDERED BY THE ARBITRATOR(S) SHALL BE ENTERED IN ANY COURT OF COMPETENT JURISDICTION.

15. LIABILITY LIMITED TO THIS POLICY; POLICY ENTIRE CONTRACT

(A) THIS POLICY TOGETHER WITH ALL ENDORSEMENTS, IF ANY, ATTA COMPANY IS THE ENTIRE POLICY AND CONTRACT BETWEEN THE INSURED A INTERPRETING ANY PROVISION OF THIS POLICY, THIS POLICY SHALL BE CON

(B) ANY CLAIM OF LOSS OR DAMAGE THAT ARISES OUT OF THE STATU ANY ACTION ASSERTING SUCH CLAIM SHALL BE RESTRICTED TO THIS POLIC

(C) NO AMENDMENT OF OR ENDORSEMENT TO THIS POLICY MUST BE SUBSCRIBED BY AN AUTHORIZED PERSON, OR EXPRESSLY INCORPORA

16. SEVERABILITY

IN THE EVENT ANY PROVISION OF THIS POLICY, IN WHOLE OR IN PART, IS HELD INVALID OR UNENFORCEABLE UNDER APPLICABLE LAW, THE POLICY SHALL BE DEEME PROVISION OR SUCH PART HELD TO BE INVALID, BUT ALL OTHER PROVISIO FORCE AND EFFECT.

17. CHOICE OF LAW; FORUM

(A) CHOICE OF LAW: THE INSURED ACKNOWLEDGES THE COMPANY HA SUBSCRIBED TO THIS POLICY AND DETERMINED THE PREMIUM C RELIANCE UPON THE LAW AFFECTING INTERESTS IN REAL PROPERTY A INTERPRETATION, RIGHTS, REMEDIES, OR ENFORCEMENT OF POLICIES OF T JURISDICTION WHERE THE LAND IS LOCATED.

THE PARTIES AGREE THAT ANY COURT OR AN ARBITRATOR SHALL APPLY THE LAW OF THE JURISDICTION WHERE THE LAND IS LOCATED TO DETERMINE THE VALIDITY OF CLAIMS AGAIN DUTIES OWED TO THE INSURED AND TO INTERPRET AND ENFORCE THE TERM EITHER MAY APPLY, THE COURT OR ARBITRATOR APPLY ITS CONFLICT OF LAW PRINCIPLES TO DETERMINE THE APPLICABLE LAW.

(B) CHOICE OF FORUM: ANY LITIGATION OR OTHER PROCEEDING BROUG AGAINST THE COMPANY MUST BE FILED ONLY IN A STATE OR FEDERAL CO STATES AND ITS TERRITORIES HAVING APPROPRIATE JURISDICT

18. NOTICES, WHERE SENT

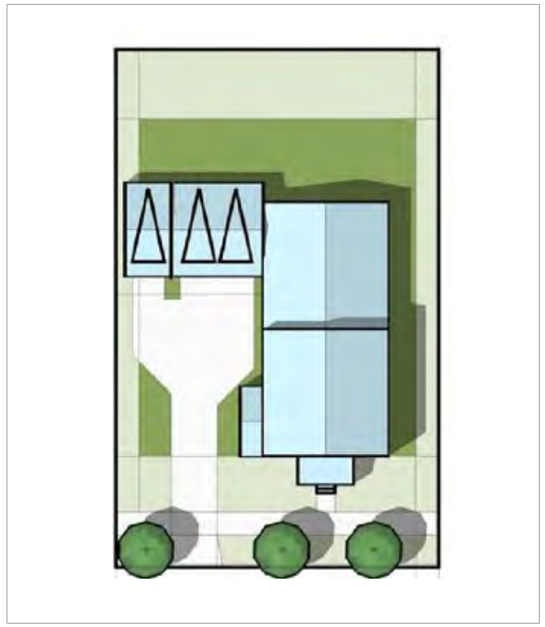
ANY NOTICE OF CLAIM AND ANY OTHER NOTICE OR STATEMENT IN WR GIVEN TO THE COMPANY UNDER THIS POLICY MUST BE GIVEN TO THE CO REVISED STATUTES, COMPANY, ATTN: CLAIMS DEPARTMENT, P. O. BOX 45023, FLORIDA 32232-5023.

Appendix 2

Waiehu Community Design Documents

Single Family House

A Single Family House is a Building Type consisting of a single-family detached home on an individual lot. These homes may be in large lot configurations to small-lot or cluster configurations. Design of Single Family Building Types should include a variety of garage configurations that respond to the applicable Frontage type. In addition to Zone and Frontage standards, the following standards shall apply to all Single Family House Building Types:



Single Family House Building Type diagram - large lot

Single Family House plan diagram - large lot

Plotting

Standard front loaded and or rear/ alley loaded types are permitted

"Z" lot plotting permitted

Two and three car garage configurations are permitted

Frontage Types

Frontage types appropriate for Single Family Homes are:

Common Yard

Frontyard Porch

Parking and Services

- Required parking for 2 cars shall be provided within a garage.
- Guest parking is not required; 0 guest spaces per unit required
- Where an alley is present, services, above-ground equipment and trash container areas should be located on the lane and screened from view.; may be located within the garage.

Open Space

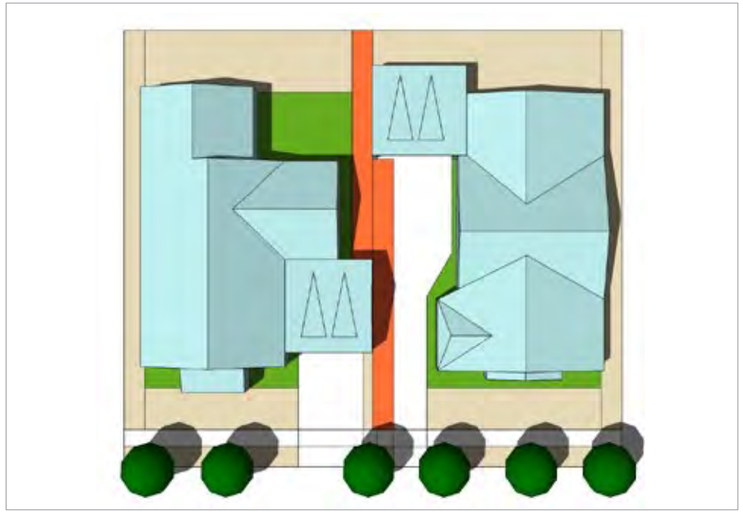
One usable, private open space shall be provided in the front, side yard, rear or interior of the house.

Building Size and Massing

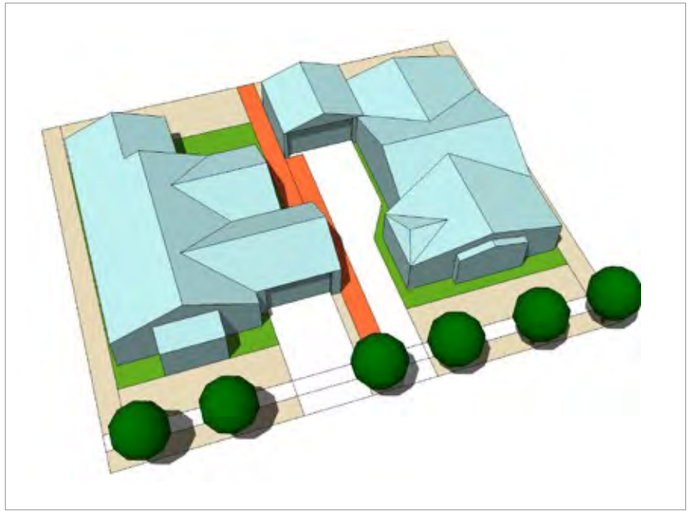
- Houses on corner lots shall be designed with a comparable level of architectural expression on the corner side elevation as the front elevation.
- Buildings shall be composed of one- and two-story volumes or articulated with single-story elements such as porches, balconies or wings.

Landscape

- A mixed palette of groundcovers, shrubs and trees shall be used to complement the Landscape Theme Master Plan and architecture of the home. Screen plantings should be reserved for rear and side yards only. Safety and visibility are critical factors in planting design.
- Vegetables, herbs and other plants selected from the Agricultural Plant Palette are encouraged where regular maintenance and harvesting plans are established.



Single Family House plan diagram - "Z" lot (RUE in orange color)



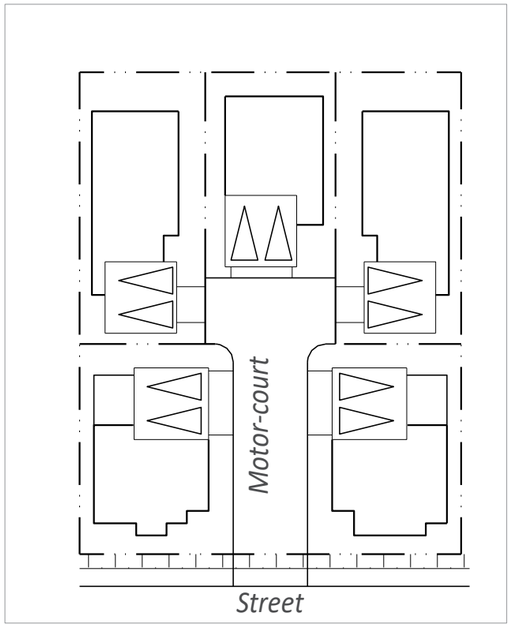
Single Family House plan diagram - "Z" lot (RUE in orange color)

Single Family House example

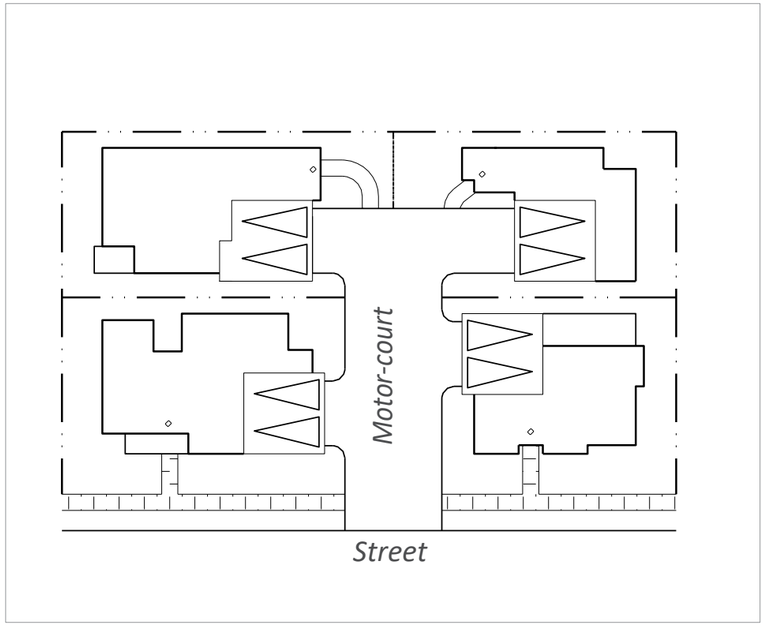
Conceptual Single Family House

Motor-court

A Motor-court is a Building Type configuration of single-family detached homes oriented toward a motor court, with pedestrian and garage access to the building taken from the motor court. The Motor-court orients small-lot detached homes in a manner that activates the street scene by reducing the presence of garage along the street and provide more "active" architecture on the frontage. In addition to Zone and Frontage standards, the following standards shall apply to all Motor court Building Types:



Motor-court Building Type plan diagram



Motor-court Building Type plan diagram

Lot Requirements

- Minimum lot width: 35 feet
- Minimum lot size: 2,000 square feet

Plotting

All plotting of Motor-court Building Types shall be done in the motor-court module. Where site planning constraints exist, Motor courts should be plotted in conjunction with another Building Type.

Access

Garage access shall be taken from the motor-court. Homes along the street frontage shall orient building entries to address the street, all other units shall take building access from the motor-court.

Frontage Types

Frontage types appropriate for Motor-court homes are: Front

yard, Porch, Stoop

Parking and Services

- Required parking for at least 2 cars shall be provided within a garage. Additional guest parking may be provided on-street, off- street or in-driveway spaces where the appropriate dimensions are provided.
- Garages shall accommodate at least 2 parking spaces with a maximum of 2 spaces in width.
- A single-door garage space, taking access from the street or motor-court, is permitted
- Services, above-ground equipment and trash areas should be located on the motor-court or screened from view of the street with landscaping or a fence. Trash containers are encouraged to be located within the garage; garage dimensions should be increased, as appropriate, to accommodate such services.

Open Space

- One usable, private open space shall be provided in the form of a porch, courtyard or balcony and may be provided in yard space or interior court.
- In lieu of private open space, a common open space including a tot lot or community amenities may be provided with a total area of 90 square feet per unit.

Building Size and Massing

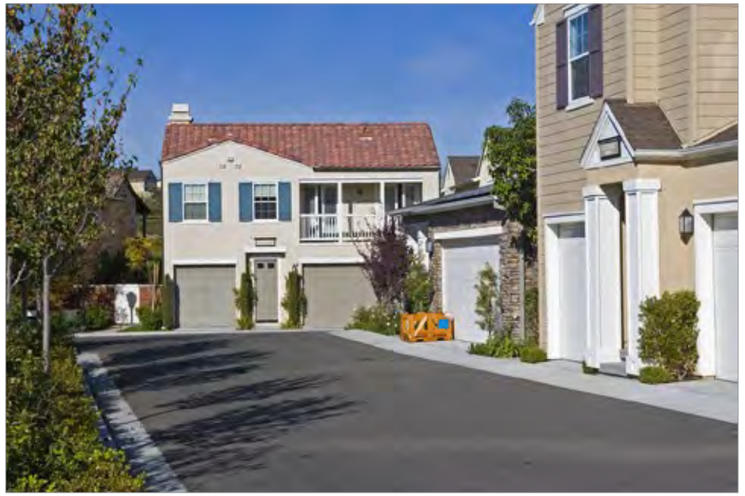
- Buildings adjacent to the street shall be composed of one- and two-story volumes or articulated with single-story elements such as porches, balconies or building massing offsets that vary the setback.
- Design of lanes should address the functional and aesthetic features of the space to create a pleasant experience for residents; this may include but is not limited to: planting, decorative paving, upgraded garage doors and building offsets along lane elevation.

Landscape

- Plantings shall be designed and selected to minimize the use of Irrigation.
- A mixed palette of groundcovers, shrubs and trees shall be used to complement the Landscape Theme Master Plan and architecture of the home. Screen plantings should be reserved for rear and side yards only. Safety and visibility are critical factors in planting design.
- Community gardens and plants selected from the Plant Palette are encouraged in the linear court where regular maintenance and harvesting plans are established.

Motor-court example

Motor-court/linear court example

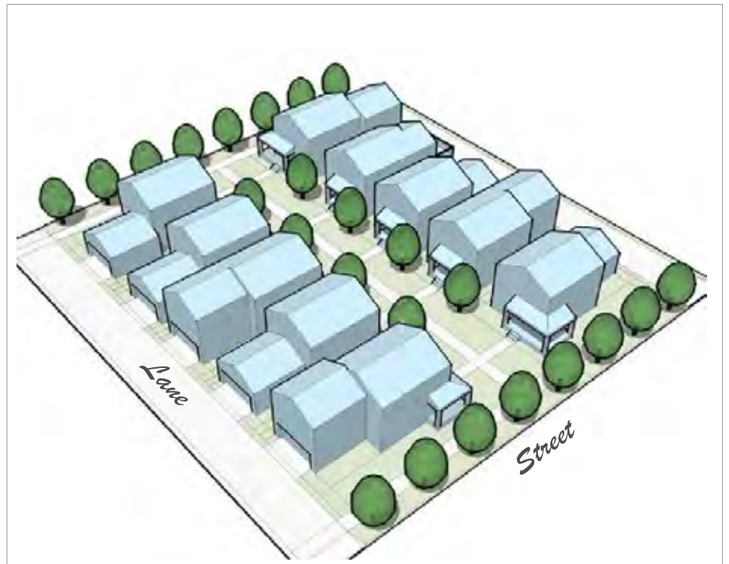


Motor-court example

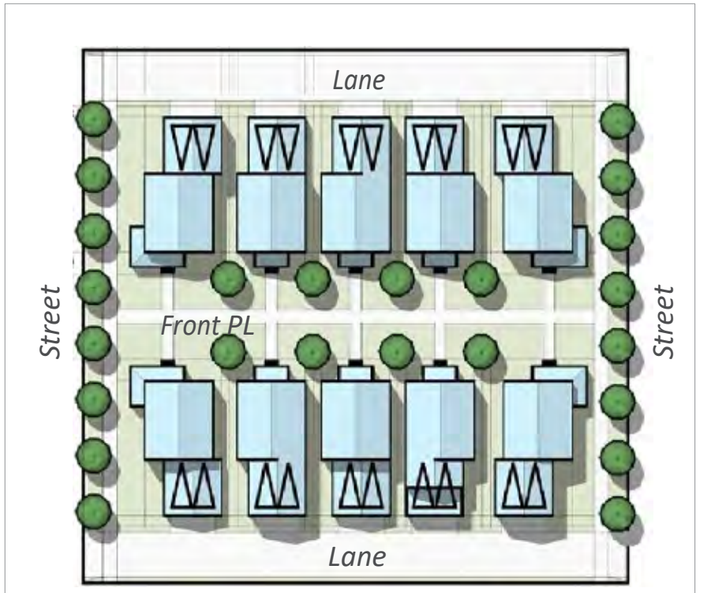
Motor-court example

Linear Court

A Linear Court is a Building Type configuration of individual detached homes designed to address the street frontage or oriented toward a linear court. The Court orients small-lot detached homes in a manner that activates the street scene or creates common paseos by separating garage and pedestrian access to opposite sides of the building. This Building Type takes access from a lane and may include linear courts along the "front property line " (PL). In addition to Zone and Frontage standards, the following standards shall apply to all Linear Court Building Types:



Linear Court Building Type diagram



Linear Court plan diagram

Lot Requirements

- Minimum lot width: 30 feet
- Minimum lot size: 1,500 square feet
- Minimum linear court width: 10 feet minimum between buildings, front to front dimension

Plotting

"Z" lot plotting is permitted.

Where plotting constraints require or accommodate, this Building Type may be plotted as a "half" Linear Court which takes garage and front entry access from the street.

Access

The main entrance should be accessed, and oriented to be visible, from the main frontage street or court(s). Parking and services shall be accessed through the lane where possible. "Half" street plotting with garage access taken from the street is permitted where site planning constraints exist.

Frontage Types

Frontage types appropriate for Linear Court homes are:

Frontyard, Porch, and or Stoop

Parking and Services

- Required parking for at least 1 car shall be provided within a garage. Additional required or guest parking may be provided in on-street, off-street or in-driveway spaces where the appropriate dimensions are provided.
- Garages shall accommodate at least 1 parking space with a maximum of 2 spaces in width. Additional garage spaces may be accommodated in tandem configurations.
- A single-door garage space, taking access from the street or lane, is permitted

- Services, above-ground equipment and trash areas should be located on the lane and screened from view with landscaping or a fence. Trash containers are encouraged to be located within the garage; garage dimensions should be increased, as appropriate, to accommodate such services.

Open Space

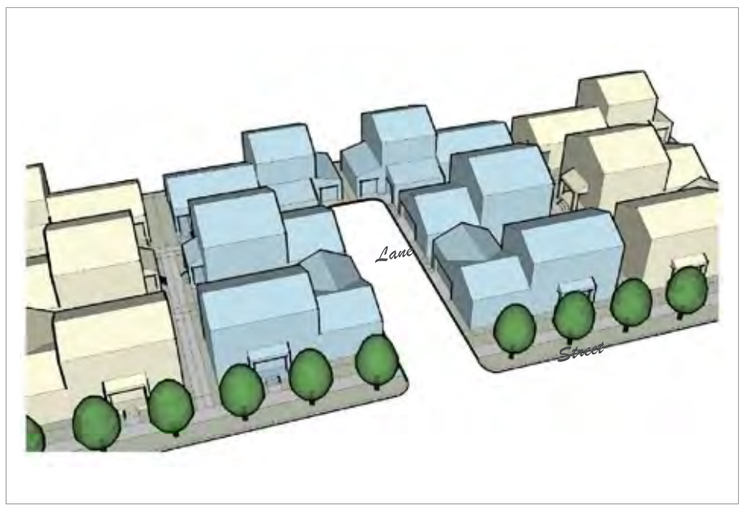
- One usable, private open space shall be provided in the form of a porch, courtyard or balcony and may be provided in yard space or an interior court. A minimum area of 60 square feet is required with a minimum dimension of 6 feet.

Building Size and Massing

- Buildings adjacent to the street shall be composed of one- and two-story volumes or articulated with single-story elements such as porches, balconies or offset wall planes.
- Front elevations, facing courts or streets, are encouraged to be designed to have building massing offsets that vary the setback along the linear court or street as applicable to the plotting of the buildings.
- Design of lanes should address the functional and aesthetic features of the space to create a pleasant experience for residents; this may include but is not limited to: planting, decorative paving, upgraded garage doors and building offsets along lane elevation.

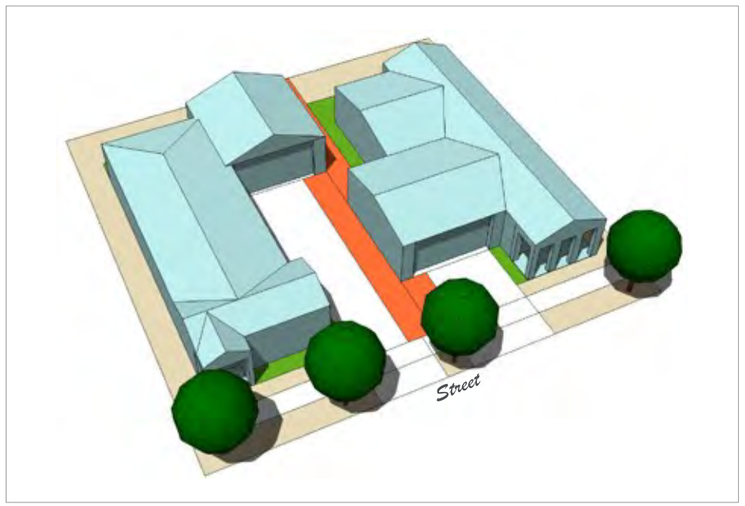
Landscape

- Plantings shall be designed and selected to minimize the use of irrigation
- A mixed palette of groundcovers, shrubs and trees shall be used to complement the Landscape Theme Master Plan and architecture of the home. Screen plantings should be reserved for rear and side yards only. Safety and visibility are critical factors in planting design.
- Community gardens and plants selected from the Plant Palette are encouraged in the linear court where regular maintenance and harvesting plans are established.



Linear Court plan diagram

Linear Court Plan Diagram - "half" street plotting



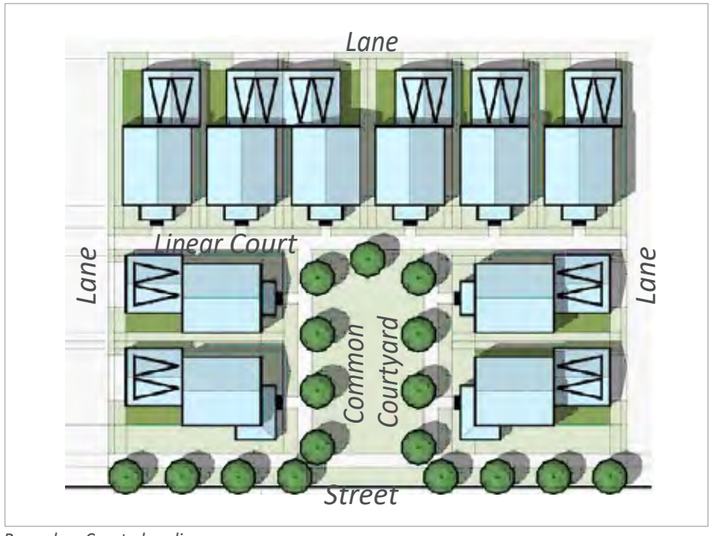
"Z" lot (RUE in orange color) plan diagram

Linear Court Example. Linear court plotting with massing offsets to vary the setback along the linear court.

Green or Garden Court

A Green/ Garden Court is a Building Type configuring four or more detached units or duplexes arranged around a shared courtyard, with pedestrian access to the building entrances from the courtyard and/or street. The Green or Garden Court orients small-lot homes in a manner that creates common courtyards and activates the streetscene with open space pockets. In addition to Zone and frontage standards, the following standards shall apply to all Green or Garden Court Building Types:

Bungalow Court Building Type diagram



Bungalow Court plan diagram

Lot Requirements

- Minimum lot width: 25 feet
- Maximum lot width: 45 feet
- Minimum lot area: 1,300 square feet / unit
- Minimum courtyard size: 150 square feet / unit
- Minimum common courtyard width: 14 feet minimum
- Minimum linear courtyard width: 10 feet minimum

Access

The main entrance should be accessed and oriented to be visible from the courtyard, linear court or street where no courtyard is present.

Parking and services shall be accessed through the lane.

Frontage Types

Frontage types appropriate for Green or Garden Court homes are:

Common Yard, Frontyard Porch

Parking and Services

- Required parking for at least 1 car shall be provided within a garage. Additional required or guest parking may be provided in on-street, off-street or on the driveway where the appropriate dimensions are provided.
- Garages shall accommodate at least 1 space with a maximum of 2 spaces in width. Additional garage spaces may be accommodated in tandem configurations.
- Services, above-ground equipment and trash containers should be located on the lane and screened from view with landscaping or a fence. Trash containers are encouraged to be located within the garage; garage dimensions should be increased as appropriate to accommodate such services.

Open Space

- Front yard open space is defined by the front setback line and Frontage type requirements of the applicable Zone.
- One usable, private open space shall be provided in the form of a porch, courtyard or balcony and may be provided in yard space or interior court. A minimum area of 60 square feet is required with a minimum dimension 6 feet.
- Common open space may be provided in lieu of private open space. In lieu of private open space, an additional 60 square feet per unit may be added to the area of the common courtyard requirements on the previous page.

Building Size and Massing

- Buildings should be composed of one- and two-story volumes or articulated with single-story elements such as porches or balconies, or building massing offsets that vary the setback.
- Design of lanes should address the functional and aesthetic features of the space to create a pleasant experience for residents; this may include but is not limited to: planting, decorative paving, upgraded garage doors and building offsets along lane elevation.

Landscape

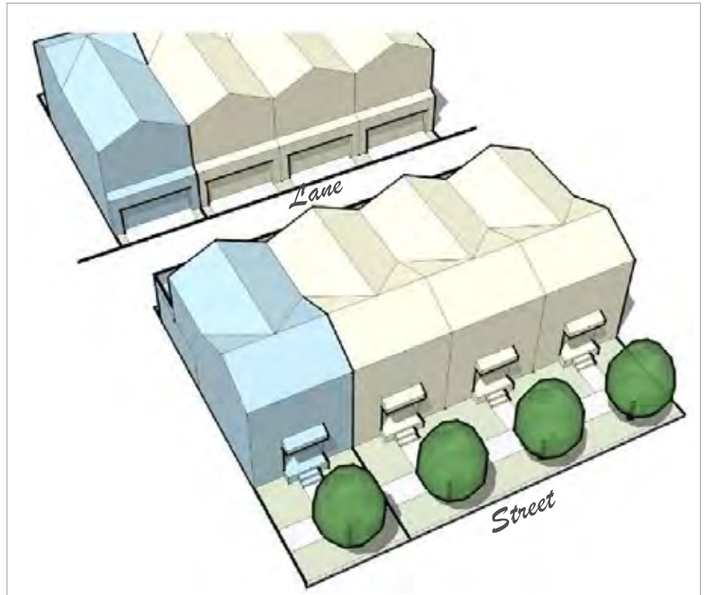
- Plantings shall be designed and selected to minimize the use of irrigation.
- A mixed palette of groundcovers, shrubs and trees shall be used to complement the Landscape Theme Master Plan and House Architecture. Screen plantings should be reserved for rear and side yards only. Safety and visibility are critical factors in planting design.
- Community Gardens and plants selected from the Agricultural Plant Palette are encouraged in the shared courtyard where regular maintenance and harvesting plans are established.

Green or Garden Court example

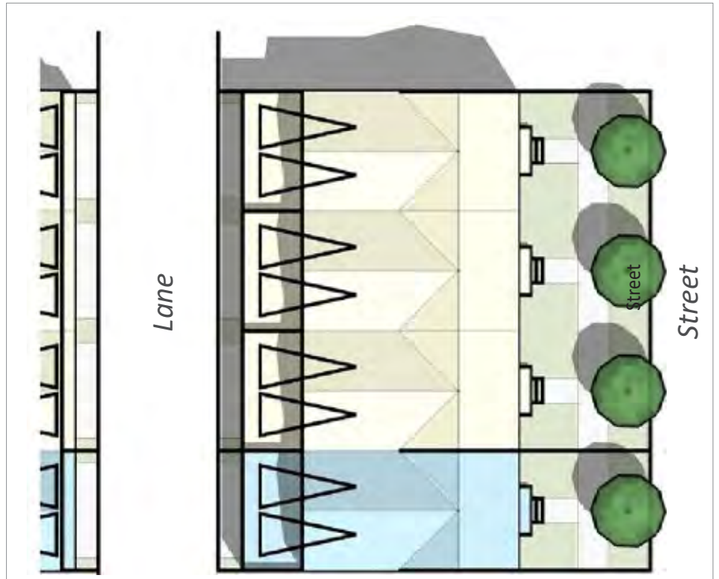
Green or Garden Court example, view looking into lane

Row House

Two or more attached two- to three-story dwellings. Row homes may be plotted with a strong relationship to the street to create a more urban setting, or in court or garden configurations to provide greater common open space opportunities in a more traditional townhouse configuration. In addition to Zone and Frontage standards, the following standards shall apply to all Row House Building Types:



Row House Building Type diagram



Row House plan diagram

Lot Requirements

- Minimum lot width: 22 feet per unit
- Minimum building separation: 10 feet between buildings

Access

- Each unit shall have an individual entrance that is accessed by walkways leading from parking or the street.
- Where a lane is present, parking and services shall be accessed through the lane.
- Curb cuts should be limited to 1 lane access per 8 units.

Frontage Types

Frontage types appropriate for Single Front Yard homes are:

Common Yard
Front Yard Porch
Stoop
Forecourt

Parking and Services

- Required parking for 1 car shall be provided within a garage. Additional required or guest parking may be provided in on- street, off-street, or on the driveway where the appropriate dimensions are provided.
- Additional garage spaces may be accommodated in turn-in or tandem configurations.
- Services, above-ground equipment and trash containers should be located on the lane and shielded from view.
- Trash containers are encouraged to be located within the garage; garage dimensions should be increased as appropriate to accommodate such services.

Open Space

- One usable, private open space shall be provided in the front, side yard, rear or interior of the house. A minimum area of 60 square feet is required with a minimum dimension of 5 feet.

Building Size and Massing

- Building elevations facing streets or public spaces shall be designed with a comparable level of architectural detail as front elevations.
- Buildings shall be composed as a series of volumes or articulated with single-story elements such as porches, balconies or offset massing.
- Where three-story buildings are permitted, massing is shall step down to two-stories, or have dominant two-story massing, along streets.
- Front entries access by stoops are encouraged to be separated from grade to promote privacy.
- Design of lanes should address the functional and aesthetic features of the space to create a pleasant experience for residents; this may include but is not limited to: planting, decorative paving, upgraded garage doors and building offsets along lane elevation.

Landscape

- Plantings shall be designed and selected to minimize the use of irrigation.
- A mixed palette of groundcovers, shrubs and trees shall be used to complement the Landscape Theme Master Plan and architecture of the home. Screen plantings should not be used in front yards. Safety and visibility are critical factors in planting design.
- Community gardens and plants selected from the Agricultural Plant Palette are encouraged in planter areas of 200 square feet or larger where regular maintenance and harvesting plans are established.

Row House example -

Row House example

Row House example

Appendix 3

Early Consultation Comment Letters with Responses

Y. IGE
GOVERNOR

CURT T. OTAGURO
COMPTROLLER

AUDREY HIDANO
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)20.192

NOV 18 2020

Mr. Brett Davis
Senior Planner
Chris Hart & Partners, Inc.
115 N. Market Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Davis:

Subject: Early Consultation for the Proposed Waiehu Residential Community Project
Intersection of Kahekili Highway and Waiehu Beach Road
Kahului, Maui, Hawaii
TMK# (2) 3-3-002:031

Thank you for the opportunity to comment on the subject project. We have no comments to offer at this time as the proposed project does not impact any of the Department of Accounting and General Services' projects or existing facilities.

If you have any questions, your staff may call Ms. Dora Choy of the Planning Branch at 586-0488.

Sincerely,

CHRISTINE L. KINIMAKA
Public Works Administrator

DC:mo
c: Mr. Wade Shimabukuro, DAGS MDO

RECEIVED
NOV 23 2020
CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning
CC: Brett + Helen
191065

CHRIS HART
& PARTNERS, INC.
Landscape Architecture
City & Regional Planning

August 2, 2021

Mr. Curt T. Otaguro, Comptroller
State of Hawaii, Department of Accounting and General Services
P.O. Box 119
Honolulu, HI 96810-0119

Dear Mr. Otaguro,

RE: Request for HRS Chapter 343, Early Consultation for the **proposed 100% affordable Waiehu Residential Community Project** located at the intersection of Kahekili Highway and Waiehu Beach Road, Kahului, Maui, Hawaii, identified by TMK: (2) 3-3-002: 031

Thank you for your comment letter of November 18, 2020, indicating that the department does not have any comments on the proposed project at this time.

Thank you for participating in the environmental review process. Please feel free to call me or Ms. Helen Pratiwi at (808) 242-1955 or e-mail Helen at HPratiwi@chpmaui.com should you have any questions.

Sincerely yours,

Brett Davis, Senior Planner

Cc: Mr. Todd Larner, Owner Representative
Mr. Buddy Almeida, Dept. of Housing and Human Concerns
Project File 19-065

115 N. Market Street, Wailuku, Maui, Hawaii 96793-1717 • Ph 808-242-1955 • Fax 808-242-1956
www.chpmaui.com

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 13, 2020

MEMORANDUM

TO: **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
_X_ Engineering Division (DLNR.ENGR@hawaii.gov)
_X_ Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks
_X_ Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
___Office of Conservation & Coastal Lands
_X_ Land Division – Maui District (daniel.l.ornellas@hawaii.gov)
_X_ Historic Preservation (DLNR.Intake.SHPD@hawaii.gov)

FROM: Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Early Consultation for the Proposed **Waiehu Residential Community Project**
LOCATION: Kahekili Highway and Waiehu Beach Road, Kahului, Island of Maui; TMK: (2) 3-3-002:031
APPLICANT: Chris Hart Partners, Inc.

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **December 7, 2020.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed: [signature]
Print Name: Daniel Ornellas
Division: Land Div
Date: 11/16/20

Attachments
cc: Central Files

CHRIS HART
& PARTNERS, INC.
Landscape Architecture
City & Regional Planning

August 2, 2021

Mr. Daniel Ornellas
State of Hawaii, Department of Land & Natural Resources
Land Division, Maui District
130 Mahalani Street
Wailuku, Hawaii 96793

Dear Mr. Ornellas,

RE: Request for HRS Chapter 343, Early Consultation for the **proposed 100% affordable Waiehu Residential Community Project** located at the intersection of Kahekili Highway and Waiehu Beach Road, Kahului, Maui, Hawaii, identified by TMK: (2) 3-3-002: 031.

Thank you for your comment letter of November 16, 2020, indicating that the department does not have any comments on the proposed project at this time.

Thank you for participating in the environmental review process. Please feel free to call me or Ms. Helen Pratiwi at (808) 242-1955 or e-mail Helen at HPratiwi@chpmaui.com should you have any questions.

Sincerely yours,

Brett Davis, Senior Planner

Cc: Mr. Todd Larner, Owner Representative
Mr. Buddy Almeida, Dept. of Housing and Human Concerns
Project File 19-065

115 N. Market Street, Wailuku, Maui, Hawaii 96793-1717 • Ph 808-242-1955 • Fax 808-242-1956
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

December 2, 2020

REF: RFD.5507.6

TO: Mr. Brett Davis, Senior Planner
Chris Hart & Partners, Inc.

FROM: M. Kaleo Manuel, Deputy Director
Commission on Water Resource Management

SUBJECT: Request for HRS Chapter 343, Early Consultation for the Proposed Waiehu Residential Community Project located at the intersection of Kahekili Highway and Waiehu Beach Road, Kahului, Maui

FILE NO.: RFD.5507.6
TMK NO.: (2) 3-3-002:031

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at http://dlnr.hawaii.gov/cwrm.

Our comments related to water resources are checked off below.

[X] 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.

[ ] 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

[ ] 3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.

[X] 4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EAP as having high water efficiency can be found at http://www.epa.gov/watersense.

[X] 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://planning.hawaii.gov/czm/initiatives/low-impact-development/

[X] 6. We recommend the use of alternative water sources, wherever practicable.

[ ] 7. We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at http://energy.hawaii.gov/green-business-program.

[X] 8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at

http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf.

[X] 9. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

[ ] 10. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the requirement to use dual line water supply systems for new industrial and commercial developments.

[ ] 11. A Well Construction Permit(s) is (are) are required before the commencement of any well construction work.

[ ] 12. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

[ ] 13. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.

[ ] 14. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

[ ] 15. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a steam channel.

[ ] 16. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.

[ ] 17. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.

[ ] 18. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

[X] OTHER: Planning - The proposed water source(s) and projected water demands for the project, both potable and non-potable, should be identified and the calculations used to estimate demands should be provided. A discussion of the potential impacts on water resources and other public trust uses of water should be included, and any proposed mitigation measures described. Water conservation and efficiency measures to be implemented should also be discussed.

If you have any questions, please contact Lenore Ohye of the Commission staff at 587-0216.

CHRIS HART
& PARTNERS, INC.
Landscape Architecture
City & Regional Planning

September 20, 2021

Mr. Kaleo Manuel, Deputy Director
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
PO Box 621
Honolulu, HI 96809

Dear Mr. Manual:

RE: Early Consultation for the proposed Waiehu Residential Community, located in Waiehu, Maui, Hawaii at TMK: (2) 3-3-002:031

Thank you for your letter of December 20, 2020, our responses to your numerated comments are provided below.

Comment 1. *We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.*

Response 1. The Applicant will coordinate with the Department of Water Supply to incorporate this project into the County's Water Use and Development Plan.

Comment 4. *We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http~://www.usubc.oru/leed. A listing of fixtures certified by the EPA as having high water efficiency can be found at http://www.epa.gov/watersense/.*

Response 4. The Applicant has reviewed the EPA website and will implement water efficient practices wherever possible to reduce the demand on water resources as a result of the proposed project.

***Comment** 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://hawaii.gov/dbedt/czm/initiative/lid.php.*

Response 5. Best Management Practices prepared in accordance with Maui County Code, Chapter 20.08 (*Soil Erosion and Sedimentation Control*) will be submitted to the Maui Department of Public Works for review and approval prior to the issuance of grubbing and grading permits. In addition, since site work for the project will exceed one acre, a National Pollutant Discharge Elimination System Permit will be obtained from the Hawaii Department of Health's Clean Water Branch for the discharge of storm water associated with construction activities.

***Comment** 6. We recommend the use of alternative water sources, wherever practicable.*

Response 6. Alternative water sources will be considered for use to the extent that they are available and practicable.

***Comment** 8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at http://landscapehawaii.org/library/documents/lich irrigation conservation_bmps.pdf*

Response 8. The proposed project will include a water and energy efficient landscaping irrigation system designed to conserve water.

***Comment** 9. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and developers acceptance of any resulting requirements related to water quality.*

Response 9. The proposed residential community is not anticipated to contaminate ground or surface water because of the proposed project. The Applicant will coordinate with the Department of Health to understand potential requirements related to water quality.

***Other Comment 1.** The proposed water source(s) and projected water demands for the project, both potable and non-potable, should be identified and the calculations used to estimate demands*

should be provided. A discussion of the potential impacts on water resources and other public trust uses of water should be included, and any proposed mitigation measures described. Water conservation an efficiency measures to be implemented should also be discussed.

Other Comment Response 1. The DEA will discuss water requirements for the project, both potable and non-potable, the calculations for the demand projections, and the proposed water supply source(s) will be provided.

The DEA will disclose the water conservation and efficiency measures to be implemented. The DEA will also discuss ground and surface water resources of the project area and how those may be impacted by the proposed development.

Thank you for participating the early consultation review process. Please feel free to call me at (808) 242-1955 or email at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis

Brett Davis, Senior Planner

Cc: Mr. Todd Larner, Owner Representative
Mr. Buddy Almeida, DHHC
Project File 19-065

POLICE DEPARTMENT
COUNTY OF MAUI

MICHAEL P. VICTORINO
MAYOR

OUR REFERENCE

YOUR REFERENCE

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

TIVOLI S. FAAUMU
CHIEF OF POLICE

DEAN M. RICKARD
DEPUTY CHIEF OF POLICE

November 17, 2020

Mr. Brett Davis, Senior Planner
Chris Hart & Partners, Inc.
115 North Market Street
Wailuku, Hawaii 96793-1717

Re: Request for HRS Chapter 343, Early Consultation for the Proposed Waiehu Residential Community Project located at the Kahekili Highway and Waiehu Beach Road, Kahului, Maui, Hawaii, identified by TMK: (2) 3-3-002:031

Dear Mr. Davis:

This is in response to your letter dated November 6, 2020 requesting comments for the proposed Waiehu Residential Community Project located at Kahekili Highway and Waiehu Beach Road.

In review of the submitted documents, we would like to recommend the project meets the minimal standards set forth by county codes and state laws. If the roads will be temporarily closed due to alternating traffic, we ask the project manager utilize flag men to conduct traffic control, as well as post proper signage along the routes during construction.

Thank you for giving us the opportunity to comment on this project.

Sincerely,

Assistant Chief John Jakubczak
for: TIVOLI S. FAAUMU
Chief of Police

C. Brett + Helen
19/065

CHRIS HART
& PARTNERS, INC.
Landscape Architecture
City & Regional Planning

August 2, 2021

Mr. Dean Rickard, Deputy Chief of Police
County of Maui, Police Department
55 Mahalani Street
Wailuku, HI 96793

Dear Mr. Rickard,

RE: Request for HRS Chapter 343, Early Consultation for the **proposed 100% affordable Waiehu Residential Community Project** located at the intersection of Kahekili Highway and Waiehu Beach Road, Kahului, Maui, Hawaii, identified by TMK: (2) 3-3-002: 031.

Thank you for your comment letter of November 16, 2020, indicating that the department does not have any comments on the proposed project at this time.

Thank you for participating in the environmental review process. Please feel free to call me or Ms. Helen Pratiwi at (808) 242-1955 or e-mail Helen at HPratiwi@chpmaui.com should you have any questions.

Sincerely yours,

Brett Davis, Senior Planner

Cc: Mr. Todd Larner, Owner Representative
Mr. Buddy Almeida, Dept. of Housing and Human Concerns
Project File 19-065

MICHAEL P. VICTORINO
Mayor

KARLA H. PETERS
Director

MARY A. KIELTY
Deputy Director

DEPARTMENT OF PARKS AND RECREATION

700 Hali'a Nakoa Street, Unit 2, Wailuku, Hawai'i 96793
Main Line (808) 270-7230 / Facsimile (808) 270-7942

June 14, 2021

Brett Davis, Senior Planner
Chris Hart & Partners, Inc.
115 N. Market Street
Wailuku, HI 96793

Dear Mr. Davis:

SUBJECT: REQUEST FOR HRS CHAPTER 343, EARLY CONSULTATION FOR THE PROPOSED 100% AFFORDABLE WAIEHU RESIDENTIAL COMMUNITY PROJECT LOCATED AT THE INTERSECTION OF KAHEKILI HIGHWAY AND WAIEHU BEACH ROAD, KAHULUI, MAUI, HAWAII, IDENTIFIED BY TMK: (2)-3-3-002:031

Thank you for the opportunity to review the updated site plan for the subject project.

In review of the project, we note that the applicant is currently proposing to develop 752 affordable housing units, along with a connected trail and open space network with parks and a small commercial center. As a result, should this project satisfy requirements as set by Maui County Code (MCC) 2.96 Residential Workforce Housing Policy, and remain 100% workforce housing, the project would be exempted from MCC 18.16.320 Parks and Playgrounds requirements. We have no further comments at this time and look forward to reviewing your EA, CIZ, CPA, and 201H applications.

Should you have any questions or concerns, please feel free to call me, or Kristofer Baptist, Acting Chief of Planning and Development, at (808) 270-6158.

Sincerely,

KARLA H. PETERS
Director of Parks and Recreation

c: Kristofer Baptist, Acting Chief of Planning and Development

KHP:KB:csa

CHRIS HART
& PARTNERS, INC.
Landscape Architecture
City & Regional Planning

August 2, 2021

Ms. Karla Peters, Director
County of Maui, Department of Parks & Recreation
700 Hali'a Nakoa Street, Unit 2
Wailuku, HI 96793

Dear Ms. Peters,

RE: Request for HRS Chapter 343, Early Consultation for the **proposed 100% affordable Waiehu Residential Community Project** located at the intersection of Kahekili Highway and Waiehu Beach Road, Kahului, Maui, Hawaii, identified by TMK: (2) 3-3-002: 031.

Thank you for your comment letter of June 14, 2021, indicating that the 100% affordable project would be exempt from MCC 18.16.320 Parks and Playgrounds requirements. The Draft Environmental Assessment will be provided to the department for additional comments.

Thank you for participating in the environmental review process. Please feel free to call me or Ms. Helen Pratiwi at (808) 242-1955 or e-mail Helen at HPratiwi@chpmaui.com should you have any questions.

Sincerely yours,

Brett Davis, Senior Planner

Cc: Mr. Todd Larner, Owner Representative
Mr. Buddy Almeida, Dept. of Housing and Human Concerns
Project File 19-065

115 N. Market Street, Wailuku, Maui, Hawaii 96793-1717 • Ph 808-242-1955 • Fax 808-242-1956
www.chpmaui.com

MICHAEL P. VICTORINO
Mayor

MICHELE CHOUTEAU MCLEAN, AICP
Director

JORDAN E. HART
Deputy Director

DEPARTMENT OF PLANNING
COUNTY OF MAUI
ONE MAIN PLAZA
2200 MAIN STREET, SUITE 315
WAILUKU, MAUI, HAWAII 96793

June 30, 2021

RECEIVED

JUL 12 2021

CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning
cc: Brett

Mr. Brett Davis
Senior Planner
Chris Hart & Partners, Inc.
115 North Market Street
Wailuku, Hawaii 96793

Dear Mr. Davis:

SUBJECT: REQUEST FOR EARLY CONSULTATION REGARDING THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED WAIEHU RESIDENTIAL COMMUNITY PROJECT, LOCATED ON KAHEKILI HIGHWAY, WAIEHU, ISLAND OF MAUI, HAWAII; TMK: (2) 3-3-002:031 (EAC 2020/0012)

The Department of Planning (Department) is in receipt of the proposed Waiehu Residential Community housing project (Project) request for early consultation in preparation of a Draft Environmental Assessment (DEA). The Department understands from your letter dated May 27, 2021, that the Department of Housing and Human Concerns (DHHC) will be the Approving Authority for the Chapter 343, Hawaii Revised Statutes (HRS) Environmental Assessment (EA).

The project will be 100 percent affordable, providing 752 affordable housing units. These are proposed in different densities with the following residence types listed from the most dense to the least: Townhomes, Duplexes, Motorcourts, Bungalows, Single Family Dwelling Small Lots, and Single Family Dwelling Lots. In addition to the residential units, a connected trail and open space network, parks, and a small commercial center are proposed. The project also includes interior roadways, utilities, and landscaping. Access to the project is proposed via two entry points along Kahekili Highway. The Department offers the following comments:

1. Resolution No. 05-123, adopted by the Maui County Council on August 23, 2005 to approve the former "Hale Mua" project, requires the Director of Housing and Human Concerns to determine if the plans and specifications have substantially deviated from the preliminary plans and specifications submitted to the Maui County Council. If the Director of Housing and Human Concerns determines the project has substantially deviated from what was proposed, the preliminary plans and specifications shall be submitted to Council for prior approval.

2. The request did not state what is triggering the need for an EA. Is the project seeking either State or County funding or the use of State or County funds, such as the installation of infrastructure improvements along Kahekili Highway, a County right-of-way? If that is the case then the use of State or County funds or lands are triggers for the preparation of an EA pursuant to Chapter 343, HRS. The

Department cannot comment on whether the project qualifies as a Chapter 343, HRS exemption.

3. The income qualifications for this housing project were not provided. Please provide the Area Median Income (AMI) percentage qualifications for dwelling unit purchase to determine if the project can qualify for any affordable housing exemptions.

4. Under the Chapter 201H HRS or Chapter 2.97 Maui County Code processes for affordable housing project approval, exemptions can be obtained for changes in zoning and community plan amendments. The request states that the applicant will seek these land use changes. Please confirm if this project could obtain exemptions from these land use changes.

5. The Department notes split land use designations for the parcel with regards to State Land Use District Boundaries, County community plan designations, and County zoning districts. Spatially relate each of these designations on a project site map in the DEA.

6. Similarly, the parcel is partially situated within the Urban Growth Boundary (UGB) of the Maui Island Plan (MIP). Please note if the project will seek a MIP amendment to place all of the urban-like development within the UGB and if an exemption for this change will be sought. If not, please explain why.

7. The Department highly supports the inclusion of neighborhood commercial within the project.

8. The Department supports the variety of residential unit types as they provide a suitable mix of dwelling units per acre.

9. Please incorporate a minimum of three transit stops evenly distributed throughout the project, with one being located near the neighborhood commercial, or as otherwise recommended by the County Department of Transportation.

10. The two parks are both located within close proximity of one another and within only the SF small lot area (southwest side). Ensure the parks are evenly distributed within the project to provide for more equitable use among the residents. If the applicant proposes that the basins are to serve a dual purpose and be used for recreational purposes as well, then the above statement may not apply; however, the applicant must address any health and safety concerns of such dual use and provide assurances that a dual use will be supported by all relevant County departments.

11. Site plan revisions are required to better differentiate between parks and drainage basins.

12. Both new and previously completed Archaeological Inventory Studies and Cultural Impact Assessments must include recent consultations with lineal

descendants and agencies like DLNR's State Historic Preservation Division, the Office of Hawaiian Affairs, and the Cultural Resources Commission.

13. The project area has severe traffic congestion during commuter times. Implement multimodal transit options such as providing sidewalks along Kahekili Highway as well as bike lanes and mass transit stops with shelters. Particular attention should be given in the DEA traffic assessment to analyze the impacts the project will have during commuter times caused by increased vehicular density. It is important to not only prevent impacts to traffic flow but use this opportunity to reduce existing flow obstructions and improve the quality of life for area residents, including future residents of the project. Left-hand turns in and out of the project will cause traffic flow obstructions. With the proposal of 752 housing units, this could cause severe traffic congestion. Due to the safety hazards of left-turns in and out of the project, consideration should be given to mitigating the traffic congestion and safety hazards, particularly utilizing a traffic circle at each entrance. Additionally, one or two additional access points onto Kahekili Highway, with traffic circles, will distribute project-related traffic more evenly.

14. Due to the close proximity of Waiehu Beach Road, pedestrian traffic from the Project crossing Kahekili Highway to Waiehu Beach Road must be expected. Sidewalks up to the Waiehu Beach Road intersection and crosswalk signaling should be added.

15. Each dwelling unit occupies the majority of its lot. Off-street parking will take up a considerable amount of the remaining free space. Because of the limited space, visitor parking must be accommodated throughout the project.

16. A two-direction shared use (bike/pedestrian) path should be provided in the greenway on both sides of the stream. This will allow the community to connect and recreate safely away from vehicular traffic.

17. Bike and pedestrian connections to the shared use paths should be provided throughout the project to encourage community use of the shared use paths and greenway.

18. The project should include a community center, either as an open pavilion or enclosed structure, to function as a gathering area.

19. The project should include a number of small playgrounds, even if minimal in size such as between 5,000 to 10,000 square feet. Hale Mahaolu Lahaina Surf can be used as an example of how playground equipment is incorporated into an open space area of an affordable housing complex (Lahaina Surf has 112 units on 4.35 acres). Please consult with the Department of Parks and Recreation to determine what would be appropriate for a project of this size.

20. If the units do not include a washer and dryer, consider providing an onsite laundry facility for the residents (similar to Lahaina Surf, Front Street Apartments, Hale Mahaolu Kulamalu, Luana Gardens, etc.).

21. Please ensure the existing wastewater facilities can accommodate this many addition dwelling units. If they cannot be accommodated, state what systems will be in place for wastewater treatment.

22. Trash locations are often inadequate for housing projects. County refuse collection services do not run on private roads. Ensure that roadway dedications to the County are agreed upon and timelines are in place; otherwise indicate what private solid waste systems will be utilized.

23. Increasing utility costs decrease the affordability of housing. Please consider the addition of solar energy systems for each dwelling unit so that the affordability is consistent.

24. Install traffic calming devices such as bulb-outs, chicanes, or mini-roundabouts, and install crosswalks within the project's interior roadways for pedestrian safety.

25. The landscaping plan should consider the incorporation and the use of bioswales, tailored to native plants, to capture urban storm water runoff from impervious surfaces including roads and parking lots. Do not plant any aggressive or invasive species.

26. The Department understands this is a 100 percent affordable project; however, it encourages good design as this is a prominent location along Kahekili Highway.

Though the project proposes a range of single-family dwelling lot sizes and a creative variety of housing typologies, it utilizes a typical Euclidean arrangement of those uses. As such, it segregates residents by housing type and income. Likewise, the layout and uses appear auto-centric, with an average of 12 dwelling units per acre, which is not transit supportive.

The Department suggests that the project's land use be redesigned as a transit-oriented neighborhood by increasing densities at its core, creating a hierarchy of land divisions and housing typologies radiating out from a village commons (or public square) centrally located along the Kahekili Highway and surrounded by neighborhood supportive small retail spaces (see attached schematic).

The implementation recommendations follow:

- Create a village commons (or public square) visible from the highway and facing the greenway.
- Superimpose a clearer, connected, street grid over the entire site regardless of terrain.
- Coordinate with the Department of Transportation (Maui Bus) to provide a major bus stop facility adjacent to the commons along Kahekili Highway.
- Group retail at ground level around the commons with second floor residences above.
- Retail spaces should be kept very small, with only neighborhood serving uses.
- Position the project's main entrances at the Makaala Drive and Waiehu Beach Road intersections to increase connectivity.
- Add two additional minor interior road connections (near the commons) to the highway.

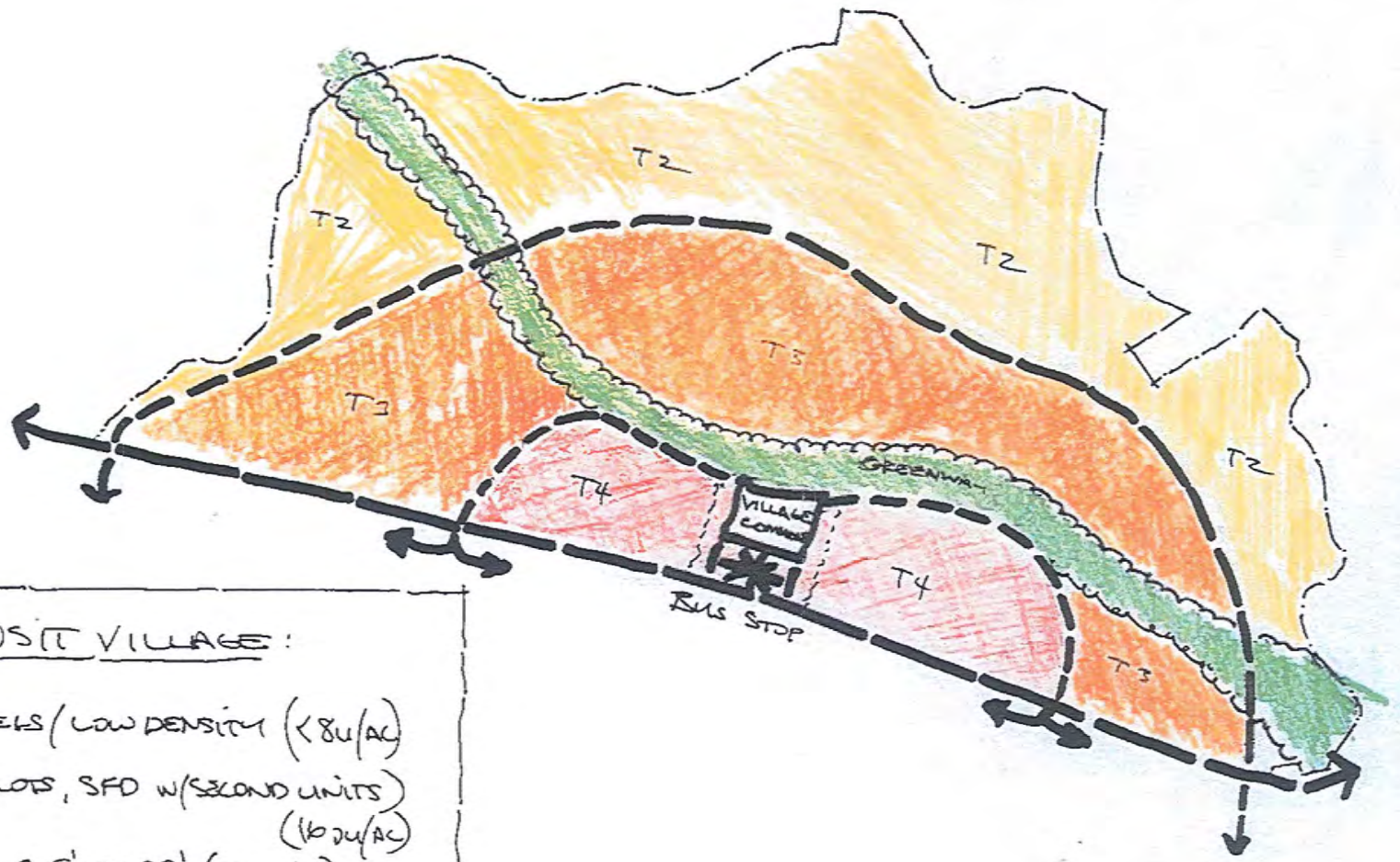
- Give priority to pedestrian and bike linkages throughout the village.
- To implement a transit oriented development, increase the overall density.
- Regroup lots so that smaller lots (25'x100') are nearer the village core (32 dwelling units per acre) and larger lots (50'x100') are in a second ring from the village core (16 dwelling units per acre).
- Use land mauka of the perimeter road for community gardens and/or cottages (less than 8 dwelling units per acre).
- Include on-street curb-side parking on major and minor roadways throughout the development.
- Provide space at the village commons for ride-share facilities for both bikes and cars.
- Utilize the greenway running through the project as a major recreational feature.
- All residences should be within a five-minute walk of a park or recreational greenway.

Thank you for the opportunity to comment on the preparation of the DEA for the Waiehu Residential Community Project. Should you require further clarification, please contact Staff Planner Jared Burkett at jared.burkett@mauicounty.gov or at (808) 270-7378.

Sincerely,

MICHELE MCLEAN, AICP
Planning Director

Attachment: Transit Oriented Development Sketch
xc: Clayton I. Yoshida, Planning Program Administrator (PDF)
John S. Rapacz, Planning Program Administrator (PDF)
Pam Eaton, Planning Program Administrator (PDF)
Kathleen Aoki, Planning Program Manager (PDF)
Jennifer Maydan, Planning Supervisor (PDF)
Jared L. Burkett, Staff Planner (PDF)
Paul Critchlow, Staff Planner (PDF)
Brett Davis, Christ Hart & Partners, LLC. (PDF)
Project File
MCM:JLB:th
K:\WP_DOCS\Planning\EAC\2020\0012_WaiehuResidentialProj\Comment Letter.docx



WAIEHU TRANSIT VILLAGE:

T2 LARGE PARCELS / LOW DENSITY (<8U/AC)

T3 50'X100' LOTS, SFD W/SECOND UNITS (16DU/AC)

T4 SMALL LOTS, 25'X100' (32DU/AC)
MIXED USE, RETAIL FRONTING COMMONS

CHRIS HART
& PARTNERS, INC.
Landscape Architecture
City & Regional Planning

September 20, 2021

Ms. Michele McLean, Director
Department of Planning
2200 Main Street, Suite 315
Wailuku, HI 96793

Attention: Mr. Jared Burkett

Dear Ms. McLean,

RE: Request for HRS Chapter 343, Early Consultation for the **proposed 100% affordable Waiehu Residential Community Project** located at the intersection of Kahekili Highway and Waiehu Beach Road, Wailuku, Maui, Hawaii, identified by TMK: (2) 3-3-002: 031.

Thank you for your comment letter of June 30, 2021, Chris Hart & Partners, Inc. (CH&P) has the prepared the following responses to your comments:

Comment 1. Resolution No. 05-123, adopted by the Maui County Council on August 23,2005, to approve the former "Hale Mua" project, requires the Director of Housing and Human Concerns to determine if the plans and specifications have substantially deviated from the preliminary plans and specifications submitted to the Maui County Council. If the Director of Housing and Human Concerns determines the project has substantially deviated from what was proposed, the preliminary plans and specifications shall be submitted to Council for prior approval.

Response 1: The Applicant acknowledges this comment. The proposed project is different from the former Hale Mua project and, therefore, new plans and specifications will be submitted to Council for approval.

Comment 2. The request did not state what is triggering the need for an EA. Is the project

seeking either State or County funding or the use of State or County funds, such as the installation of infrastructure improvements along Kahekili Highway, a County right-of-way? If that is the case then the use of State or County funds or lands are triggers for the preparation of an EA pursuant to Chapter 343, HRS. The Department cannot comment on whether the project qualifies as a Chapter 343, HRS exemption.

Response 2: The project includes installation of infrastructure improvements along Kahekili Highway which triggers compliance with HRS Chapter 343; therefore, an EA is being prepared. In addition, the Department of Housing and Human Concerns (DHHC) requires compliance with HRS Chapter 343 for 201H projects.

Comment 3. The income qualifications for this housing project were not provided. Please provide the Area Median Income (AMI) percentage qualifications for dwelling unit purchase to determine if the project can qualify for any affordable housing exemptions.

Response 3: The Applicant is coordinating with the Department of Housing and Human Concerns on the final breakdown of AMI percentage qualification for dwelling unit purchase. At this time, the Applicant is proposing a 100% affordable for sale project to the Below Moderate (81%-100%) and moderate (101%-120%) income groups.

Comment 4. Under the Chapter 201H HRS or Chapter 2.97 Maui County Code processes for affordable housing project approval, exemptions can be obtained for changes in zoning and community plan amendments. The request states that the applicant will seek these land use changes. Please confirm if this project could obtain exemptions from these land use changes.

Response 4: The Applicant is proposing land use exemptions in order to develop the property as a new 100% affordable residential community with a small commercial space, parks, trails and open space. It is anticipated that these exemptions would be granted by the Maui County Council in order to develop affordable housing.

Comment 5. The Department notes split land use designations for the parcel with regards to State Land Use District Boundaries, County community plan designations, and County zoning districts. Spatially relate each of these designations on a project site map in the DEA.

Response 5: The Draft EA will contain a land use map identifying the designations on a site map.

Comment 6. Similarly, the parcel is partially situated within the Urban Growth Boundary (UGB) of the Maui Island Plan (MIP). Please note if the project will seek a MIP amendment to place all of the urban-like development within the UGB and if an exemption for this change will be sought. If not, please explain why.

Response 6: Yes, an exemption from the Maui Island Plan Urban Growth Boundary will be requested as part of this 201H application.

Comment 7. The Department highly supports the inclusion of neighborhood commercial within the project.

Response 7: The Applicant acknowledges this comment.

Comment 8. The Department supports the variety of residential unit types as they provide a suitable mix of dwelling units per acre.

Response 8: The Applicant acknowledges this comment.

Comment 9. Please incorporate a minimum of three transit stops evenly distributed throughout the project, with one being located near the neighborhood commercial, or as otherwise recommended by the County Department of Transportation.

Response 9: The Applicant has met with the Maui County, Department of Transportation and public transportation locations were discussed. The Applicant is continuing to work with the department on the appropriate locations for future bus stops.

Comment 10. The two parks are both located within close proximity of one another and within only the SF small lot area (southwest side). Ensure the parks are evenly distributed within the project to provide for more equitable use among the residents. If the applicant proposes that the basins are to serve a dual purpose and be used for recreational purposes as well, then the above statement may not apply; however, the applicant must address any health and safety concerns of such dual use and provide assurances that a dual use will be supported by all relevant County departments.

Response 10: The proposed drainage basins are intended to be landscaped and could be utilized as recreational space. The Applicant has discussed the potential use of the basins as a recreational space with the Department of Parks and Recreation and will continue dialogue on this item.

Comment 11. Site plan revisions are required to better differentiate between parks and drainage basins.

Response 11: The drainage basins are intended to be landscaped and used as potential recreational areas. The Applicant will include clearer labels for the basins and parks in the site plan.

Comment 12. Both new and previously completed Archaeological Inventory Studies and Cultural Impact Assessments must include recent consultations with lineal descendants and agencies like DLNR's State Historic Preservation Division, the Office of Hawaiian Affairs, and the Cultural Resources Commission.

Response 12: The project team archaeologist has coordinated with SHPD and submitted a 6E form seeking guidance on appropriate archaeological study. The 6E form is currently under review by SHPD. A Cultural Impact Assessment was prepared as part of the Draft EA and contains interviews with individuals knowledgeable about the area. SHPD and the Office of Hawaiian Affairs will be given the opportunity to provide comments on the Draft EA for the project.

Comment 13. The project area has severe traffic congestion during commuter times. Implement multimodal transit options such as providing sidewalks along Kahekili Highway as well as bike lanes and mass transit stops with shelters. Particular attention should be given in the DEA traffic assessment to analyze the impacts the project will have during commuter times caused by increased vehicular density. It is important to not only prevent impacts to traffic flow but use this opportunity to reduce existing flow obstructions and improve the quality of life for area residents, including future residents of the project. Left-hand turns in and out of the project will cause traffic flow obstructions. With the proposal of 752 housing units, this could cause severe traffic congestion. Due to the safety hazards of left-turns in and out of the project, consideration should be given to mitigating the traffic congestion and safety hazards, particularly utilizing a traffic circle at each entrance. Additionally, one or two additional access points onto Kahekili Highway, with traffic circles, will distribute project-related traffic more evenly.

Response 13: A Transportation Engineer prepared a TIAR for the proposed project that includes trip generation analysis, potential impacts and recommended mitigation measures. The TIAR will include a discussion on roundabouts.

Comment 14. Due to the close proximity of Waiehu Beach Road, pedestrian traffic from the Project crossing Kahekili Highway to Waiehu Beach Road must be expected. Sidewalks up to the Waiehu Beach Road intersection and crosswalk signaling should be added.

Response 14: The proposed project includes construction of a bike lane and a separated sidewalk along Kahekili Highway fronting the project site. The Applicant will coordinate with the Department of Public Works and State Department of Transportation on appropriate crosswalk mitigation measures at this intersection.

Comment 15. Each dwelling unit occupies the majority of its lot. Off-street parking will take up a considerable amount of the remaining free space. Because of the limited space, visitor parking must be accommodated throughout the project.

Response 15: Off-street parking will be provided for each unit. All units will include a garage and visitor parking will be provided throughout the project.

Comment 16. A two-direction shared use (bike pedestrian) path should be provided in the greenway on both sides of the stream. This will allow the community to connect and recreate safely away from vehicular traffic.

Response 16: A two-direction shared use (bike pedestrian) trail is provided along the mauka edge of the greenway. The applicant will explore a second trail along the makai edge of the central greenway. The project includes a connected network of sidewalks, bike paths and trails to allow the community to connect and recreate safely away from vehicular traffic.

Comment 17. Bike and pedestrian connections to the shared use paths should be provided throughout the project to encourage community use of the shared use paths and greenway.

Response 17: Bike and pedestrian connections to the shared use paths are proposed throughout the project to encourage community use of the shared use paths and greenway.

Comment 18. The project should include a community center, either as an open pavilion or enclosed structure, to function as a gathering area.

Response 18: The applicant acknowledges this comment and an appropriate location for a community center could be the small commercial space identified on the site plan. The Applicant will continue to coordinate with the Department on a proposed community center.

Comment 19. The project should include a number of small playgrounds, even if minimal in size such as between 5,000 to 10,000 square feet. Hale Mahaolu Lahaina Surf can be used as an example of how playground equipment is incorporated into an open space area of an affordable housing complex (Lahaina Surf has 112 units on 4.35 acres). Please consult with the Department of Parks and Recreation to determine what would be appropriate for a project of this size.

Response 19: The applicant acknowledges this comment and will continue to coordinate with the Parks and Recreation Department on appropriate playground spaces to be incorporated at the site.

Comment 20. If the units do not include a washer and dryer, consider providing an onsite laundry facility for the residents (similar to Lahaina Surf, Front Street Apartments, Hale Mahaolu Kulamalu, Luana Gardens, etc.).

Response 20: The applicant acknowledges this comment and will consider an onsite laundry facility as an alternative if the units do not include a washer and dryer.

Comment 21. Please ensure the existing wastewater facilities can accommodate this many addition dwelling units. If they cannot be accommodated, state what systems will be in place for wastewater treatment.

Response 21: Currently, the Kahului Wastewater Treatment Facility has the available capacity to accommodate the proposed project.

Comment 22. Trash locations are often inadequate for housing projects. County refuse collection services do not run-on private roads. Ensure that roadway dedications to the County are agreed upon and timelines are in place; otherwise indicate what private solid waste systems will be utilized.

Response 22: The Applicant will be requesting that roadways be dedicated to the County and will ensure that agreements with timelines will be in place to ensure that the County solid waste system will be available to future residents.

Comment 23. Increasing utility costs decrease the affordability of housing. Please consider the addition of solar energy systems for each dwelling unit so that the affordability is consistent.

Response 23: The applicant is considering the option of solar energy systems for each dwelling unit to help keep monthly bills affordable for future residents.

Comment 24. Install traffic calming devices such as bulb-outs, chicanes, or mini-roundabouts, and install crosswalks within the project's interior roadways for pedestrian safety.

Response 24: The Applicant is exploring the appropriate traffic calming devices such as speed tables, bulb-outs, chicanes, or mini-roundabouts. The Applicant is committed to installing crosswalks within the project's interior roadways and along Kahekili Highway for pedestrian safety.

Comment 25. The landscaping plan should consider the incorporation and the use of bioswales, tailored to native plants, to capture urban storm water runoff from impervious surfaces including roads and parking lots. Do not plant any aggressive or invasive

species.

Response 25: The landscaping plan will incorporate native trees and plants to provide shade and capture urban storm water runoff from impervious surfaces including roads, sidewalks, bike lanes and parking lots. The site plan allows for the natural drainage way to be maintained and enhanced with walking trails and landscaping.

Comment 26. The Department understands this is a 100 percent affordable project; however, it encourages good design as this is a prominent location along Kahekili Highway.

Though the project proposes a range of single-family dwelling lot sizes and a creative variety of housing typologies, it utilizes a typical Euclidean arrangement of those uses. As such, it segregates residents by housing type and income. Likewise, the layout and uses appear auto-centric, with an average of 12 dwelling units per acre, which is not transit supportive.

The Department suggests that the project's land use be redesigned as a transit-oriented neighborhood by increasing densities at its core, creating a hierarchy of land divisions and housing typologies radiating out from a village common (or public square) centrally located along the Kahekili Highway and surrounded by neighborhood supportive small retail spaces (see attached schematic).

Response 26: The location of the project site on the island and the surrounding/ existing land uses is problematic for a high density transit development that is away from the urban core(s). The proposed 12 DU/ AC average for the site is well above the existing 3 - 4 DU/ AC that exist in adjacent subdivisions to the project site. It was imperative from the beginning that the Waiehu project development team wanted to be a good neighbor with compatible residential uses to fulfill the county-wide need for attaining workforce housing.

The implementation recommendations follow:

- *Create a village common (or public square) visible from the highway and facing the greenway.*

The forthcoming Draft EA will consider the Departments design recommendation as an alternative. The ultimate design and integration of a pedestrian-centric plaza will be determined as the project evolves. The location along the highway could be problematic for creating a pedestrian friendly environment due to the high speeds, trip volumes and verticality of the access points. The design team made the shift to an internal location adjacent to the neighborhood collector, the main pedestrian corridor, and the loop road. The confluence of these three multimodal travel-ways was determined to be the most beneficial for the community and walkability for future residents.

• *Superimpose a clearer, connected, street grid over the entire site regardless of terrain.*

The existing topography appears to be relatively flat, but in reality, there is significant amount of grade and cross slope. In order to create viable workforce housing in Waiehu, larger graded development pads are required. This type of development requires a significant amount of modification to slopes to accommodate drainage, water, sewer and roadway infrastructure based on County of Maui design standards.

With these requirements and with site slope considerations, a traditional neighborhood design (TND) grid approach would have been cost prohibitive. This is in large part due to additional roadways, smaller graded lots, and increased non-permeable surfaces that would cause additional run-off and increase in stormwater conveyance and storage. Lastly, we intentionally pulled back from the upper portions of the site to buffer and preserve the existing agricultural lands as a good neighbor gesture to the existing residents.

• *Coordinate with the Department of Transportation (Maui Bus) to provide a major bus stop facility adjacent to the commons along Kahekili Highway.*

The Applicant has met with the Maui County, Department of Transportation and public transportation locations were discussed. The Applicant is continuing to work with the department on the appropriate locations for future bus stops.

• *Group retail at ground level around the commons with second floor residences above.*

The architectural design team has determined that vertically integrated architecture is three (3) time more expensive to construct than conventional horizontal construction. The building code and the insurance requirements trigger additional requirements and aren't affordable unless there are participating funding mechanisms in place.

• *Retail spaces should be kept very small, with only neighborhood serving uses.*

The Applicant acknowledges this statement.

• *Position the project's main entrances at the Makaala Drive and Waiehu Beach Road intersections to increase connectivity.*

The project team explored this option, initially. However, due to the topography, logistics, requirements of stormwater management, County of Maui roadway design

standards, and sewer lift station realities, the main access point was located further south. This location also improves the stacking distance requirement for our site as well as the proposed affordable housing project across the highway.

• *Add two additional minor interior road connections (near the commons) to the highway.*

This is problematic due to the high volume and speed of the existing highway. By adding additional access points to the highway the project would trigger additional lane construction as well as low level of service along the highway during peak hours.

• *Give priority to pedestrian and bike linkages throughout the village.*

This is accomplished by the streets, multimodal paths, and walkability of the enclaves to the central drainage corridor.

• *To implement a transit-oriented development, increase the overall density.*

Please see above statement on density.

• *Regroup lots so that smaller lots (25'xlOO') are nearer the village core (32 dwelling units per acre) and larger lots (5O'x100') are in a second ring from the village core (16 dwelling units per acre). Use land mauka of the perimeter road for community gardens and/or cottages (less than 8 dwelling units per acre).*

A 25' x 100' lot configuration is approximately 10.8 - 11.3 DU/AC. At this density it would be challenging to accommodate for circulation, grading, parking, and infrastructure. The second ring of 50'x 100' lots up the hill side is cost prohibitive and is in closer proximity to existing neighbors. Additionally, the Maui Island Plan Urban Growth Boundary currently occupies a portion of the project parcel and maintains a portion as agricultural, which the Applicant proposes to maintain as a good neighbor gesture to the existing residents who enjoy a rural lifestyle. Lastly, the ability for the project to sell residential typologies of 32 DU/AC would require County participatory funding to make it financially viable.

• *Include on-street curb-side parking on major and minor roadways throughout the development.*

As previously noted, the units will include off street parking and visitor parking throughout the site. Street parking is cost prohibitive in this area because the challenging topography is too steep for safety.

• *Provide space at the village commons for ride-share facilities for both bikes and cars.*

The Applicant acknowledges this statement.

• *Utilize the greenway running through the project as a major recreational feature.*

A green way is accommodated within the design as seen in the forthcoming Draft EA site plan with pedestrian access along the central drainage corridor.

• *All residences should be within a five-minute walk of a park or recreational greenway.*

All residences are within a 2 – 3 minute walk of a park or the greenway.

Thank you for participating in the environmental review process. Please feel free to call me or at (808) 242-1955 or e-mail Bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Todd Larner, Owner Representative
Mr. Buddy Almeida, DHHC
Project File 19-065

MICHAEL P. VICTORINO
Mayor

MARC I. TAKAMORI
Director

MICHAEL B. DU PONT
Deputy Director

DEPARTMENT OF TRANSPORTATION
COUNTY OF MAUI
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793
TELEPHONE: (808) 270-7511
FAX: (808) 270-7505

November 16, 2020

Chris Hart and Partners, Inc.
Attention: Brett Davis, Senior Planner
115 N. Market Street
Wailuku, HI 96793
Via email: bdavis@chpmaui.com

SUBJECT: Request for HRS Chapter 343, Early Consultation for the Proposed Waiehu Residential Community Project located at the intersection of Kahekili Highway and Waiehu Beach Road, Kahului, Maui, identified by TMK: (2) 3-3-002:031.

Dear Mr. Davis,

We appreciate the opportunity to provide early consultation comments on the Proposed Waiehu Residential Community Project.

The County Department of Transportation provides public transit services within the vicinity of the proposed residential community project. In order for public transit to be considered for expansion in new developments, there are certain criteria that makes transit works such as through streets whether it's major collector roads or within the subdivisions. Providing interconnecting sidewalks within and between the subdivisions and ample lighting in the evenings is also necessary for walkable communities and for the safety of potential residents and public transit riders.

Please feel free to contact me if you have any questions.

Sincerely,

Marc Takamori, Director
Department of Transportation

CHRIS HART
& PARTNERS, INC.
Landscape Architecture
City & Regional Planning

August 2, 2021

Mr. Marc Takamori, Director
County of Maui, Department of Transportation
110 Ala`ihi Street, Suite 210
Kahului, Hawaii 96732

RE: Request for HRS Chapter 343, Early Consultation for the **proposed 100% affordable Waiehu Residential Community Project** located at the intersection of Kahekili Highway and Waiehu Beach Road, Kahului, Maui, Hawaii, identified by TMK: (2) 3-3-002: 031.

Dear Mr. Takamori,

Thank you for your letter dated November 17, 2020, regarding the subject application. The applicant acknowledges that your department has no comments or recommendations to offer at this time. Thank you for taking the time to have a follow up meeting with project team in May 2021.

Thank you for participating in the environmental review process. Please feel free to call me or Ms. Helen Pratiwi at (808) 242-1955 or e-mail Helen at HPratiwi@chpmaui.com should you have any questions.

Sincerely yours,

Brett Davis
Senior Planner

Cc: Mr. Todd Larner, Owner Representative
Mr. Buddy Almeida, Dept. of Housing and Human Concerns
Project File 19-065

115 N. Market Street, Wailuku, Maui, Hawaii 96793-1717 • Ph 808-242-1955 • Fax 808-242-1956
www.chpmaui.com

MICHAEL P. VICTORINO
Mayor

LORI TSUHAKO
Director

LINDA R. MUNSELL
Deputy Director

DEPARTMENT OF HOUSING
& HUMAN CONCERNS
COUNTY OF MAUI
2200 MAIN STREET, SUITE 546
WAILUKU, MAUI, HAWAII
96793
PHONE: (808) 270-7805

November 19, 2020

Brett Davis, Senior Planner
Chris Hart & Partners, Inc.
115 North Market Street
Wailuku, Hawaii 96793

Subject: **Request for HRS Chapter 343, Early Consultation for the Proposed Wailehu Residential Community Project located at the intersection of Kahekili Highway and Waiehu Beach Road, Kahului, Maui, Hawaii, identified by TMK (2) 3-3-002:031.**

Dear Mr. Davis:

The Department has reviewed the information submitted for the above subject project. Based on our review, we have determined that the project is subject to Chapter 2.96, Maui County Code. The owner will be required to execute a Residential Workforce Housing Agreement.

Please call Mr. Buddy Almeida of our Housing Division at 270-7355 if you have any questions.

Sincerely,

C. BUDDY ALMEIDA
Housing Administrator

cc: Lori Tsuhako, Director of Housing and Human Concerns

CHRIS HART
& PARTNERS, INC.
Landscape Architecture
City & Regional Planning

August 2, 2021

Ms. Lori Tsuhako
County of Maui, Department of Housing and Human Concerns
2200 Main Street, Suite 546
Wailuku, HI 96793

Dear Ms. Tsuhako,

RE: Request for HRS Chapter 343, Early Consultation for the **proposed 100% affordable Waiehu Residential Community Project** located at the intersection of Kahekili Highway and Waiehu Beach Road, Kahului, Maui, Hawaii, identified by TMK: (2) 3-3-002: 031.

Your letter dated November 19, 2020, confirms our understanding that the project will need to comply with Chapter 2.96 of the Maui County Code and that prior to the issuance of a building permit a Residential Work Force Housing agreement will be required.

Thank you for participating in the environmental review process. Please feel free to call me or Ms. Helen Pratiwi at (808) 242-1955 or e-mail Helen at HPratiwi@chpmaui.com should you have any questions.

Sincerely yours,

Brett Davis, Senior Planner

Cc: Mr. Todd Larner, Owner Representative
Mr. Buddy Almeida, Dept. of Housing and Human Concerns
Project File 19-065

115 N. Market Street, Wailuku, Maui, Hawaii 96793-1717 • Ph 808-242-1955 • Fax 808-242-1956
www.chpmaui.com

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 08, 2020

Chris Hart & Partners, Inc.
Attn: Mr. Brett A. Davis, Senior Planner
115 North Market Street
Wailuku, Hawaii 96793

via email: bdavis@chpmaui.com

Dear Mr. Davis:

SUBJECT: Early Consultation for the Proposed **Waiehu Residential Community Project** located at Kahekili Highway and Waiehu Beach Road, Kahului, Island of Maui; TMK: (2) 3-3-002:031

Thank you for the opportunity to review and comment on the subject matter. The Land Division of the Department of Land and Natural Resources (DLNR) distributed or made available a copy of your request pertaining to the subject matter to DLNR's Divisions for their review and comments.

At this time, enclosed are comments from the (a) Engineering Division, (b) Division of Forestry & Wildlife, and (c) Land Division-Maui District on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: darlene.k.nakamura@hawaii.gov. Thank you.

Sincerely,

Russell Tsuji

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files

CHRIS HART
& PARTNERS, INC.
Landscape Architecture
City & Regional Planning

August 2, 2021

Mr. Russell Y. Tsuji, Land Administrator
State of Hawaii, Department of Land & Natural Resources
Land Division
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Tsuji,

RE: Request for HRS Chapter 343, Early Consultation for the **proposed 100% affordable Waiehu Residential Community Project** located at the intersection of Kahekili Highway and Waiehu Beach Road, Kahului, Maui, Hawaii, identified by TMK: (2) 3-3-002: 031.

Thank you for your letter of November 16, 2020, distributing our request for comments to various DLNR divisions.

Thank you for participating in the environmental review process. Please feel free to call me or Ms. Helen Pratiwi at (808) 242-1955 or e-mail Helen at HPratiwi@chpmaui.com should you have any questions.

Sincerely yours,

Brett Davis, Senior Planner

Cc: Mr. Todd Larner, Owner Representative
Mr. Buddy Almeida, Dept. of Housing and Human Concerns
Project File 19-065

115 N. Market Street, Wailuku, Maui, Hawaii 96793-1717 • Ph 808-242-1955 • Fax 808-242-1956
www.chpmaui.com

DAVID Y. IGE
GOVERNOR OF HAWAII

ELIZABETH A. CHAR, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
Maui District Health Office
54 South High St. Rm. #301
Wailuku, HI 96793

Lorrin W. Pang, M.D., M.P.H.
District Health Officer

November 30, 2020

Mr. Brett Davis
Senior Planner
Chris Hart & Partners, Inc.
115 North Market Street
Wailuku, Hawai`i 96793

Dear Mr. Davis:

Subject: Request for HRS Chapter 343, Early Consultation for the Proposed Waiehu Residential Community Project
Location: Intersection of Kahekili Highway and Waiehu Beach Road, Wailuku, Maui, Hawaii
TMK: (2) 3-3-002:031

Thank you for the opportunity to review this project. We have the following comments to offer:

> We are not able to make comments on the subdivision as the wastewater disposal method was not satisfactorily addressed for review. Please provide the type of wastewater disposal method for the proposed project. If you have any questions, please call Roland Tejano, Environmental Engineer, at 808 984-8232.

It is strongly recommended that you review the department's website at https://health.hawaii.gov/epo/files/2018/05/DOHEHA.LandUseContactList.20180502.pdf and contact the appropriate program that concerns your project.

Should you have any questions, please contact me at 808 984-8230 or email me at patricia.kitkowski@doh.hawaii.gov.

Sincerely,

Patti Kitkowski

Patti Kitkowski
District Environmental Health Program Chief

c Joanna Seto, Acting EMD Administrator

RECEIVED
DEC 02 2020
CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

CC: Brett + Helen
191065

CHRIS HART & PARTNERS, INC.
Landscape Architecture
City & Regional Planning

September 20, 2021

Ms. Patti Kitkowski, District Environmental Health Program Chief
State of Hawaii
Department of Health, Maui District
54 High Street
Wailuku, HI 96793

Dear Ms. Kitkowski:

RE: Early Consultation for the proposed Waiehu Residential Community, located in Waiehu, Maui, Hawaii at TMK: (2) 3-3-002:031

Thank you for your comment letter of November 30, 2020, providing the department's comment on the proposed project.

Comment 1. *Please provide the type of wastewater disposal method for the proposed project.*

Response 1. The wastewater system for the proposed project will connect to the County Sewer system.

The Applicant will review the departments website and contact the appropriate programs applicable to the proposed project.

Thank you for participating in the early consultation review process. Please feel free to call me at (808) 242-1955 or e-mail at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett A. Davis, Senior Planner

Cc: Mr. Todd Larner, Owner Representative
Mr. Buddy Almeida, DHHC
Project File 19-065

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 13, 2020

MEMORANDUM

~~TO:~~ **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
_X_ Engineering Division (DLNR.ENGR@hawaii.gov)
_X_ Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks
_X_ Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
___Office of Conservation & Coastal Lands
_X_ Land Division – Maui District (daniel.l.ornellas@hawaii.gov)
_X_ Historic Preservation (DLNR.Intake.SHPD@hawaii.gov)

~~FROM:~~ Russell Y. Tsuji, Land Administrator *Russell Tsuji*

SUBJECT: Early Consultation for the Proposed **Waiehu Residential Community Project**

LOCATION: Kahekili Highway and Waiehu Beach Road, Kahului, Island of Maui; TMK: (2) 3-3-002:031

APPLICANT: Chris Hart Partners, Inc.

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **December 7, 2020.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed: _____
Print Name: Carty S. Chang, Chief Engineer
Division: Engineering Division
Date: Dec 4, 2020

Attachments
cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji

Ref: Early Consultation for the Proposed Waiehu Residential Community Project
Location: Kahekili Highway and Waiehu Beach Road, Kahului,
Island of Maui
TMK(s): (2) 3-3-002:031
Applicant: Chris Hart Partners, Inc.

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM), which can be viewed on our Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT).

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7253.
- Kauai: County of Kauai, Department of Public Works (808) 241-4896.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: Dec 4, 2020

CHRIS HART
& PARTNERS, INC.
Landscape Architecture
City & Regional Planning

September 20, 2021

Mr. Carty S. Chang, Chief Engineer
State of Hawaii
Department of Land and Natural Resources
Engineering Division
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Chang,

RE: Early Consultation for the proposed Waiehu Residential Community, located in Waiehu, Maui, Hawaii at TMK: (2) 3-3-002:031

Thank you for your comment letter of December 4, 2020, providing the department's comment on the proposed project.

The Applicant acknowledges your comment that the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard area.

The Draft EA will identify the Flood Hazard Zone designation and the Engineering Division will receive a copy for additional review and comment.

Thank you for participating in the early consultation review process. Please feel free to call me at (808) 242-1955 or e-mail at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett A. Davis, Senior Planner

Cc: Mr. Todd Larner, Owner Representative
Mr. Buddy Almeida, DHHC
Project File 19-065

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 13, 2020

MEMORANDUM

TO: **DLNR Agencies:**
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division (DLNR.ENGR@hawaii.gov)
X Div. of Forestry & Wildlife (rubyrosa.l.terrago@hawaii.gov)
__Div. of State Parks
X Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
__Office of Conservation & Coastal Lands
X Land Division – Maui District (daniel.l.ornellas@hawaii.gov)
X Historic Preservation (DLNR.Intake.SHPD@hawaii.gov)

FROM: Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Early Consultation for the Proposed **Waiehu Residential Community Project**
LOCATION: Kahekili Highway and Waiehu Beach Road, Kahului, Island of Maui; TMK: (2) 3-3-002:031
APPLICANT: Chris Hart Partners, Inc.

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **December 7, 2020.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

( ) We have no objections.
( ) We have no comments.
(☑) Comments are attached.

Signed: _____
Print Name: DAVID G. SMITH, Administrator
Division: Division of Forestry and Wildlife
Date: Dec 7, 2020

Attachments
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

December 7, 2020

Brett Davis
Chris Hart & Partners, Inc
115 N. Market Street
Wailuku, HI 96793
bdavis@chpmaui.com

Log no. 2886/ 2893

Dear Mr. Davis:

The Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) has received your inquiry regarding review of the HRS Chapter 343 early consultation request for the proposed Waiehu Residential Community Project in Kahului, Maui, TMK: (2) 3-3-002:031. The proposed project consists of constructing workforce housing units, market rate housing units, a connected trail and open space network with parks, interior roadways, utilities, landscaping and a small commercial center on a 241 acre parcel.

The State listed Blackburn's Sphinx Moth (BSM; *Manduca blackburni*) has a historic range that encompasses the project area. Larvae of BSM feed on many nonnative hostplants that include tree tobacco (*Nicotiana glauca*) which grows in disturbed soil. We recommend contacting our Maui DOFAW office at (808) 984-8100 for further information about where BSM may be present and whether a vegetation survey should be conducted to determine the presence of plants preferred by BSM. To avoid harm to BSM, DOFAW recommends removing plants less than one meter in height or during the dry time of the year. If you remove tree tobacco over one meter in height or disturb the ground around or within several meters of these plants they must be checked thoroughly for the presence of eggs and larvae.

State listed waterbirds such as the Hawaiian Duck (*Anas wyvilliana*), Hawaiian Stilt (*Himantopus mexicanus knudseni*), Hawaiian Coot (*Fulica alai*) and Hawaiian Goose or Nēnē (*Branta sandvicensis*) have the potential to occur in the vicinity of the proposed project site. It is against State law to harm or harass these species. If any of these species are present during construction activities, then all activities within 100 feet (30 meters) should cease, and the bird should not be approached. Work may continue after the bird leaves the area of its own accord. If a nest is discovered at any point, please contact the Maui DOFAW office at the aforementioned number.

DOFAW is concerned about attracting vulnerable birds to areas that may host nonnative predators such as cats, rodents, and mongoose. Additionally, construction and improvements to the area, are likely to increase the number of users and may generate more predator attractants. We

recommend taking action to minimize predator presence; remove cats, place bait stations for rodents and mongoose, and provide covered trash receptacles.

The State listed Hawaiian Hoary Bat or ʻŌpeʻapeʻa (*Lasiurus cinereus semotus*) has the potential to occur in the vicinity of the project area and may roost in nearby trees. If any site clearing is required this should be timed to avoid disturbance during the bat birthing and pup rearing season (June 1 through September 15). If this cannot be avoided, woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed without consulting DOFAW.

DOFAW recommends minimizing the movement of plant or soil material between worksites, such as in fill. Soil and plant material may contain invasive fungal pathogens, vertebrate and invertebrate pests (e.g. Little Fire Ants), or invasive plant parts that could harm our native species and ecosystems. We recommend consulting the Maui Invasive Species Committee at (808) 573-6472 in planning, design, and construction of the project to learn of any high-risk invasive species in the area and ways to mitigate spread. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive species.

DOFAW recommends using native plant species for landscaping that are appropriate for the area (i.e. climate conditions are suitable for the plants to thrive, historically occurred there, etc.). Please do not plant invasive species. DOFAW recommends consulting the Hawaiʻi-Pacific Weed Risk Assessment website to determine the potential invasiveness of plants proposed for use in the project (https://sites.google.com/site/weedriskassessment/home). We recommend that you refer to www.plantpono.org for guidance on selection and evaluation for landscaping plants.

We note that artificial lighting can adversely impact seabirds that may pass through the area at night by causing disorientation. This disorientation can result in collision with manmade artifacts or grounding of birds. For nighttime lighting that might be required, DOFAW recommends that all lights be fully shielded to minimize impacts. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season from September 15 through December 15. This is the period when young seabirds take their maiden voyage to the open sea. For illustrations and guidance related to seabird-friendly light styles that also protect the dark, starry skies of Hawaiʻi please visit: https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf.

We appreciate your efforts to work with our office for the conservation of our native species. Should the scope of the project change significantly, or should it become apparent that threatened or endangered species may be impacted, please contact our staff as soon as possible. If you have any questions, please contact Koa Matsuoka, Protected Species Habitat Conservation Planning Associate at (808) 587-4149 or koa.matsuoka@hawaii.gov.

Sincerely,

DAVID G. SMITH
Administrator

CHRIS HART
& PARTNERS, INC.
Landscape Architecture
City & Regional Planning

September 20, 2021

Mr. David G. Smith, Administrator
State of Hawaii
Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl Street, Room 325
Honolulu, HI 96813

Dear Mr. Smith,

RE: Early Consultation for the proposed Waiehu Residential Community, located in Waiehu, Maui, Hawaii at TMK: (2) 3-3-002:031

Thank you for your letter of December 7, 2020. We have prepared the following responses to your comments:

Comment: *The State listed Blackburn's Sphinx Moth (BSM; Manduca blackbumi) has a historic range that encompasses the project area. Larvae of BSM feed on many nonnative hostplants that include tree tobacco (Nicotiana glaucd) which grows in disturbed soil. We recommend contacting our Maui DOFAW office at (808) 984-8100 for further information about where BSM may be present and whether a vegetation survey should be conducted to determine the presence of plants preferred by BSM.*

Response: The forthcoming Draft EA contains a survey conducted by Robert Hobdy at the project site to document the existing flora and fauna and included an analysis of BSM. The survey resulted in no findings of special plant habitats or rare plant communities found on the property. The full report is provided in the Draft EA as an Appendix, a digital copy of the Draft EA will be provided to your office at the time of publication.

Comment: *State listed waterbirds such as the Hawaiian Duck, Hawaiian Stilt, Hawaiian Coot, and Hawaiian Goose or Nene have the potential to occur in the vicinity of the proposed project site. It is against State law to harm or harass these species.*

DOFAW is concerned about attracting vulnerable birds to areas that may host non-native predators such as cats, rodents, and mongoose. We recommend taking action to minimize predator presence: remove cats, place bait stations for rodents and mongoose, and provide covered trash receptacles.

Response: At the time of construction the Applicant will ensure that if any of the species are present that activities within 100 feet should cease and the bird should not be approached. In the event a nest is discovered the Maui DOFAW office will be contacted.

The Applicant acknowledges the recommendation of taking action to minimize predator presence. Including removal of cats, bait stations for rodents and mongoose, and covered trash receptacles.

Comment: The State listed Hawaiian Hoary Bat or 'Ope'ape'a (Lasiurus cinereus semotus) has the potential to occur in the vicinity of the project area and may roost in nearby trees. If any site clearing is required this should be limited to avoid disturbance during the bat birthing and pup rearing season (June 1 through September 15).

Response: The Applicant is committed to practices that will ensure safety for the Hawaii hoary bats including avoiding disturbance during the bat birthing and pup rearing season.

Comment: DOFAW recommends minimizing the movement of plant or soil material between worksite, such as infill.

DOFAW recommends using native plant species for landscaping that are appropriate for the area.

Response: The Applicant will minimize movement of plant or soil material between worksites during construction activities. The Applicant will coordinate with Maui Invasive Species Committee to earn of any high-risk invasive species in the area and ways to mitigate spread.

Additionally, the Site plan will incorporate native landscape planting that are appropriate for the Waiehu area climate conditions. Landscaping will be incorporated throughout the site and within park spaces and along pathways and roadways.

Comment: We note that artificial lighting can adversely impact seabirds that may pass through the area at night by causing disorientation. This disorientation can result in collision with manmade artifacts or grounding of birds. For nighttime lighting, DOFAW recommends that all lights be fully shielded to minimize impacts. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season from September 15 through December 15. This is the period when young seabirds take their maiden voyage to the open sea.

For illustrations and guidance related to seabird-friendly light styles that also protect the dark, starry skies of Hawai'i please visit: https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf.

Response: The Applicant and the design team will coordinate with DOFAW Wildlife Biologists to develop a lighting strategy that utilizes "seabird-friendly lighting" for the proposed project.

Thank you for participating in the early consultation review process. Please feel free to call me or at (808) 242-1955 or e-mail at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis

Brett Davis, Senior Planner

Cc: Mr. Todd Lamer, Owner Representative
Mr. Buddy Almeida, DHHC
Project File 19-065

DAVID Y. IGE
GOVERNOR

DR. CHRISTINA M. KISHIMOTO
SUPERINTENDENT

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI'I 96804

OFFICE OF FACILITIES AND OPERATIONS

December 4, 2020

Mr. Brett Davis, Senior Planner
Chris Hart & Partners, Inc.
115 N. Market Street
Wailuku, Maui 96793-1717

Re: Early Consultation Request for the Proposed Waiehu Residential Community Project, Kahului, Maui, Hawaii, TMK 3-3-002:031

Dear Mr. Davis:

The Hawaii State Department of Education (HIDOE) has the following early consultation comments in the preparation of a consolidated application for the proposed Waiehu Residential Community (Project) on approximately 241 acres located at TMK 3-3-002:031, Kahului, Island of Maui. This consolidated application will include a Draft Environmental Assessment, State Land Use District Boundary Amendment, Community Plan Amendment, Change in Zoning, and 201H-38, Hawaii Revised Statutes.

The HIDOE schools servicing the proposed Project are Waihee Elementary, Iao Middle, and Baldwin High. Waihee Elementary has capacity and will continue to have capacity during the next five years. Both Iao Middle and Baldwin High are over capacity. This over capacity is expected to remain over the next five years.

The Project is located within the Central Maui School Impact District with fee amounts of $2,371 for multi-family residential units and $5,373 for single family residential units. The Project developer is encouraged to meet with the HIDOE as early as possible to discuss executing and Educational Contribution Agreement.

The combined application should identify whether the Project will include accessory dwelling units.

Thank you for the opportunity to comment. Should you have questions, please contact Robyn Loudermilk, Planner with the Facilities Development Branch, Planning Section, at (808) 784-5093 or via email at robyn.loudermilk@k12.hi.us

Respectfully,

Brenda Lowrey
for Public Works Manager
Planning Section

BL:rll

c: Kathleen Dimino, Complex Area Superintendent, Baldwin/Kekaulike/Maui Complex Area

RECEIVED
DEC 10 2020
CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

cc: Brett + Helen
19/a05

CHRIS HART
& PARTNERS, INC.
Landscape Architecture
City & Regional Planning

September 29, 2021

Ms. Brenda Lowery, Public Works Manager
State of Hawaii, Department of Education
Planning Section
P. O. Box 2360
Honolulu, HI 96804

Dear Ms. Lowery:

RE: Early Consultation for the proposed Waiehu Residential Community, located in Waiehu, Maui, Hawaii at TMK: (2) 3-3-002:031

Thank you for your comment letter of December 4, 2020. The Applicant acknowledges that the project is in the Central Maui School Impact District and will continue to coordinate with DOE staff to discuss executing an Educational Contribution Agreement. The forthcoming Draft EA will include a unit type breakdown and discussion of the impact fees. No accessory dwelling units are proposed as part of this project.

Thank you again for your comments. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis

Brett Davis, Senior Planner

Cc: Mr. Todd Larner, Owner Representative
Mr. Buddy Almeida, DHHC
Project File 19-065

MICHAEL P. VICTORINO
Mayor

ROWENA M. DAGDAG-ANDAYA
Director

JORDAN MOLINA
Deputy Director

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

RODRIGO "CHICO" RABARA, P.E.
Engineering Division

JOHN R. SMITH, P.E.
Highways Division

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

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
200 SOUTH HIGH STREET, ROOM 434
WAILUKU, MAUI, HAWAII 96793

March 1, 2021

Mr. Brett Davis, Sr. Planner
CHRIS HART & PARTNERS, INC.
115 North Market Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Davis:

SUBJECT: REQUEST FOR HRS CHAPTER 343, EARLY CONSULTATION FOR PROPOSED WAIEHU RESIDENTIAL COMMUNITY PROJECT; TMK: (2) 3-3-002:031

We reviewed your early consultation request and have the following comments:

Comment from the Highways Division:

1. Highways Division requests that all roadways and storm water facilities associated with the project remain private in-perpetuity.

Comments from the Engineering Division:

2. Upon submittal of the drainage report, please ensure compliance with the following:

   - Title MC-15, Chapter 4, "Rules for the Design of Storm Drainage Facilities in the County of Maui";
   - Title MC-15, Chapter 111, "Rules for the Design of Storm Water Treatment Best Management Practices"; and
   - Title 20, Chapter 20.08, "Soil Erosion and Sedimentation Control".

3. The property drainage report should demonstrate that post-development discharge along the property line will not adversely affect downstream properties and conveyances. Provide analysis of pre-developed and post-developed conditions for discharge locations along the property line and the resulting effects of post-developed conditions.

4. Identify any adjacent drainageways in both the report and project construction plans. Include information regarding the reserved flooded width, flow rates, and conveyance calculations.

5. Provide information on offsite runoff if it enters the project site. Please note that the recurrence interval is based on the drainage area and not the developed area. Review the drainage area contributing to the project site and select the criteria and design methodology accordingly.

6. Please provide the following information with the project drainage report:

   - Verification that the proposed drainage improvements are in compliance with any existing development master plans;
   - Flooded width calculations for roadways;
   - Hydraulic grade lines on drainline profiles;
   - Backwater calculations; and
   - Calculations for sizing of all drainage systems (i.e., bioretention strips, underground detention systems and detention basin).

Please call Jordan Molina at 270-7845 if you have any questions regarding this letter.

Sincerely,

Jordan Molina

FOR ROWENA M. DAGDAG-ANDAYA
Director of Public Works

RMDA:JM:da
xc: Highways Division
Engineering Division
S:\DSA\Engr\CZM\Draft Comments\33002031_waiehu_residential_community_proj_ecr.rtf

CHRIS HART
& PARTNERS, INC.
Landscape Architecture
City & Regional Planning

September 20, 2021

Ms. Rowena Dagdag-Andaya, Director
Department of Public Woks
200 South High Street, Room 434
Wailuku, HI 96793

Dear Ms. Dagdag-Andaya,

RE: Early Consultation for the proposed Waiehu Residential Community, located in Wailuku, Maui, Hawaii at TMK (2) 3-3-00:031

Thank you for your comment letter of March 1, 2021, providing the department's comment on the proposed project.

Comment 1 ***(Highways Division)***

Highways Division request that all roadways and storm water facilities associated with the project remain private in-perpetuity.

Response 1: The Applicant acknowledges this statement. As part of the 100% affordable project, the Applicant will be requesting that all roadways and stormwater facilities associated with the project are public and dedicated to the County of Maui.

Comment 2 from ***(Engineering Division)***

Upon submittal of the drainage report, please ensure compliance with the following:

- *Title MC-15, Chapter 4, "Rules for the Design of Storm Drainage Facilities in the County of Maui";*
- *Title MC-15, Chapter 111, "Rules for the Design of Storm Water Treatment Best Management Practices"; and*
- *Title 20, Chapter 20.08, "Soil Erosion and Sediment Control"*

Response 2: The project will comply with the said rules.

Comment 3

The drainage report should demonstrate that post-development discharge along the property line will not adversely affect downstream properties and conveyances. Provide analysis of pre-developed and post-developed conditions for discharge locations along the property line and the resulting effects of post-development conditions.

Response 3: The Draft EA contains a Preliminary Engineering Report prepared by Unemori Engineering and the drainage report demonstrates that post-development discharge along the property line will not adversely affect downstream properties and conveyances. The report includes an analysis of pre-developed and post-developed conditions for discharge locations along the property line and the resulting effects of post-development conditions.

Comment 4

Identify any adjacent drainageways in both the report and project construction plans. Include information regarding the reserved flooded width, flow rates, and conveyance calculations.

Response 4: The Draft EA contains a Preliminary Engineering Report prepared by Unemori Engineering and the above-mentioned information is provided within the report.

Comment 5

Provide information on offsite runoff if it enters the project site. Please note that the recurrence interval is based on the drainage area and not on the developed area. Review the drainage area contributing to the project site and select the criteria and design methodology accordingly.

Response 5: The Draft EA contains a Preliminary Engineering Report prepared by Unemori Engineering and the above-mentioned information is provided within the report.

Comment 6

Please provide the following information with the project drainage report:

- *Verification that the proposed drainage improvements are in compliance with any existing development master plans;*
- *Flooded width calculations for roadways;*
- *Hydraulic grade lines on drainage profiles;*
- *Backwater calculations; and*
- *Calculation s for sizing of all drainage systems (i.e., bioretention strips, underground detention systems*

Ms. Rowena Dagdag-Andaya, Director
Department of Public Woks
Waiehu Residential Community
September 20, 2021

Response 6: The Draft EA contains a Preliminary Engineering Report prepared by Unemori Engineering and the above-mentioned information is provided within the report.

Thank you for participating in this early consultation review process. Please feel free to call me at (808) 242-1955 or e-mail at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett A. Davis, Senior Planner

cc: Mr. Todd Larner, Owner Representative
Mr. Buddy Almeida, DHHC
Project file 19-065

Appendix 4

Biological Resources Study for The Waiehu Master Plan Project

BIOLOGICAL RESOURCES STUDY

FOR THE

WAIEHU MASTER PLAN PROJECT

WAIEHU, MAUI

by

Robert W. Hobdy
Environmental Consultant
Kokomo, Maui
February 2021

Prepared for:
Genova Construction & Development

FLORA AND FAUNA STUDY
WAIEHU MASTERPLAN PROJECT
WAIEHU, MAUI

INTRODUCTION

The Waiehu Master Plan Project lies on 283.2 acres of land spanning the Waiehu – Wailuku boundary in central Maui (see Figures 1 & 2). It is situated on former agricultural land that is now fallow. This biological study was initiated by the owner in fulfillment of environmental requirements of the planning process in pursuit of developmental improvements.

SITE DESCRIPTION

This land was formerly used for sugar cane agriculture and more recently for macadamia nut production but has lain fallow for well over a decade and is overgrown with remnant trees and dense tall grassland. The project area lies above Kahekili Highway to the south of Waiehu Stream at elevations ranging from 50 feet up to 270 feet above sea level. The land is gently to moderately sloping. Soils are characterized as Iao silty clay, 0 – 3% and 3 – 7% slopes (1aC & 1aB), and Wailuku Silty Clay, 7 – 15% slopes (WvC) which are deep, well-drained alluvial soils (Foote et al, 1972). Rainfall averages between 25 inches and 30 inches per year, with most falling during the winter months (Armstrong, 1983).

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the proposed Waiehu Master Plan Project which was conducted in February 2021. The objectives of the survey were to:

1. Document what flora and fauna species occur on the property or may likely occur in the existing habitat.
2. Document the status and abundance of each species.

3. Determine the presence or likely occurrence of any native flora and fauna, particularly any that are federally listed as Threatened or Endangered. If such occur, identify what features of the habitat may be essential for these species.

4. Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora and fauna in this part of the island.

BOTANICAL SURVEY REPORT

SURVEY METHODS

A walk-through botanical survey method was used following routes to ensure maximum coverage of the habitats in this property. Areas most likely to harbor native or rare plants such as gullies were more intensively examined. Notes were made on plant species, distribution and abundance as well on terrain and substrate.

DESCRIPTION OF THE VEGETATION

The vegetation in the project area is dominated by four abundant, non-native species that together make up about 95% of the plant life. These include the Guinea grass (*Megathyrsus maximus),* the Macadamia nut tree *(Macadamia integrifolia*), the koa haole (*Leucaena leucocephala*) and the glycine vine (*Neonotonia wightii*). All the rest of the plant species were of uncommon or rare occurrence in the project area. A total of 69 species were recorded during three site visits.

Three species were found that are native to Hawaii: moa (*Psilotum nudum*), `uhaloa (*Waltheria indica*) and pōpolo (*Solanum americanum*). All three of these are indigenous in Hawaii but are also widespread in other countries as well. All three are common throughout Hawaii but were of rare occurrence in the disturbed habitat within the project area.

DISCUSSION AND RECOMMENDATIONS

The vegetation throughout the project area was dominated by just a few non-native plants. Most of the plants recorded during the survey were common, non-native species and are of no particular environmental concern. The three native plant species found in the project area, moa, `uhaloa and pōpolo, are all widespread and common and all three are listed as species of least concern.

No federally listed Endangered or Threatened native plant species (USFWS, 2021) were encountered during the course of the survey. Nor were any species that are candidates for such status seen. No special plant habitats or rare plant communities were seen on the property.

As a result of these above conditions there is little of botanical concern on this property and the proposed land use changes are not expected to have a significant negative impact on the botanical resources in this part of Maui.

No recommendations are deemed necessary or appropriate regarding the botanical resources on this property.

PLANT SPECIES LIST

Following is a checklist of all those vascular plant species inventoried during the field studies. Plant families are arranged alphabetically within each of four groups: Ferns, Conifers, Monocots and Dicots. Taxonomy and nomenclature of the plants are in accordance with Wagner et al. (1999).

For each species, the following information is provided:

1. Scientific name with author citation.

2. Common English or Hawaiian name.

3. Bio-geographical status. The following symbols are used:

   endemic = native only to the Hawaiian Islands; not naturally occurring anywhere else in the world.

   indigenous = native to the Hawaiian Islands and, also to one or more other geographic area(s).

   Polynesian = all those plants brought to these islands by the Polynesians during the course of their migrations.

   non-native = all those plants brought to the islands intentionally or accidentally after western contact.

4. Abundance of each species within the project area:

   abundant = forming a major part of the vegetation within the project area.

   common = widely scattered throughout the area or locally abundant within a portion of it.

   uncommon = scattered sparsely throughout the area or occurring in a few small patches.

   rare = only a few isolated individuals within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
FERNS			
PSILOTACEAE (Whisk Fern Family)			
Psilotum nudum (L.) P. Beauv.	moa	indigenous	rare
THELYPTERIDACEAE (Marsh Fern Family)			
Cyclosorus parasiticus (L.) Farw.	parasitic maiden fern	non-native	rare
CONIFERS			
ARAUCARIACEAE (Araucaria Family)			
Araucaria columnaris (G. Forster) J.D. Hooker	Cook pine	non-native	uncommon
MONOCOTS			
ARACEAE (Aroid Family)			
Syngonium aureum (L.) Schott	five fingers	non-native	rare
Xanthosoma robustum Schott	'ape	non-native	rare
ARECACEAE (Palm Family)			
Dypsis lutescens (H. Wendl.) Beentjie & Dransfield	golden fruited palm	non-native	rare
ASPARAGACEAE (Asparagus Family)			
Cordyline fruticosa (L.) A. Chev.	kī, tī	Polynesian	rare
Furcraea foetida (L.) Haw.	Mauritius hemp	non-native	rare
COMMELINACEAE (Day Flower Family)			
Commelina diffusa N.L. Burm.	honohono	non-native	rare
CYPERACEAE (Sedge Family)			
Cyperus involucratus Rottb.	umbrella sedge	non-native	rare
HELICONIACEAE (Heliconia Family)			
Heliconia bihai (L.) L.	lobster claw heliconia	non-native	rare
POACEAE (Grass Family)			
Cenchrus echinatus L.	common sandbur	non-native	rare
Cenchrus purpureus (Schumach.) Morrone	napier grass	non-native	uncommon
Megathyrsus maximus (Jacq.) Simon & Jacobs	Guinea grass	non-native	abundant
Oplismenus hirtellus (L.) P. Beauv.	basketgrass	non-native	rare
Phyllostachys aurea A. & C. Riviere	dwarf bamboo	non-native	rare
DICOTS			
ACANTHACEAE (Acanthus Family)			
Asystasia gangetica (L.) T. Anderson	Chinese violet	non-native	rare
Thunbergia fragrans Roxb.	white thunbergia	non-native	rare
AMARANTHACEAE (Amaranth Family)			
Alternanthera pungens Kunth	khaki weed	non-native	rare
Amaranthus spinosus L.	spiny amaranth	non-native	uncommon
ANACARDIACEAE (Mango Family)			
Mangifera indica L.	mango	non-native	rare
Schinus terebinthifolius Raddi	Christmas berry	non-native	rare
ARALIACEAE (Panax Family)			
Schefflera actinophylla (Endl.) Harms	ocotopus tree	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
ASTERACEAE (Sunflower Family)			
Ageratum conyzoides L.	maile hohono	non-native	rare
Bidens pilosa L.	Spanish needle	non-native	rare
Calyptocarpus vialis Lesson	straggler daisy	non-native	rare
Pluchea carolinensis (Jacq.) G. Don	sourbush	non-native	uncommon
Sonchus oleraceus L.	pualele	non-native	rare
Sphagneticola trilobata (L.) Pruski	wedelia	non-native	rare
BIGNONIACEAE (Bignonia Family)			
Spathodea campanulata P. Beauv.	African tulip tree	non-native	rare
BORAGINACEAE (Borage Family)			
Heliotropium amplexicaule Vahl	summer heliotrope	non-native	rare
Heliotropium procumbens Mill.	fourspike heliotrope	non-native	uncommon
CARICACEAE (Papaya Family)			
Carica papaya L.	papaya	non-native	rare
CASUARINACEAE (She-oak Family)			
Casuarina equisetifolia L.	common ironwood	non-native	uncommon
CLUSIACEAE (Mangosteen Family)			
Clusia rosea Jacq.	autograph tree	non-native	rare
CONVOLVULACEAE (Morning Glory Family)			
Ipomoea obscura (L.) Ker-Gawl	obscure morning glory	non-native	rare
Ipomoea triloba L.	little bell	non-native	rare
CUCURBITACEAE (Gourd Family)			
Momordica charantia L.	bitter melon	non-native	uncommon
EUPHORBIACEAE (Spurge Family)			
Aleurites moluccana (L.) Willd.	kukui	Polynesian	rare
Euphorbia hirta L.	hairy spurge	non-native	rare
Euphorbia prostrata Aiton	prostrate spurge	non-native	rare
Manihot esculenta Cranz	cassava	non-native	rare
Ricinus communis L.	Castor bean	non-native	uncommon
FABACEAE (Pea Family)			
Acacia confusa Merr.	Formosa koa	non-native	rare
Canavalia cathartica Thouars	maunaloa	non-native	uncommon
Crotalaria incana L.	fuzzy rattlepod	non-native	rare
Crotalaria pallida Aiton	smooth rattlepod	non-native	rare
Desmodium tortuosum (Sw.) DC.	Florida beggarweed	non-native	rare
Falcataria moluccana (Miq.) Barneby & Grimes	albizia	non-native	uncommon
Indigofera suffruticosa Mill.	inikō	non-native	rare
Leucaena leucocephala (Lam.) de Wit	koa haole	non-native	abundant
Macroptilium atropurpureum (DC.) Urb.	siratro	non-native	rare
Neonotonia wightii (Wight & Arnott) Lackey	glycine	non-native	abundant
LAMIACEAE (Mint Family)			
Leonotis nepetifolia (L.) R. Br.	lion's ear	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
LAURACEAE (Laurel Family)			
Persea americana Mill.	avocado	non-native	rare
MALVACEAE (Mallow Family)			
Abutilon coromandelianum (L.) Garcke	false mallow	non-native	uncommon
Sida rhombifolia L.	arrowleaf sida	non-native	uncommon
Waltheria indica L.	'uhaloa	indigenous	rare
MORACEAE (Mulberry Family)			
Ficus microcarpa L. fil.	Chinese banyan	non-native	rare
MYRTACEAE (Myrtle Family)			
Melaleuca quinquenervia (Cav.) S.T. Blake	paperbark	non-native	rare
Syzygium cumini (L.) Skeels	Java plum	non-native	uncommon
OXALIDACEAE (Wood Sorrel Family)			
Oxalis corniculata L.	yellow wood sorrel	Polynesian	rare
PASSIFLORACEAE (Passion Flower Family)			
Passiflora edulis Sims	passion fruit	non-native	rare
PHYTOLACCACEAE (Pokeweed Family)			
Rivina humilis L.	coral berry	non-native	rare
PROTEACEAE (Protea Family)			
Macadamia integrifolia Maiden & Betche	macadamia nut	non-native	abundant
SOLANACEAE (Nightshade Family)			
Nicandra physalodes (L.) Gaertner	apple-of-Peru	non-native	rare
Solanum americanum Mill.	pōpolo	indigenous	rare
Solanum torvum Sw.	pea aubergine	non-native	rare

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through fauna survey method was conducted in conjunction with the botanical survey. All parts of the project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species, abundance, activities and location as well as observations of trails, tracks, scat and signs of feeding. In addition, an evening visit was made to the area to record crepuscular activities and vocalizations and to see if there was any evidence of occurrence of the endemic and endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the area.

RESULTS

MAMMALS

Signs of presence four species of non-native mammals were observed in the project area during three site visits. Taxonomy and nomenclature of the mammals follows Tomich (1986). These were domestic dogs (*Canis familiaris*), axis deer (*Axis axis*), mongoose (*Herpestes auropunctatus*) and feral pigs (*Sus scrofa*).

An evening survey was made in the project area to determine any presence of the Hawaiian bat. A bat detecting device (Batbox III D) was used at two locations, set to the frequency of 27,000 Hertz that these bats are known to emit when echo-locating for nocturnal flying insect prey. No bat activity was detected with the use of this device.

Other non-native mammals that would likely use this project area, but which were not seen, include rats (*Rattus* spp.), mice (*Mus domesticus*) and domestic cats (*Felis catus*).

BIRDS

Bird diversity and total numbers were moderate in this habitat. Taxonomy and nomenclature follow American Ornithological Society (2021). Twelve widespread non-native bird species were observed during three site visits. One species was abundant, the zebra dove (*Geopelia striata*), while five species were all uncommon. These include the spotted dove (*Streptopelia chinensis*), northern cardinal (*Cardinalis cardinalis*), nutmeg mannikin (*Lonchura punctulata*), chestnut mannikin (*Lonchura malacca*) and common chicken (*Gallus gallus*). A few other non-native bird species would likely utilize this habitat occasionally, but this tall and dense grassland and forest is not suitable for Hawaii's native forest birds, sea birds, water birds or nēnē, and none were seen.

INSECTS

There was a moderate diversity of insect species present in the project area. Fourteen species were recorded during three site visits. Taxonomy and nomenclature follow Nishida et al (1992). One species was common throughout the project area, the dung fly (*Musca sorbens*). Four other species were uncommon: the Asian tiger mosquito (*Aedes albopictus*), the Southern house mosquito (*Culex quinquefasciatus*), the globe skimmer dragonfly (*Pantala flavescens*) and the long-tailed blue butterfly (*Lampides boeticus*). Two species of dragonflies were native to Hawaii, the globe skimmer, and the pinao or green darner (*Anax junius*). The other twelve species were non-native.

DISCUSSION AND RECOMMENDATIONS

Nearly all mammal, bird and insect species recorded during the survey were non-native in Hawaii and of no conservation concern. The two native dragonflies, the globe skimmer and the pinao or green darner, are both indigenous to Hawaii but also occur naturally in other countries as well. They are both widespread throughout Hawaii and are not of any particular conservation concern.

No federally listed Endangered or Threatened animal species (USFWS, 2021) were encountered during the survey, nor were any species that are candidates for such status seen. No special rare native animal habitats or communities were found on the project area.

While no Endangered Hawaiian bats were recorded during the survey, these wide-ranging nocturnally active flying mammals could occasionally pass through the area. If they show up in the project area the U.S. Fish and Wildlife Service has guidelines for their protection.

Another Endangered species, the Blackburn's sphinx moth (*Manduca blackburni*), was looked for but not found. The lack of any of their host plants on this project area, however, makes their presence unlikely.

No native bird species were found on the property during two site visits. However, there are native seabirds, the Endangered Hawaiian petrel (*Pterodroma sandwichensis*) and the Threatened Newell's shearwater (*Puffinus newelli*) that fly over these lowlands on the way to their burrows high in the mountains. These seabirds, and especially the fledglings, are attracted to bright lights in the evenings and early dawn hours and can become disoriented and crash. They are then vulnerable to injury, vehicle strikes and predators. It is recommended that any significant outdoor lighting in any proposed development on this property be shielded to direct the light downward to minimize disorientation of these protected seabirds.

No other issues are anticipated with wildlife species.

FAUNA SPECIES LIST

Following is a checklist of the fauna species inventoried during the field work. Species are arranged in descending abundance within three groups: Mammals, Birds, and Insects. For each species the following information is provided:

1. Common name.

2. Scientific name.

3. Bio-geographical status. The following symbols are used:

   endemic = native only to Hawaii; not naturally occurring anywhere else in the world.

   indigenous = native to the Hawaiian Islands and, also to one or more other geographic area(s).

   non-native = all those species brought to Hawaii intentionally or accidentally after western contact.

   migratory = spending a portion of the year in Hawaii and a portion elsewhere. In Hawaii, the migratory birds are usually in the overwintering/non-breeding phase of their life cycle.

4. Abundance of each species within the project area:

   abundant = many flocks or individuals seen throughout the area at all times of day.

   common = a few flocks or well scattered individuals throughout the area.

   uncommon = only one flock or several individuals seen within the project area.

   rare = only one or two seen within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
MAMMALS			
CANIDAE (Dog Family)			
Canis familiaris L.	domestic dog	non-native	uncommon
CERVIDAE (Deer Family)			
Axis axis Erxleben	axis deer	non-native	rare
SUIDAE (Swine Family)			
Sus scrofa L.	feral pig	non-native	rare
VIVERRIDAE (Mongoose Family)			
Herpestes auropunctatus Hodgson	mongoose	non-native	uncommon
BIRDS			
CARDINALIDAE (Cardinal Family)			
Cardinalis cardinalis L.	northern cardinal	non-native	uncommon
COLUMBIDAE (Dove Family)			
Geopelia striata L.	zebra dove	non-native	abundant
Streptopelia chinesis Scopoli	spotted dove	non-native	uncommon
ESTRILDIDAE (Estrildid Finch Family)			
Lonchura malacca L.	chestnut mannikin	non-native	uncommon
Lonchura punctulata L.	nutmeg mannikin	non-native	uncommon
MUSCICAPIDAE (Old World Flycatcher Family)			
Copsychus malabaricus Scopoli	white-rumped shama	non-native	rare
PASSERIDAE (Sparrow Family)			
Passer domesticus L.	house sparrow	non-native	rare
PHASIANIDAE (Pheasant Family)			
Francolinus pondicerianus Gmelin	gray francolin	non-native	rare
Gallus gallus L.	common chicken	non-native	uncommon
STURNIDAE (Starling Family)			
Acridotheres tristis L.	common myna	non-native	rare
TYTONIDAE (Barn Owl Family)			
Tyto alba Scopoli	barn owl	non-native	rare
ZOSTEROPIDAE (White-eye Family)			
Zosterops japonicus Temmink & Schlegel	white-eye	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
INSECTS			
Order ARANAE - true spiders			
ARANEIDAE (Orb Weaver Family)			
Argiope appensa Walkenaer	garden spider	non-native	rare
Gasteracantha mammosa Koch	Asian spiny-backed spider	non-native	rare
Order DIPTERA - flies			
CULICIDAE (Mosquito Family)			
Aedes albopictus Skuse	Asian tiger mosquito	non-native	uncommon
Culex quinquefasciatus Say	Southern house mosquito	non-native	uncommon
MUSCIDAE (House Fly Family)			
Musca sorbens Wiedemann	dung fly	non-native	common
Order HEMIPTERA - true bugs			
PSYLLIDAE (Psyllid Plant Lice Family)			
Heteropsylla cubana Crawford	Cuban koa haole psyllid	non-native	rare
Order HYMENOPTERA - bees, wasps			
APIDAE (Honey Bee Family)			
Apis mellifera L.	honey bee	non-native	rare
Order LEPIDOPTERA - butterflies, moths			
CRAMBIDAE (Grass Moth Family)			
Spoladea recurvalis Fabricius	beet webworm moth	non-native	rare
LYCAENIDAE (Gossamer-winged Butterfly Family)			
Lampides boeticus L.	long-tailed blue butterfly	non-native	uncommon
NOCTUIDAE (Brush-footed Butterfly Family)			
Danaus plexippus L.	monarch butterfly	non-native	rare
PIERIDAE (White & Sulphur Butterfly Family)			
Eurema niccipe Cramer	sleepy orange butterfly	non-native	rare
Pieris rapae L.	cabbage butterfly	non-native	rare
Order ODONATA - dragonflies, damselflies			
AESHNIDAE (Hawker Dragonfly Family)			
Anax junius Drury	green darner dragonfly	indigenous	rare
LIBBELLULIDAE (Skimmer Dragonfly Family)			
Pantala flavescens Fabricius	globe skimmer dragonfly	indigenous	uncommon

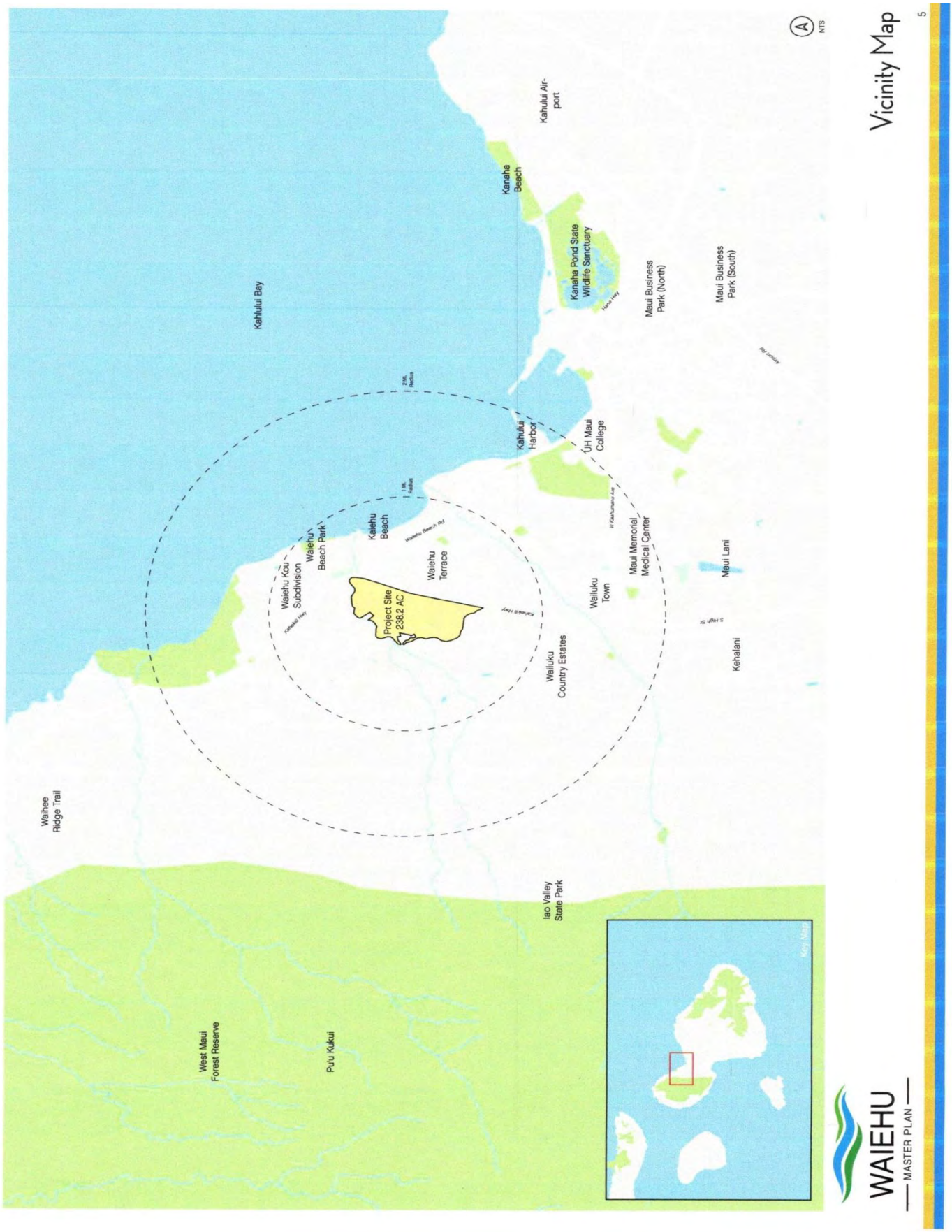


Figure 1. Waiehu Master Plan – Project area 238.2 acres

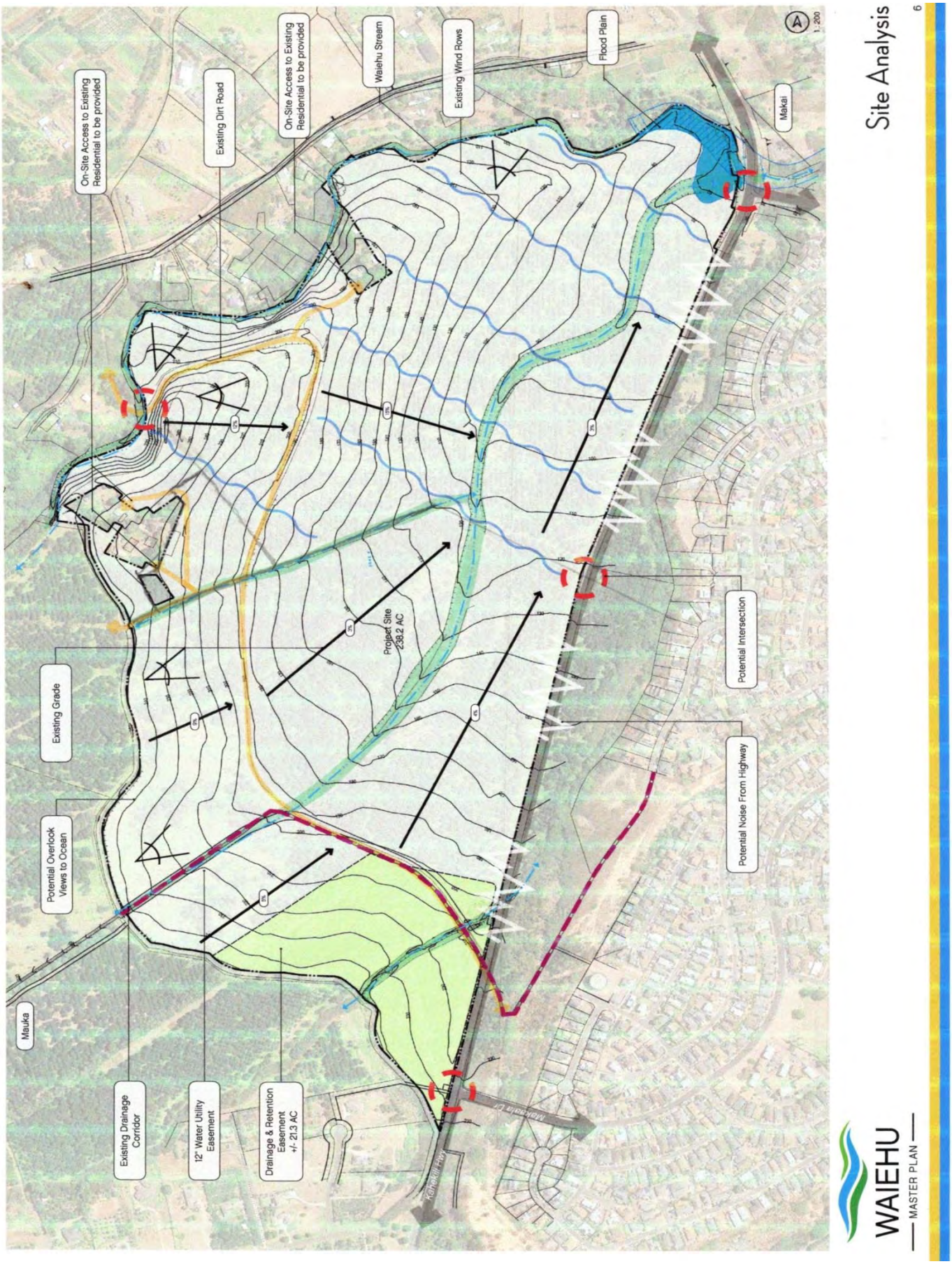


Figure 2. Waiehu Master Plan – Project Area

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Appendix 5

Preliminary Engineering Report

Established 1969

Preliminary Engineering Report

WAIEHU DEVELOPMENT

Waiehu, Maui, Hawaii
TMK: (2) 3-3-002: 031

Prepared for:

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May 18, 2021

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Preliminary Engineering Report
for
Waiehu Development

1. INTRODUCTION

1.1 Purpose

This report discusses the existing condition of the Waiehu Development project site and the infrastructure improvements needed to support the proposed development plan.

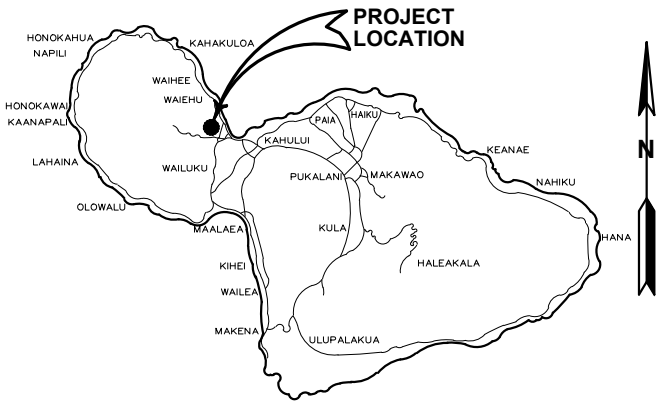
1.2 Project Location

The project parcel is located in Waiehu, Maui, on the west side of Kuihelani Highway south of its intersection with Waiehu Beach Road. (See Figure 1-1)

1.3 Project Description

The proposed Waiehu Development consists of a single 238 acre parcel[1] of agricultural land on which an approximately 158 acre portion will be developed into an urban residential community consisting of approximately 750 homes through the entitlement process described in Section 201H-38 of the Hawaii Revised Statues.

[1] Lot C of Iao Valley Large-Lot Subdivision at Tax Map Key (2) 3-3-002: 031.



ISLAND OF MAUI

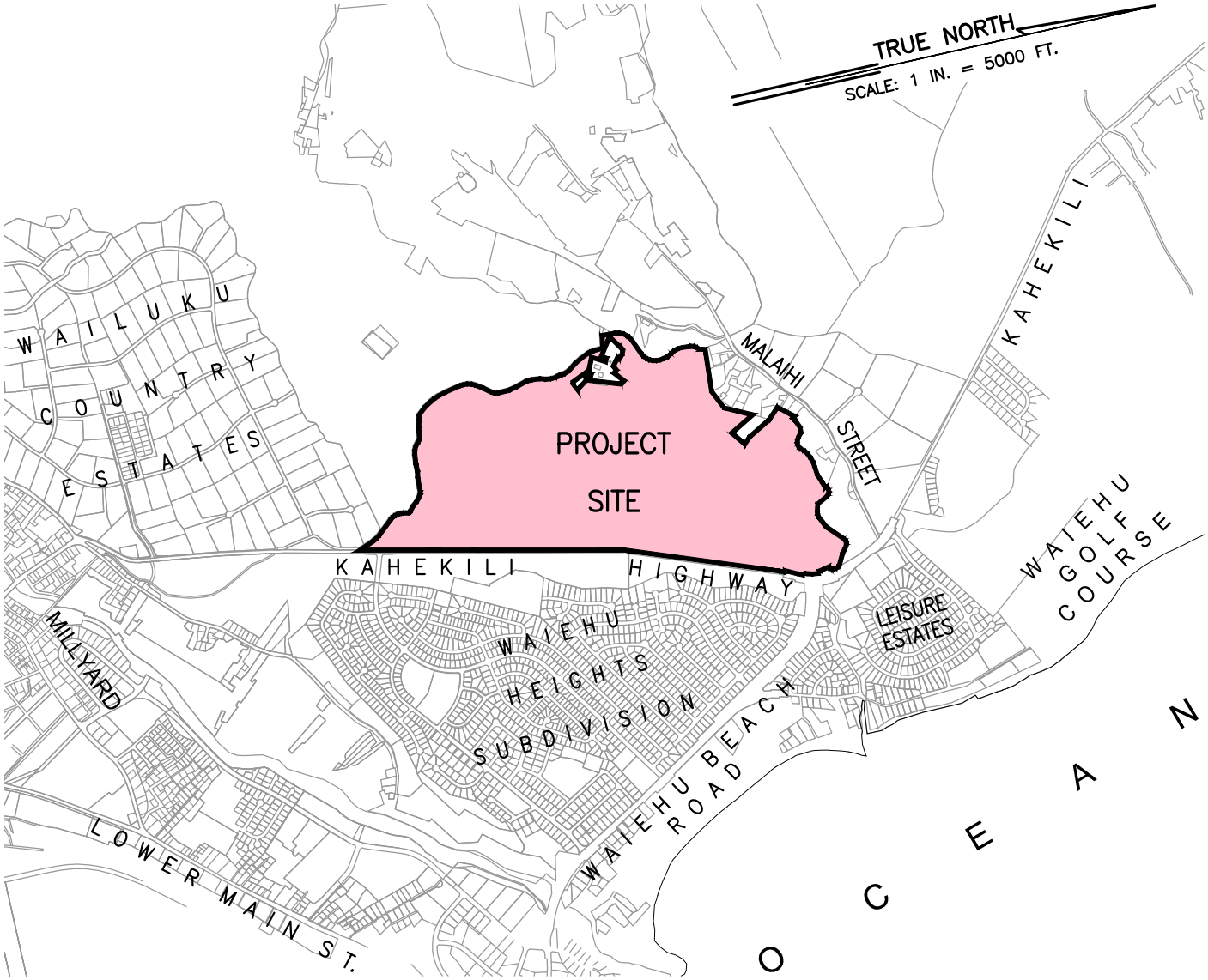


FIGURE 1-1
Location Map

2. ROADWAY IMPROVEMENTS

2.1 Existing Roadways

The project site is accessible from the County-owned segment of Kahekili Highway which, along the project parcel, currently consists of two 11-foot wide vehicle lanes and paved shoulders[2] within a narrow 40-foot wide right-of-way.

2.2 Proposed Improvements

2.2.1 Vehicular Access

Two new intersections will be constructed along Kahekili Highway to provide access into the development area. New 60 ft. wide County-standard collector streets will extend inward from these intersections to create two large loops that will provide primary access to the interior of the development. Minor streets, lanes and driveways will, in turn, connect to these two collector streets and provide local secondary access to individual dwellings. (See Figures 2-1 and 2-2)

2.2.2 Bike and Pedestrian Access

County-standard five- and six-foot wide concrete sidewalks will be constructed along one side of Kahekili Highway and along all curbed interior streets to create a network of safe, walkable routes linking residences to parks, the neighborhood commercial area, and each other.

---

[2] The paved shoulders along Kahekili Highway differ in width. The east (makai) shoulder is approximately 8 feet wide; the west (mauka) shoulder is approximately 4 feet wide.

The line of existing telephone poles along the west (mauka) side of Kahekili Highway will be relocated out of the way so that the narrow existing shoulder can be widened to create a 7-foot wide bike lane comparable to the paved shoulder on the east (makai) side of the Highway. The new internal collector streets will also include an 8-foot wide concrete path suitable for both walking and biking along one shoulder which will make the interior of the development fully accessible by bicycle. (See Figures 2-1 and 2-2)

2.3 Proposed Exemptions

The following exemptions to Maui County Code Section 16.26B.3600 (Chapter 36: Improvements to Public Streets)[3] and Maui County Code Section 18.20.040.B (Existing Streets)[4] may be sought in order to limit access improvements to those described above.

---

[3] Ref. MCC 16.26B.3600 - Chapter 36: Improvements to Public Streets.
"Where public streets are adjacent to the property on which any new structures(s) will be situated ... improvements as may be required by the [Public Works] director shall be constructed on those portions of the streets adjacent to the property. Improvements may include, but shall not be limited to, pavement widening, construction of sidewalks, curbs, gutters, swales, drainage improvements, driveways, curb ramps, striping, signage, relocation of utilities, and placement of utilities underground....In determining appropriate improvement and road widening requirements, the [Public Works] director may take into consideration the Maui County General Plan, Community Plans, standards of title 18 of the Maui County Code, future roadway improvement plans, or any other development standard on file with the department....

[4] Ref. MCC 18.20.040.B - Existing streets.
"...the [Public Works] director may require such additional improvements as may be practicable, up to and including curbs, gutters, and sidewalks; and... the subdivider shall provide the minimum conforming width of improvements ... along the entire length of the existing street providing access to the subdivision, or the director shall deny the subdivision."

2.3.1 EXEMPTION #1: If the project is required to participate in offsite traffic improvements with other private or government entities, the Applicant will request that the project be allowed to fully and immediately satisfy its obligation by making a cash payment to Maui County that is equivalent in value to the project's pro rata share of those improvements plus reasonable administrative costs instead of having to await the completion of design, permitting and construction of those shared offsite traffic improvements prior to receiving permits for and occupancy of any phase of development.

2.3.2 EXEMPTION #2: Exempt the development from having to install concrete curbs, gutters and sidewalks along Kahekili Highway where the abutting lands will remain in open space or agricultural use.

TMK 3-3-002: 001
Wahi Hoomalu LP
(Owner)

TRUE NORTH
SCALE: 1 IN. = 500 FT.

MALAIHI ROAD

WAILUKU COUNTRY ESTATES

KAHEKILI HIGHWAY

MAKAALA DRIVE

WAIEHU HEIGHTS SUBDIVISION

WAIEHU BEACH ROAD

LEGEND:

- HIGHWAY WIDENING
- INTERNAL COLLECTOR STREET
- SHARED BIKE AND WALKING PATH (LOCATED ON ROAD SHOULDER)
- NEW CURBSIDE BIKE LANE
- EXISTING PAVED SHOULDER USED AS BIKE LANE

FIGURE 2-1
Bike and Vehicular Access Plan

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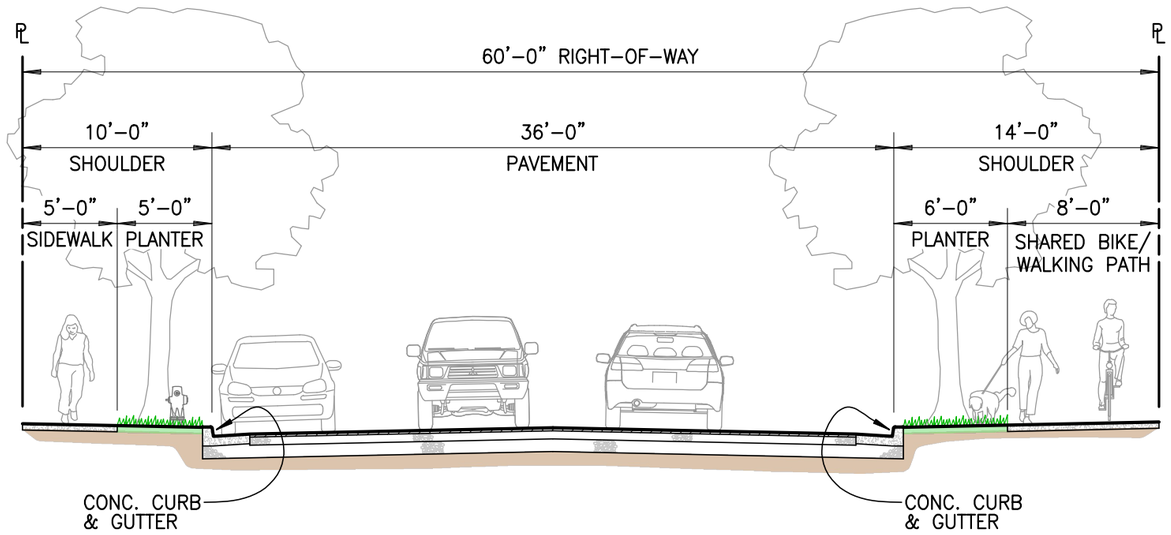
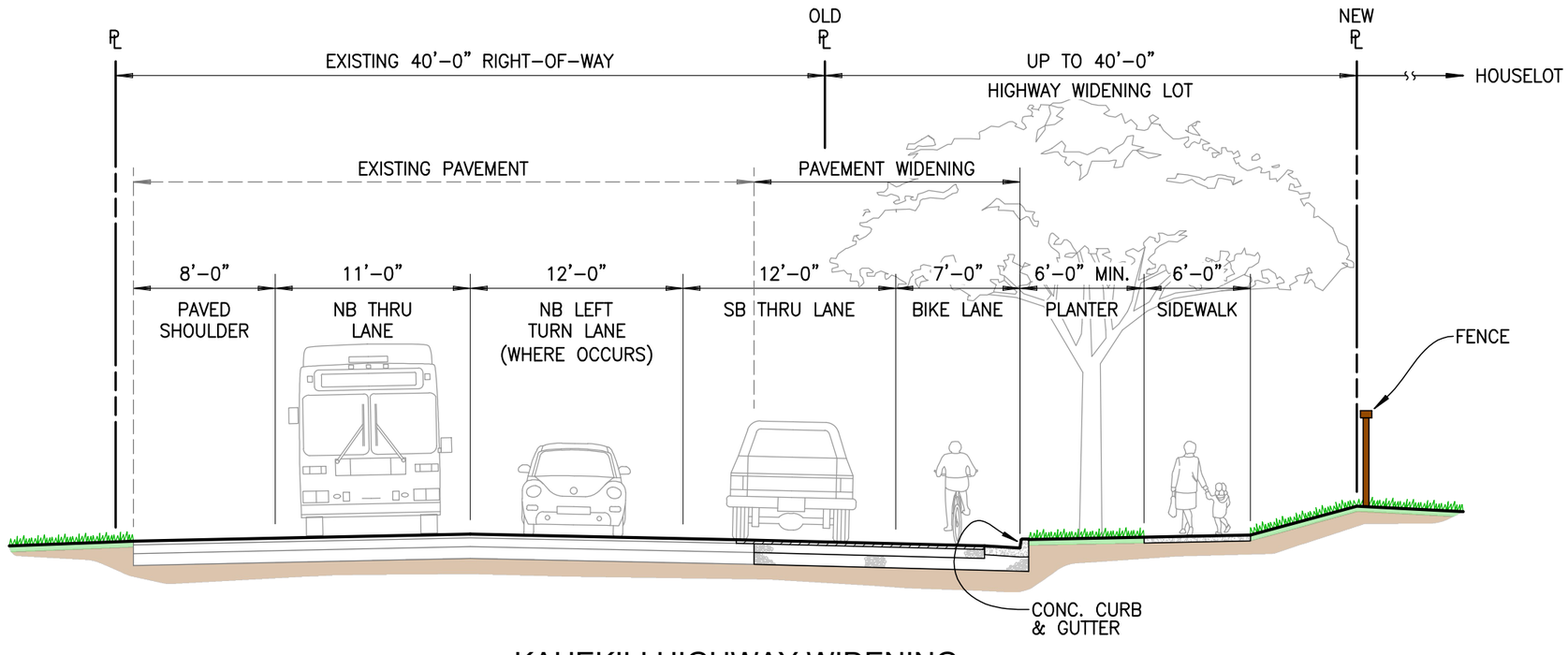


INTERNAL COLLECTOR STREET

SCALE: 1/8" = 1'-0"



KAHEKILI HIGHWAY WIDENING

SCALE: 1/8" = 1'-0"

FIGURE 2-2
Typical Roadway Sections

3. DRAINAGE

3.1 Existing Conditions

3.1.1 Topography and Soils

The project parcel slopes downward west-to-east at an average grade of approximately 6 percent, and south-to-north at an average grade of 4 percent. Elevations across the parcel range from 270 feet at its high point near its western boundary to 58 feet at its northeastern tip. Three existing drainageways cross the parcel. The alignments of Spreckels Ditch -- a sugar plantation era irrigation ditch -- defines the parcel's southwestern boundary; Waiehu Stream its northwestern boundary; and Kahekili Highway its western boundary.

The *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii* identifies the soil types present on the project site as Iao silty clay (IaA), Iao cobbly silty clay (IbB), and Wailuku silty clay (WvC). Iao silty clays are reportedly slow runoff soils posing a moderate erosion hazard; Iao cobbly silty clays are medium runoff soils posing a moderate erosion hazard; and Wailuku silty clays are slow to medium runoff soils with moderate permeability posing a slight to moderate erosion hazard.[5] (See Figure 3-1)

[5] United States Department of Agriculture, Soil Conservation Service, *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*, pp. 46,47, & 133, Maps 98-99, August 1972.

3.1.2 Flood and Tsunami Zone

The Flood Insurance Rate Map for Maui County locates most of the project parcel outside the 500-year floodplain and tsunami zone in Zone X. However, a small area along Waiehu Stream at the northeastern tip of the parcel lies within Special Flood Hazard Area Zones A and AE and is subject to 100-year flooding.[6]

3.1.3 Existing Drainage Conditions

Offsite Flows

The undeveloped project site receives offsite flows from approximately 3,600 acres of lands located above and to the west of the project site. Runoff from these offsite lands passes through the project site in three distinct drainageways which eventually converge into the main stem of Waiehu Stream near the Kahekili Highway / Waiehu Beach Road intersection. (See Figures 3-2 and 3-3)

Waiehu Stream drains approximately 2,854 acres of land above the project area and conveys a 100-year storm flow of approximately 5,550 cfs[7] along the northern boundary of the project parcel before crossing its

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[6] U.S. Department of Homeland Security, Federal Emergency Management Agency, *Flood Insurance Rate Map, Maui County, Hawaii,* Community-Panel Number 150003 0383E, September 25, 2009.

A DLNR Flood Hazard Assessment Report for the project parcel at TMK 3-3-002: 031 can be found in Appendix A-1.

[7] U.S. Department of Homeland Security, Federal Emergency Management Agency, *Flood Insurance Study, Maui County, Hawaii*, Community-Panel Number 150003V001D, November 4, 2015, Table 2, p.35.

northeastern tip on its way across Kahekili Highway to the Ocean.

Gully 1 drains approximately 637 acres of land above the project area and conveys a storm flow of approximately 1,575 cfs at the western boundary of the project parcel. Gully 1 continues across the project parcel to an existing 48-inch culvert crossing at Kahekili Highway, then along the base of the Waiehu sand dune before crossing Waiehu Beach Road and flowing into the main stem of Waiehu Stream.

Gully 2 drains approximately 138 acres of land above the project area and conveys a storm flow of approximately 365 cfs into the project parcel at its western (mauka) boundary. Gully 2 continues across the project parcel until it converges with the main stem of Waiehu Stream just upstream of the point where Waiehu Stream crosses Kahekili Highway.

Table 3-1

Offsite Drainage Summary[8]

Drainage Area	Receiving Drainageway	Approx. Area Draining to Receiving Drainageway	Pre-Development Peak Runoff (100 yr / 24 hr)
A	Gully 1	637 Ac.	1,575 cfs
B	Gully 2	138 Ac.	365 cfs
C	Waiehu Stream	2,854 Ac.	5,550 cfs
Total		3,629 Ac.	7,490 cfs

[8] See Appendix A-2 for supporting calculations.

Onsite Flows

The existing, undeveloped 238-acre project site generates a 100-year storm flow of approximately 282 cfs. Figure 3-4 indicates which portions of the project site drain into Gullies 1, 2 and Waiehu Stream. Flow rates are summarized in Table 3-2.

Table 3-2

Pre-Development Onsite Drainage Summary[9]

Drainage Area	Receiving Drainageway	Approx. Area Draining to Receiving Drainageway	Pre-Development Peak Runnoff (100 yr / 24 hr)
1	Gully 1	11 Ac.	13 cfs
2	Gully 2	201 Ac.	238 cfs
3	Waiehu Stream	26 Ac.	31 cfs
Total		238 Ac.	282 cfs

[9] See Appendix A-3 for supporting calculations.

3.2 Drainage Plan

3.2.1 Projected Increase in Onsite Runoff Due to Development

Only a portion of the 238-acre project parcel will be developed. The central 158 acres closest to Kahekili Highway will be developed into a compact residential community, while approximately 80 acres will remain as undeveloped and used as open space. Once developed, the 100-year peak flow generated by Drainage Area 2 is expected to increase to 580 cfs – a 342 cfs increase over existing flows. Drainage Areas 1 and 3, which will not be developed, will remain at their pre-development levels. Figure 3-5 illustrates the onsite drainage pattern following development. Table 3-3 summarizes the post-development drainage condition before mitigation measures have been applied.

Table 3-3

Post-Development Onsite Drainage Summary Before Mitigation[10]

Drainage Area	Receiving Drainageway	Approx. Area Draining to Receiving Facility	Pre-Development Peak Runoff (100 yr / 24 hr)	Post-Development Peak Runoff BEFORE Mitigation	Net Change Peak Flow BEFORE Mitigation
1	Gully 1	11 Ac.	13 cfs	13 cfs	0 cfs
2	Gully 2	206 Ac.	238 cfs	580 cfs	+342 cfs
3	Waiehu Stream	21 Ac.	31 cfs	≤ 31 cfs	≤ 0 cfs
Total		238 Ac.	282 cfs	624 cfs	+342 cfs

[10] See Appendix A-4 for supporting calculations.

3.2.2 Proposed Improvements

Runoff from offsite lands and undeveloped onsite lands remaining in open space will pass through the project parcel conveyed in open drainageways in the manner allowed under Maui County's Storm Drainage Rules.[11]

Runoff from the developed lands will be captured by a conventional urban storm drainage system consisting of curbside drain inlets and underground drain pipes installed within the roads which will collect runoff from rooftops, yards and pavements and convey it to one of two stormwater detention basins constructed within the development for treatment. (See Figure 3-6) These basins will perform two functions.

1) They will suppress the increase in peak flow attributable to development to ensuring that flows released downstream remain at or below pre-development levels so as not to cause flooding downstream.

2) They will provide the "detention-based" treatment required by the Maui County Dept. of Public Works to remove trash and sediment and keep the quality of stormwater released downstream at acceptable levels.[12]

---

[11] Ref. Maui County Administrative Rules, Title 15 Dept. of Public Works, Chapter 4 "Rules for the Design of Storm Drainage Facilities," Section 15-04-06.a, pp. 15-6 and 15-7.

> *"5. In general, natural gullies, waterways, streams and tributaries shall not be replaced with a closed system except at roadway crossings..."*
>
> *"14. Off-site flows may be passed safely through a development provided there are no additional adverse effects ...to adjacent and downstream properties..."*

[12] Ref. Maui County Dept. of Public Works Administrative Rules, Title MC-15, Subtitle 01, Chapter 111, "Rules for the Design of Stormwater Treatment Best Management Practices."

3.2.3 Post-Development Conditions After Application of Mitigation Measures

The use of detention basin treatment will enable the Waiehu Development to fully mitigate its impact on downstream drainage conditions. Table 3-4 summarizes the post-development drainage condition once mitigation measures have been applied. The right-most column describes their effectiveness.

Table 3-4

Post-Development Onsite Drainage Summary After Mitigation[13]

Drainage Area	Receiving Drainageway	Approx. Area Draining to Receiving Facility	Pre-Development Peak Runoff (100 yr / 24 hr)	Post-Development Peak Runoff *BEFORE* Mitigation	Post-Development Peak Runoff *AFTER* Mitigation	Net Change in Peak Flow *AFTER* Mitigation
1	Gully 1	11 Ac.	13 cfs	13 cfs	13 cfs	0 cfs
2	Gully 2	206 Ac.	238 cfs	580 cfs	≤ 238 cfs	≤ 0 cfs
3	Waiehu Stream	21 Ac.	31 cfs	≤ 31 cfs	≤ 31 cfs	≤ 0 cfs
Total		238 Ac.	282 cfs	624 cfs	≤ 282 cfs	≤ 0 cfs

[13] See Appendix A-5 for detention basin calculations.

3.3 Proposed Exemption

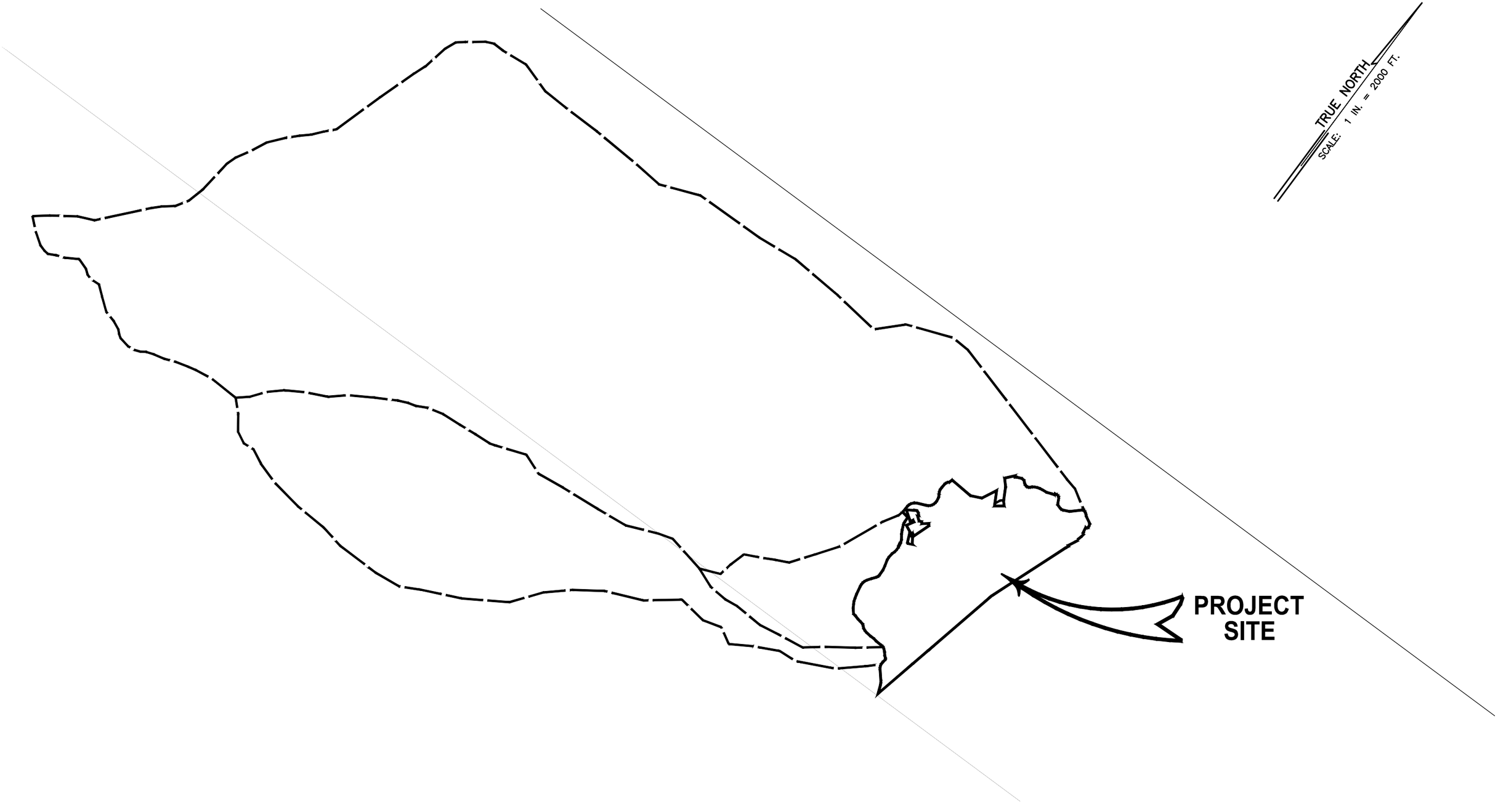
The following exemption to Maui County Code Section 16.26B.3600 (Chapter 36: Improvements to Public Streets)[14] and Maui County Administrative Rules Section 15-04-06.a.10 (Storm Drainage Design Standards)[15] may be sought in order to limit drainage improvements to those described above.

EXEMPTION #3: Exempt development from having to replace the existing 48-inch drainage culvert crossing Kahekili Highway with a larger culvert to meet current County drainage standards.

---

[14] Ref. MCC 16.26B.3600 - Chapter 36: Improvements to Public Streets.
"Where public streets are adjacent to the property on which any new structures(s) will be situated ... improvements as may be required by the [Public Works] director shall be constructed on those portions of the streets adjacent to the property. Improvements may include, but shall not be limited to, pavement widening, construction of sidewalks, curbs, gutters, swales, drainage improvements, driveways, curb ramps, striping, signage, relocation of utilities, and placement of utilities underground....In determining appropriate improvement and road widening requirements, the [Public Works] director may take into consideration the Maui County General Plan, Community Plans, standards of title 18 of the Maui County Code, future roadway improvement plans, or any other development standard on file with the department....

[15] Ref. Maui County Administrative Rules, Title 15 Dept. of Public Works, Chapter 4 "Rules for the Design of Storm Drainage Facilities," Section 6.a.10 (Design Standards).
"In areas where existing drainage systems are inadequate, the existing system shall be upgraded to handle runoff from the new project area..."



Source:
U.S. Department of Agriculture, Soil Conservation Service, "Soil Survey of Island of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii", August 1972, Maps 98 and 99.

FIGURE 3-1
Soil Survey Map

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TRUE NORTH

SCALE: 1 IN. = 1000 FT.

PROJECT SITE

Gully 1

Gully 2

South

North

Waiehu Stream

Waiehu Stream

MAEAIHI ROAD

KAHEKILI HIGHWAY

KAHEKILI HIGHWAY

WAILUKU COUNTRY ESTATES

WAIEHU GOLF COURSE

WAIEHU HEIGHTS SUBDIVISION

MAKAALA DRIVE

WAILUKU RIVER

MILLYARD

LOWER MAIN STREET

WAIEHU BEACH ROAD

LEISURE ESTATES

OCEAN

WAIEHU STREAM DISCHARGES INTO OCEAN HERE

V:\Projdata\20PROJ\20012 - Waiehu 201H Genova\dwg\exhibits\Drainage\Drainage-Overview-00.dwg

FIGURE 3-2

Existing Drainageways

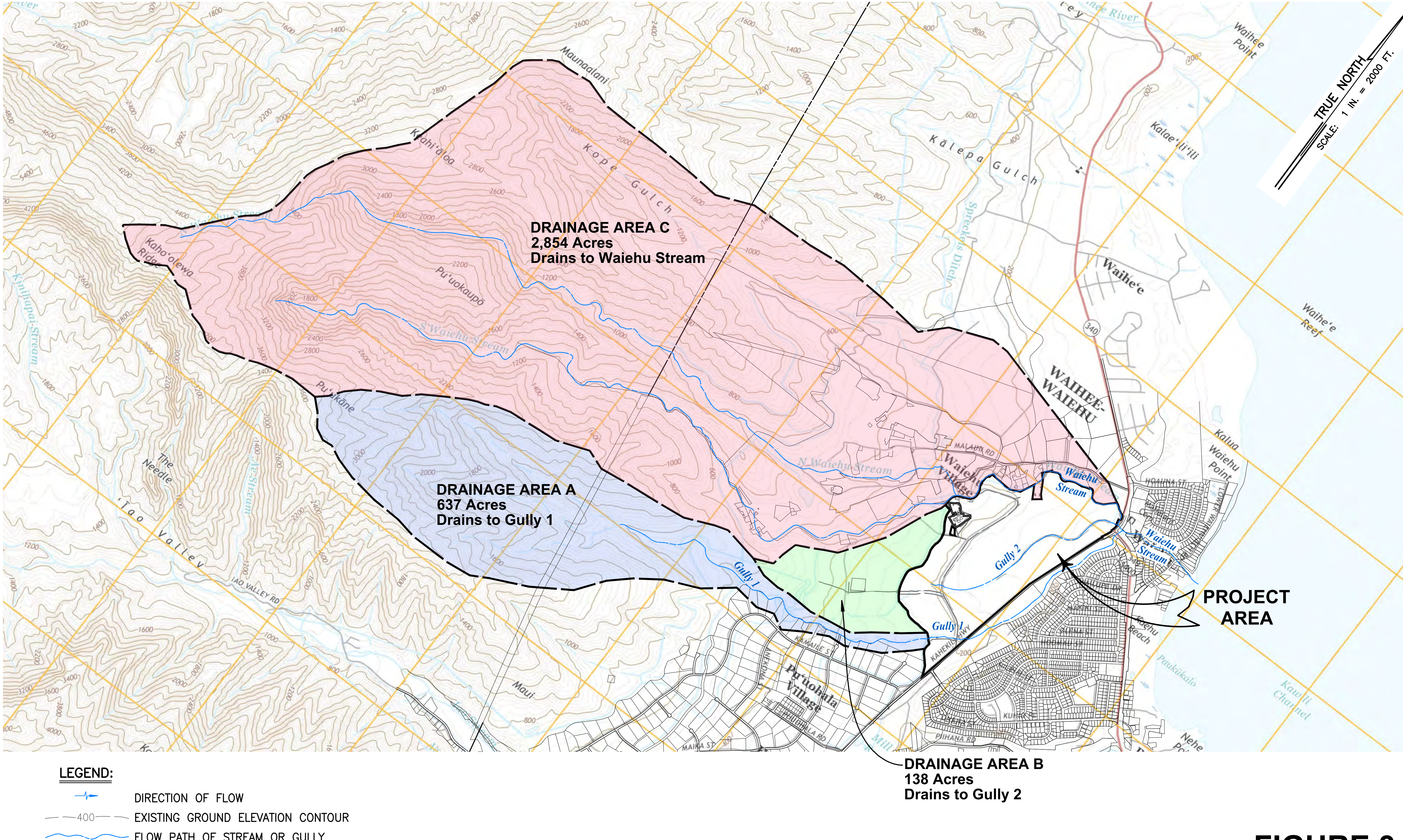

FIGURE 3-3
Existing Offsite Drainage Pattern

V:\Projdata\20PROJ\20012 – Waiehu 201H Genova\dwg\exhibits\Drainage\Pre-Development-Drainage-00.dwg

TRUE NORTH
SCALE: 1 IN. = 500 FT.

TMK 3-3-002: 001
Wahi Hoomalu LP
(Owner)

DRAINAGE AREA 3
26 Acres
Drains to Waiehu Stream

DRAINAGE AREA 2
201 Acres
Drains to Gully 2

DRAINAGE AREA 1
11 Acres
Drains to Gully 1

Gully 1
Gully 2
Waiehu Stream
Waiehu Stream

Ext'g 48" Culvert Crossing

Ext'g Culvert Crossing

APPROX. 100-YEAR INUNDATION LIMITS SHOWN ON FEMA FLOOD INSURANCE MAP

A
AE

MALAIHI ROAD
KAHEKILI HIGHWAY
WAIEHU BEACH ROAD
WAILUKU COUNTRY ESTATES
MAKAALA DRIVE
WAIEHU HEIGHTS SUBDIVISION

LEGEND:

- DIRECTION OF FLOW
- 400 EXISTING GROUND ELEVATION CONTOUR
- FLOW PATH OF STREAM OR GULLY

FIGURE 3-4
Existing Onsite Drainage Pattern

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LEGEND:

- DIRECTION OF FLOW
- 400 EXISTING GROUND ELEVATION CONTOUR
- FLOW PATH OF STREAM OR GULLY

FIGURE 3-5
Post-Development Drainage Plan

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TRUE NORTH
SCALE: 1 IN. = 500 FT.

TMK 3-3-002: 001
Wahi Hoomalu LP
(Owner)

MALAIHI ROAD

WAILUKU COUNTRY ESTATES

Waiehu Stream

Gully 1

Gully 2

BASIN #2

BASIN #1

30"

48"

54"

66"

72"

78"

84"

24"

Ext'g 48" Culvert Crossing

KAHEKILI HIGHWAY

MAKAALA DRIVE

WAIEHU HEIGHTS SUBDIVISION

WAIEHU BEACH ROAD

Ext'g Culvert Crossing

Waiehu Stream

LEGEND:

- DIRECTION OF FLOW
- 24" NEW DRAINLINE W/ SIZE
- 24" EXISTING DRAINLINE W/ SIZE
- FLOW PATH OF DRAINAGEWAY

FIGURE 3-6
Drainage System Improvements

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4. WATER

4.1 Existing Infrastructure

The Waiehu Development lies within the Iao Aquifer Groundwater Management Area and Na Wai Eha Surface Water Mangement Area, both of which are under the control of the State of Hawaii Department of Land and Natural Resources' Commission on Water Resource Management (CWRM). The proposed development lacks any water rights or capacity allocation from CWRM, and will therefore be completely dependent upon the Maui County Department of Water Supply (DWS) for potable water.

The proposed development is located within a portion of DWS' Central Maui service area where DWS' existing water source, storage and distribution systems lack sufficient capacity to serve the project demand without significant improvements being made.

4.2 Projected Demand

4.2.1 Domestic Consumption

The proposed development is expected to consume between 367,000 and 490,000 gallons of potable water per day.[16]

[16] See Appendix B-1 for unit-based and area-based water demand calculations.

4.2.2 Fire Protection

The proposed project will also require a fire protection system capable of delivering a fire flow of 2,000 gallons per minute (gpm) sustainable for 2 hours to protect the multi-family and neighborhood commercial areas within the development.[17] Duplex and single-family residential areas will require a sustained fire flow of 1,250 gpm and 1,000 gpm, respectively.

4.3 Needed Improvements

4.3.1 Water Source

No new water sources will be developed by the proposed project, as the project lacks the necessary water rights to enable it to do so. It therefore must depend upon the Maui County Department of Water Supply for potable water. This potable water is expected to come from DWS' existing groundwater wells located in upper Waiehu and North Waihee which draw groundwater from the Iao and Waihee aquifers.

DWS has indicated that it is currently drawing an amount of water from its existing wells in the Iao and Waihee aquifers which is close to the maximum pumpage recommended by CWRM. While there are strategies Maui County has identified to develop new source capacity or free existing capacity for the other

[17] Required fire flows are specified by Maui County Code Section 14.05.090.D (Fire Protection) and Maui County Department of Water Supply *Water System Standards*, 2002, Table 100-19, p.111-4. See Appendix B-2 for a calculation of the minimum storage tank capacity needed for fire protection.

uses,[18] they will take time to pursue so there may not be a sufficient quantity of water at the outset to build out the entire development. Consequently, the project may have to phase development and time its build-out to reflect the availability of water source capacity.

4.3.2 Storage Reservoir

The project proposes to construct a new 1.0 million gallon (MG) capacity[19] water storage tank at an elevation fully compatible with the Dept. of Water Supply's Waiehu Heights 0.3 MG and Waiehu Kou 0.5 MG water storage tanks. The new 1.0 MG tank will be configured so that it is filled primarily from DWS' Central Maui Water Transmission System, or alternately from DWS' Waiehu wells for added reliability, and will be dedicated to DWS upon completion.

(See Figure 4-1)

---

[18] Maui County Department of Water Supply's March 2019 (Draft) *Maui Island Water Use and Development Plan* discusses possible strategies to make more water available. Two examples include:

a) Development of a new basal well in the southern portion of Waihe'e aquifer, whose potential yield is estimated to be 1.6 MGD; *[Ref. Maui Island Water Use and Development Plan, Part III: Regional Plans, Wailuku Aquifer Sector Area, Strategy #4, pp.104-105.]* and

b) Expanding distribution of R-1 Reclaimed Wastewater from the Kihei Wastewater Treatment Facility to offset (reduce) potable water use from the Iao and Waihee aquifers. *[Ref. Maui Island Water Use and Development Plan, Part III: Regional Plans, Wailuku Aquifer Sector Area, Strategy #9, pp.116-117.]*

[19] See Appendix B-1 for calculation of required storage tank size.

4.3.3 Distribution System

A primary distribution loop consisting of County-standard 12-inch diameter waterlines will be extended into the development area from the existing 16-inch transmission main used by DWS to serve the Waiehu Heights subdivision. Each of the residential areas comprising the Waiehu Development will, in turn, draw water for domestic use and fire protection from this primary distribution loop. (See Figure 4-1)

Fire hydrants will be installed along the internal streets throughout the development at a minimum spacing of 250 feet in multi-family and neighborhood commercial areas, and 350 feet in duplex and single-family residential areas.

4.4 Proposed Exemption

The following exemption to Maui County Administrative Rules Section 16-201-05 (Daily water usage)[20] may be sought in order to limit improvements to those described above.

EXEMPTION #4: Exempt the undeveloped portions of the project parcel which will remain in open space use under agricultural zoning from water source requirements when subdividing.

---

[20] Ref. Maui County Administrative Rules, Title 16 Dept. of Water Supply, Chapter 201, "Rules Relating to Water Service", Section 16-201-05 (Daily water usage).

"Calculations of daily water usage shall be based on the department's Water System Standards (2002), as amended..."

SECONDARY WATER SOURCE
to be Waiehu Heights Wells
via Interconnection with Existing
Waiehu Heights / Waiehu Kou
Water Storage Tanks

NEW 1.0 MG WATER STORAGE TANK
SERVING GENOVA WAIEHU DEVELOPMENT
Spillway Elevation 362'
Floor Elevation ±342'

±1.5 ACRE LOT to be Purchased
and Dedicated to Maui County DWS
to Accommodate New Tank

OUTFLOW LINE FROM NEW TANK
Connected to Existing 16" Distribution Main
Serving Waiehu Heights and Waiehu Kou
Subdivisions

Existing Storage Tanks

TMK 3-3-002: 001
Wahi Hoomalu LP
(Owner)

From CMWTS Tank
at Elev. 491'

To WCE
Low Level Tank

PRIMARY WATER SOURCE
to be CMWTS / North Waihee Wells
via Connection to 12" Transmission
Line Tap Installed by
Wailuku Country Estates

TRUE NORTH
SCALE: 1 IN. = 500 FT.

MALAIHI ROAD

ELEV. 235'
(50 psi)

TOP OF SERVICE ZONE

ELEV. 235'
(50 psi)

BOTTOM OF SERVICE ZONE

ELEV. 60'
(125 psi)

ELEV. 60'
(125 psi)

To Waiehu Kou Subd.

To Waiehu Hts. Subd.

To Kihei

WAILUKU COUNTRY ESTATES

KAHEKILI HIGHWAY

MAKAALA DRIVE

WAIEHU HEIGHTS SUBDIVISION

WAIEHU BEACH ROAD

LEGEND:

42" — EXISTING WATERLINE W/ LINE SIZE
(CENTRAL MAUI WATER TRANSMISSIONS SYSTEM)

16" — EXISTING WATERLINE W/ LINE SIZE
(WAIEHU HEIGHTS/WAIEHU KOU SYSTEM)

12" — NEW WATERLINE W/ LINE SIZE

RED SHADING DENOTES AREA IN WHICH WATER PRESSURE CREATED BY NEW STORAGE TANK MEETS MAUI COUNTY DEPT. OF WATER SUPPLY SERVICE STANDARDS

FIGURE 4-1
Potable Water System
Improvements

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5. WASTEWATER

5.1 Existing Infrastructure

The land parcel on which the project is located currently has no sewer service; however, the nearby urban areas to the east are served by the County of Maui's sewerage system, which collects wastewater and conveys it through a series of pumping stations and large capacity transmission lines to the Kahului Wastewater Reclamation Facility (KWWRF) for treatment and disposal. The project parcel can, therefore, obtain sewer service by making the improvements necessary to extend the existing County wastewater collection system to the project parcel.

5.2 Projected Demand

The Waiehu Development is expected to generate approximately 255,000 gallons of wastewater per day.[21]

5.3 Needed Improvements

5.3.1 Collection System

A branching network of new gravity sewer pipes will be installed within the internal streets to collect wastewater from the various buildings within the development and convey it to a sewer pumping station located at the low point in the wastewater collection system at the northern end of the development area.

[21] Wastewater demand calculations can be found in Appendix C.

new pressurized force main which will take one of two alternate routes to make a connection to the existing County wastewater collection system. (See Figure 5-1)

- Alternate #1 is a northward route approximately 4,000 feet long that makes a connection to the County's 12-inch gravity main on Waiehu Beach Road.
- Alternate #2 is a 5,500 ft. long southward route along Kahekili Highway that connects to the end 8-inch gravity main on Makaala Drive within the Waiehu Terrace Subdivision.

Both Alternatives converge at an existing County Pumping Station along Waiehu Beach Road which, in turn, conveys the wastewater to the Kahului Wastewater Treatment Facility for disposal.

5.3.2 Treatment Plant Capacity

Average daily wastewater flows received at the County's Kahului Wastewater Reclamation Facility (KWWRF) currently measure approximately 5.7 million gallons per day (MGD), or roughly 72 percent of the plant's 7.9 MGD capacity. KWWRF's current remaining treatment capacity appears able to accommodate the 0.25 MGD of wastewater that Waiehu Development is expected to generate at build-out.

Hawaii State law[22] requires County of Maui to initiate a treatment facility expansion plan once actual wastewater flows reach 75 percent of current plant capacity[23] and implement that plan once actual wastewater flows reach 90 percent of plant capacity. This statutory mandate that treatment capacity be programmed to keep pace with regional demand should enable the Waihee Development to rely on there continuing to be sufficient treatment capacity available into the future as the project develops.

5.4 Proposed Exemptions

The following exemptions to Maui County Dept. of Environmental Management's Wastewater Reclamation Division (WWRD) policy affecting the dedication of improvements may be sought in order to ensure that the wastewater improvements described above may be dedicated to the County of Maui upon completion.[24]

---

[22] Ref. Hawaii Administrative Rules, Title 11, Chapter 62 - Wastewater Systems, Section 23.1,

[23] WWRD reports it has begun work on the facility plan for future expansion of the Kahului Wastewater Reclamation Facility.

[24] Maui County Dept. of Environmental Management Wastewater Reclamation Division adheres to the following policies regarding dedication of sewer improvements.

a) County will not accept [dedication of] sewer easements that traverse private property.
b) Sewer improvements which are located upstream of privately owned wastewater facilities cannot be dedicated to the County of Maui.

5.4.1 EXEMPTION #5: Allow the project pump station and sewer force main to be dedicated to the County of Maui if the pumping station and force main are:

a) constructed to County standards;

b) located within a dedicable lot or easement conforming to MCC 18.16.310.B[25]; and

c) provide reasonable provision to accommodate future wastewater contributions from TMK 3-3-001: 105 and TMK 3-3-001: 106.

5.4.2 EXEMPTION #6: Allow sanitary sewerlines constructed to County standards and located within sewerline easements across private property conforming to MCC 18.16.310.C[26] to be dedicated to the County of Maui.

---

[25] Ref. Maui County Code Chapter 18.16.310.B - Utilities.
"If in the opinion of the director... the most suitable and reasonable location for any of the utilities, such as sewers, storm drains, water and gas pipes, electric and telephone pole lines and conduits, which are likely to be required within a subdivision, either for the service thereof or for the service of areas in the surrounding territory, do not lie wholly within the street width, the director may require provisions to be made for the location as mutually agreed with the subdivider of such utilities on routes elsewhere than within said street width. The subdivider shall designate the required area or areas for all such utility locations outside of the street width."

[26] Ref. Maui County Code Chapter 18.16.310.C - Utilities.
"Easements or rights-of-way for sewers, storm drains, public utilities, and government owned water facilities shall be not less than fifteen feet in width and may be required to be fenced along the perimeter of said easements or rights-of-way and centered on or along rear or side lot lines...except that this width may be modified where the director ... finds that a greater or lesser width is necessary or satisfactory for the purpose of the use of the area. When required by the director, easements or rights-of-way for sewer lines and drain lines shall be conveyed to the County and documents shall be delivered to the council for acceptance...."

WAILUKU COUNTRY ESTATES

TMK 3-3-002: 001
Wahi Hoomalu LP
(Owner)

TRUE NORTH
SCALE: 1 IN. = 500 FT.

Connection to County Gravity Sewer Collection System at Elev = ±220 ft.

FM ALIGNMENT ALTERNATIVE #2
L = ±5,500 l.f.

MAKAALA DRIVE

KAHEKILI HIGHWAY

HILINAI STREET

PUMEHANA STREET

KAWANANAKOA STREET

KALAKAUA STREET

WAIEHU HEIGHTS SUBDIVISION

SEWAGE PUMPING STATION
(Elev = ±85')

OFFSITE CONNECTION ALTERNATIVE #1
L = 4,000 l.f.

To Kahului Wastewater Treatment Facility

Existing Sewage Pump Station

Connection to County Gravity Sewer Collection System at Elev = ±28 ft.

MAALAHI ROAD

WAIEHU BEACH ROAD

LEGEND:

- 8" — NEW SEWER GRAVITY MAIN W/ SIZE
- FM — NEW SEWER FORCE MAIN
- 8" — EXISTING SEWER GRAVITY MAIN W/ SIZE
- 8" — EXISTING SEWER FORCE MAIN W/ SIZE

FIGURE 5-1
Sanitary Sewer Improvements

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6. ELECTRICAL POWER AND TELECOMMUNICATIONS

6.1 Existing Infrastructure

The existing overhead utility lines visible along the mauka side of Kahekili Highway belong to Hawaiian Telcom and do not include any Hawaiian Electric (HECO) or Spectrum facilities. The nearest HECO and Spectrum facilities are located along Kahekili Highway at the Makaala Drive and Waiehu Beach Road intersections.

HECO will likely require that its primary overhead infrastructure be extended from the Makaala Drive / Kahekili Highway intersection, along the project frontage, to its existing facilities near the Waiehu Beach Road / Kahekili Highway intersection where it has a small substation. This substation and its associated facilities may need to be upgraded or expanded to accommodate the additional loading required by the Waiehu Development. The substation upgrade/expansion will likely not prevent the project from proceeding, but may need to be in place before the project is completed.[27]

Spectrum will also likely need to upgrade their overhead infrastructure along the same route as Hawaiian Electric. County requirements normally require overhead utilities along the frontage of an urban development project be installed underground, unless an exemption is received.[28]

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[27] Expanding the existing substation is not expected to take as long as constructing a new substation.

[28] See discussion in Section 6.3 - Proposed Exemption

6.2 Needed Improvements

6.2.1 Hawaiian Electric Company

HECO's preferred configuration for the project's onsite distribution system will likely involve an underground extension from both project entrances on Kahekili Highway to complete a loop within the interior of the project. (See Figure 6-1) The onsite electrical system will be comprised of both three-phase and single-phase underground distribution as required by Maui County, unless a variance is received. The three-phase system will be used mainly to connect switching equipment and service the commercial area of the project. The single-phase system will serve all of the residential units and power street lighting. Pad-mounted switchgear and transformers will be required onsite. Underground distribution facilities (underground conduit, handholes and equipment pads) will be installed by the Developer. Other parts of the system (electrical conductors, pad-mounted transformers, switchgear and street lights) will be installed by HECO. Table 6-1 contains a preliminary estimate of the project's electrical demand load. Distribution facilities will be installed as part of the site work; however, service requests for each individual unit will need to be submitted to HECO separately during construction.

Easements will be required to contain handholes, ducts, equipment pads and other facilities located in private property and ensure vehicular access for their maintenance. Easements will also be needed to cover Hawaiian Telcom's fiber pads and Spectrum's power supply pads.

Table 6-1

Estimated Project Demand Load

Unit Type	Number	HECO Estimate		NEC Estimate
		kW/Lot	Total kW	kW
Townhouses	108	5	540	2,700
Duplex	76	5	380	2,280
Motor Courts	126	5	630	3,780
Bungalow	134	5	670	4,020
SFD Small Lots	149	5	894	4,470
SFD Small Lots	101	6	606	3,030
SFD Lot	58	6	348	1,740
Total	**752**		**4,068**	**22,020**
Commercial	LS			1009 kW

6.2.2 Hawaiian Telcom

Hawaiian Telcom provides telephone and DSL services in the area. No television service is currently available.

Hawaiian Telcom's existing telephone plant serving this area is not sufficient for this project. Fiber optic equipment including a number of fiber distribution hubs (FDH) will be installed to provide telecommunication services to this project. The FDH equipment will act as a hub for the distribution of all

Hawaiian Telcom's telecommunication services within this project. The required telephone support structures will depend upon the easement locations for the fiber distribution hubs (FDH)[29] and Hawaiian Telcom's preferred route of entry from Kahekili Highway. Telephone cables will be installed at Hawaiian Telcom's expense with customers responsible for service connections and monthly rental fees. The distribution path will follow the Hawaiian Electric facilities.

Preferred easement location for FDH equipment will be transmitted upon receipt of information from its planning department when detailed plans are available.

6.2.3 Spectrum

Spectrum is the regulated cable television provider on Maui, but also provides telephone and internet connectivity. Spectrum currently maintains existing overhead facilities along Kahekili Highway at Makaala Drive and Malaihi Road intersections. The path of its new distribution system along the Kahekili Highway project frontage and project interior will follow the Hawaiian Electric facilities. The Developer will be responsible to coordinate the installation of all required on- and offsite infrastructure (ducts, boxes, power supple pad, etc.) with Spectrum at its own expense. Spectrum will require a 4" conduit for their main runs along streets and street crossings with 2" service stub-outs. They will

[29] Preferred locations for FDH equipment easements will be determined by Hawaiian Telcom's planning department and made known once detailed plans are available.

also need a number of power supply pads within the project site. The cost of installing the power supply equipment and all related cabling will be Spectrum's expense. As with the other utilities, it will be the responsibility of the individual home owner to submit his/her own service request for the desired service connection, rental equipment, installation and monthly fees to Spectrum.

Easements will be required to contain any underground facilities located in private property and provide vehicular access for maintenance.

6.2.4 Site Improvements

Project utility improvements will involve the installation of underground service distribution system infrastructure for Hawaiian Electric, Hawaiian Telcom and Spectrum. The normal division of effort has the Developer responsible for installing basic infrastructure -- such as handholes, conduit, and concrete pads for transformers, switchgear and communication equipment -- while the Utility companies bear responsibility for pulling cable and installing their equipment once the basic infrastructure has been installed and accepted. Infrastructure for street lighting -- including conduit, handholes, and concrete light bases -- will also be installed by Developer. Light fixtures will be provided by HECO for all roads that will be dedicated to the County of Maui. Private light fixtures will be the responsibility of the Developer to furnish and install.

All exterior lighting must be full cut-off fixtures compliant with Maui County's Outdoor Lighting Ordinance.[30] Public street lights will be installed at a 20-foot height per HECO and Maui County Standards.[31] If streets remain private, metered pole-mounted street lights may be used for area and street lighting.

Physical space for required utility facilities within the project may be a potential concern as the proposed houselots in some parts of the project are very small. If space does not allow for handhole placement, or if project does not have curbs and gutters, the use of manholes or traffic-rated handholes may be required.

[30] Ref. Maui County Code, Chapter 20.35 - Outdoor Lighting.

[31] Ref. Maui County Administrative Rules, Title 15 Dept. of Public Works, Chapter 901, "Street Lighting Standards," Section 15-901-8(c).

6.3 Proposed Exemptions

The following exemptions to Maui County Code Section 12.16.010 (Placement of Utility Poles)[32], Section 18.20.140.B (Utility lines and facilities)[33] and Section 16.26B.3600 (Improvements to Public Streets)[34] may be requested.

6.3.1 EXEMPTION #7: Exempt the development from the requirement to relocate the existing overhead power and telecom lines along its Kahekili Highway frontage underground. This exemption shall not limit the ability of the Public Works Director to require the underground installation of any new electric, telephone, street lighting, cable television services elsewhere within the project area.

---

[32] Ref. Maui County Code Section 12.16.010 - (Placement of Utility Poles: Council permission required)
"No person, firm, or corporation shall erect or place or cause to be erected or placed upon any public highway in the County, utility poles without first obtaining permission to do so, by resolution, from the county council, or its authorized representatives; provided that the director of public works may permit the installation of utility poles upon a public highway when the height of the new utility poles does not exceed the height of existing poles on the highway by more than five feet and the number of new poles does not exceed six..."

[33] Ref. MCC 18.20.140.B - Utility lines and facilities.
"Utility lines, including but not limited to those required for electric, telephone, street lighting, cable television services and other related facilities, shall be installed underground in all subdivisions laid out within the industrial, business, hotel, apartment and duplex areas in accordance with the applicable standards and methods employed for such underground installation by the public utility companies involved..."

[34] Ref. MCC 16.26B.3600 - Chapter 36: Improvements to Public Streets.
"Where public streets are adjacent to the property on which any new structures(s) will be situated ... improvements as may be required by the [Public Works] director shall be constructed on those portions of the streets adjacent to the property. Improvements may include, but shall not be limited to...relocation of utilities, and placement of utilities underground..."

6.3.2 EXEMPTION #8: Exempt the development from the requirement to obtain a resolution from the Maui County Council to install taller utility poles or more than six new utility poles along Kahekili Highway.

TRUE NORTH

SCALE: 1 IN. = 500 FT.

MALAIHI ROAD

WAILUKU COUNTRY ESTATES

KAHEKILI HIGHWAY

MAKAALA DRIVE

WAIEHU HEIGHTS SUBDIVISION

WAIEHU BEACH ROAD

UG

OH

eOH

Ext'g Telephone Equipment

Ext'g Power Substation

LEGEND:

eOH — EXISTING OVERHEAD UTILITY LINES

OH — NEW OVERHEAD UTILITY LINES

UG — NEW UNDERGROUND UTILITY LINES

FIGURE 6-1

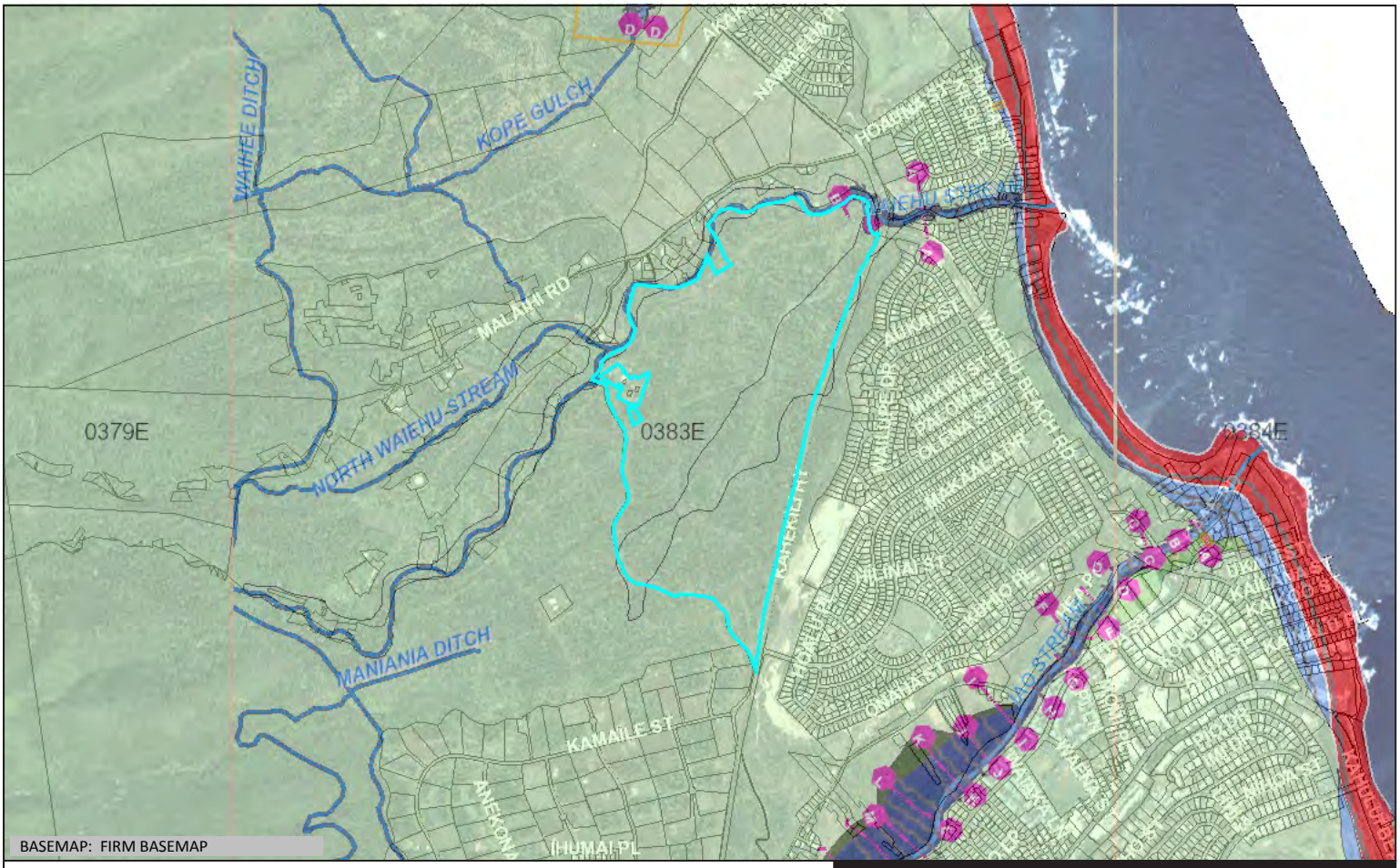
Electrical System Improvements

V:\Projdata\20PROJ\20012 - Waiehu 201H Genova\dwg\exhibits\PER\Electrical System-00.dwg

APPENDIX A

Drainage Calculations

APPENDIX A-1
DLNR Flood Hazard Assessment Report
for TMK 3-3-002: 031



BASEMAP: FIRM BASEMAP

Flood Hazard Assessment Report

www.hawaiinfip.org

Hale Mua Subdivision

Property Information

COUNTY:	MAUI
TMK NO:	(2) 3-3-002:031
WATERSHED:	WAIEHU
PARCEL ADDRESS:	HALE MUA SUBDIVISION WAILUKU, HI 96793

Notes:

Flood Hazard Information

FIRM INDEX DATE:	NOVEMBER 04, 2015
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL:	1500030383E
PANEL EFFECTIVE DATE:	SEPTEMBER 25, 2009

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: NO
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

0 0.30 0.60 mi

Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(*Note: legend does not correspond with NFHL)*

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

	Zone A: No BFE determined.
	Zone AE: BFE determined.
	Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
	Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
	Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
	Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
	Zone AEF: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

	Zone XS (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
	Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

	Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.

APPENDIX A-2

Pre-Development Offsite Runoff (100-yr./24-hr.)

TABLE A-2

Offsite Drainage Summary

Drainage Area	Receiving Drainageway	Approx. Area Draining to Receiving Drainageway	Pre-Development Peak Runoff (100 yr / 24 hr)
A	Gully 1	637 Ac.	1,575 cfs
B	Gully 2	138 Ac.	365 cfs
C	Waiehu Stream	2,854 Ac.	5,550 cfs
Total		3,629 Ac.	7,490 cfs

Hydrologic Calculations Background

The following hydrologic calculations are based on the "Rules for the Design of Storm Drainage Facilities in the County of Maui"[35] and the *Rainfall-Frequency Atlas of the Hawaiian Islands*.[36] NRCS hydrograph method is used for the onsite and offsite drainage areas which exceed 100 acres is based on the 100-year recurrence interval, 24-hour duration storm.[37]

NRCS Method

The hydrology for combined onsite and offsite drainage areas which exceed 100-acre and the design of the onsite drainage basin which receives its stormwater runoff are based on the hydrograph method developed by the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS)[38] and described in the "SCS National Engineering Handbook, Section 4, Hydrology (NEH-4)."

A 100-year recurrence interval, 24-hour duration storm rainfall depth of 12.5 inches was used for the project area. Calculations were carried out using the "Hydroflow Hydrographs Extension for Autodesk Civil 3D". The curve numbers (CN) used in the hydrologic calculations were derived from USDA soil series and hydrologic group information and existing and proposed land uses for the relevant

---

[35] County of Maui, Department of Public Works and Waste Management, "Rules for the Design of Storm Drainage Facilities in the County of Maui", November 2, 1995.

[36] U.S. Department of Commerce, Weather Bureau, Rainfall-Frequency Atlas of the Hawaiian Islands, 1962.

[37] See Appendices A-1, A-2 and A-3 for 100-yr./24-hr. onsite and offsite storm runoff calculations.

[38] Formerly known as the USDA Soil Conservation Service (SCS).

study area as recommended by USDA-NRCS in its publications entitled "Erosion and Sediment Control Guide for Hawaii"[39] and "Urban Hydrology for Small Watersheds."[40] Weighted curve numbers were computed whenever a study area possessed a non-homogeneous mix of characteristics.

[39] U.S. Department of Agriculture, Soil Conservation Service, Erosion and Sediment Control Guide for Hawaii, March 1981.

[40] U.S. Department of Agriculture, Soil Conservation Service, Urban Hydrology for Small Watersheds, June 1986.

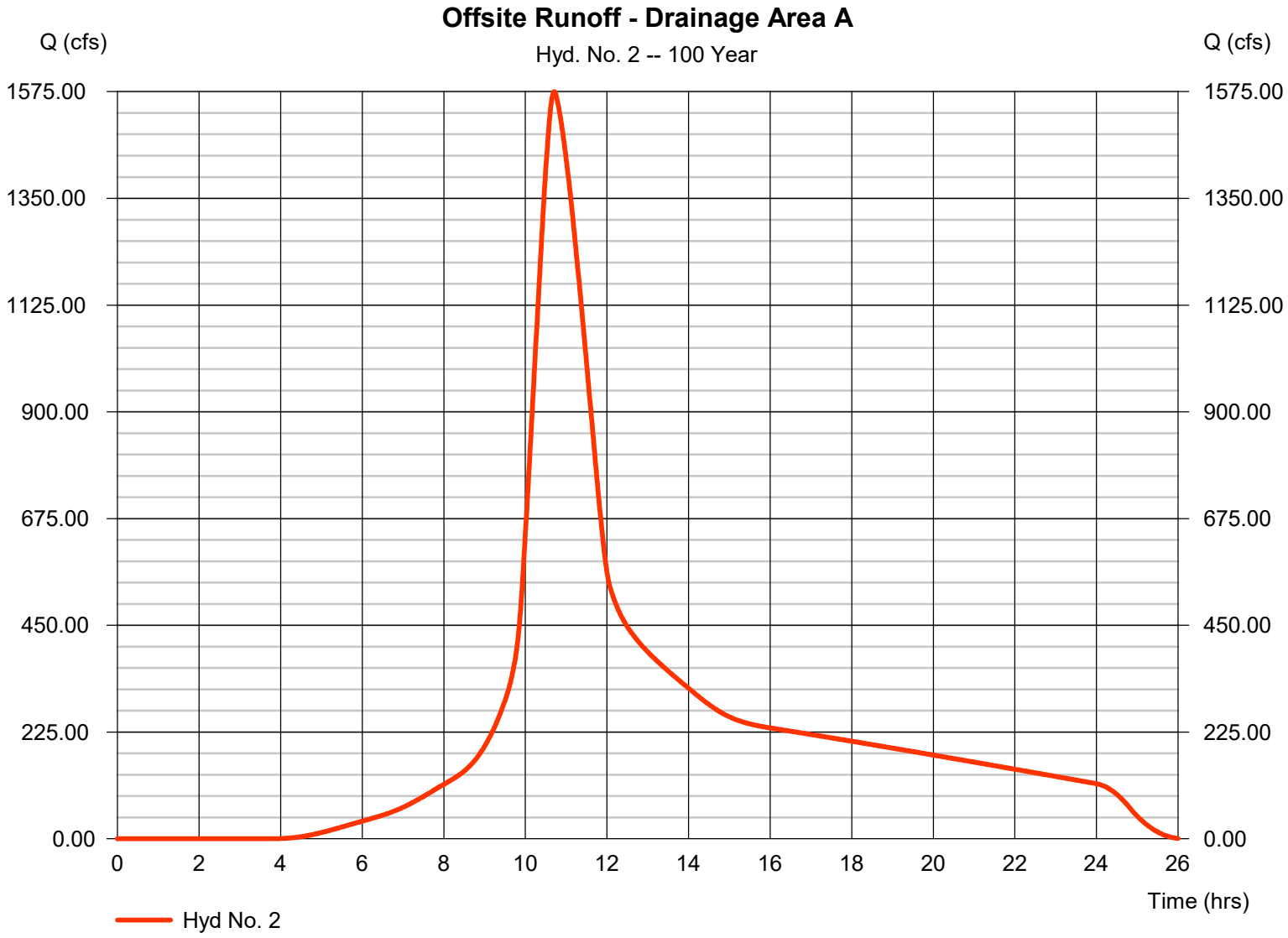
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Monday, 04 / 19 / 2021

Hyd. No. 2

Offsite Runoff - Drainage Area A

Hydrograph type	= SCS Runoff	Peak discharge	= 1574.59 cfs
Storm frequency	= 100 yrs	Time to peak	= 10.72 hrs
Time interval	= 1 min	Hyd. volume	= 20,753,360 cuft
Drainage area	= 637.000 ac	Curve number	= 70
Basin Slope	= 22.3 %	Hydraulic length	= 15640 ft
Tc method	= LAG	Time of conc. (Tc)	= 81.19 min
Total precip.	= 13.00 in	Distribution	= Type I
Storm duration	= 24 hrs	Shape factor	= 484



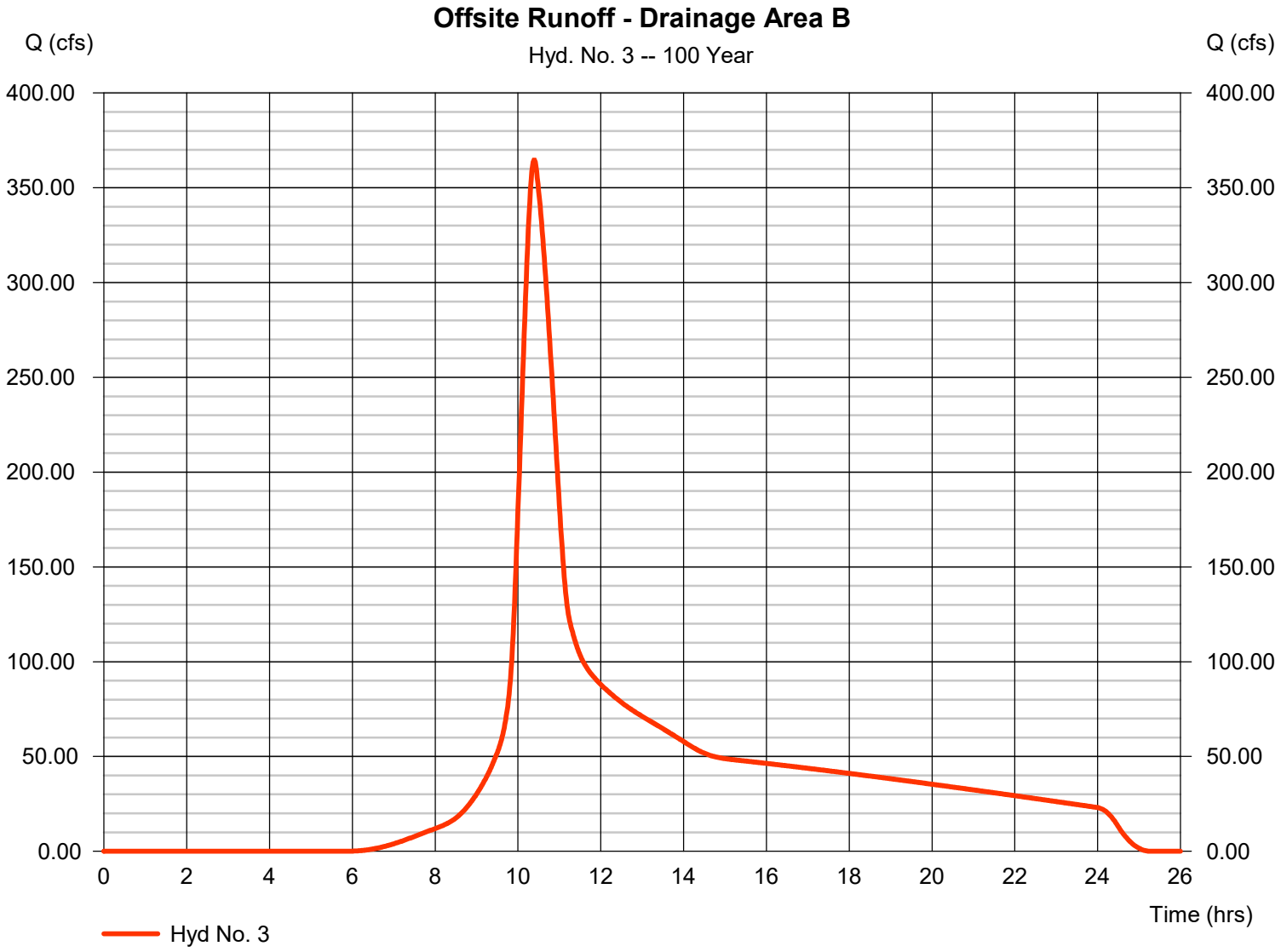
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Monday, 05 / 3 / 2021

Hyd. No. 3

Offsite Runoff - Drainage Area B

Hydrograph type	= SCS Runoff	Peak discharge	= 364.63 cfs
Storm frequency	= 100 yrs	Time to peak	= 10.40 hrs
Time interval	= 1 min	Hyd. volume	= 3,710,963 cuft
Drainage area	= 138.000 ac	Curve number	= 55
Basin Slope	= 11.6 %	Hydraulic length	= 3387 ft
Tc method	= LAG	Time of conc. (Tc)	= 48.73 min
Total precip.	= 14.00 in	Distribution	= Type I
Storm duration	= 24 hrs	Shape factor	= 484



APPENDIX A-3

Pre-Development Onsite Runoff (100-yr./24-hr.)

TABLE A-3

Pre-Development Onsite Drainage Summary

Drainage Area	Receiving Drainageway	Approx. Area Draining to Receiving Drainageway	Pre-Development Peak Runoff (100 yr / 24 hr)
1	Gully 1	11 Ac.	13 cfs
2	Gully 2	201 Ac.	238 cfs
3	Waiehu Stream	26 Ac.	31 cfs
Total		238 Ac.	282 cfs

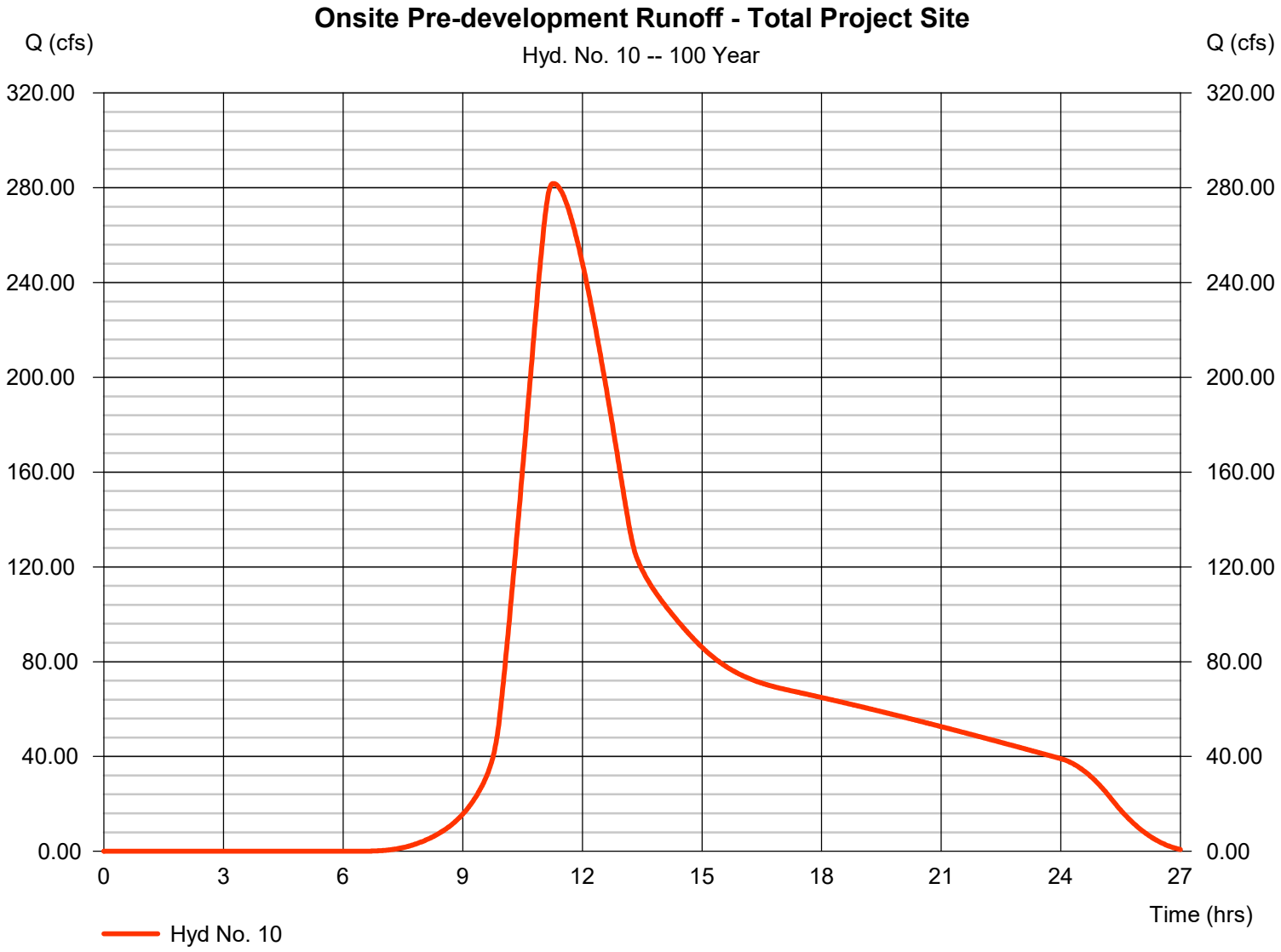
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Monday, 05 / 3 / 2021

Hyd. No. 10

Onsite Pre-development Runoff - Total Project Site

Hydrograph type	= SCS Runoff	Peak discharge	= 281.80 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.28 hrs
Time interval	= 1 min	Hyd. volume	= 5,344,866 cuft
Drainage area	= 238.000 ac	Curve number	= 55
Basin Slope	= 3.5 %	Hydraulic length	= 5465 ft
Tc method	= LAG	Time of conc. (Tc)	= 130.08 min
Total precip.	= 12.50 in	Distribution	= Type I
Storm duration	= 24 hrs	Shape factor	= 484



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Wells Street Professional Center
2145 Wells Street, Suite 403
Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Waiehu 201H Development
Project No.: 20012
Engineer: Aj Nithianantham
Date: 05/04/2021

Description: Pre-development onsite surface runoff.

Area

Drainage Area 1:	11	acres
Drainage Area 2:	201	acres
Drainage Area 3:	26	acres
Total Area (A):	238	acres

Runoff

Description: Total pre-development peak runoff is distributed to individual drainage areas.

Total pre-development peak runoff from hydrograph: 282 cfs

Drainage Area 1:	282 / 238 x 11 = 13 cfs
Drainage Area 2:	282 / 238 x 201 = 238 cfs
Drainage Area 3:	282 / 238 x 26 = 31 cfs

APPENDIX A-4

Post-Development Onsite Runoff (100-yr./24-hr.)

TABLE A-4

Post-Development Onsite Drainage Summary BEFORE Mitigation

Drainage Area	Receiving Drainageway	Approx. Area Draining to Receiving Facility	Pre-Development Peak Runoff (100 yr / 24 hr)	Post-Development Peak Runoff *BEFORE* Mitigation	Net Change in Peak Flow *BEFORE* Mitigation
1	Gully 1	11 Ac.	13 cfs	13 cfs	0 cfs
2	Gully 2	206 Ac.	238 cfs	580 cfs	+342 cfs
3	Waiehu Stream	21 Ac.	31 cfs	$\leq$ 31 cfs	$\leq$ 0 cfs
Total		238 Ac.	282 cfs	624 cfs	+342 cfs

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HYDROLOGIC CALCULATIONS - Surface Runoff

Project Name: Waiehu 201H Development
Project No.: 20012
Engineer: Aj Nithianantham
Date: 05/04/2021

Description: Post-development onsite surface runoff.

Area

Drainage Area 1:	11	acres
Drainage Area 2:	206	acres
Drainage Area 3:	21	acres
Total Area (A):	238	acres

Runoff

Description: Drainage Areas 1 and 3 will not be developed and remain at their pre-development levels

Drainage Area 1:	13	cfs
Drainage Area 2:	580	cfs (from post-development hydrograph)
Drainage Area 3:	31	cfs
Total Area (A):	624	cfs

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Monday, 05 / 3 / 2021

Hyd. No. 18

Post-development Onsite Runoff - Drainage Area 2

Hydrograph type	= SCS Runoff	Peak discharge	= 580.22 cfs
Storm frequency	= 100 yrs	Time to peak	= 10.62 hrs
Time interval	= 1 min	Hyd. volume	= 7,135,675 cuft
Drainage area	= 206.000 ac	Curve number	= 77*
Basin Slope	= 3.5 %	Hydraulic length	= 5465 ft
Tc method	= LAG	Time of conc. (Tc)	= 72.54 min
Total precip.	= 12.50 in	Distribution	= Type I
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(56.000 x 55) + (99.000 x 85) + (51.000 x 85)] / 206.000

APPENDIX A-5

Detention Basin Sizing Calculations

TRUE NORTH
SCALE: 1 IN. = 500 FT.

TRIBUTARY AREA 2
51.0 Acres
Drains to Drainage Basin #2

TRIBUTARY AREA 1
99.0 Acres
Drains to Drainage Basin #1

TMK 3-3-002: 001
Wahi Hoomalu LP
(Owner)

BASIN #2
BASIN #1

Gully 1
Gully 2
Waiehu Stream

APPROX. 100-YEAR INUNDATION LIMITS SHOWN ON FEMA FLOOD INSURANCE MAP

Ext'g 48" Culvert Crossing

Ext'g Culvert Crossing

MALAIHI ROAD
KAHEKILI HIGHWAY
WAILUKU COUNTRY ESTATES
MAKAALA DRIVE
WAIEHU HEIGHTS SUBDIVISION
WAIEHU BEACH ROAD

LEGEND:

- DIRECTION OF FLOW
- 24" NEW DRAINLINE W/ SIZE
- NEW DMH
- LIMITS OF TRIBUTARY DRAINAGE AREA
- 24" EXISTING DRAINLINE W/ SIZE
- FLOW PATH OF DRAINAGEWAY

FIGURE A-5.1
Drainage Basin Tributary Areas

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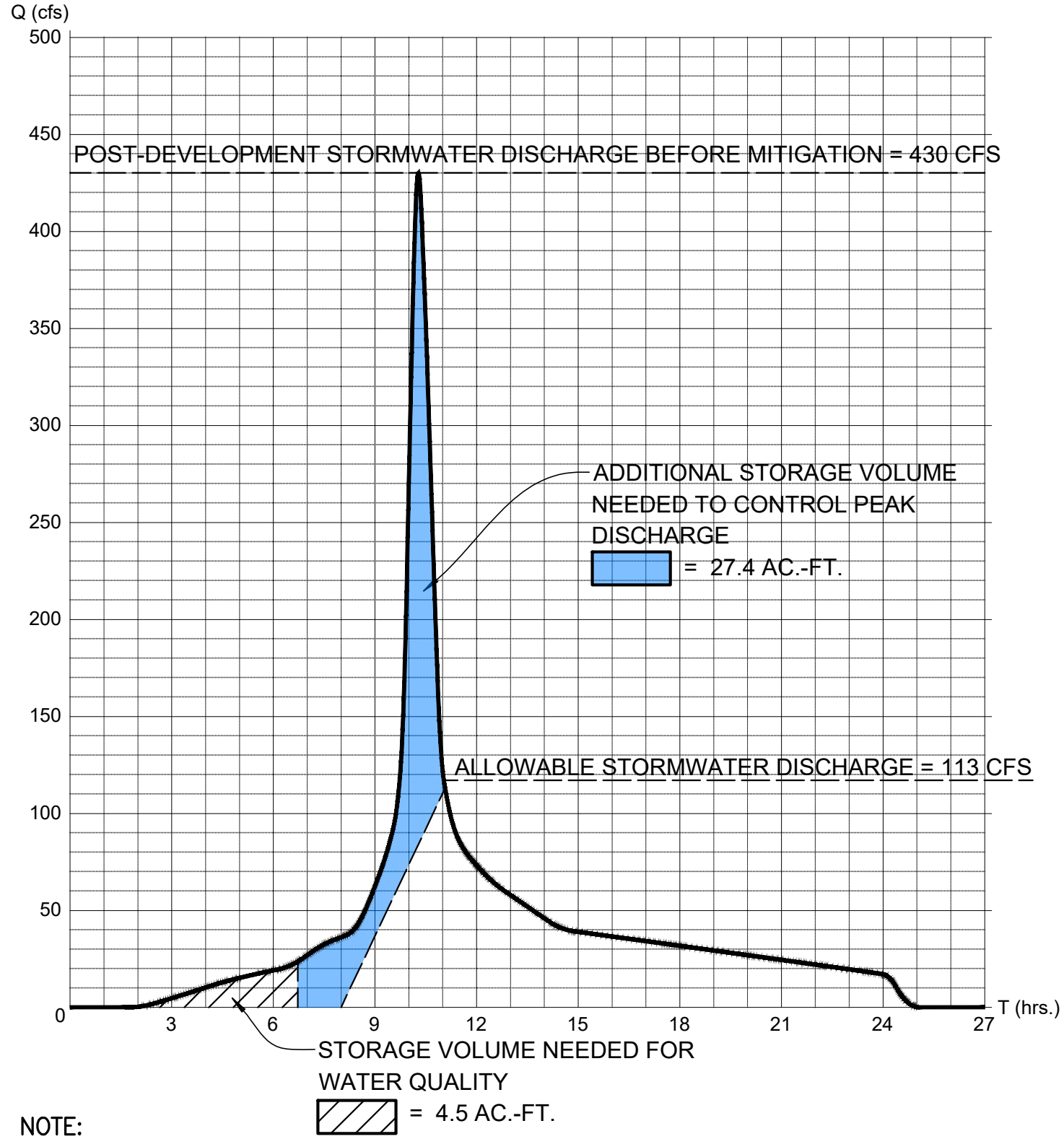
TABLE A-5.1

Minimum Storage Capacities for Drainage Basins 1 and 2

Drainage Area	Receiving Basin	Approx. Area Draining to Receiving Basin	Pre-Development Peak Runoff (100 yr / 24 hr)	Approximate Minimum Detention Storage Volume Required to Ensure Post-Development Peak Flow Does Not Exceed Pre-Development Peak Flow	Minimum 48 hr. Retention Capacity Needed to Meet Maui County Stormwater Quality Requirements	Minimum Basin Volume Needed to Meet Maui County Flood Control and Water Quality Requirements
T-1	Basin #1	99 Ac.	430 cfs	28 Ac-ft	5.0 Ac-ft	33 Ac-ft
T-2	Basin #2	51 Ac.	286 cfs	17 Ac-ft	3.0 Ac-ft	20 Ac-ft



NOTE:

1. TOTAL REQUIRED STORAGE VOLUME = + = 31.9 AC.-FT.
2. HYDROGRAPH DEPICTS 100-YR., 24-HR. STORM FOR WAIEHU, HI

FIGURE A-5.2

Drainage Basin 1 Inflow/Ouflow Hydrograph for 100-Year Storm

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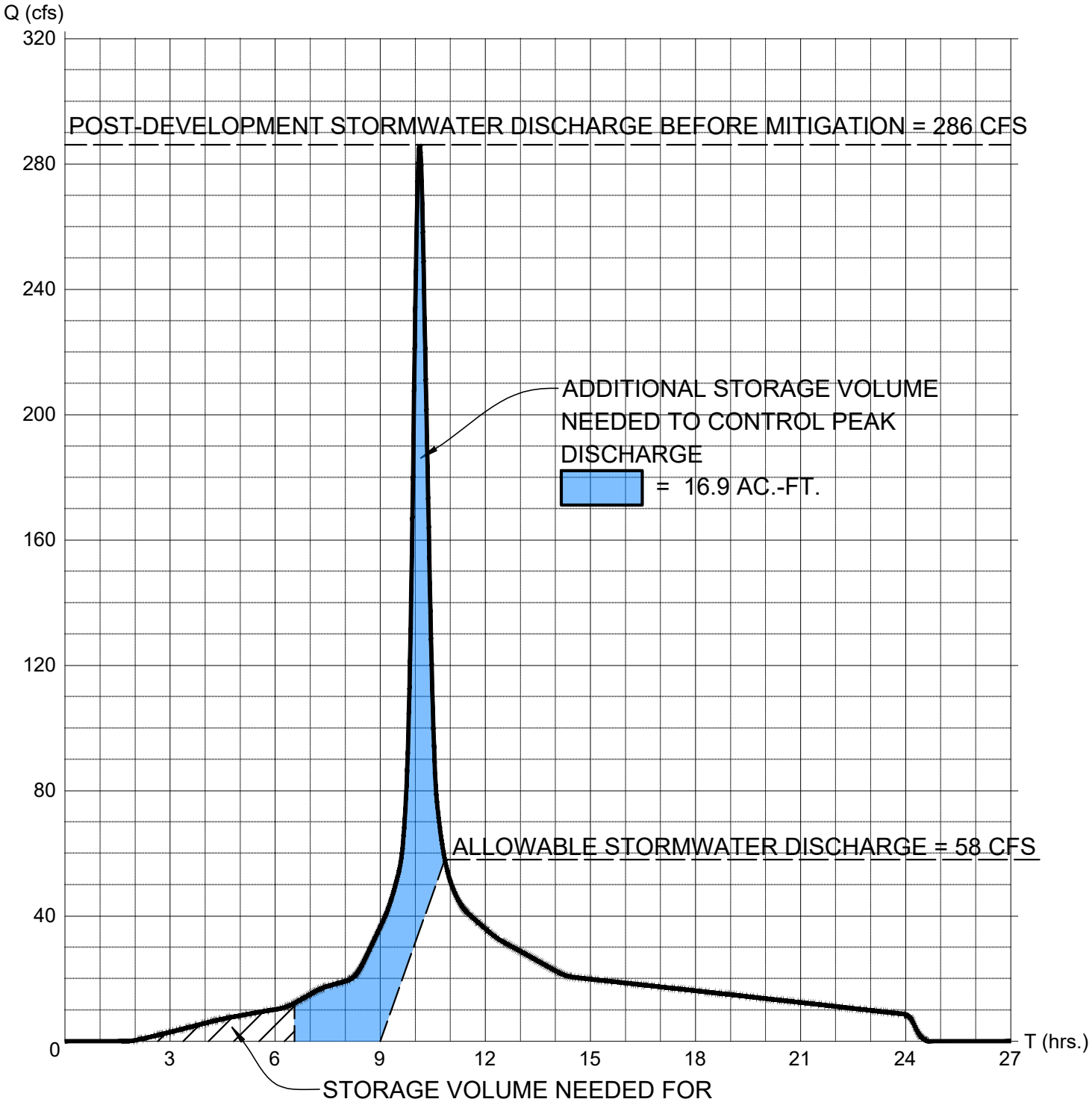

NOTE:

1. TOTAL REQUIRED STORAGE VOLUME = + = 19.2 AC.-FT.
2. HYDROGRAPH DEPICTS 100-YR., 24-HR. STORM FOR WAIEHU, HI

FIGURE A-5.3

Drainage Basin 2 Inflow/Ouflow Hydrograph for 100-Year Storm

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Peak Runoff Calculations for Drainage Basin Tributary Areas

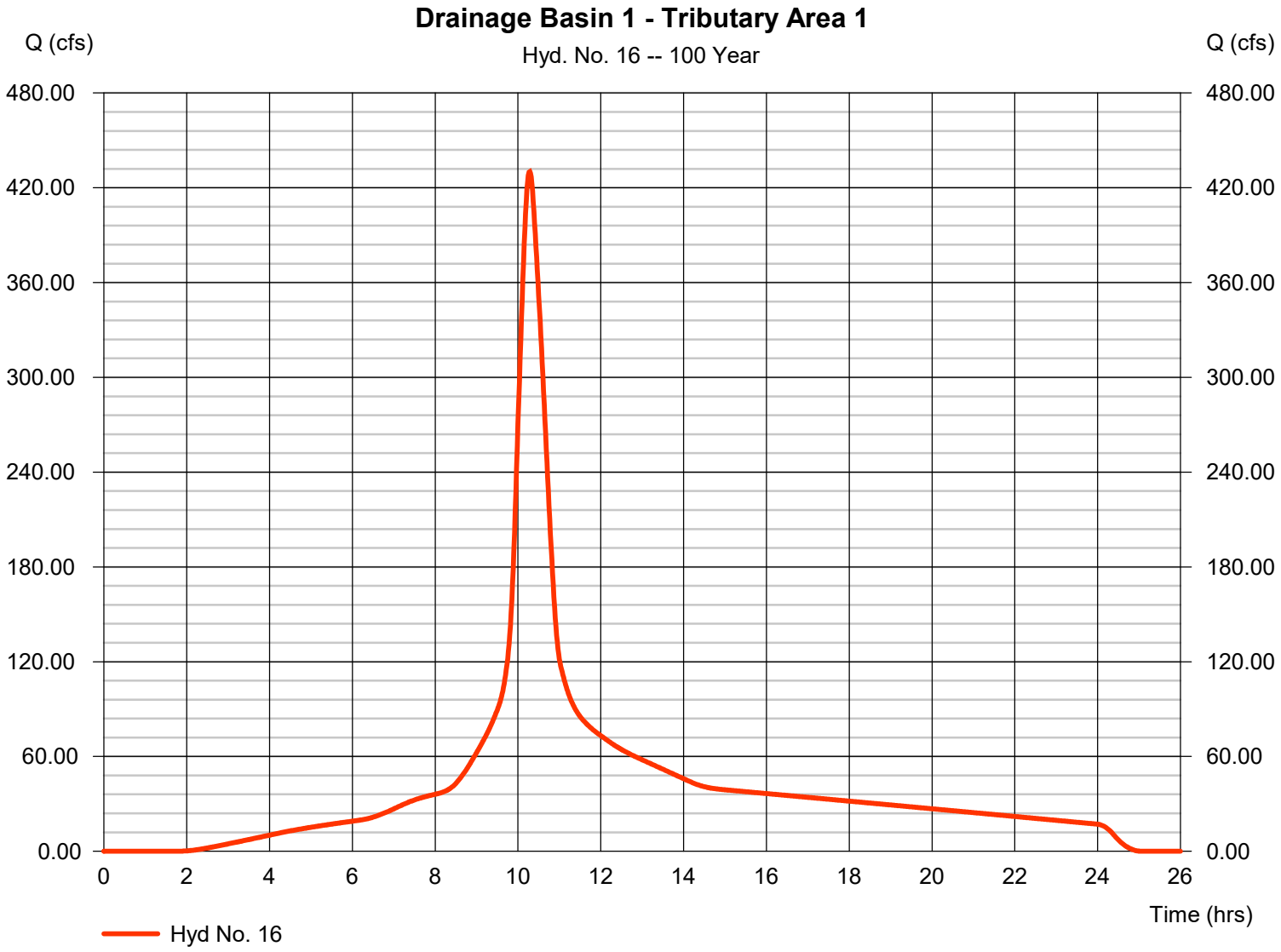
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Tuesday, 05 / 4 / 2021

Hyd. No. 16

Drainage Basin 1 - Tributary Area 1

Hydrograph type	= SCS Runoff	Peak discharge	= 430.17 cfs
Storm frequency	= 100 yrs	Time to peak	= 10.28 hrs
Time interval	= 1 min	Hyd. volume	= 3,811,551 cuft
Drainage area	= 99.000 ac	Curve number	= 85
Basin Slope	= 4.1 %	Hydraulic length	= 3918 ft
Tc method	= LAG	Time of conc. (Tc)	= 39.75 min
Total precip.	= 12.50 in	Distribution	= Type I
Storm duration	= 24 hrs	Shape factor	= 484



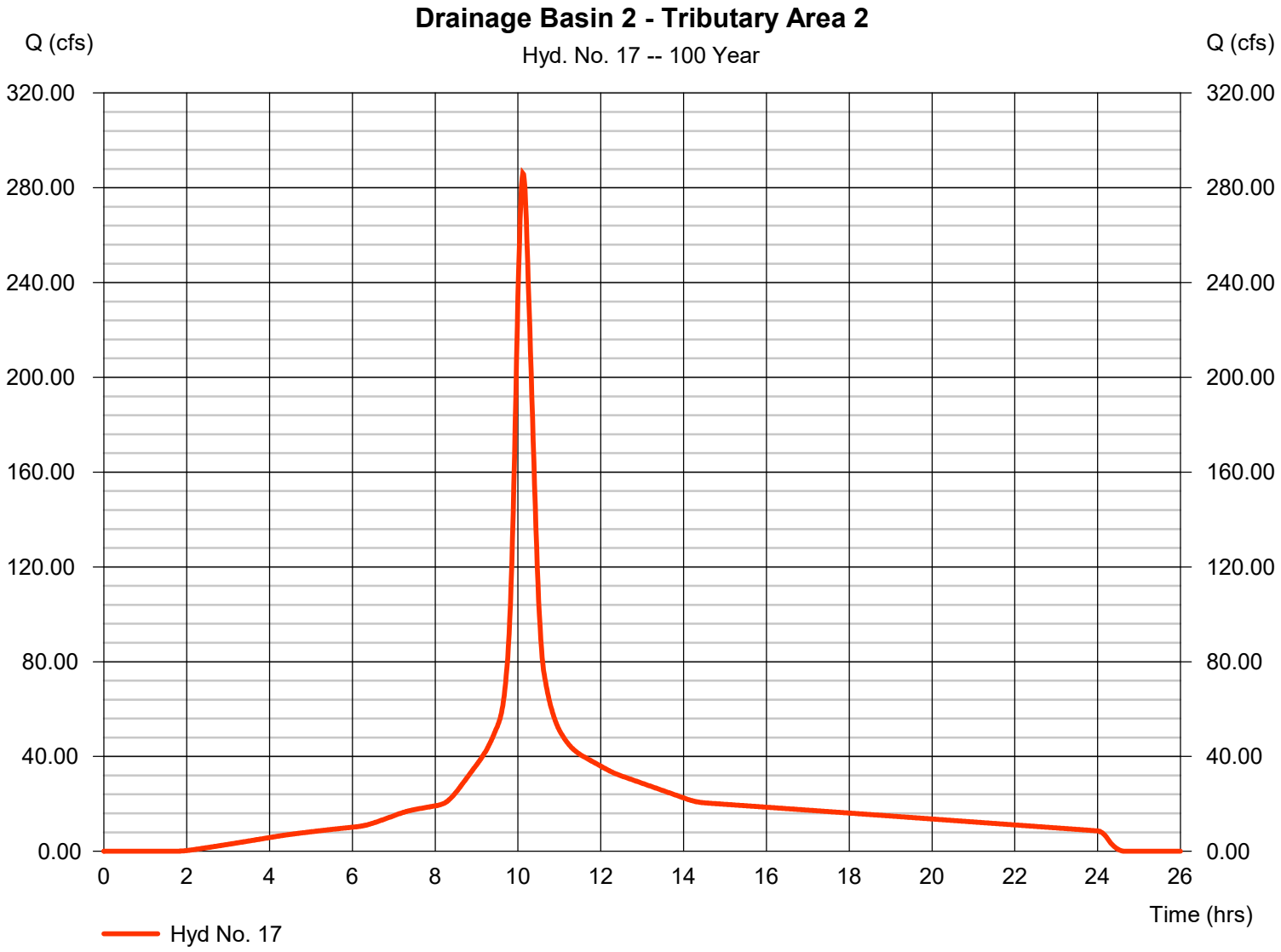
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Tuesday, 05 / 4 / 2021

Hyd. No. 17

Drainage Basin 2 - Tributary Area 2

Hydrograph type	= SCS Runoff	Peak discharge	= 286.14 cfs
Storm frequency	= 100 yrs	Time to peak	= 10.12 hrs
Time interval	= 1 min	Hyd. volume	= 1,963,528 cuft
Drainage area	= 51.000 ac	Curve number	= 85
Basin Slope	= 3.3 %	Hydraulic length	= 1942 ft
Tc method	= LAG	Time of conc. (Tc)	= 25.27 min
Total precip.	= 12.50 in	Distribution	= Type I
Storm duration	= 24 hrs	Shape factor	= 484



Storm Water Quality Volume Calculations

TABLE A-5.2

Minimum 48 hr. Retention Capacity Needed to Meet Maui County Stormwater Quality Requirements[1]

Drainage Area	Receiving Facility	Approx. Area Draining to Receiving Facility	Minimum 48 hr. Retention Capacity Needed to Meet Maui County Stormwater Quality Requirements
T-1	Basin #1	99 Ac.	5 Acre-ft
T-2	Basin #2	51 Ac.	3 Acre-ft

[1] Ref. Maui County Dept. of Public Works Administrative Rules, Title MC-15, Chapter 111, "Rules for the Design of Stormwater Treatment Best Management Practices", Section

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Wailuku, Maui, HI 96793

HYDROLOGIC CALCULATIONS - Storm Water Treatment

Project Name: Waiehu 201H Development
Project No.: 20012
Engineer: Aj Nithianantham
Date: 04/30/2021

Purpose: To determine the required Driange Basin 1 volume to meet the County of Maui, Department of Public Works' "Rules for the Design of Storm Water Treatment Best Management Practices"

Calculations: The required design volume for detention based control is computed by the MCC §15-111-5.a.1.C formula:

$$WQDV = C \times 1'' \times A \times 3630$$

where, WQDV = water quality design volume in cubic feet
C = EPA volumetric runoff coefficient
A = gross area of the site in acres = 99 ac.
1" = design storm for detention based water quality system
3630 = conversion factor

The EPA volumetric runoff coefficient, C, calculated from the formula given in MCC §15-111-5.a.1.A is:

$$C = 0.05 + (0.009) \times (IMP)$$

where, IMP = percentage of impervious area
= (impervious area) / (gross area) x 100
= (54.5 ac.) / (99 ac.) x 100
= 55

Since IMP = 55, the value of C is:

$$C = 0.05 + (0.009) \cdot (55)$$
$$= 0.54$$

Compute the required design volume for a 1" storm with C = 0.54:

$$WQDV = C \times 1'' \times A \times 3630$$
$$= 0.54 \times 1'' \times 99 \times 3630$$
$$= 194060 \text{ ft}^3$$
$$= 4.5 \text{ acre-ft}$$

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HYDROLOGIC CALCULATIONS - Storm Water Treatment

Project Name: Waiehu 201H Development
Project No.: 20012
Engineer: Aj Nithianantham
Date: 04/30/2021

Purpose: To determine the required Driange Basin 2 volume to meet the County of Maui, Department of Public Works' "Rules for the Design of Storm Water Treatment Best Management Practices"

Calculations: The required design volume for detention based control is computed by the MCC §15-111-5.a.1.C formula:

$$WQDV = C \times 1'' \times A \times 3630$$

where, WQDV = water quality design volume in cubic feet
C = EPA volumetric runoff coefficient
A = gross area of the site in acres = 51 ac.
1" = design storm for detention based water quality system
3630 = conversion factor

The EPA volumetric runoff coefficient, C, calculated from the formula given in MCC §15-111-5.a.1.A is:

$$C = 0.05 + (0.009) \times (IMP)$$

where, IMP = percentage of impervious area
= (impervious area) / (gross area) x 100
= (28 ac.) / (51 ac.) x 100
= 55

Since IMP = 55, the value of C is:

$$C = 0.05 + (0.009) \cdot (55)$$
$$= 0.54$$

Compute the required design volume for a 1" storm with C = 0.54:

$$WQDV = C \times 1'' \times A \times 3630$$
$$= 0.54 \times 1'' \times 51 \times 3630$$
$$= 99970 \text{ ft}^3$$
$$= 2.3 \text{ acre-ft}$$

APPENDIX B

Potable Water Calculations

APPENDIX B-1

Potable Water Demand and Needed Reservoir Capacity

WAIEHU DEVELOPMENT

UNIT-Based Estimate of Potable Water Demand and Needed Reservoir Capacity

April 1, 2021

Land Use	Basis		Average Daily Consumption Rate[1]	Usage Factor		Average Daily Demand		Max. Daily Demand / Needed Reservoir Capacity
Residential								
Townhomes	108 units	*x*	560 gals/unit	x 100%	==>	60,480 gpd	*x 1.5* ==>	90,720 gpd
Duplex	76 units	*x*	560 gals/unit	x 100%	==>	42,560 gpd	*x 1.5* ==>	63,840 gpd
Single-Family	568 units	*x*	600 gals/unit	x 100%	==>	340,800 gpd	*x 1.5* ==>	511,200 gpd
Subtotal	752 units					443,840 gpd		665,760 gpd
Neighborhood Commercial	17,400 s.f.	*x*	140 gals/1000 s.f.	x 100%	==>	2,436 gpd	*x 1.5* ==>	3,654 gpd
Roads	28.0 Ac.	*x*	1,700 gals/Ac.	x 25%	==>	11,900 gpd	*x 1.5* ==>	17,850 gpd
Parks + Irrigated Open Space	19.0 Ac.	*x*	1,700 gals/Ac.	x 100%	==>	32,300 gpd	*x 1.5* ==>	48,450 gpd
Non-Irrigated Open Space	95.0 Ac.	*x*	0 gals/Ac.	x 100%	==>	0 gpd	*x 1.5* ==>	0 gpd
TOTAL Potable Water Demand						490,476 gpd		735,714 gpd

Notes:

[1] *Consumption rate taken from Water System Standards, Department of Water Supply, County of Maui, State of Hawaii, 2002, Table 100-18, p. 111-3.*

WAIEHU DEVELOPMENT

AREA-Based Estimate of Potable Water Demand and Needed Reservoir Capacity

April 1, 2021

Land Use	Basis		Average Daily Consumption Rate[1]	Usage Factor		Average Daily Demand		Max. Daily Demand / Needed Reservoir Capacity
Affordable Residential								
Townhomes	7.6 Ac.	*x*	5,000 gals/Ac.	x 100%	==>	38,000 gpd	*x 1.5* ==>	57,000 gpd
Duplex	6.7 Ac.	*x*	5,000 gals/Ac.	x 100%	==>	33,500 gpd	*x 1.5* ==>	50,250 gpd
Single-Family	79.9 Ac.	*x*	3,000 gals/Ac.	x 100%	==>	239,700 gpd	*x 1.5* ==>	359,550 gpd
Subtotal	94.2 Ac.					311,200 gpd		466,800 gpd
Neighborhood Commercial	2.0 Ac.	*x*	6,000 gals/Ac.	x 100%	==>	12,000 gpd	*x 1.5* ==>	18,000 gpd
Roads	28.0 Ac.	*x*	1,700 gals/Ac.	x 25%	==>	11,900 gpd	*x 1.5* ==>	17,850 gpd
Parks + Irrigated Open Space	19.0 Ac.	*x*	1,700 gals/Ac.	x 100%	==>	32,300 gpd	*x 1.5* ==>	48,450 gpd
Non-Irrigated Open Space	95.0 Ac.	*x*	0 gals/Ac.	x 100%	==>	0 gpd	*x 1.5* ==>	0 gpd
TOTAL Water Demand	238.2 Ac.					367,400 gpd		551,100 gpd

Notes:

[1] *Consumption rate taken from Water System Standards, Department of Water Supply, County of Maui, State of Hawaii, 2002, Table 100-18, p. 111-3.*

APPENDIX B-2

Minimum Storage Reservoir Capacity for Fire Protection

WAIEHU DEVELOPMENT
MINIMUM STORAGE RESERVOIR CAPACITY FOR FIRE PROTECTION

Determine the minimum tank size to necessary to meet DWS Reservoir Sizing Criterion No. 2: Maximum day rate plus fire flow for duration of fire.[1]

Max. Day Consumption Rate = 736,000 gpd = 511 gpm

Required Fire Flow Rate = 2,000 gpm[2]

Minimum Reservoir Capacity for Fire Protection

= (Max. Day Consumption Rate + Fire Flow Rate) x 2 hours

= (511 gpm + 2,000 gpm) x 120 min.

= 301,320 gallons

April 6, 2021

V:\Projdata\20PROJ\20012 - Waiehu 201H Genova\Reports\Prelim Engineering Report\Calcs\Water Demand\dtu_Fire Storage Capacity_rev01.wpd

---

[1] *Water System Standards*, Dept. of Water Supply, County of Maui, State of Hawaii, 2002, Section 111.07.2 (Reservoir Capacity), p. 111-6.

[2] Based on Neighborhood Commercial land use. Ref. *Water System Standards*, Dept. of Water Supply, County of Maui, State of Hawaii, 2002, Table 100-19 (Fire Flow Requirements), p. 111-4.

APPENDIX C

Wastewater Discharge Calculations

WAIEHU DEVELOPMENT

Projected Daily Sewer Demand

April 1, 2021

Land Use	Basis		Contribution Rate[1]		Average Daily Demand
Townhomes	108 units	*x*	255 gals/unit/day	==>	27,540 gpd
Duplex	76 units	*x*	350 gals/unit/day	==>	26,600 gpd
Single-Family	568 units	*x*	350 gals/unit/day	==>	198,800 gpd
Commercial	17,400 s.f.	*x*	0.10 gal/s.f./day[2]	==>	1,740 gpd
Total					254,680 gpd

Notes:

[1] Contribution rates taken from County of Maui, Wastewater Reclamation Division, "Wastewater Flow Standards," February 2, 2000.

[2] 20 gal / employee / day ÷ 200 sf / employee = 0.10 gal / sf / day

Appendix 6

Archaeological 6E consultation

MICHAEL P. VICTORINO
Mayor

LORI TSUHAKO
Director

LINDA R. MUNSELL
Deputy Director

DEPARTMENT OF HOUSING
& HUMAN CONCERNS
COUNTY OF MAUI
2200 MAIN STREET, SUITE 546
WAILUKU, MAUI, HAWAI'I 96793
PHONE: (808) 270-7805

September 22, 2021

Dr. Alan Downer, Administrator
Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Boulevard, Suite 555
Kapolei, Hawai'i 96707
(via: SHPD HICRIS)

Dear Dr. Downer:

SUBJECT: Request for Concurrence, HRS Chapter 6E-42 Historic Preservation Review for Proposed Waiehu Subdivision Project in Waiehu, Waiehu and Wailuku Ahupua'a, Wailuku District, Island of Maui, TMK: (2) 3-3-002:031

The County of Maui, Department of Housing and Human Concerns is submitting this letter to introduce the 6E submittal and relevant illustrations for the above-noted project in Waiehu, Maui.

The project area consists of 238.18 acres, of which 158.30 will be utilized for construction of affordable and market rate residences. The parcel is currently undeveloped, although it has been under cultivation for over 100 years (sugar cane, macadamia nut farm). Wailuku District is situated on the eastern side of the Mauna Kahalawai (West Maui Mountains) and occupies the isthmus through the center of Maui to coastal reaches in Kahului and Mā`alaea. The project area lies within the northern half of Wailuku District. Approximately 60 percent of the project area is in Wai`ehu Ahupua`a — the southern 40 percent lies within the boundary of Wailuku Ahupua`a. The project area is one kilometer north of Wailuku town and 750 meters *makai* of the West Maui Mountains. The eastern perimeter of the project area, a section of the Kahekili Highway, averages 500 meters *mauka* of the coastline, and is situated south of Wai`ehu Point and north of Nehe Point. The property is roughly three-sided, with the Wai`ehu Stream defining the northern boundary and the curving Spreckels Ditch as the perimeter to the west and to the south, where it intersects Kahekili Highway (the eastern boundary). The coastal Wai`ehu Golf Course sits 700 meters northeast of the project area's northeastern corner.

As noted above, the parcel has been altered in several ways through its history of commercial cultivation. Planted protective windrows, pushed topsoil deposits, and irrigation constructions have noticeably altered the landscape. The project area, along with adjacent

parcels, was utilized for sugar cane production for over 100 years, starting in the late 1800s (Fredericksen and Fredericksen 2002). In the 1980s, macadamia nut trees replaced the sugar cane, and the land surface still bears evidence from the earth moving of heavy machinery. Awai et al. (1967:15) describe the "nonstony" ground surface as "well-suited" for machine tilling, having a "slope of predominantly 8 percent" with near optimal conditions for sugar cane productivity.

Thank you for your assistance and support of this project. Should you need further clarification, please contact Mr. Buddy Almeida, Housing Administrator, at Buddy.Almeida@co.maui.hi.us or at (808) 270-7355.

Sincerely,

LORI TSUHAKO, LSW, ACSW
Director of Housing and Human Concerns

Attachments
xc: Mr. Michael Dega, Ph.D., Scientific Consultant Services, Inc.
Mr. Brett Davis, Chris Hart & Partners, Inc.
Buddy Almeida, Housing Administrator

State Historic Preservation Division
HRS 6E Submittal Form

Per §6E, Hawai‘i Revised Statutes, if the Project requires review by the State Historic Preservation Division (SHPD), please review and fill out this form and submit all requested information to SHPD. Please submit this form and project documentation **electronically** to:

dlnr.intake.shpd@hawaii.gov

If you are unable to submit electronically, please contact SHPD at (808) 692-8015. Mahalo.

The submission date of this form is:

1. APPLICANT (select one)

☑ Property Owner ☐ Government Agency

2. AGENCY (select one)

☐ Planning Department ☐ Department of Public Works ☑ Other (specify): DHHC

Type of Permit Applied For: Draft EA, 201H affordable Housing, State Land Use District Boundary

3. APPLICANT CONTACT

3.1) Name: John Falls 3.2) Title: Managing Member of Waiehu LLC

3.3) Street Address: 555 Corporate Drive, Suite 120

3.4) County: Orange 3.5) State: CA 3.6) Zip Code: 92694

3.7) Phone: (801) 644-2887 3.8) Email: johnponifalls@gmail.com

4. PROJECT DATA

4.1) Permit Number (if applicable):

4.2) TMK [e.g. (3) 1-2-003:004]: (2) 3-3-002:031

4.3) Street Address: Kahekili Highway and Waiehu Beach Road

4.4) County: Maui 4.5) State: HI 4.6) Zip Code: 96793

4.7) Total Property Acreage: 238.18

4.8) Project Area (acreage, square feet): 158.30

4.9) List any previous SHPD correspondence (LOG Number & DOC Number, if applicable):

LOG NO. 2004.3632 DOC NO. 0412MK14

5. PROJECT INFORMATION

5.1) Does the Project involve a Historic Property? A Historic Property is any building, structure, object,

district, area, or site, including heiau and underwater site, **which is over 50 years old** (*HRS §6E-2*).

☑ Yes ☐ No

5.2) The date(s) of construction for the historic property (building, structure, object, district, area, or site, including heiau and underwater site) is Historic (plantation era)

5.3) Is the Property listed on the Hawai'i and or National Register of Historic Places? To check: http://dlnr.hawaii.gov/shpd/

☐ Yes ☑ No

5.4) Detailed Project Description and Scope of Work:

The proposed 100% affordable Waiehu residential community is to develop a 752-unit community with associated infrastructure, roadways, landscaping, and amenities such as park space and walking trails. The community will be developed on 158.30 acres of the 238.18-acre parcel. The remaining

5.5) Description of **previous** ground disturbance (e.g. previous grading and grubbing):

Over 90 percent of the project area has been intensely modified for over a 100 year history of cultivation (sugar cane, macademia nut plantation); road construction, earth leveling, erosion control techniques, and irrigation systems on the parcel. These are all types of modifications found on the land tract that date back to the late-nineteenth centurv onwards.

5.6) Description of **proposed** ground disturbance (e.g. # of trenches, Length x Width x Depth):

On the proposed net residential acreage estimate of 89.7 acres, we project a figure of 1 million cubic yards of cut and 1 million cubic yards fill.

5.7) The Agency shall ensure whether historic properties are present in the project area, and, if so, it shall ensure that these properties are properly identified and inventoried. Identify all known historic properties:

SIHP 50-50-07-01508 (Spreckels Ditch)
SIHP 50-50-04-05522 (seven plantation features)
SIHP 50-50-04-05523 (isolated lithics)

5.8) Once a historic property is identified, then an assessment of significance shall occur.

Integrity (check all that apply):

☑ Location ☐ Design ☑ Setting ☐ Materials ☐ Workmanship ☐ Feeling ☑ Association

Criteria (check all that apply):

☐ a – associated with events that have made an important contribution to the broad patterns of our history
☐ b – associated with the lives of persons important in our past
☐ c – embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value
☑ d – have yielded, or is likely to yield, information important for research on prehistory or history
☐ e – have an important value to the Native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out or still carried out, at the property or due to associations with traditional beliefs, events, or oral accounts - - these associations being important to the group's history and cultural identity

5.9) The effects or impacts of a project on significant historic properties shall be determined by the agency.

Effect Determination (select one):

☐ No Historic Properties Affected
☑ Effect, with Agreed Upon Mitigation Commitments (§6E-42, HRS)
☐ Effect, with Proposed Mitigation Commitments (§6E-8, HRS)

5.10) This project is (check all that apply, if applicable):

☐ an activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency;

☐ carried out with Federal financial assistance; and or

☐ requiring a Federal permit, license or approval.

If any of these boxes are checked, then the Project may also be subject to compliance with Section 106 of the National Historic Preservation Act (NHPA).

6. PROJECT SUBMITTALS

6.1) Please submit a copy of the Tax Map Key (TMK) map

6.2) Please submit a copy of the property map showing the project area and indicate if the project area is smaller than the property area.

6.3) Please submit a permit set of drawings. A permit set is a set of drawings prepared and signed by a licensed architect or engineer and is at least 65% complete.

6.4) Are you submitting a survey?

☐ Yes ☑ No

Specify Survey:

6.5) Did SHPD request the survey?

☐ Yes ☑ No

If 'Yes', then please provide the date, SHPD LOG NO, and DOC NO:

Date: LOG NO. DOC NO.

6.6) **SURVEY REVIEW FEES**. Fee for Review of Reports and Plans (§§13-275-4 and 284-4). A filing fee will be charged for all reports and plans submitted to our office for review. Please go to:

http://dlnr.hawaii.gov/shpd/about/branches/archaeology/filing-fee-schedule/

A check payable to the Hawaii Historic Preservation Special Fund should accompany all reports or plans submitted.

6.7) Please submit color photos/images of the Historic Property (any building, structure, object, district, area, or site, including heiau and underwater site) that will be affected by the Project.

The following are the minimum number and type of color photographs required:

Quantity	Description
1-2	Street view(s) of the resource and surrounding area
1-2	Over view of exterior work area
1	exterior photo of the North elevation (if applicable)
1	exterior photo of the South elevation (if applicable)
1	exterior photo of the East elevation (if applicable)
1	exterior photo of the West elevation (if applicable)
1-2	interior photos(s) of areas affected (if applicable)

CHECKLIST

☑ **SHPD FORM 6E** (this form)

☑ **PROJECT SUBMITTALS** (any requested documentation for items 6.1 - 6.7 of this form)

☐ **FILING FEE FORM** (if applicable)

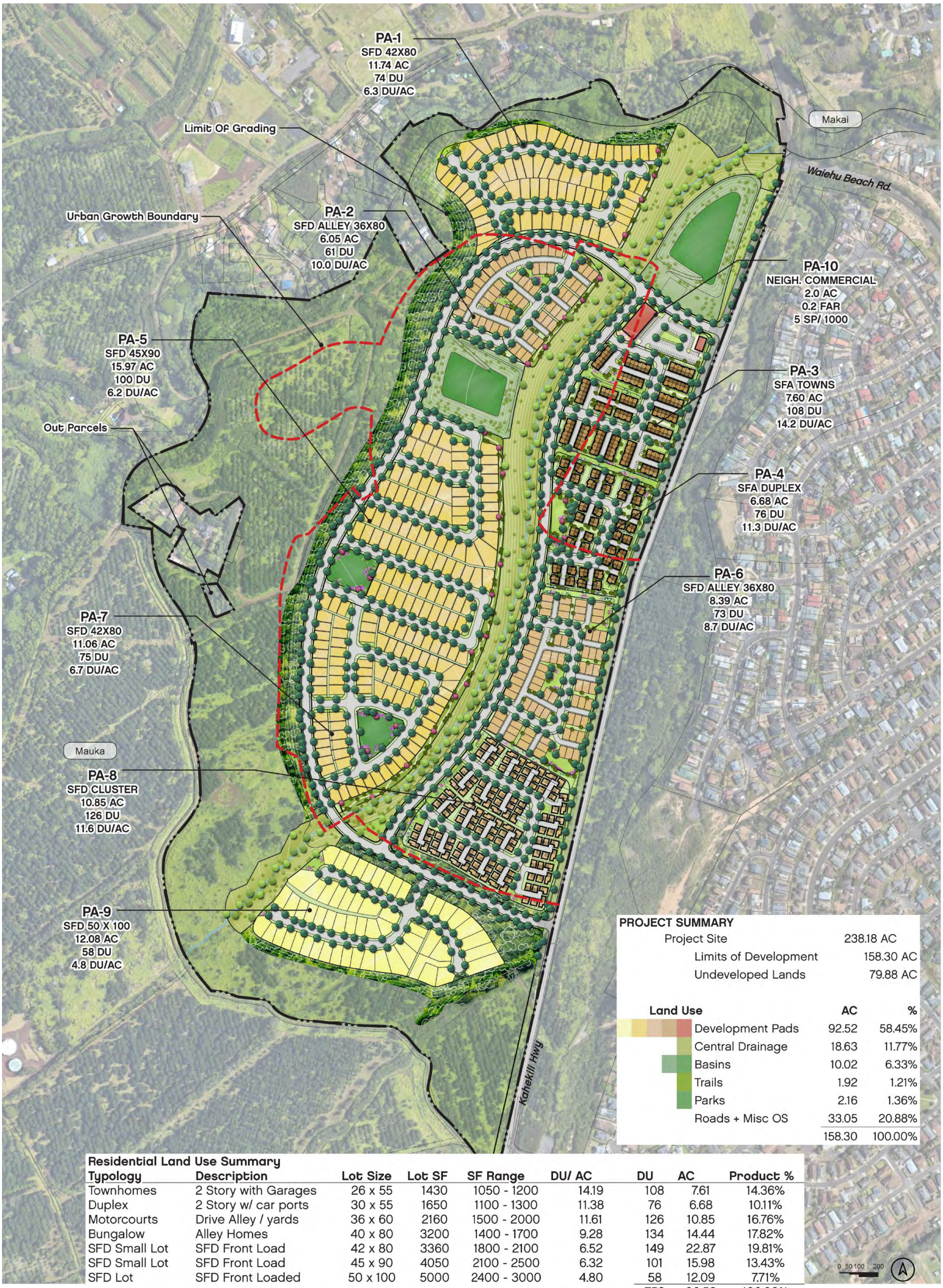
SUBMITTAL ITEM 6.1

Tax Map Key

Waiehu Residential Community

Source: ESRI, County of Maui

CHRIS HART & PARTNERS, INC.



PROJECT SUMMARY

Project Site	238.18 AC
Limits of Development	158.30 AC
Undeveloped Lands	79.88 AC

Land Use	AC	%
Development Pads	92.52	58.45%
Central Drainage	18.63	11.77%
Basins	10.02	6.33%
Trails	1.92	1.21%
Parks	2.16	1.36%
Roads + Misc OS	33.05	20.88%
	158.30	100.00%

Residential Land Use Summary

Typology	Description	Lot Size	Lot SF	SF Range	DU/ AC	DU	AC	Product %
Townhomes	2 Story with Garages	26 x 55	1430	1050 - 1200	14.19	108	7.61	14.36%
Duplex	2 Story w/ car ports	30 x 55	1650	1100 - 1300	11.38	76	6.68	10.11%
Motorcourts	Drive Alley / yards	36 x 60	2160	1500 - 2000	11.61	126	10.85	16.76%
Bungalow	Alley Homes	40 x 80	3200	1400 - 1700	9.28	134	14.44	17.82%
SFD Small Lot	SFD Front Load	42 x 80	3360	1800 - 2100	6.52	149	22.87	19.81%
SFD Small Lot	SFD Front Load	45 x 90	4050	2100 - 2500	6.32	101	15.98	13.43%
SFD Lot	SFD Front Loaded	50 x 100	5000	2400 - 3000	4.80	58	12.09	7.71%
						752	90.52	100.00%

WAIEHU
MASTER PLAN

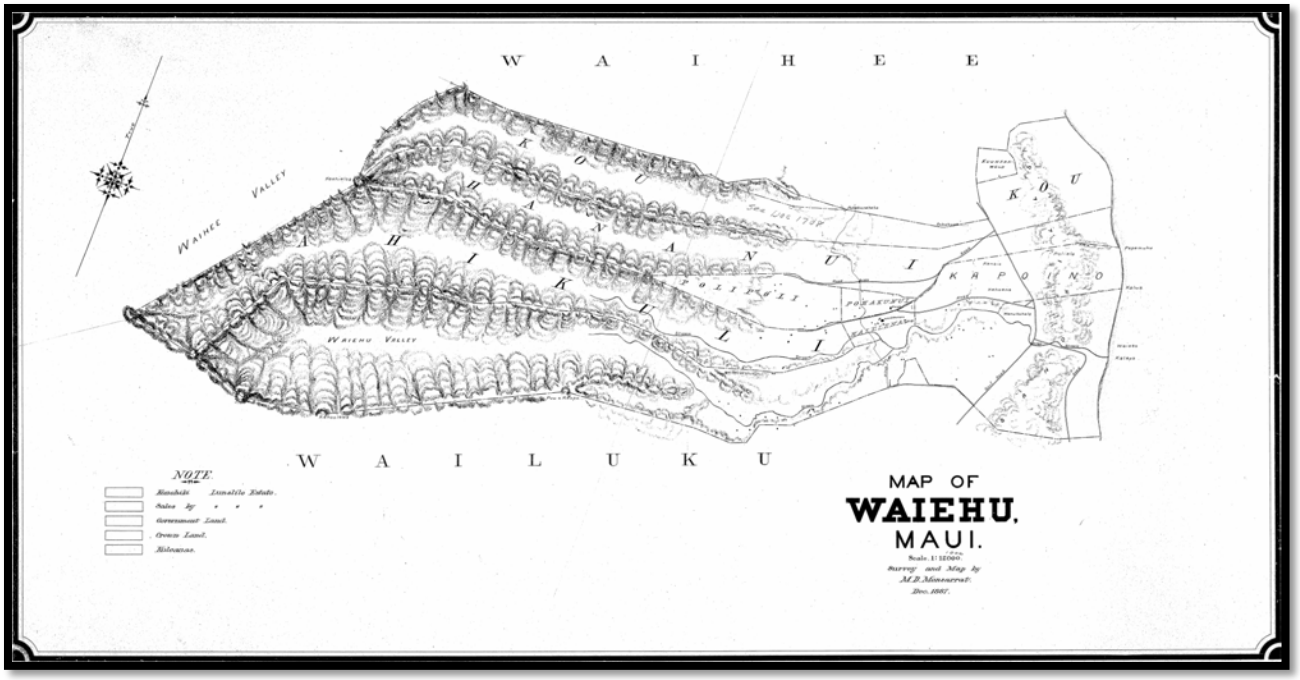
SUBMITTAL ITEM 6.2
Conceptual Site Plan
(Preferred Alternative)

Waiehu Residential Community
Source: Genova, WHA

CHRIS HART & PARTNERS, INC.

Appendix 7

Cultural Impact Assessment



Cultural Impact Assessment Report for the Waiehu Affordable Residential Community
Waiehu ʻIli, Wailuku Ahupuaʻa, Wailuku District, Maui Island
TMKs: [2] 3-3-002:031

Prepared for

GENOVA CONSTRUCTION | DEVELOPMENT

CHRIS HART & PARTNERS, INC.
Landscape Architecture • City & Regional Planning

Prepared by

HONUA CONSULTING

June 2022

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Matthew Kawaiola Sproat
Elmer Kailikole Kaʻai, Jr.
Pono Fernandez, M.A.

Note on Hawaiian language usage

In keeping with other Hawaiian scholars, we do not italicize Hawaiian words. Hawaiian is both the native language of the pae ʻāina of Hawaiʻi and an official language of the State of Hawaiʻi. Some authors will leave Hawaiian words italicized if part of a quote; we do not. In the narrative, we use diacritical markings to assist our readers, except in direct quotes, in which we keep the markings used in the original text. We provide translations contextually when appropriate.

Front Cover Credit

Hawaii State Archives Digital Collections.
1887 Registered Map 1435. Monsarrat, M.D. Surveyor. State of Hawaii.

Executive Summary

At the request of Genova Construction and Development (Genova CD) and Chris Hart & Partners, Inc., Honua Consulting, LLC and CKM Cultural Resources, LLC are preparing a Cultural Impact Assessment (CIA) of the proposed Waiehu Affordable Residential Community project. The proposed 100% affordable Waiehu residential community is to develop a 752-unit community with associated infrastructure, roadways, landscaping, and amenities such as park space and walking trails. The community will be developed on 158.30 acres of the 238.18-acre parcel. The remaining 79.88 acres of land will remain undeveloped agricultural land. Genova CD is seeking to minimize environmental and cultural impacts by carefully inventorying the natural and cultural environment and avoiding any significant archaeological sites, cultural resources, and sensitive species.

An Environmental Assessment (EA) that is under preparation will provide an overview analysis of the benefits and adverse impacts of project to the ʻili of Waiehu in the ahupuaʻa of Wailuku and its adjacent community. The County of Maui is the accepting authority for the EA.

Research in preparation of this report involved a thorough search of Hawaiian language documents including, but not limited to, the Bishop Museum mele index and Bishop Museum archival documents, such as the Hawaiian language archival caché. All Hawaiian language documents were reviewed by Hawaiian language experts for relevant information that could be included in the report. Documents considered relevant to this analysis are included herein and translations are provided when appropriate to the discussion. Summaries of interviews and information on other oral testimonies are also provided. An impact analysis and *Ka Paʻakai* analysis are both included in this CIA.

Additionally, a CIA was prepared for a previously proposed project that is largely similar in nature to the current project. That CIA was prepared by Kahu Charles Maxwell of CKM Cultural Resources, LLC. Honua Consulting, LLC has partnered with Kahu Dane Maxwell who is now the manager of CKM Cultural Resources, LLC to incorporate the previous work and to complete this CIA. Kahu D. Maxwell also conducted contemporaneous interviews regarding this project.

Based on the extensive identification effort and thorough analysis undertaken for this assessment, which included interviews with a number of cultural experts and area practitioners, there is a negligible potential for the project to have a direct, adverse impact on valued cultural, historical, or natural resources in the project area or larger geographic extent. Additionally, there is a negliable potential for the project to have a direct, adverse impact on traditional or customary Native Hawaiian rights in the project area or in the larger geographic extent, largely in part to the extensive commercial agricultural use of the project area for over

100 years. It is unfortunate, but any cultural practices that may have not occurred in the project area or surrounding area were likely discontinued after the land was taken by foreign companies for plantation use. Cultural resources that may have once existed in the project area were likely irreparably destroyed by decades of agricultural use. Any potential for an adverse indirect or cumulative impact in the larger geographic extent can be minimized through the conditions and best management practices (BMPs) recommended herein, much of which was previously recommended by Kahu Charles Maxwell. These conditions and BMPs constitute feasible action that may be reasonably taken to protect Native Hawaiian rights and cultural rights in the larger geographic extent.

Additionally, based on the imput of practitioners interviewed for this assessment, the project redesigned the landscaping and design themes to better integrate native plants, Hawaiian-inspired motifs, and other design elements to honor Maui's unique cultural heritage while focusing on the place-based history of Waiehu. The purpose of these efforts is to honor and respect the culture of the area while utilizing an opportunity to educate visitors about native culture, history, and flora.

Table of Contents

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Abbreviations and Acronyms

AIS: Archaeological Inventory Survey
AMSL: Above Mean Sea Level
APE: Area of Potential Effect
BMP: Best Management Practice
CIA: Cultural Impact Assessment
CWRM: State of Hawaii Commission on Water Resource Management
DEIS: Draft Environmental Impact Statement
DLNR: Department of Land and Natural Resources
DOFAW: Division of Forestry and Wildlife
EA: Environmental Assessment
GPD: Gallons Per Day
HAR: Hawaii Administrative Rules
HC&S: Hawaiian Commercial & Sugar Company
HDOT: Hawaii Department of Transportation
HRS: Hawaii Revised Statutes
IIFS: Interim Instream Flow Standards
MDWS: Maui Department of Water Supply
MGD: Million Gallons Per Day
NASKA: Naval Air Station Kahului
NCSS: National Cooperative Soil Series
ROI: Range of Influence
SCS: Scientific Consultant Services, Inc.
SIHP: State Inventory of Historic Places
TMK: Tax Map Key
USACE: U.S. Army Corps of Engineers
WTP: Water Treatment Plant

I. Project Description

At the request of Genova Construction and Development (Genova CD) and Chris Hart & Partners, Inc., Honua Consulting is preparing a Cultural Impact Assessment (CIA) of the proposed Waiehu Affordable Residential Community project. The proposed 100% affordable Waiehu residential community is to develop a 752-unit community with associated infrastructure, roadways, landscaping, and amenities such as park space and walking trails. The community will be developed on 158.30 acres of the 238.18-acre parcel. The remaining 79.88 acres of land will remain undeveloped agricultural land. Genova CD is seeking to minimize environmental and cultural impacts by carefully inventorying the natural and cultural environment and avoiding any significant archaeological sites, cultural resources, and sensitive species.

An Environmental Assessment (EA) that is under preparation will provide an overview analysis of the benefits and adverse impacts of project to the ʻili of Waiehu in the ahupuaʻa of Wailuku and its adjacent community. The County of Maui is the accepting authority for the EA.

The "Project Area" is located on TMK [2] 3-3-002:031. The land is located in Waiehu, adjacent (mauka, mountainward) of Kaheliki Highway. The new community will consist of 108 multi-family units and 644 single family homes. The plan proposes six (6) different types of single-family development to provide a variety of housing options to future residents. All units within the proposed community are for sale at prices determined by the Housing and Urban Development (HUD) annual price guidelines.

The development plan includes a 2-acre location for a small-scale neighborhood business, a walking trail along the natural central drainage corridor, and active park spaces. The 752-unit community with will be constructed as the demand for the housing warrants — the construction is projected to start in 2024.

Scientific Consultant Services, Inc. (SCS) conducted a study that complies with Hawaiʻi Revised Statutes (HRS) Chapter 6E. The Archaeological Inventory Sutdy (AIS) was completed in 2004 and contemporaneously accepted by the State Historic Preservation Dvision (SHPD). Review of previous archaeological studies identified one historic site in the project area (Spreckles Ditch, State Inventory of Historic Places (SIHP) Number 50-50-07-1508), and the 2004 study identified an additional six sites. The seven historic sites documented in the 2004 AIS are listed below (Table 1).

Table 1. Historic Sites within the Project Area

SIHP #	Description	Traditional or Historic	Function
Sites within Project Area			
50-50-07-1508	Sprekels ditch	Historic	Agriculture
50-50-04-5522	Seven (7) sugar agriculture features	Historic	Agriculture
50-50-04-5523	Three (3) isolated lithics	Traditional	Habitation
50-50-04-5524	Marine shell	Traditional	Habitation
50-50-04-5525	Terrace and mountain	Historic	Agriculture
50-50-04-5526	Concrete foundation	Historic	Animal husbandry
50-50-04-5527	Five (5) feature terrance complex	(Early) historic	None specified

SHPD accepted the AIS on January 3, 2005.

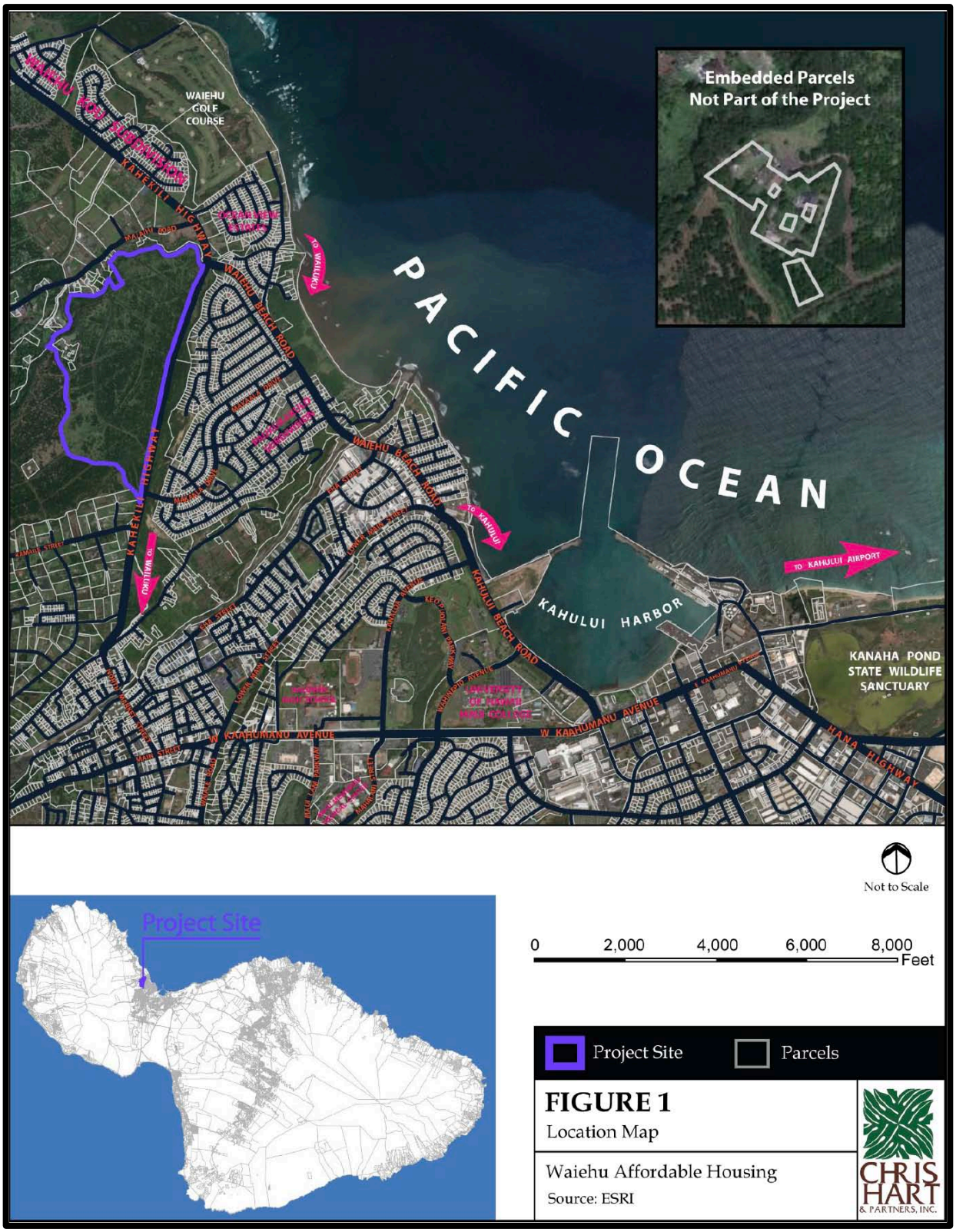

Figure 1. Location Map (Prepared by Chris Hart & Partners, Inc.)

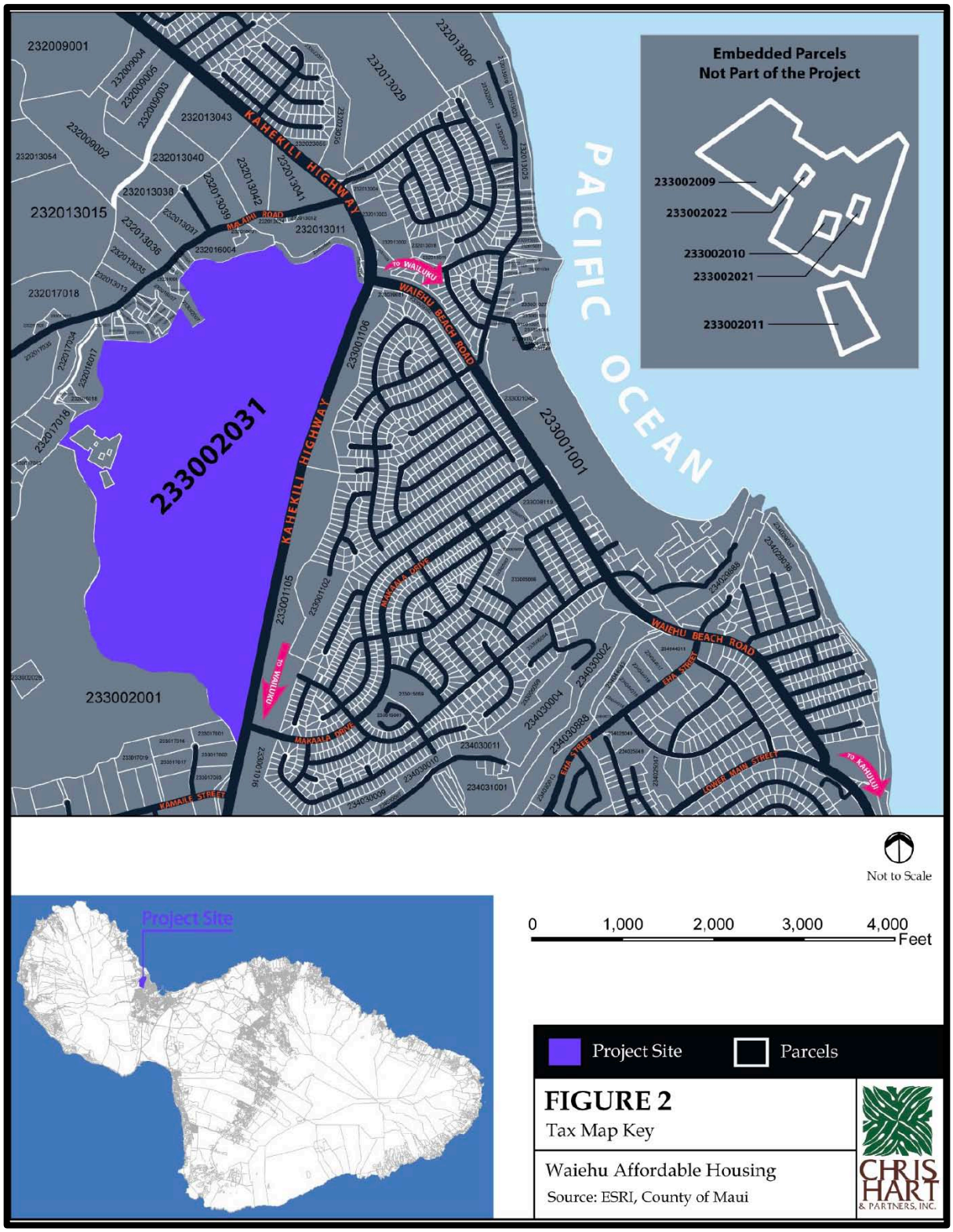

Figure 2. Tax Map Key (Prepared by Chris Hart & Partners, Inc.)

Figure 3. State Land Use District Map

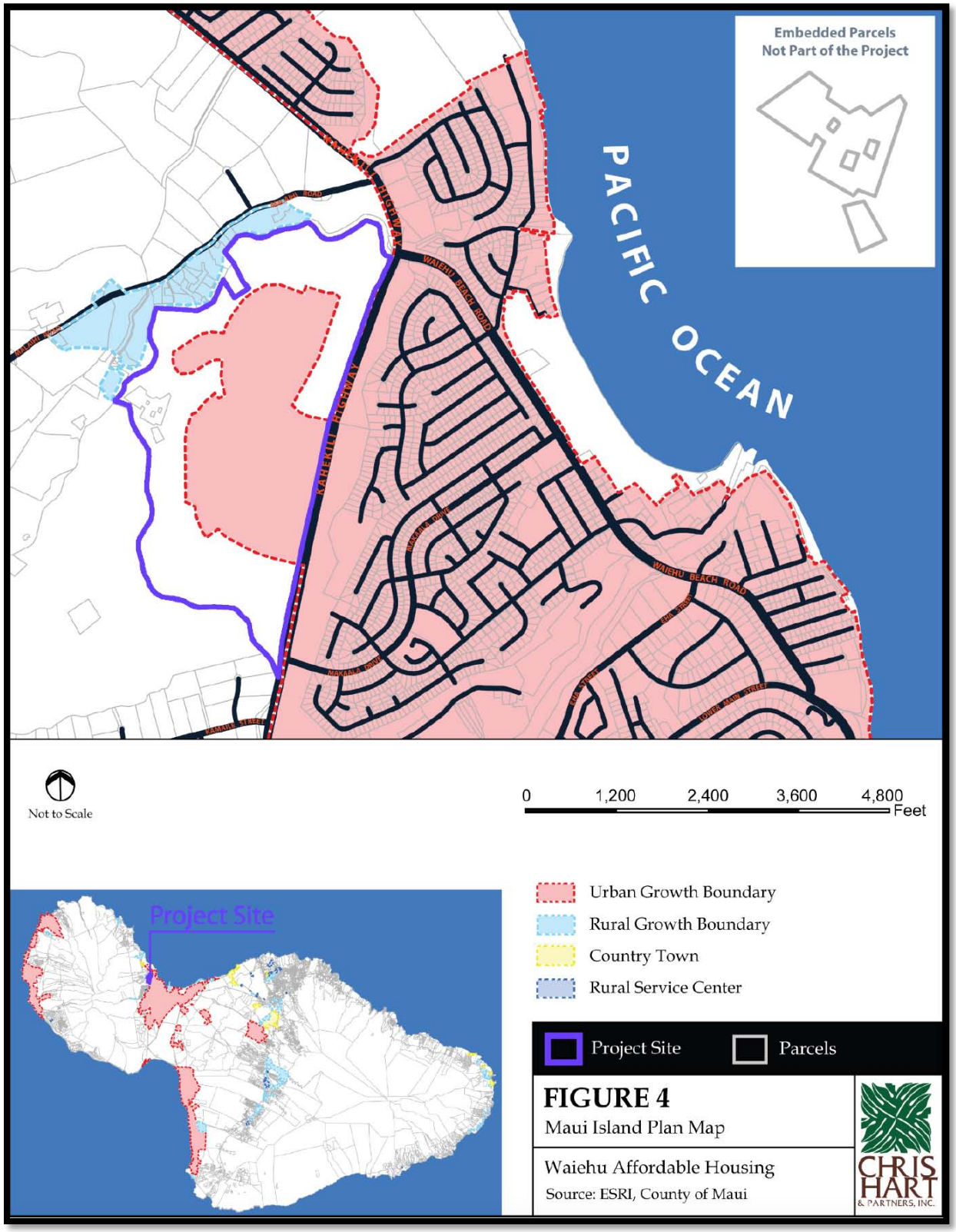

Figure 4. Maui Island Plan Map

II. Need for a Cultural Impact Assessment

Articles IX and XII of the State Constitution, other state laws, and the courts of the state require government agencies to protect and preserve cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups. To assist decision makers in the protection of cultural resources, Chapter 343, HRS and Hawaii Administrative Rules (HAR) § 11-200 for the environmental impact assessment process require project proponents to assess proposed actions for their potential impacts to cultural properties, practices, and beliefs.

A. Regulatory Background

The regulatory process was clarified by Act 50, Session Laws of Hawaii (2000), which recognized the importance of protecting Native Hawaiian cultural resources and required that Environmental Impact Statements include the disclosure of a proposed action's effects on the cultural practices of the community, state, and the Native Hawaiian community. Specifically, the Environmental Council suggested the CIAs include information about practices and beliefs of a particular cultural or ethnic group/groups. Such information may be obtained through public scoping, community meetings, ethnographic interviews, and oral histories.

B. Compliance

The State and its agencies have an obligation to preserve and protect Native Hawaiians' customarily and traditionally exercised rights to the extent feasible.[1] State law further recognizes that the cultural landscapes provide living and valuable cultural resources where Native Hawaiians have and continue to exercise traditional and customary practices, including hunting, fishing, gathering, and religious practices. In *Ka Paʻakai*, the Hawaiʻi Supreme Court provided government agencies an analytical framework to ensure the protection and preservation of traditional and customary Native Hawaiian rights while reasonably accommodating competing private development interests. This is accomplished through:

1) The identification of valued cultural, historical, or natural resources in the project area, including the extent to which traditional and customary Native Hawaiian rights are exercised in the project area;
2) The extent to which those resources—including traditional and customary Native Hawaiian rights—will be affected or impaired by the proposed action; and
3) The feasible action, if any, to be taken to reasonably protect Native Hawaiian rights if they are found to exist.

[1] Article XII, Section 7 of the Hawaiʻi State Constitution, *Ka Paʻakai O Ka ʻĀina v. Land Use Commission*, 94 Haw. 31 [2000](Ka Paʻakai), Act 50 HSL 2000.

The CIA was prepared under HRS Chapter 343 and Act 50 HSL 2000. The appropriate information concerning Wailuku ahupuaʻa has been collected, focusing on areas near or adjacent to the project area. A thorough analysis of this project and potential impacts to cultural resources, historical resources, and archaeological sites is included in this assessment.

The present analyses of archival documents, oral traditions (chants, mele (songs), and/or hula), and Hawaiian language sources including books, manuscripts, and newspaper articles, are focused on identifying recorded cultural and archaeological resources present on the landscape, including: Hawaiian and non-Hawaiian place names; landscape features (ridges, gulches, cinder cones); archaeological features (kuleana parcel walls, house platforms, shrines, heiau (places of worship), etc.); culturally significant areas (viewsheds, unmodified areas where gathering practices and/or rituals were performed); and significant biocultural resources. The information gathered through research helped to focus interview questions on specific features and elements within the project area.

Interviews with lineal and cultural descendants are instrumental in procuring information about the project area's transformation through time and changing use. Interviews were conducted with recognized cultural experts and summaries of those interviews are included herein.

The DEA will provide an overview of cultural and historic resources in the project area thorough literature review, community and cultural practitioner consultation, and high-level, project-specific surveys. The DEIS will focus on identifying areas in which disturbance should be avoided or minimized to reduce impacts to historic properties or culturally important features. The paramount goal is to prevent impacts through avoidance of sensitive areas and mitigating for impacts only if avoidance is not possible.

Environmental factors potentially influencing the distribution of historic properties will also be evaluated in the DEA. The resulting data will be analyzed to develop a general settlement pattern model for the area that helps estimate the likely types and distribution of historic properties. The potential significance and required treatment of expected historic properties will also be summarized. The goal of this work is to develop recommendations to assist with future infrastructure planning that minimizes adverse effects upon historic properties.

The Range of Influence (ROI) for impacts to cultural resources and historic properties includes the project area and localized surroundings. This CIA also reviews some of the resources primarily covered by the DEA and HRS 6E Compliance documents. It primarily researches and

reviews the range of biocultural resources identified through historical documents, traditional knowledge, information found in the Hawaiian language historical caché, and oral histories and knowledge collected from cultural practitioners and experts.

C. Methodology

The approach to developing the CIA is as follows:

- Gather Best Information Available
  - Gather historic cultural information from stories and other oral histories about the affected area to provide cultural foundation for the report;
  - Inventory as much information as can be identified about as many known cultural, historic, and natural resources, including previous archaeological inventory surveys, CIAs, etc. that may have been completed for the possible range of areas; and
  - Update the information with interviews with cultural or lineal descendants or other knowledgeable cultural practitioners.
- Identify Potential Impacts to Cultural Resources
- Develop Reasonable Mitigation Measures to Reduce Potential Impacts
  - Involve the community and cultural experts in developing culturally appropriate mitigation measures; and
  - Develop specific Best Management Practices (BMPs), if any are required, for conducting the project in a culturally appropriate and/or sensitive manner as to mitigate and/or reduce any impacts to cultural practices and/or resources.

While numerous studies have been conducted on this area, very few have effectively utilized Hawaiian language resources and Hawaiian knowledge. Honua Consulting developed a list of place names, which includes, but is not limited to, the following places and terms to help guide research and analyses.

Table 2. Place Names Associated with Waiehu

Toponym	Type	District	Definition
ʻAʻawa	Surf	Waiehu	Named for the wrasse fish of the same name
Ahikuli	Ahupuaʻa	Waiehu	Deafening fire
Alakaha	ʻIli ʻĀina	Waiehu	Way (to) pass by
Alapaka	ʻIli ʻĀina	Waiehu	Stairway
Hālawa	ʻIli ʻĀina	Wailehu	Curve
Halelau	ʻIli ʻĀina	Waiehu	House of leaves

Toponym	Type	District	Definition
Hananui	ʻIli Kū	Waiehu	Much work
Honohono	ʻIli ʻĀina	Waiehu	(Several meanings)
Kaakukui	ʻIli ʻĀina	Waiehu	Rolling candlenut
Kaalaino	ʻIli ʻĀina	Waiehu	The bad road
Kahakapiele	ʻIli ʻĀina	Waiehu	Unknown
Kahakupiela	ʻIli ʻĀina	Waiehu	Misspelling of Kahakapiele
Kahimana	ʻIli ʻĀina	Waiehu	Unknown
Kailiili	ʻIli ʻĀina	Waiehu	The pebble
Kalahape	ʻIli ʻĀina	Waiehu	Unknown
Kaluaʻōlena	ʻIli ʻĀina	Waiehu	The ʻōlena pit
Kaʻohe	ʻIli ʻĀina	Waiehu	The bamboo
Kaohia	ʻIli ʻĀina	Waiehu	The mountain apple
Kapaka	ʻIli ʻĀina	Waiehu	The raindrop
Kapalaoa	ʻIli ʻĀina	Waiehu	The whale or the whale tooth
Kapalaua	ʻIli ʻĀina	Waiehu	They two were named
Kapoino	ʻIli ʻĀina	Waiehu	The misfortune, disaster, calamity
Kapuoho	ʻIli ʻĀina	Waiehu	Startled
Kauhiloa	ʻIli ʻĀina	Waiehu	The long yam
Kaula	ʻIli ʻĀina	Waiehu	Misspelling of Kaulu
Kaulu	ʻIli ʻĀina	Waiehu	Ledge
Kauwila	ʻIli ʻĀina	Waiehu	Variant spelling of kauila, a native tree (*Alphitonia ponderosa*)
Keokanui	ʻIli Kū	Waiehu	Unknown
Kiha	ʻIli ʻĀina	Waiehu	(Multiple meanings)
Kīpapa	ʻIli ʻĀina	Waiehu	Placed prone
Koalaina	ʻIli ʻĀina	Waiehu	Misspelling of Kaalaino
Kope Gulch	Stream	Waiehu	To rake
Kou	ʻIli Kū	Waiehu	Kou tree
Kuhimana	ʻIli ʻĀina	Waiehu	Supposed power
Kukuialaemaka	ʻIli ʻĀina	Waiehu	Misspelling of Kukuialaimaka
Kukuiālaimaka	ʻIli ʻĀina	Waiehu	Unknown

Toponym	Type	District	Definition
Kukuiokomo	ʻIli ʻĀina	Waiehu	Also written as Kukuikomo, kukui-grove entrance
Kumukahi	ʻIli ʻĀina	Waiehu	First beginning
Kumuwiliwili	ʻIli ʻĀina	Waiehu	Wiliwili tree
Kunuhawelu	ʻIli ʻĀina	Waiehu	Misspelling of Kunuhawelu
Kuunahawelu	ʻIli ʻĀina	Waiehu	Variant of Kuʻunahāwele
Lualaʻilua	ʻIli ʻĀina	Waiehu	Two-fold tranquility
Mahalani Cemetary	Cemetary	Waiehu	Heavenly rest
Mookahi	ʻIli ʻĀina	Waiehu	Single strip of land
Napoko	Poko	Waiehu	The shorts (i.e., the small lands)
Niukūkahi	Surf	Waiehu	Coconut standing alone
North Waiehu Stream	Stream	Waiehu	Water spray
Nukukahi	Heiau (destroyed)	Waiehu	Unknown
ʻŌhiʻa	ʻIli ʻĀina	Waiehu	ʻŌhiʻa tree
Ohiaiki	ʻIli ʻĀina	Waiehu	Small ʻōhiʻa
Omaa	ʻIli ʻĀina	Waiehu	Misspelling of Omao
ʻŌmaʻo	ʻIli ʻĀina	Waiehu	Green
Pālaʻelaʻe	ʻIli ʻĀina	Waiehu	Bright, as the sun
Panene	ʻIli ʻĀina	Waiehu	Possibly pānēnē, goose enclosure
Papahawale	ʻIli ʻĀina	Waiehu	Possibly papahāwale
Pāpalaloa	ʻIli ʻĀina	Waiehu	Tall pāpala tree
Papamuku	Boundary point; Place	Waiehu	Unknown
Pauopalili	ʻIli ʻĀina	Waiehu	Misspelling of Puuopalili
Piʻilani	ʻIli ʻĀina	Waiehu	Named for Maui high chief
Pilipili	ʻIli ʻĀina	Waiehu	Sticky
Pōʻaiwa	ʻIli ʻĀina	Waiehu	Ninth night

Toponym	Type	District	Definition
Pōhakuloa	ʻIli ʻĀina	Waiehu	Long stone
Pohakunui	ʻIli Kū	Waiehu	Large stone
Pohakunui	Boundary point; Stone	Waiehu	Large stone
Pohuea	ʻIli ʻĀina	Waiehu	Also written Poʻohuʻea, and perhaps Pōhuʻea
Polipoli	Ahupuaʻa; Puʻuhonua	Waiehu	Polishing stone
Poohuea	ʻIli ʻĀina	Waiehu	Unknown
Poopuea	ʻIli ʻĀina	Waiehu	Misspelling of Poʻohuʻea
Puʻu Kane	Boundary Point; Puʻu	Waiehu	Kāneʻs hill
Puʻu o Kaupō	Puʻu	Waiehu	Kaupō hill
Puʻuopalili	ʻIli ʻĀina	Waiehu	Palili's hill
South Waiehu Stream	Stream	Waiehu	Water spray
Ukihi	ʻIli ʻĀina	Waiehu	Cold sores or name of a bird
Wahikuli	Ahupuaʻa	Waiehu	Noisy place
Waiale	ʻIli ʻĀina	Waiehu	Rippling water
Waiehu	Ahupuaʻa; Kalana	Waiehu	Water spray
Waiehu Point	Point	Waiehu	Water spray
Waiehu Stream	Stream	Waiehu	Water spray
Wailaʻahia	ʻIli ʻĀina	Waiehu	Consecrated water

III. Description of Project Area

Maui has a unique geography; it is considered to be two islands, joined together by an isthmus. Land divisions on Maui are unlike those on other islands (Sterling 1998). Ancient names for Maui include Ihikapalaumaewa and Kulua (Sterling 1998: 2). Since Waiehu, and thereby the project area, is located on the isthmus, it is important to understand the unique geopolitical construct of Maui's landscape.

> The division into district of the islands of the Maui group has not simplicity observed in the other islands. The configuration of the island of Maui, which is really a double island made up of two distinct mountain masses joined by a low flat isthmus, is probably the explanation for the group number of districts on that island, namely Kaanapali and Lahaina in West Maui, and the districts of Hamakua Poko, Hamakua Loa, Koolau, Hana, Kipahulu, Kaupo, Kahikinui, Honuaula and Kula in East Maui. The *ahupuaa* of Kahakuloa in Kaanapali and the *ahupuaas*[2] [sic] of Olowalu and Ukemehame in Lahaina were at times termed *kalanas* [sic]. The *ahupuaas* [sic] of Waihee and Waiehu were independent of any *moku* and are listed in the *Book of the Mahele* as being in "Puali Komohana," i.e., West Isthmus. The large *ahupuaas* [sic] of Wailuku of Waikapu, which appropriated almost the whole of the isthmus, belonged to no district and in the *Mahele* were said to be in Na Poko, Na Poko in this case meaning a smaller division of the island. C. J. Lyons says "with reference to the ahupuaas of Waihee, Waiehu, Wailuku and Waikapu, on the map it was necessary to form a new district and call it Wailuku, Nawaieha, 'the four waters,' being too cumbersome and ill understood'' (Sterling 1998: 3).

Wailuku is widely agreed to mean the "waters of destruction." While many associate the term with the Battle of Kapaniwai, scholars believe the term to have an older origin. One moʻolelo (story) recounts a battle in Wailuku between kanaka (humans) and pueo (owls). While such tales seem far-fetched, this moʻolelo is not unique to Maui as a similar moʻolelo of a great battle between kanaka and pueo is found on Oʻahu. In the Wailuku tale, published in the Hawaiian newspaper *Ke Au Okoa* in 1871, the story speaks of how many humans and chiefs were killed, including Kapoi and his wife (Uaua 1871: 3). Clark provides an interpretation of this story:

[2] In the Hawaiian language, the plural form of words is not created by adding an "s" to the end of the word, hence "[sic]" has been added where "s" was added to Hawaiian words. Words are instead made plural through the use of the kahakō and/or the plural definite article, for example, the plural form of the word he haumana (a student, singular) is nā haumāna (the students, plural).

> In 1871 the Hawaiian newspaper *Ke Au ʻOkoʻa* told a legend involving a man named Kapoi who lived with his wife at Kaimuheʻe, just above the two waters Kanahā and Mauoni. One day Kapoi's wife went out to gather *ʻūhini* (grasshoppers) and found an owl's nest with seven eggs. Thinking they were duck's eggs, she took them and gave them to Kapoi. He realized what they were, but refused to give them back to the owl who appeared and requested for their return. Kapoi then smashed the eggs against the stone wall surrounding the house. Infuriated over the senseless loss, ʻAʻapueo, the mother owl, and her mate, Pueokaia, gathered owls from all the islands. All of the men and chiefs of the area, including Kapoi and his wife, were destroyed. The place *mauka* of the ponds where the cruel breaking of ʻAʻapueo's eggs was avenged was called Wailuku, "water (of) destruction" (Clark 1980: 8-9).

In this moʻolelo, the place name Kaimuhee is found: "I ka wa e noho alii ana o Kanenenuiakawaikalu no Maui, ma Wailuku kona wahi noho mau, e noho ana kekahi kanaka kaulana o ia wahi, o Kapoi me kana wahine, ma Kaimuhee, mauka ae o na wai elua, o Kanaha me Mauoni, he mau loko kaulana ia no Wailuku…" (Uaua 1871: 1). This specifies that Kapoi and his wife lived in Kaimuhee, mauka (uplands) from the famed ponds of Wailuku, Kanahā and Mauʻoni.

There are also moʻolelo about the name Waiehu. In a previous recording included in the Sites of Maui, Pia Cockett explained the meaning of the name Waiehu: "And Waiehu, there's a water in the upland there when the water came down the cliff, the sprays fly just as it does over the sea. It was called Waiehu" (cited in Sterling 1998: 71).

The following research and analyses appropriately study the history and cultural resources of Waiehu and Wailuku, focusing on the project area and the surrounding environment.

A. Physical Environment

The project area is located in the ahupuaʻa of Wailuku, within the moku (district) of the same name. Wailuku moku consists of four ahupuaʻa: Waihee, Waiehu, Wailuku, and Waikapu.

The ahupuaʻa of Waiehu is located within the larger moku of Wailuku, south of the ahupuaʻa of Waiheʻe and north of the ahupuaʻa of Wailuku (Figure 5).

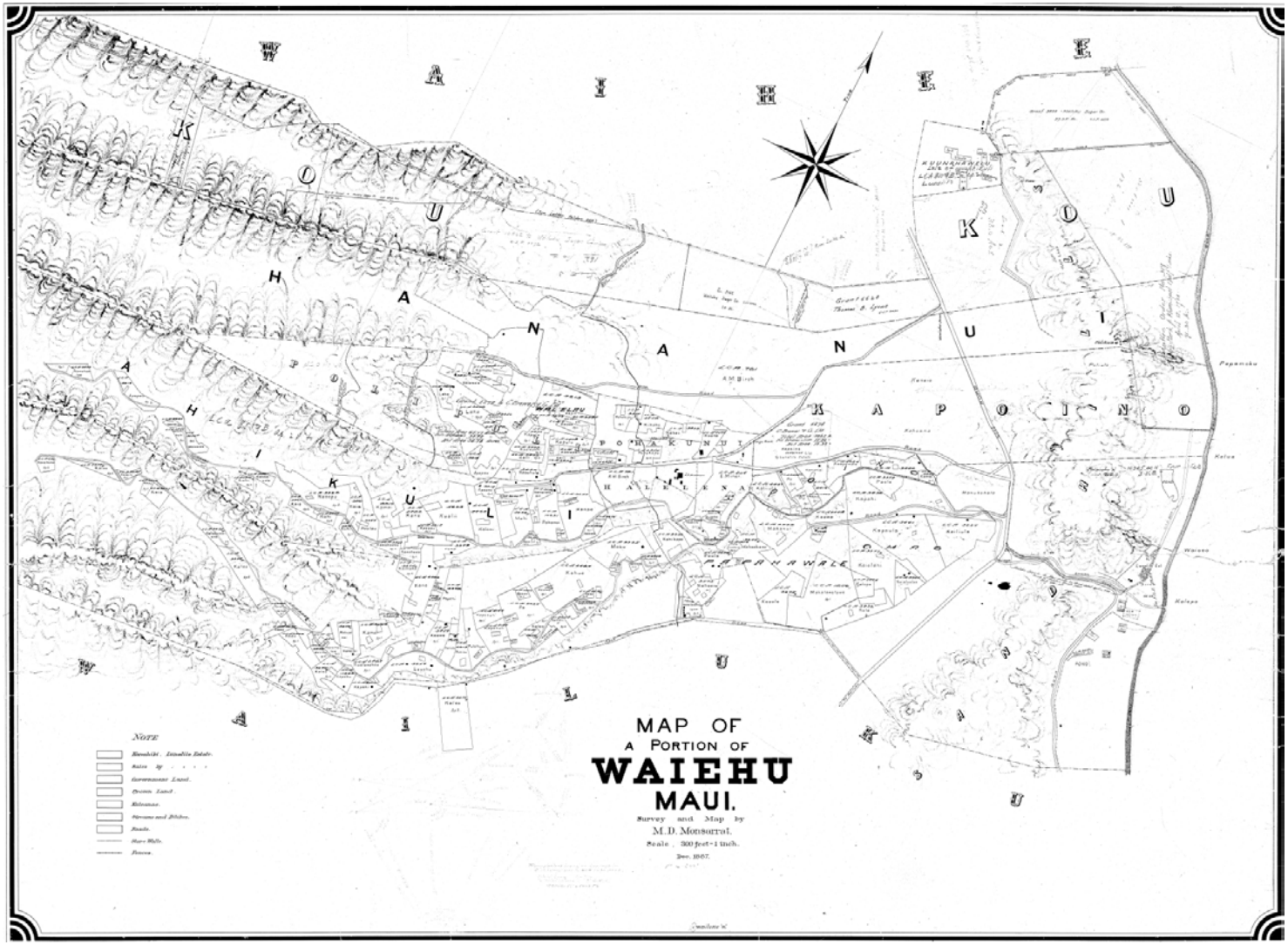

Figure 5. State of Hawaii, Registered map no. 1436, M.D. Monsarrat, surveyor (1887)

B. Biocultural Environment

To employ the Hawaiian landscape perspective and emphasize the symbiosis of natural and cultural resources, Honua Consulting uses the term 'biocultural' to refer to natural and cultural resources, with additional sub-classifications by attributes.

A brief further discussion of environmental zones and traditional Hawaiian land management practices is necessary to understand the tangible and intangible aspects of the Hawaiian landscape. Additionally, it is important to point out once again that in the Hawaiian landscape, all natural and cultural resources are interrelated and culturally significant. Natural unaltered landscape features such as rocky outcrops, cinder cones, intermittent streams, or an open plain can carry as much significance as a planted grove of wauke (*Broussonetia papyrifera*) or a boulder-lined ʻauwai (canal).

Maly presents a narrative of traditional Hawaiian land management strategies and the different environmental zones recorded in *Ka Hoku o Hawaii* (September 21, 1916):

> Hawaiian customs and practices demonstrate the belief that all portions of the land and environment are related, like members of an extended family, each environmental zone was named, and their individual attributes were known. Acknowledging the relationship of one environmental zone (wao) to another, is rooted in traditional land management practices and values. Just as place names tell us that areas are of cultural importance, the occurrence of a Hawaiian nomenclature for environmental zones also tells us that there was an intimate relationship between Hawaiians and their environment.
>
> The native tradition of Ka-Miki provides readers with a detailed account of Hawaiian land divisions and environmental zones. While competing in a riddling contest at the court of the chief, Palikū-a-Kīkoʻokoʻo, the hero, Ka-Miki sparred with Pīnaʻau, the foremost riddler of the district of Hilo Palikū (northern Hilo). The riddles covered topics describing regions from the mountain tips to the depths of the ocean, and descriptions of kalo (taro growth), the ala loa (trail systems), and nā mea lawaiʻa (fishing practices). As the contest unfolded, it was seen that each of the competitors were well matched. In one of the riddles, Ka-Miki described the various regions of the island of Hawaii, extending from the mountain to the sea. Ka-Miki then told his opponent, that if he could rise to the challenge of answering the riddle, his knowledge could be compared to one who has ascended to the summit of the "mauna o Paliahu" (mountain of Poliʻahu, or Mauna Kea) (in *Ka Hoku o Hawaii*, September 21, 1916).

> Through one of the riddles [the] reader learn[s] about the traditional wao or regions of land, districts, and land divisions of the administrators who kept peace upon the land. The environmental zones include:
>
> 1 – Ke kuahiwi; 2 – Ke kualono; 3 – Ke kaumauna; 4 – Ke ku(a)hea; 5 – Ke kaolo; 6 – Ka wao; 7 – Ka wau maʻu kele; 8 – Ka wao kele; 9 – Ka wao akua; 10 – Ka wao lāʻau; 11 – Ka wao kānaka; 12 – Ka ʻamaʻu; 13 – Ka ʻāpaʻa; 14 – Ka paheʻe; 15 – Ke kula; 16 – Ka ʻilima; 17 – Ka puʻeone; 18 – Ka poʻina nalu; 19 – Ke kai kohola; 20 – Ke kai ʻele; 21 – Ke kai uli; 22 – Ke kai pualena; 23 – Kai Pōpolohua-a-Kāne-i-Tahiti.
>
> 1 – The mountain; 2 – The region near the mountain top; 3 – The mountain top; 4 – The misty ridge; 5 – The trail ways; 6 – The inland regions; 7 and 8 – The rain belt regions; 9 – The distant area inhabited by gods; 10 – The forested region; 11 – The region of people below; 12 – The place of ʻamaʻu (fern upland agricultural zone); 13 – The arid plains; 14 – The place of wet land planting; 15 – The plain or open country; 16 – The place of ʻilima growth (a seaward, and generally arid section of the kula; 17 – The dunes; 18 – The place covered by waves (shoreline); 19 – The shallow sea (shoreline reef flats); 20 – The dark sea; 21 – The deep blue-green sea; 22 – The yellow (sun-reflecting sea on the horizon); and 23 – The deep purplish black sea of Kāne at Tahiti (Maly 2001: 3).

The area of Wailuku as a whole contained a full range of wao and as a result, the area was known to be kapu (sacred or restricted). One historian explains:

> Na Wai Ehā, the Four Waters, including Wai-ka-pu Walley, waterfalls and stream, the Forbidden or Sacred Valley. Wai-lu-ku is the Destructive Waters of I-a-o Valley whose stream is best known as Wai-aka-ma-kea or Waters of Light and Shadow. Wai-ehu is the Valley of Misty Waters; and Wai-heʻe is the Valley of Racing Waters. All this area on the eastern slop of west Maui, whose name is Mauna-ka-Hala-Wai, or Mountain Blessed with Waters, was farmed dligiently in olden times. With the produce from those lovely gardens, and the fat fish from the ponds of Kana-hā and Mauʻoni at Kahului and their counterparts at Ke-alia of Ka-lepo-lepo on Maʻalaea Bay, the people of Maui were rich and happy. Here, many temples were built for prayer, ceremonials, and finally, some were rededicated as war temples.

Today little of the flourishing gardens remains. There are some active taro patches, but the land now produces sugar cane products at the Wailuku Sugar Company which began under King Kamehameha III, who has the burden of changing the ancient feudal system into a modern money-making venture (1825 to 1854) during his reign of the Kingdom of all Hawaiʻi.

The fishponds date back for many centuries and were rededicated under Kiha-a-Piilani and Umi-a-Liloa who was his brother-in-law, in the middle 1500s. During the reign of King Ke-kau-li-ke, who died in 1736, the twin ponds of kanaha and Mauʻoni were again repaired along their walls. Today Kanaha is a bird sanctuary; and Kealia is a modern commercial shrimp pond.

The area of Na Wai Ehā were kapu (sacred) to Maui Kingdom, with the beach at Kahului Bay being named Maka-wela, or literally, the Burning Eyes, indicative of the kapu of the burning sun peculies to the Aliʻi of Maui (Ashdown 1976: 3).

IV. Existing Resources

W.D. Alexander wrote in 1891 that the establishment of the district of Wailuku was a post-foreign contact construct: "On Maui the lands of Waikapu and Wailuku appropriated almost the whole of the isthmus so as to cut off half of the lands in the distrct of Kula from access to the sea. These two ahupuaʻa(s), together with Waiehu and Waiheʻe, which were independent, belonging to no Moku, were called Na Poko, and have been formed into a district in modern times" (Sterling 1998: 63; see also Van Dyke 2008: 178). F.S. Dodge would refer to the area as an ʻili kupono (Figure 3). Moffet and Fitzgerald note about Dodge's 1885 map of the island: "In addition to the standard colors of yellow for Crown and green for government lands, Dodge employed several other colors to cope with the land complexities of Maui. For example, an unusual land in Hawaiʻi is the *ʻili kupono* of Wailuku, shown in pink and covering the north half of the isthmus that connects the two halves of the island. An *ʻili kupono* was an *ʻili* that was independent of any ahupuaʻa. Wailuku was purchased by Claus Spreckels in 1882 and formed a major component of his sugar empire in Hawaiʻi" (Moffat and Fitzgerald 1987: 47). It is unclear when the area became known as its own district, but it occurred some time between the creation of Dodge's map in 1885 and the passage of the County Act by the Territorial Government in 1905 when the Act named Wailuku to the County seat of Maui.[3]

[3] The National Register of Historic Places Inventory – Nomination Form for the Wailuku Civic Center Historic District: https://npgallery.nps.gov/GetAsset/053a8c8a-3956-4c7d-831a-0c3e0a737037

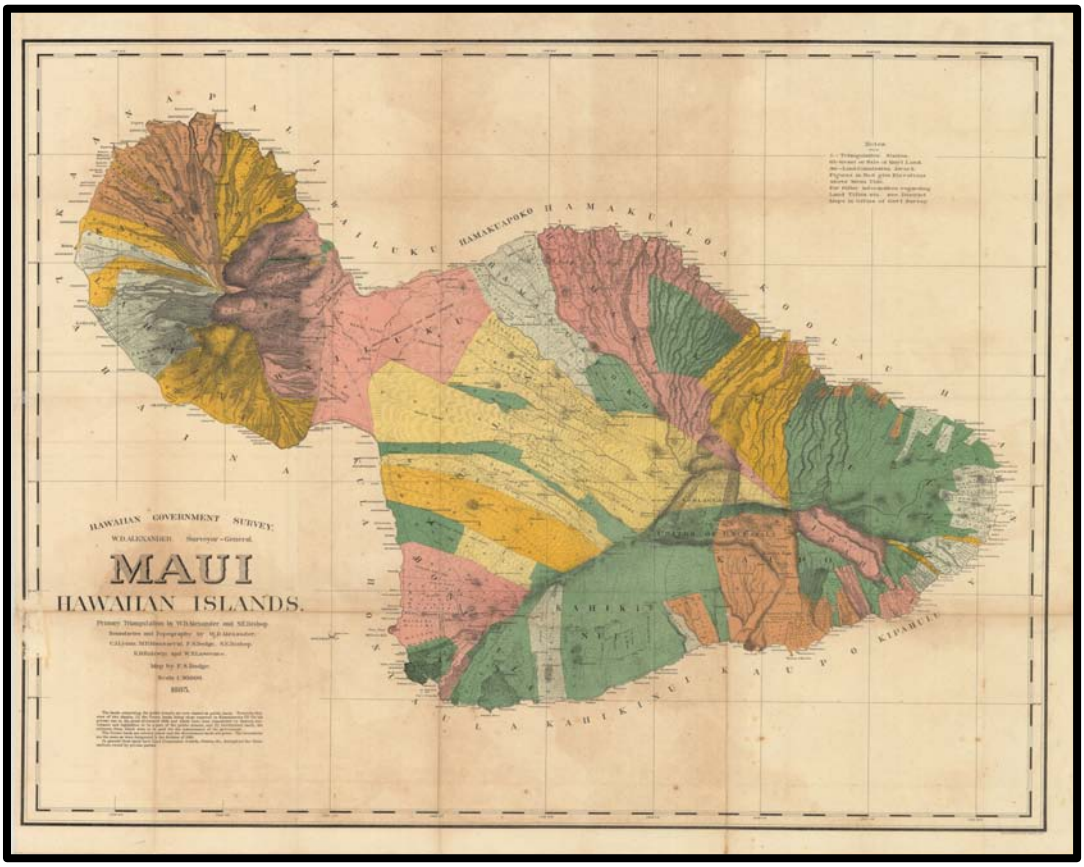

Figure 6. Map of Maui by W.D. Alexander and F.S. Dodge (1885)

A. Cultural History of Central Maui

Fornander notes that Hawaiians settled within the Wailuku moku as early as the 9-10th century: "Among other southern families of note who arrived at the Hawaiian group during this migratory period, though now it is impossible to place them in their proper order, the legend mentions *Kalana-nuunui-kua-mamao*, and *Humu*, and *Kamaunua-niho* who came from Kahiki (the southern groups), and landed at Kahahawai in Waihee, Maui" (Fornander 1878: 43).

It seems best to begin a genealogy of Maui's chiefs with Moʻoinanea. Moʻoinanea appears in numerous moʻolelo throughout Hawaiian history. She is considered "the matriarch of all moʻo [(lizard)] gods and goddesses" (Pukui and Elbert 1971: 394). Accounts detail her arrival from Kahiki "with the Kū and Hina family of gods" and that she was "the ancestor of the ʻUlu / Hemo linage of Maui" (Klieger 1998: 8). It is explained:

> One of [Moʻoinanea's] descendants was Kelea (Keleanuinohoʻanaʻapiʻapi), a Maui chief and famous surfer of married Kalamakua, a prominent chief on

> Oʻahu. Maui was not yet a unified kingdom at the time, but soon the moʻo would be evoked for the unification of the island, and then the entire archipelago. Kelea was the daughter of Kahekili I, the alii nui of the kingdom of West Maui, and his wife Haukanuimakamaka. The moʻo lineage was most likely introduced through Kelea's mother. Kelea's paternal grandfather and great uncle were Kakaʻe and Kalaʻalaneo, alii nui of the Wailuku line who ruled West Maui and Lanai from Lele/Lahaina in the sixteenth century (Klieger 1998: 8).

After Kahekili I passed, Kelea's brother, Kawaokaohele, gained control over his kingdom. Kawaokaohele was a popular aliʻi (chief) and the reign is known for its prosperity. Most importantly, it was during the reign of Kawaokaohele that East Maui (i.e., Hana) recognized the Wailuku aliʻi as being mōʻī (King) of Maui (Klieger 1998: 8-9).

Kawaokaohele's son, Piʻilani, is widely acknowledged to this day to be the greatest aliʻi in Maui's history. He ruled all of Maui from Lahaina, which would eventually become the political center of the island and later the unified Hawaiian Kingdom. Piʻilani is known for creating a trail that circumnavigated the entire island (Klieger 1998: 9). Piʻilani married his first cousin, Laieloheloheikawai, daughter of Kelea. Piʻilani and Laieloheloheikawai had at least four children: daughter Kihawahine Mokuhinia Kalamaula Kalaaiheana, daughter Piʻikea, son Lono-a-Piʻilani[4] and son Kiha-a-Piʻilani. These children, being the result of a piʻo union (marriage between two close relatives, sometimes a brother and sister), had a very strong lineage.

Upon her death, it is believed that Kihawahine transformed into a moʻo and became a guardian of sacred places on Maui, most notably fishponds, some of which bear her names. Mary Kawena Pukui said that her home was Mauʻoni fishpond, located in Kahului (Klieger 1998: 9). Yet, it is also said that Kihawahine possessed the ability to travel between islands and fishponds (Klieger 1998: 9). Many fishponds to this day are associated with a moʻowahine (female lizard deity) that protects the pond. It is likely that this continued existence of moʻo deities originated with Kihawahine.

Historians estimate that Piʻilani ruled in the 16th century. It is important to note that Hawaiian chiefs demonstrated considerable savvy in politics. Chiefs commonly intermarried for political reasons. Piʻikea-a-Piʻilani, daughter of Piʻilani, married Umi-a-Liloa, the King of Hawaiʻi Island. When Piʻilani died, the Maui Kingdom went to his oldest son Lono-a-Piʻilani. For many years,

[4] Children often bore the name of an ancestor, so names such as Lono-a-Piʻilani mean "Lono of Piʻilani." Whenever historical figures' names have this element, the name has been broken up with dashes in this report to help the reader follow geneaologies and familial relationships.

Lono-a-Piʻilani and his younger brother Kiha-a-Piʻilani (brothers to Piʻikea) co-existed peacefully. Eventually, Lono-a-Piʻilani and Kiha-a-Piʻilani had a falling out and the latter feared his brother, the King, would try to kill him, so Kiha-a-Piʻilani fled and lived on Lānaʻi. He eventually returned and stayed in the southern parts of Maui, as to not be found by his brother. His identity was eventually discovered and he traveled to Hawaiʻi Island to stay with his sister, Piʻikea-a-Piʻilani and her husband, ʻUmi-a-Liloa (Kamakau 1992: 23-27). Kiha-a-Piʻilani joined with ʻUmi-a-Liloa, and together they planned to invade Maui. Lono-a-Piʻilani resided in Wailuku during this time.

Kiha-a-Piʻilani and ʻUmi-a-Liloa successfully invaded and conquered East Maui. Before they could reach Lono-a-Piʻilani in Wailuku, Lono-a-Piʻilani died. A prophet told Kiha-a-Piʻilani that the body of Lono-a-Piʻilani was "in Wailuku in a land called Paʻuniu" (Kamakau 1992: 31). Despite a wide search throughout Wailuku, the bones of Lono-a-Piʻilani were never found by Kiha-a-Piʻilani.

Kiha-a-Piʻilani ruled Maui in the 17th century. During ʻUmi-a-Liloa's reign of Hawaiʻi Island, the two kingdoms remained close and peaceful thanks to the intermarrying of the chiefly families. It would be this history of strategically intermarrying that would help to engender the eventual unification of the islands. Kiha-a-Piʻilani's descendant, Kekaulike, would become the King of Maui in the 18th century.

As Kekaulike ruled on Maui, Keawe ruled on Hawaiʻi Island. Keawe was a famed ruler of Hawaiʻi Island (Kamakau 1992: 64). Keawe's half sister was Ka-lani-kau-lele-ia-iwi, whose husband was Ka-uaua-nui-a-Mahi and to them was born Alapaʻi-nui-a-Kauaua (Alapaʻi) (Kamakau 1992: 64). Kamakau (1992) notes that Keawe enjoyed travel and would travel to the other islands, including Maui. When Keawe died, he left Kohala and Kona to his son Keʻeaumoku and Kaʻu to his son Kalaninuiʻiamamao (Kamakau 1992: 64-65).

Alapaʻi also lived on Maui during this time, moving there after Hilo chiefs killed his father, Ka-uaua-nui-a-Mahi. Alapaʻi's half-sister Kekuʻiapoiwanui-a-Kalaninuikauleleiaiwi (Kekuʻiapoiwanui) was the wife of Kekaulike (Kamakau 1992: 65). After Keawe's death, Alapaʻi returned to Hawaiʻi Island. He first waged war against Keʻeaumoku and gained control of Kohala and Kona. Kekaulike did not approve of this and took his own warriors to fight with Alapaʻi on Hawaiʻi Island. Kekaulike was unsuccessful in this battle and he slaughtered numerous commoners during his campaign in Kohala (Kamakau 1992: 65-66). Alapaʻi then unsuccessfully launched a campaign against Kekaulike on Maui.

Kekaulike had four biological children with his wife Kekuʻiapoiwanui: Kalola (wahine (female)), Kamehamehanui (kāne (male)), Kahekili II (kāne), and Kahuʻaimokuakama (wahine). Kalola

bore children with three different men: Kalanikauōkikilokalaniakua (wahine) with her brother Kamehamehanui, Kīwalaʻo (kāne) through her union with Kalaniʻopuʻu, and Kekuʻaipoiwa Liliha (wahine) from her union with Keōua. Kalanikauōkikilokalaniakua had many kapu on her due to her being the result of a nīʻau piʻo union between siblings, which Hawaiians believed gave a child a sacred status. Kalaniʻopuʻu and Keōua are two sons of Keawe, both of which Alapaʻi brought up as leaders in his government.

Keōua had many wives. In addition to Kalola, he also married Kekuʻaipoiwa, daughter of Kekela and Haʻae (not to be confused with Kekuʻaipoiwa Liliha, daughter of Kalola, or Kekuʻaipoiwanui, wife of Kekaulike). Keōua and Kekuʻaipoiwa would become the parents of Kamehameha I (kāne), who was born as Alapaʻi launched his attack against Kekaulike on Maui.

As Kekaulike ruled Maui, Alapaʻi ruled over Hawaiʻi Island. Alapaʻi was a peaceful and prosperous chief and additional war between the two kingdoms was avoided for a period of time. On Maui, Wailuku had been the central location of power since the time of Piʻilani. Kekaulike moved it to Kaupō, likely in preparation of attacks on Hawaiʻi Island. Kekaulike fell ill and never returned to Hawaiʻi Island. Kekaulike turned over Maui to his son, Kamehamehanui (not to be confused with Kamehameha I).

In anticipation of an attack from Alapai's forces, the weakened Kekaulike directed his family and governing officials to return to Wailuku, to Halekiʻi, "the royal residence of the Maui ruling line near Wailuku" (Kirch 2012: 240). There Kekaulike died and after his death, "fearing the arrival of Alapaʻi bent on war, the chiefs cut the flesh from the bones of Ke-kau-like in order to lighten the load in carrying the body to ʻIao" (Kamakau 1992: 69).

Alapaʻi arrived on Maui as anticipated. Yet, when Alapaʻi heard of Kekaulike's death and of Kamehamehanui's rule, he relinquished his planned attack on the island and rather opted for peace between the kingdoms.

Kahekili II, the second son of Kekaulike, would become one of Maui's most famed aliʻi. He was known to be a ferocious warrior and a staunch follower of the Hawaiian religious beliefs and protocols. He kept individuals for sacrifice at a place called Puaʻanui, near the site of the Wailuku mill (Thrum 1917: 60). It was during Kahekili II's reign that the great battle at Kakanilua occurred.

Joseph Mokuohai Poepoe wrote of this great battle in Hawaiian language newspapers in 1905:

> As the Alapa[5] and Piipii proceded to the plain of Kamaomao [from Kihei-pukoʻa] they met with no hindrance until they reached the southeastern side of a place called Kalua, close to the village of Wailuku.
>
> When the Alapa arrived there, the warriors of Kahekili concentrated upon them from many points, like sandcrabs running over the sand.
>
> A bitter fight was fought by the Alapa and Piipii armies of Kalaniopuu against the well trained warriors of Maui and those of Oahu under Kahahana…
>
> Kalaniopuu received the news on the evening of the day of the terrible battle. This battle in which the Alapa and Piipii were destroyed was called Ahulau ka Piipii i Kakanilua (completely slaughtered were the Piipii at Kakanilua) (Sterling 1998: 88, citing Poepoe 1905).

Kekuʻaipoiwa Liliha (daughter of Keōua and Kalola) and her half-brother Kīwalaʻō married and this nīʻau piʻo union resulted in the birth of Keōpuōlani (wahine). Due to the half-sibling relationship between her parents and her royal lineage, Keōpuōlani was a chiefess of substantial status and rank. While Kamehameha I would eventually take many wives, none held as high a sacred status as Keōpuōlani and she would become known as Kamehameha's sacred wife. It is through their children, Liholiho (kāne), Kauikeaouli (kāne), and Nahiʻenaʻena (wahine), that the Kamehameha Dynasty was established.
The Wailuku district was generally abundant with resources, both from the moutains and the sea, yet its name implies a history of conflict also impacted the area. Wailuku, as previously mentioned, literally translates to "water of destruction" and while some attribute the name to the historic battle instigated by Kamehameha I that took place in this area, the name reaches further back prior to Kamehameha's reign.

Wailuku would become an important political hub. Kahekili kept a home in Wailuku, known as Lanikeha, which was a name often used for the residences of high chiefs (Pukui and Elbert 1971: 178; Malo 1951: 104). Literally meaning "lofty heaven," it referenced the legendary part of heaven. It is possible Kahekili kept a second home in Wailuku. One account from *Ka Naʻi Aupuni* mentions another home called Kalani-hale: "The people of Hawaii lamented greatly. Kalaniʻopuu grieved over the destruction of his ʻAlapa and Piipii warriors. At that time Kahekili was living in his house, Lanikeha, in Wailuku. Kiwalaʻo donned his royal regalia; Kameeiamoku held his spittoon and Kamanawa carried his kahili. The delegate from Hawaii

[5] "Alapa" in this case references the famed warrior company of Kalaniʻopuʻu. The spelling of the term with diacriticals is ʻālapa.

went up to Wailuku, for at that time Kahekil was living in his house named Kalani-hale" (Sterling 1998: 89).[6]

B. Post-Contact Wailuku

When foreigners arrived, Hawaiians resided throughout Wailuku. The first foreigners established in Wailuku in 1832 under Jonathan S. Green (U.S. Department of the Interior 1986). It is said that "[v]ery little development occurred, however, until after the Wailuku Sugar Company commenced its operations in 1862" (U.S. Department of the Interior 1986). In 1870, Samuel Thomas Alexander and Henry Perrine Baldwin (Alexander & Baldwin) planted their first sugarcane crop on their planation; this would eventually become the foundation of Maui Agricultural Company (HC&S 2017).

Wailuku was significantly impacted by both foreign contact and the Māhele, which made the establishment of sugar operations and plantations possible. Although listed among the Crown Lands,[7] significant acreage from these Crown Lands would be transferred to Claus Spreckels through Government Grant 3343 (Van Dyke 2008: 178); this Grant included all of Kahului. Through this land transfer, Wailuku and Kahului became a central hub of Hawaiʻi's sugar industry. Claus Spreckels acquired a total of 40,000 acres in East Maui: 16,000 acres in Waikapu and 24,000 acres in Wailuku. Spreckels developed a particularly close relationship with King David Kalākaua, who executed a number of questionable transactions that would significantly benefit Spreckels (Wilcox 1996: 61). These resouces allowed Spreckles to form Hawaiian Commercial Company in 1878, the predecessor to Hawaiian Commercial & Sugar Company (HC&S), which was officially incorporated and renamed in 1882 (HC&S 2017).

Historic accounts detail Spreckels' activities:

> Claus Spreckels & Co.'s Sugar Mill and Plantation, Wailuku and Waikapu Common, seven miles from Wailuku; Kahului Road; post office address, Kahului. Owns 30,000 acres; 3,000 acres under cultivation; 25,000 acres available for sugar planting; the balance is pasture, etc. sole right of 32 streams for irrigating purposes; said right obtained direct from the Crown; estimated yield for season of 1880, 3,000 tons of sugar. The cane will average six tons to the acre. Number of men employed, 350; horses and mules employed, 70 head.

[6] The original text of this account implies the home was in the mauka (mountain or inland) part of Wailuku: "Ua pii aku la nohoi ka elele o Hawaii no uka o Wailuku, a, aia ia wa, e noho ana no o Kahekili iloko o kona hale i heaia ma ka inoa o 'Kalani-hale'" (Poepoe 1905).

[7] Wailuku, not yet being its own autonomous moku, is listed under Napoko, with Wailuku being the name of the land area (Van Dyke 2008: 178).

> The ploughing on the whole is done by steam ploughs, and the cane is transported by the aid of portable railways to the mill. The capacity of the mill will be about twenty tons per diem; the mill will have five crushers in two sets, one of three, and one of two. The mill buildings are now in course of construction, and it is expected that grinding may be commenced about November next. Mr. Spreckels has his own landing and storehouse at Kahului, and the sugar is brought down to the landing by Captain Hobron's Wailuku and Hamakua Railway. Messrs. J. Horner & Co. plant 600 acres, all under cultivation, on shares with this company. Mr. Spreckels calculates to import, inside of four years, 40,000 tons of sugar per annum from his Hawaiian estates (Bowser 1880: 432).

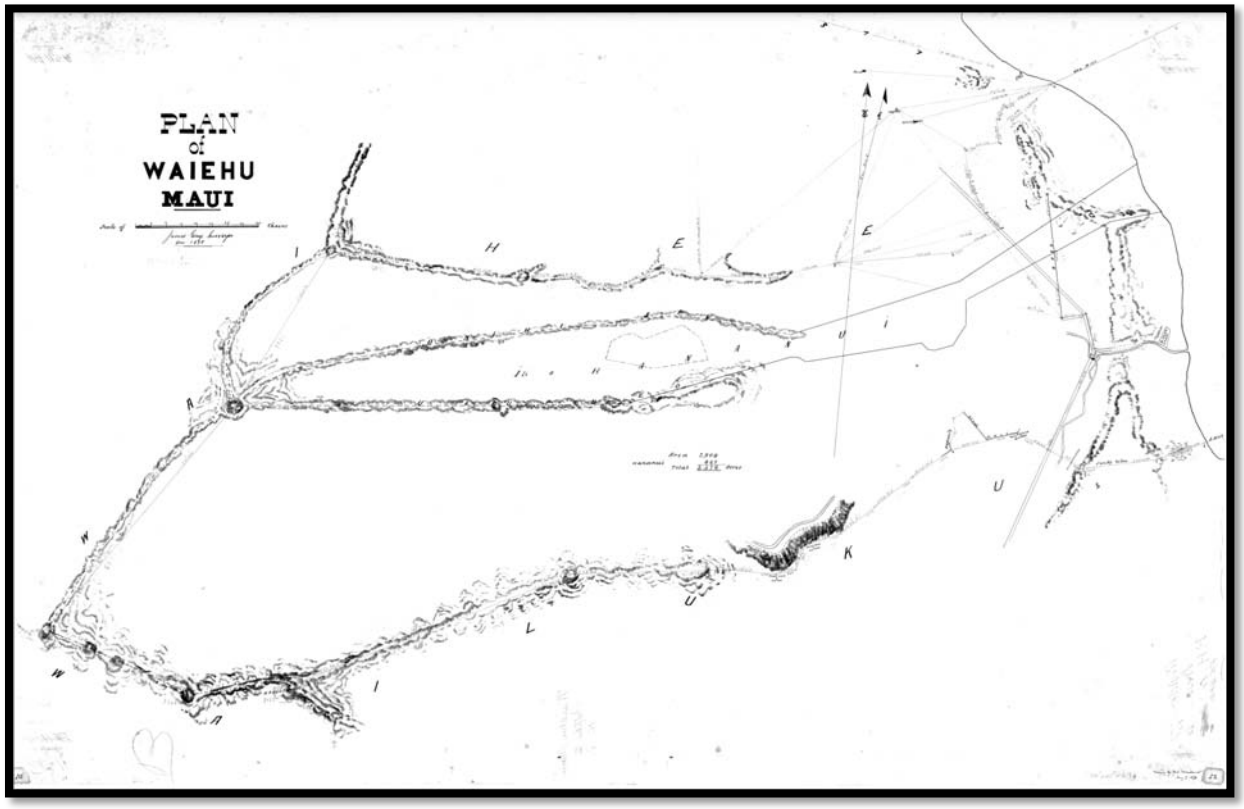

Figure 7. Map of Waiehu, Registered Map No. 772, J. Gay, Surveyor (1875)

By 1862, Wailuku Sugar Company was officially organized in 1875, the company officially incorporated (Wilcox 1996: 122). In 1863, Thomas Hogan built the first Western structure in Kahului: a warehouse near the beach (Clark 1980: 7); other Western structures followed in Kahului. The conversion from traditional Hawaiian agriculture, which was particularly

abundant on Maui, to Western irrigation practices had long-term adverse effects on the cultural practices and ecosystem services enjoyed on the island. Unlike traditional Hawaiian practices which required loʻi (pond fields) and other stream diversion activities to have a hoʻi (return flow to the stream of origin), sugar irrigation activities did not return water from perennial streams to the source. Rather, these modern irrigation practices diverted water without returning it, adversely impacting landowners downstream, particularly native tenants. Sugar also consumed an unprecendented amount of water from these water sources.

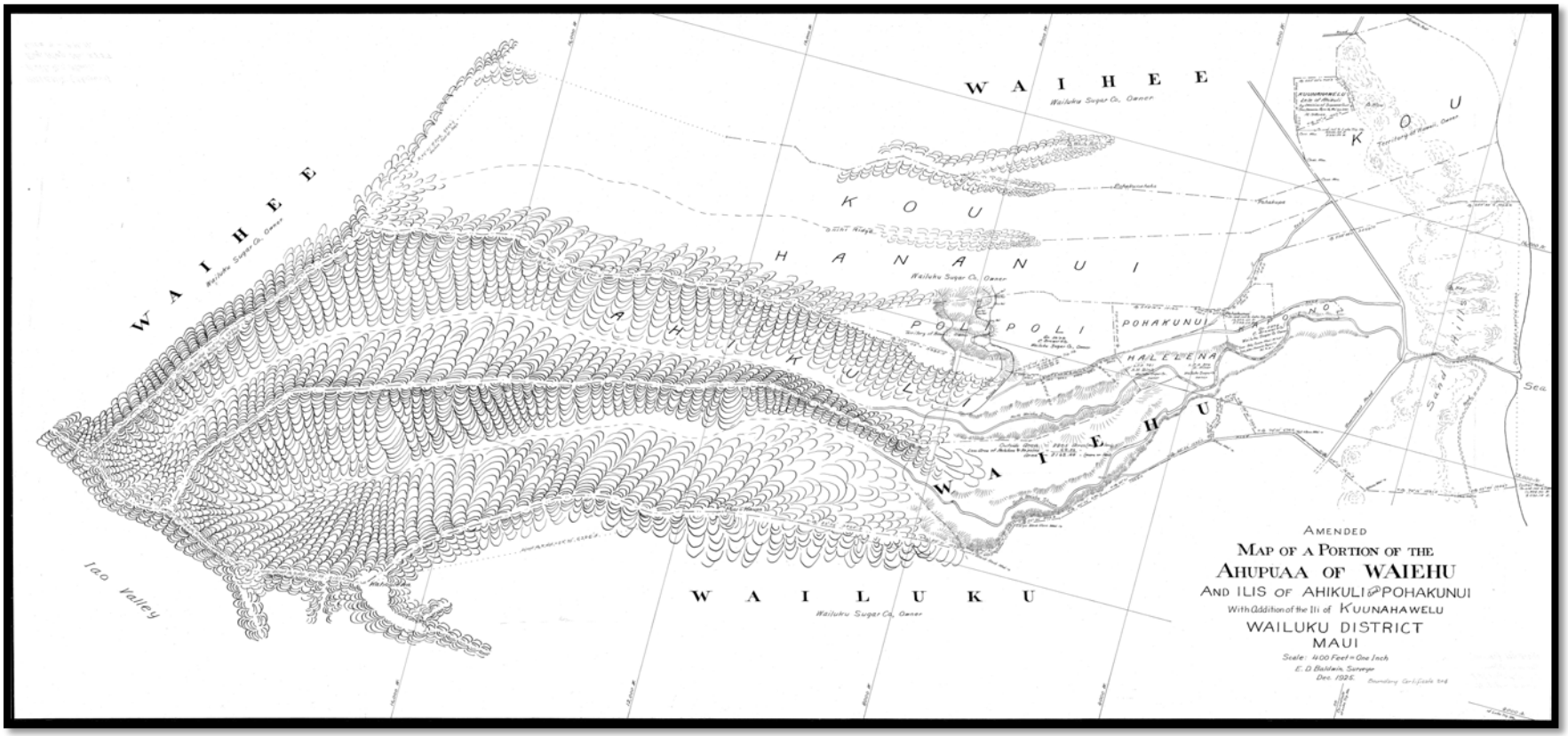

Figure 8. Registered Map 2757, E.D. Baldwin, Surveyor (1925)

Hawaiʻi's rich watershed systems are dependant upon healthy streamflow. Among the many benefits are healthy crops and healthy fisheries (Gingerich et al. 2007; Field et al. 2008). The radical changes in lifestyle and economy that accompanied foreign contact resulted in many Hawaiians becoming displaced from their family and ancestral lands. In 1876, the United States and the Hawaiian Kingdom signed the Hawaiian Reciprocity Treaty, which allowed sugar from Hawaiʻi to be imported into the United States duty-free. This made the sugar industry in Hawaiʻi far more economically viable than it had been prior to the execution of the Treaty. Sugar grew significantly on Maui as a result. A small landing was built in 1879 to service the growing sugar industry and Kahului Railroad Company incorporated in 1881 and established its headquarters near Kahului Bay. This was the first railroad company in Hawaiʻi and the first route ran from Kahului to Wailuku. The company was founded by Captain Thomas Hobron, a sea captain who came to Hawaiʻi and decided to stay and become a merchant in the islands. Hobron Point is named for him (Clark 1980: 7).

Sources note that Maui had telegraph-telephone service as early as 1877. The line ran between Napili and Wailuku. Within a few years, a more sophisticated line was set up for central Maui that included Kahului. Maui Telephone Company began in 1889, taking over the system (Ramil 1984: 6). In 1898, Alexander & Baldwin gained control of HC&S (HC&S 2017).

As Maui's sugar industry grew, so did the infrastructure needed to cultivate and export the sugar. Immigrant workers were brought to Maui from Asia and the Pacific. Plantation camps popped up throughout Wailuku and Kahului. The railroad infrastructure that carried crops to mills then to Kahului Harbor also grew. By the late 1800s, a second crop was introduced for cultivation and export on Maui: pineapple. Pineapple plantations steadily grew across Maui for several decades. The small landing at Kahului Bay transformed into a modern commercial harbor in 1900 when a plague outbreak led to the controlled, intentional burning of the town as a means of killing all the rats that were spreading the infestation. By 1910, the traditional Kahului Bay became home to a fully modernized harbor, as the Kahului Railroad Company extensively altered the area to suit its commercial needs (Clark 1980: 7).

The Maui News was established in 1900 and within the year, encouraged local Hawaiians "to give your children the best English education possible" (Ramil 1984: 7). At the time, the island's residents were primarly divided among three political parties: Republicans, which were led by plantation owners and managers, the Home Rule Party, led primarily by Hawaiians, and the Democratic Party (Ramil 1984). *The Maui News*, largely controlled by Republicans, weighed heavily into politics, making statements like: "Let [Hawaiians] have time to grasp the two great thoughts, first that all hopes of a restoration of the monarchy is gone forever, and secondly, that in order to have any weight in the management of the affairs of the Islands, [they] must forget that they are Hawaiians and remember only that they are Americans, and

then their adjustment in the body politic will come easily and naturally" (Ramil 1984: 8). Despite their rhetoric and efforts, the Republican Party failed to elect many delegates to the First Territorial Legislature; the Home Rule Party won six out of nine available seats.

Figure 9. Kahului Landing Prior to Creation of Kahului Harbor, Hawaii State Archives Call No. PPWD-5-3-019 (n.d. ca. late 1800s)

The Home Rule Party was unable to hold onto power. The Hawaiian led group continuously pushed to maintain elements of the sovereign kingdom, which led to regular conflict with foreign plantation owners. It was said that "The Home Rulers also opened themselves to criticism by their insistence of using the Hawaiian language in their legislative proceedings, in violation of the Organic Act which required the use of the English language" (Ramil 1984: 11). The publication also commented on foreign control of Maui lands: "It is monotonous untruth that the native Hawaiians have been cheated of their lands by the missionaries or the sugar planters or any body else. …On Maui, the bulk of the sugar plantations were formerly arid lands that nobody wanted, and have been made valuable only by outlay of vast sums for irrigating ditches and pumps" (Ramil 1984: 8).

During the First Territorial Legislature, a county bill was passed, only to be vetoed by the Governor. The 1901 effort would have changed the name of Maui Island to Liliuokalani and would have named Lahaina as the center of the county government (Ramil 1984: 10). Wailuku would nonetheless become the County seat of power when the County Act passed in 1903.

During World War II, the U.S. Military took over a substantial part of Maui for training and defense. Kahului was shelled by a Japanese submarine on January 1, 1942 (Clark 1980: 7; Pignataro 2013). Maui would shortly therefore become home to the 4th Marine Division, known as the "Maui Marines." The U.S. Marines built a camp and living facility for 18,000 troops in Wailuku (NOAA n.d.). The Navy would also take over land to build two naval air stations: NAS Puʻunēnē, now known as Maui Airport, and NAS Kahului, which would become known as Naska, and they were built in 1942 and 1943, respectively (NOAA n.d.). Clark identifies Naska as "the site of Kahului Airport and a small industrial-commerical complex. Some of the old-World War II structures can still be found in the area, including the now empty Naska Swimming Pool" (Clark 1980: 9).

Post-World War II demands of the "baby boomer" generation helped to turn Maui towards the tourism industry. As in many places, when soliders began to arrive home from the war, there was an increased need for single-family homes and suitable communities. The plantation camps of the past were undesirable for Maui's growing middle class, as was work on the plantation.

HC&S merged with Maui Agricultural Company in 1948, creating the largest sugar producer in the United States (HC&S 2017). In 1949, the Kahului Development Company received approval for a new development in the town (Ramil 1984: 128); the development would break ground by the end of the year. In 1950, HC&S introduced Tournahaulers to Hawaiʻi, using them to replace the aging railroad system as a means of transporting sugar (HC&S 2017). The first traffic lights installed on Maui were placed in Kahului in 1951 (Ramil 1984: 144). This provides a sense of how large and industrialized the town of Kahului had become. HC&S also diversified significantly by this time and developed a plan to transform Kahului from a plantation town into a modern city. They sought to develop their cast holdings of sugar plantation lands adjacent to Kahului Harbor into a city, which they called "Dream City." The project was successful, and this effort served as the foundation of much of Kahului today.

Evidence shows that the project area was briefly inhabited during the post-contact history, but these structures are not extant. Loko iʻa, which typically includes the boundaries of the pond itself and the surrounding ecosystem, could have possibly included the project area. Kanahā and Mauʻoni were spring-fed ponds, so there was no known stream flow or in-take from a stream source required for these ponds. Therefore, the extensive growth of Kahului around

the pond, with the exceptions of acts that filled or dredged the pond, would have had negligible impacts upon the ponds.

C. Moʻolelo

1. Native Informants

The narratives cited in this collection were excerpted from the testimonies given by native residents, or those given by surveyors who recorded the boundaries based on the testimony of native guides and their own field work. The testimonies include descriptions of several ahupuaʻa extending from ocean fisheries to plateau lands and mountain peaks. They also describe a wide range of traditional practices, travel, land use, resource collection, bird catching, and changes in the landscape witnessed during their lifetime.

In the 1871 testimonies and survey for Wailuku, Puʻuhīnale upper boundaries of Wailuku and Kahului (Figure 6). Also of interest are the proceedings from Kalialinui, which document a dispute regarding the boundaries of Kamaikaaloa's Kalialinui and the Crown Land of Wailuku. As a result of the dispute, significant testimonies from elder native informants were recorded. The original Hawaiian texts are given in their entirety below with excerpts translated by Maly situated on the right of the original text to highlight pertinent sections. Place names or cultural site/practice references have been underlined in each of the ahupuaʻa proceedings.

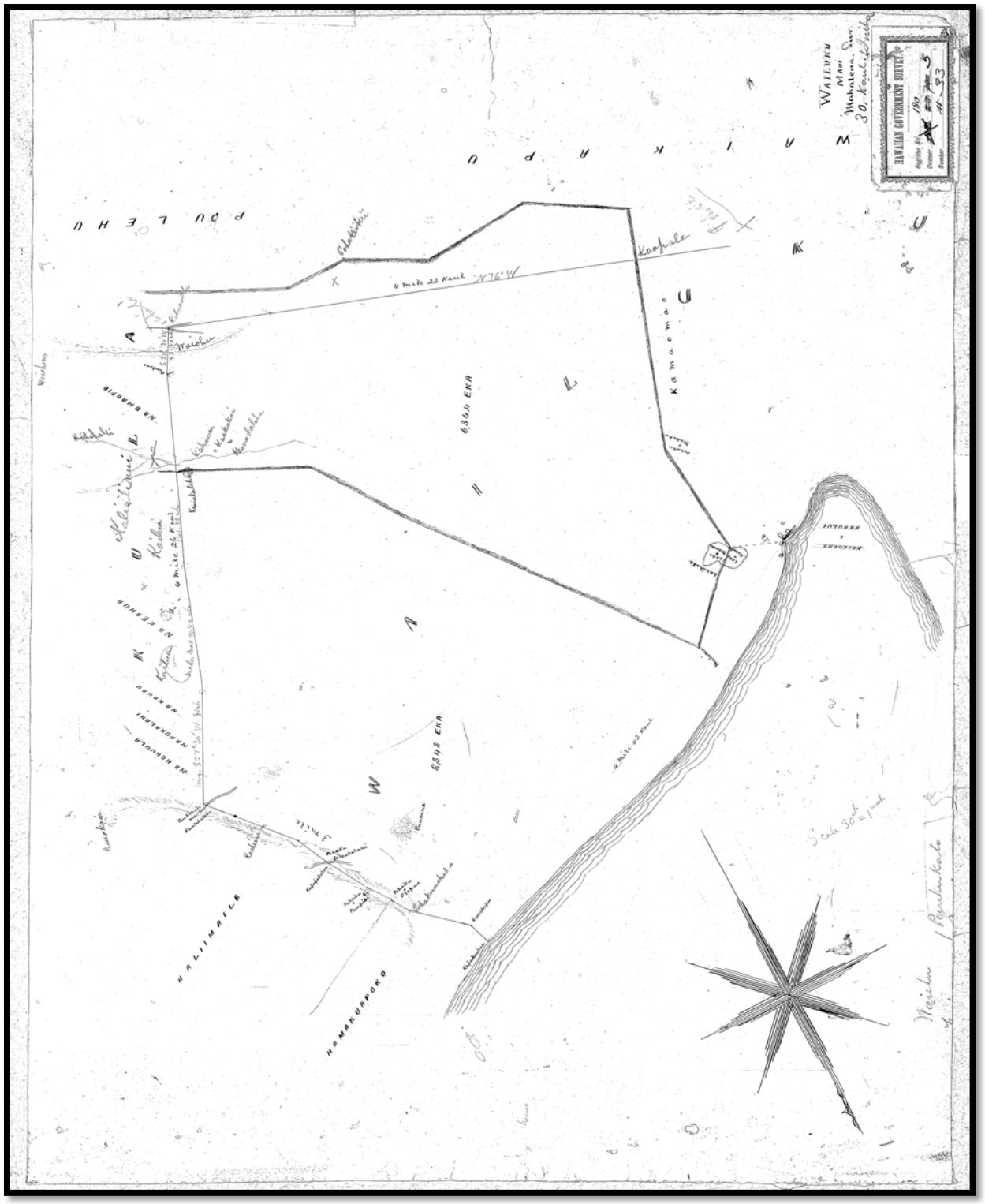

Figure 10. Registered Map No. 180. Portion of Wailuku with Boundary of Adjoining Lands and Sea. Survey by Makalena ca. 1866 (State Survey Division)

Kalialinui Ahupuaa
District of Kula, Island of Maui
Boundary Commission
Maui, Volume 1, pages 2-12

Wailuku, Maui
Febuari 21st, 1871
Keena Hookolokolo a ke Komisina o na palena aina ma Wailuku o ka Mokupuni o Maui o ko Hawaii Pae Aina

Ma ka hihia e pili ana i ka hooponopono ana i na palena o ka aina o Wailuku ame Kalialinui ma Wailuku, Moku o Maui Hawaii Pae Aina

a. Na Komisina o na Aina Lei Alii vs. Campbell & Turton

Ua waihoia mai imua o ke Komisina Palena Aina o ka Mokupuni o Maui o ko Hawaii Pae Aina [page 2] he palapala nonoi na na Komisina o na Aina Lei Alii ma ka la 22, o Dekamaba o ka M.H. Hookahi Tausani Ewalu Haneri ame Kanahiku.

Honolulu, Decemaba 19, 1870

I ka mea Hanohano
P. Nahaolelua
Kiaaina o Maui

Aloha oe
E ke Komisina o na palena aina o ka Mokupuni o Maui. Ua Kauohaia mai au e na Komisina o na Aina Lei Alii e waiho ʻku i palapala nonoi no ka hooponoponoana ina palena o ka Aina Lei Alii i kapaia o Wailuku e waiho la ma ka Apana o Wailuku, Mokupuni o Maui.

O na palena a makou i manao nui ai e hooponoponoia oia no na palena mawaena o ka Aina i oleloia maluna ame ka aina i kapaia o “Kalialinui.”

I hoomaopopo no Campbell ame Turton a ke makemake nei na Komisina i na Aina Lei Alii e kauoha ʻku ia laua

Eia mai me keia palapala ke ana o ka Aina o Wailuku e like me ka mea i

maopopo i na Komisina Lei Alii i ku like me ke Kanawai, a mai poina oe i ka hoolaha mai ia makou i ka manawa ame kahi e hoolohe ai.

O wau no,
Kau Kauwa Hoolohe
Jno O. Dominis
Komisina o na Aina Lei Alii a hope luna aina

Ua haiia na aoao elua e pili ana i keia hihia i haiia ae la, oia hoi i na Komisina Aina Lei Alii e Kue ana ia Campbell ame Turton ma ka la 21, o Febuari M.H. Hookahi Tausani Ewalu Haneri ame Kanahiku kumamakahi ma Wailuku kahi i hoolohe i keia hihia ma ka Mokupuni o Maui o ko Hawaii Pae Aina. Ua hoopukaia e ke Komisina Palena Aina o ka Mokupuni o Maui o ko Hawaii Pae Aina he palapala Kii hoike ia Kaaiaweoweo (K) no ka Mokupuni o Oahu, a ua hoihoiia mai ia [page 3]

Palapala Kii hoike imua o ka Aha ma Wailuku Mokupuni o Maui o ko Hawaii Pae Aina ma ka la 21, o ke malama o Febuari o ka makahiki Hookahi Tausani Ewalu Haneri ame Kanahiku kumamakahi me ka olelo mai, ame ka hai ana mai a ka mea nana i kii i ka mea i hooakakaia e Kii maloko o ua palapala Kii hoike la i ka hope Ilamuku nui o ka Mokupuni o Oahu ame ko Hawaii Pae Aina, aole e hiki pono mai ka hoike no ka pilikia loa i ka mai pela ka mea i maopopo imua o ka Aha.

E like me Kahi ame ka manawa i hoolahaia ai e ke Komisina Palena Aina o ka Mokupuni o Maui o ko Hawaii Pae Aina. Ua hiki mai na aoao elua o keia hihia imua o ka Aha a ua hoopaneeia keia hihia a hiki i ka hora akahi o ke Awakea o keia la ma ka ae ana mai o na Aoao Elua

Ua hiki mai no na aoao elua imua o ka Aha e like me ka manawa i hoopaneeia ma ka hora akahi oia la i oleloia oia hoi na Komisina o na Palena Aina Lei Alii ka aoao hoopii i kue ana ia Campbell ame Turton ka mea i hoopiiia ua ae mai no ka mea i hoopiiia ua loaa ʻku ia laua ka lono o ka manawa ame kahi e hoolohe ai i keia hihia e like me ke Kanawai.

W. C. Jones ka loio o Campbell ame Turton

R.H. Stanley ka loio o na Komisina o na Aina Lei Alii

Ua waiho mai o W.C. Jones i keia la 21, o Febuari o ka Makahiki o ka haku Hookahi Tausani Ewalu Haneri ame Kanahiku kumamakahi i ke Kii o ka aina o "Kalialinui."

Ua waiho mai o R.H. Stanley i keia la 21, o Febuari o ka makahiki o ka haku Hookahi Tausani Ewalu Haneri ame Kanahiku kumamakahi i ke Kii o ka aina o Wailuku o ka Mokupuni o Maui o ko Hawaii Pae Aina ame ka ana pu.

A noi hou mai R.H. Stanley e hookomoia na Inoa Campbell ame Turton i mau ona no ua aina la i kapaia Kalialinui ma Wailuku, Mokupuni o Maui, H. P. A. A olelo mai o W.C. Jones imua o ka Aha ua makaukau oia e hana i keia hihia, a e nininau kela aoao Ka mea hoopii i Kona mau hoike aka he hoike Ka Ko makou aoao aole nae, oia maanei nei, no ka mea ua loaa loa oia i ka pilikila i ka mai ma Honolulu o ka Mokupuni o Oahu, H. P. A.

Kue mai o R.H. Stanley i ke noi a W.C. Jones, no ka mea he mea pono ole i Ka Aha Ke noho i hoolohe i kekahi aoao apau kana mau hoike e loaa auanei ka manawa o kela aoao e aoao a kuai i kela hoike, ma Honolulu, Mokupuni o Oahu. [page 4]

Olelo mai o R.H. Stanley imua o ka Aha ina e hoopukaia kekahi palapala kii hoike e kekahi mea ua manaoia e ka mea nana i kii ua hoike nei i hooakakaia maloko o ua palapala kii hoike nei, e kakau ma ke kua o ua palapala nei i ke ana o kona hana ana e like me ka mea ana i kauohaia ai e hana i ka makai ai oleia i ka Ilamuku o ko Hawaii Pae Aina.

Waiho hou mai la o W.C. Jones i palapala lawe ike a kela hoike ma Honolulu, Mok. o Oahu, H.P.A. e olelo ana oia no ka hoike nui a lakou i manaonui ai a ua loaa mai ka palapala kii hoike i ka hope makai nui e olelo ana ua mai loa ka mea i kiiia, aole e hiki aku i Lahaina, Mokupuni o Maui, H. P. A. Ke ano nui nae oia palapala he palapala e noi ana imua o ka Aha e hoopanee i keia hihia no ka lawe ana i ka ike a kela hoike ma Honolulu ka Mokupuni o Oahu, H. P. A. e pili ana i ka hihia hooponopono ina palena aina ame ke Ahupuaa o Wailuku ame Kalialinui, ma Wailuku o ka Mokupuni o Maui, H. P. A.

Ku mai o R.H. Stanley a kue mai i keia palapala lawe ika hoike, no ka mea aole hoi i hooakakaia mai ana ka palapala lawe ike hoike, no ka Aha hea la ka ike a kela hoike e waiho mai ai, a imua la o ka Luna Kanawai hea

Na hoike ma ka aoao o na Komisina o na Aina Lei Alii.

Kiha hoohikiia a olelo mai.

I Kula kuu wahi i hanau ai ma Kamaole o ka Mokupuni o Maui, H. P. A. Ua noho au me Kamehameha Akahi iloko o ka makahiki 1797.

Ua ike au i ka aina o Kalialinui, a ua ike no au i ka aina e pili ana ia Kalialinui i oleloia ae la, oia no ka aina o Wailuku, no Kamehameha ia aina. Ua lilo keia wahi ia Kamehameha i ka wa e kaua ana o Kepaniwai, oia ka manawa mua aʻu i ike ai i ua Aina la a hiki wale i keia la. O koʻu poe Kupuna makuakane Ka Luna Hooponopono o Wailuku, Maui nei. Ina e komo mai kekahi Konohiki iloko o ke Ahupuaa o Wailuku alaila na kuʻu poe Kupuna e Kuhikuhi i na palena o ua Aina la. O ka wa aʻu i ike mua ai i keia aina oia no ka manawa e ola ana o Kamehameha. Aole nae au i lilo i Luna na ke Alii, aka kuʻu poe Kupuna wale no.

Ua hele au e nana ina palena o Wailuku me kuʻu mau kupuna, a ua ike hoi au ina palena o Kalialinui e kaawale aku ai o Wailuku.

Kiha sworn and says:

My birth place was in Kula at Kamaole, Island of Maui, Hawaiian Islands. I lived with Kamehameha First in the year 1797.

I know the land of Kealialinui [Kalialinui], I know the things that have been spoken of, that is for the land of Wailuku, that land is for Kamehameha. This place became Kamehameha's at the time of the battle of Kepaniwai [ca. 1790], and that was the first time that I saw that land, and to the present day. My grandfather was the one who oversaw the settlements of Wailuku. If a Konohiki came into the ahupuaa of Wailuku, my grandfather was the one who showed him the boundaries of the land. The first time that I saw this land was when Kamehameha was alive. I did not become an overseer for the chief, it was my grandfather.

I went to look at the boundaries of Wailuku with my elders, and I saw the boundary where Kalialinui is separated from Wailuku…

Ua hele au maluna o na palena o na aina o Kalialianui & Wailuku. Ua pinepine kuʻu hele ana maluna o na palena o ua mau aina i haiia la, ua oi aku mamua [illegible] manawa hookahi kuʻu hele ana. Eia na Kanaka i [page 5] hele pu ai me au. O Makalena kekahi, Kuihelani ame Malaihi.

Ua hoomaka mai ka palena o Wailuku mai Kapukaulua mai a hiki i Keone Kapoo, a mai Keone Kapoo mai hoi, a hiki i Pohakunahaha,	…it begins at the boundary of Wailuku, from Kapukaulua to Keone Kapoo, and from Keone Kapoo to Pohakunahaha…

a mai Pohakunahaha mai holo a hiki i Pohakuolopua, alaila hui o Wailuku me Haliimaile a hiki i Papakaloa, mai Papakaloa mai a hiki i Kauhiana, a mai Kauhiana mai a hiki Puuhinale, he alanui mai laila mai oia Ke Alanui o Hobron, oia ka palena i hui ai o Haliimaile, Kula ame Wailuku. Alaila holo aku la i Kalialinui, o Hokuula mauka, a o Wailuku mai makai ona Aina o Kula keia aʻu e hai nei. Hokuula, Na Pukalani, Na Kuikuiaeo, a o Kailua hoi kekahi inoa ma ka Akau i Kailua pili aku la me Kalialinui a o Wailuku no makai. Alaila ma na Omaopio hiki aku la i Puukoae ma ka hema hui aku la i ke huina Alanui e hiki aku ai i Kealia, Wailuku ame Waikapu.

O Kaluaolohe ka inoa o ka huina o keia mau Alanui. Ilaila hui o Wailuku me Pulehu makai, a hiki aku i Pohaku ame Kaopala. Alaila hui o Wailuku me Waikapu a mai laila holo a hiki i Pohakoi, a mai Pohakoi holo aku la a hiki i Kalapakailio. He aina o Omaomao no Wailuku o Kamaomao, mai Pohakoi mai a hiki i Kalapakailio oia ka palena o Wailuku a hiki aku i Kahului no Wailuku wale no ia mau aina e pili ana me Kapukaulua, mai Kahului a hiki aku i Paukukalo hui maila o Waiehu a no Wailuku no ia mau aina.

Ua ike au he mau loko ia kekahi o Mauoni, ame Kanaha na inoa o ua mau loko ia nei. Aia keia mau loko ia iluna o ka aina o Wailuku o Maui nei. Ua ike maoli au i keia mau Loko ia. He kanaka mau no na Alii. O ke kumu o kuʻu ike ana no Wailuku ia mau lokoia, noho iho la kuʻu kaikuahine me Kuaena. A oia no ka mea nana i malama ia mau loko i haiia ae la malalo o Kamehameha Akahi.	I know the fishponds Mauoni and Kanaha are the names of those ponds. These ponds are upon the land of Wailuku, Maui. I have known these fishponds very well. I was a man for the chief. The reason that I know Wailuku and these ponds is that I stayed with my elder sister and brother. They were the ones who cared for the above mentioned ponds under Kamehameha First.
Pau o Kamehameha Akahi noho iho o Auwae, o Naea mai kona hope ka makua o Emma. A pau oia noho iho	When Kamehameha First died, they went to Auwae, then Naea was his replacement, the father of Emma.

la o Keahi. Pau no oia lilo iho la ia P. Nahaolelua ke konohiki i keia manawa.	And when he was finished, it went to Keahi. When he was done, it went to P. Nahaolelua, who is the Konohiki at this time.
Ninauia i kela aoao o W. C. Jones ka Loio a olelo mai. Hanau au i Kula. I Hamakua poko au kahi i noho ai, i ka manawa e ana ia ana ka aina o Kalialinui. I laila wau kahi i kuhikuhi pololei ai i ka palena, na Kuihelani au i hoouna mai e hele aku e kuhikuhi i ka palena o Wailuku ame Kalialinui.	Question asked by the side of C.W. Jones, Attorney, and answered: I was born at Kula. I lived in Hamakua poko at the time that the surveying was done at Kalialinui. I pointed out the correct boundaries then. I was sent by Kuihelani to go and point out the boundaries of Wailuku and Kalialinui.
Ua hele pu mai no e Makalena me au. Ua hai mai no na Kanaka kahiko iaʻu ina palena o na Aina i haiia ae la. Ua hele no au maluna oia mau aina a puni iaʻu mamua o kuʻu holo pu ana me Makalena ma e kuhikuhi ai i ka palena aina. Ua hele pinepine no au iluna oia mau aina.	Makalena also came with me. The old people are the ones who told me the boundaries of the said lands. I have been all across the lands, and around them before my traveling with Makalena folks, and shown the boundaries. I have often gone upon the lands…

Ua aoia no hoi au ina [page 6] palena i keia mau aina, mai Hawaii mai a hiki i Kauai. Ua kakauia keia mau mea maloko o ka Buke i ka M.H.1860. Ua hele makou o Kuihelani ame Napela aole no au i hele kaapuni loa i ua aina nei.

Ua aoia au e na poe kahiko i ke kuhikuhi o ka manawa o ka Niaukani. E ola ana no o Kamehameha mua ia manawa ame Kuumiumi kuʻu Kupuna Keoho (K) he kanaka no Kalialinui ame Pulehu. Kamamani, Weka, ame Kuawaeku, na poe i hele pu ai me au ma ia manawa a ia manawa aku. Ua like ka lakou ike me Kaʻu. Aole no lakou i hele a puni kela wahi.

Ua ike makou ia mau loko i Kapaia o Mauoni ame Kanaha. He Alii o Kihapiilani oia ka mea nana i kukulu i ka pa ma kai o na loko ia i hai ia ae la, oia ke Alii o Wailuku,	…We saw the ponds called Mauoni and Kanaha. The Chief Kihapiilani is the one who made the walls of the ponds spoken of. He was the chief of Wailuku, Is. of Maui; the walls were

Mok. o Maui. Aole no Ke Kukuluia ana o Ka Pa, oia mau loko he kumu ia e Kaawale ai o Kalialinui ame Ka Aina o Wailuku mai. No ke Alii Ka Aina i kapaia o Kalialinui oia no Ka Aina mai Kinohi mai.

built for these ponds and are the source that separates Kalialinui and the land of Wailuku. The land called Kealialinui is for the chief, it has been that way from the beginning…

Waiho mai o W.C. Jones imua o Ka Aha he kumu ninau a penei. Aole au anei i moe mai ka aina o na Alii mai ke Kuahiwi mai a hiki i Ke Kai.

Kue mai o R.H. Stanley ame ka waiho aku omua o ka Aha i keia ninau a kela aoao ua pono ole, hooholo ia e ka Aha i ka pono ole oia ninau. O ke Konohiki oia ka mea i ka wa Kahiko. O Kahikoku ke Alii o Kula i ku[u] wa uuku. Ua lohe au mai kuʻu poe kupuna o Piikea ke Alii mamua ʻku o Kahikoku a mamuli hoi o koʻu ike maoli o mea ke Alii nui o Kahikoku. Haawi aku la o Umi keiki o Liloa ia laua ka malama. Mahope o ka noho ana o Kahikoku i Alii. Lilo iho la o Keaweaheulu kona hope, mahope mai lilo o Aikanaka kona hope a pau hoi oia noho iho o Keohohiwa, a o Keohokalole mai hoi kona hope. O ke Aupuni ka hope loa mai nei, no Kula wale no keia mau Alii.

Eia na Alii o Kalialinui. Keohohiwa ka mua a pau ia noho maila, Kauikeaouli mai, a o Maikaaloa mai a mahope mai hoi o keikimahine o Maikaaloa ka mea i mare ia Panee. Aole i anaia ka aina i ka wa ia Maikaaloa.

Here are the chiefs of Kalialinui. Keohohiwa was the first. When he was finished, then it was Kauikeaouli, and then Maʻikaʻaloa (Kamaʻikaʻaloa), and afterwards, it was the daughter of Maʻikaʻaloa, who married Pāneʻe. The land was not surveyed in the time of Maʻikaʻaloa…

Aole mea i hoike mai iaʻu ina palena o Kalialinui. Malihini loa na Alii, aole i ike loa, na kamaaina wale no kai ike i ka palena o keia aina. Aole i hai mai o Keoho iaʻu ina palena o Kalialinui, aka ua hai mai oia iaʻu he loko o Kanaha no ke Ahupuaa o Wailuku, Maui. Ua kaua o Kalalakoa mauka iho o Kanaha no ka manao o ko uka poe i ka ono i ka ia o ka loko o Kanaha ua ike au ia Makaku he Pohaku. [page 8]

Aole ia he hoailona pale. Aole no au i lohe i ka poe kahiko. Ua hoopaneeia ka Aha a hiki i k a la apopo la 22, o Febuari M.H. 1871, o ka hora 10, o ke Ka

kahiaka.

Noho hou ka Aha i ka la i hoopaneeia ai oia ka la 22, o Febuari, ua hiki mai no na aoao i elua imua o ka Aha, nonoi o R.H. Stanley e hoohikiia o Malaihi.

Malaihi hoohikiia a olelo mai.

Malaihi, Sworn and States:

I ka wa o Kamehameha mua kuʻu hanau ana. Aia ma Kula, mokupuni o Maui koʻu wahi e noho nei. Ma Lanai nae kuʻu hanau ana. I Hamakua poko wau kahi i noho ai mamua aku o ka Niaukani. Ua ike au ina aina o Kalialinui mauka mai o Kula.

My birth was during the time of Kamehameha the first. I reside in Kula on the island of Maui. But I was born on Lānaʻi. I lived in Hāmākuapoko before the time of the Nīʻaukani (ca. prior to 1811). I know the lands of Kalialinui, above Kula…

A ua hele no hoi au me kekahi mea ma ka aoao mauka o Hamakuapoko. Eia na kanaka i hele pu ai me aʻu. O Makalena, H. Kuihelani, ame Kiha. Ua hele makou ma ka aoao mauka o Hamakuapoko e pili ana ia Wailuku mai Kapukaulua ka makou wahi i hoomaka mai ai, mai Kapukaulua mai a hiki i Keone Kapoo, a mai
Keone Kapoo mai holo aku a hiki i Hamakuapoko a mai Hamakuapoko aku holo aku la a hiki Pohakunahanaha. Alaila holo aku ma ka aoao o Hamakua ame Wailuku holo hou a hiki Olopua mai laila mai paleia aku la o Hamakuapoko a pili mai o Haliimaile mauka holo hou aku la ka palena o Wailuku me Papakaloa a mai

Papakaloa aku hiki aku i Haliimaile ma ka aoao mauka mai laila mai holo aku la i Kauhiana, a hiki aku la i Haliimaile ame Wailuku. Alaila loaa aku la o Puuhinale a mao mai o Haliimaile hui ae la o Kula me Wailuku kahawai kekahi. Ua koke no i ke alanui o Hopena e pili ana me Hokuula ka aina o Kula mai, Hokuula mai o Kula mauka, a o Wailuku hoi makai a loaa ai o Kalialinui. He

From Papakōlea to Hāliʻimaile on the mauka side, from there on to Kauhiana, until reaching Hāliʻimaile and Wailuku. Then there will be Puʻuhīnale and beyond Hāliʻimaile Kula and Wailuku stream meet as well. It was close to Hopena street adjacent with Hōkūʻula, the land in Kula; From Hōkūʻula of upper Kula and to Wailuku returning toward shore there will be Kalialinui. The

kahawai ko ka aina o Kalialinui ame kekahi aoao o ka aina o Kula o Keahua ka inoa o ka aina e pili pu ana me ke kahawai o Kalialinui. He Ahupuaa o Kalialinui ame Keahua. Alaila hui ae la laua a holo mai ia Puukoae oia na aina mauka o Kealialinui ame Omaopio. O Wailuku hoi makai holo hou aku la a hiki i Pulehunui a hiki aku i ke kai.

land of Kalialinui has a kahawai (stream gulch), on one side, on the Kula side of the land is the place called Keāhua. That is the side that adjoins the kahawai of Kalialinui. Kalialinui is an ahupuaʻa and so is Keāhua. They meet together and run to Puʻukoaʻe, the lands above Kalialinui and ʻŌmaʻopio. Wailuku is below, running to Pūlehunui, and reaching to the sea…

He huina alanui e pii ana ma Waikapu i Kula. Alaila hiki ae la no i Wailuku. Iho mai makou o Makalena ma a hiki i kai a hai aku la no hoi au ia Makalena mauka iho o Pohakoi, maanei kaʻu wahi ike e pili ana ina palena. O na aina o Pulehunui ame Wailuku. Aia no ma na aoao i Pohakoi. Oia wale iho la no kaʻu mea i ike e pili ana ina palena ame na aina aʻu i hai iho nei imua o ka Aha. I ka wa mamua he mea nui ka pio manu. Eia na mea ko [page 8] Kula poe e hele ai i ka pio manu he Aweoweo he Ilima Elua no maunu, a o ko Wailuku poe kanaka hoi he walahee ka maunu e loaa i ka manu. I Puukoae nae Kahi e hele ai i ke Kapio manu. Ina e hele mai ko Kula poe iluna o Puukoae e Kapio manu ai. Alaila alualu aku la ko Wailuku e Kipaku. Aole e hiki ke kiiia mai ka paakai o Kanaha e ko Kula poe, aole no e hiki i ka Alii ke kii mai!

Ninauia e kela aoao o W.C. Jones ka loio aoao pale.

Ua kuhikuhiia au e na kanaka kahiko ina palena o keia mau aina aʻu e hai ae la. No Kula kuʻu makuakane, kuʻu makuahine no Lanai, kamaaina koʻu makuakane no Kula.

Ua ike au ina palena mamua o ka hiki ana mai o na Missionari. He puni ia makou na palena i ka hele ia i ka pii i ke Kolea. Aole i olelo mai kuʻu mau makua.

Ua hala aku ka palena o Kalialinui a Kanaha o Puukoae ka aina e pili ana, hui ae la o Umiomaopio me Pulehunui. He kahawai mai Kalialinui mai a holo i uka ma ka aoao Omaopio a hui ae la me Kalialinui. Aohe kahawai iluna o Puukoae, ma ka hema Kekahi a me ka Akau.

Ka inoa ma ka aoao Akau o Kalialinui, Kaapakai ame Keanakalahu ma kaaoao

hema o Waiohonu ame Pulehunui. Omaopio, oia mawaena hui ae la me ka Aina o Kalialinui. Aia ma ka aoao akau o Kalialinui o ke kahawai. O Kaakai ka palena nui mai Kai a hiki i uka. Ilaila hui ae la me Wailuku. O Kalialinui ma ka aoao hema, ma ka aoao Akau o Keahua o ke kahawai, he owawa ma ka Hema o Kalialinui, mai uka mai o Kalapaalii mai, a o ka Waipuilani kekahi inoa ua hai mai iau na kamaaina i keia owawa e hui ana me ke kahawainui. Ua ike no au ina kamaaina, ua make i keia manawa. Hookahi kahawai o mea Kaakakai ame Keanakalahu. Aole kahawai o Puukoae, holo aku ke kahawai o Kaakakai kona inoa a hui ae la me ka aina i kapaia Omaopio a haiki loa, ua ike au i keia mau aina ame ke kahawai mahope o ka hiki ana mai o ka poe Kaleponi oia paha ka M.H.1851 a 1852 paha. A kokoke ana ia wa aole au i ike ia Makaku. Ua ike au i ka loko ia ia Kanaha.

Ua kauoha R.H. Stanley i keia hoike e hele mai imua o ke Aha e hai i kana mea apau i ike e pili ana ina palena aina o Wailuku ame Kalialinui. Aole no he mea i hele mai a olelo mai iaʻu e hoike ma ke ano Wahahee imua o ke Aha, oia ka pane a Stanley i kue ai i ka ninau a W.C. Jones, ua hele mai keia hoike e hoike i kana mea i ike, ame kana mea i maopopo e pili ana ina palena o Hamakua, Haliimaile, Kula, ame Pulehu. [page 9]

Napue hoohikiia a olelo mai.
I Wailuku nei kuʻu wahi i hanau ai. I ka wa o Kamehameha mua. Ua ike no au ina palena o Wailuku e pili ana ia Hamakuapoko, Haliimaile, Kula, ame Pulehu. Ua hele au me kekahi mea ma keia mau wahi i haiia ae la. O wau ame Kaawa. Ua ike no au ia Makalena. Aole nae au i hele pu me ia. Hui o Hamakuapoko me Wailuku i kela wahi i kapaia o Keone Kapoo, mai Keone Kapoo mai hoi, holo aku la a hiki i Puunene. A mai Puunene mai holo aku la no a hiki i Papakaloa. A e pili ana o Hokuula, a o Haliimaile mauka. Mai laila mai hoi holo aku la a loaa o Puukoae, he puu aa nae ma kela wahi i oleloia ae la o Puukoae. He alanui o Puukoae he holoia no e ka lio maluna oia wahi aa. Aia ma ka aoao makai o ke alanui oia ka Aina o Waiohonu. Haalele iho la ia Puuhinale e holo aku la a hiki i Puukoae, a o Wailuku ka aina makai, a Omaopio hoi ma ka aoao mauka. A holo hou aku la no a hiki i Pohakoi. O Pulehu hoi ka aina mauka iho o Pohakoi, a o Wailuku no makai.

Hiki no ilaila ka pau no ia. Holo no a hiki i Paukukalo. Alaila pili ana o Kahului me ke Ahupuaa o Wailuku. Ua ike au ia Mauoni ame Kanaha. He mau loko ia ia ma Wailuku nei o Maui. Ua hele au ilaila. I kuʻu wa i hele ai ilaila o Auwae, ke Konohiki ia manawa no Wailuku. Apau hoi ka noho Konohiki ana o Auwae noho

iho la o Kawailepolepo. Apau no hoi o Kawailepolepo, noho iho la o Kailihiwa i Konohiki. Apau no hoi o Kailihiwa noho iho la o Naea, a o P. Nahaolelua mai ka mea imua o ka Aha (he Lunakanawai). Ua noho au malalo o keia poe Konohiki a hiki wale i keia manawa. Ua ike au ia Kalialinui. Aia ia aina ma Wailuku. Ua ike au ia Kaawa, he kanaka ia no Wailuku. Ua olelo mai oia iaʻu oia wale iho la no ka palena o Kalialinui a hiki i Puukoae.

Aole oia i hai mai iaʻu ina palena o Kalialinui. Ua make ke kanaka o Kaawa. Ua hoi e hiamoe, aole e ala hou mai. Ua ike au ia Makaku, aia mawaena o Wailuku. Aole no i hai mai o Kaawa iaʻu ina palena o Wailuku o Maui, Hawaii Pae Aina.

H. Kuihelani hoohikiia a olelo mai.

I Wailuku kuʻu wahi i hanau ai, he kanalima paha oʻu M.H. i noho ai ma keia aina o Wailuku nei a keu aku paha. Ua noho kuʻu makua i Konohiki no Wailuku nei. Aole au i noho Konohiki. Aka ua ike nae au ia Mauoni ame Kanaha. He mau loko ia ma Wailuku nei, Mokupuni o Maui. I kuu wa uuku ua hele pu au me kuʻu makuakane ma keia wahi i haiia ae la. He umi paha oʻu makahiki ia manawa no ka Moi. Elua ia mau loko ia. Ua hele au mahope iho o ka manawa o Kamehameha Ekolu. Ia makou nae ka malama oia mau loko. Na makou ao e lawe i ka I-a. [page 10]

Apau o Kamehameha Ekolu, o Kamehameha Eha iho, aole nae ia makou ka malama ia manawa. O P. Nahaolelua ka mea nana e malama nei i keia mau loko ia i ke ahupuaa o Wailuku, Maui. Keahua ka palena o Wailuku ma ke kai. Iaʻu ka malama

H. Kuihelani, sworn and says:

My birth place is at Wailuku, I have lived on the land of Wailuku for fifty years, a little more perhaps. My father was the konohiki of Wailuku. I was not a konohiki. But, I do know Mauoni and Kanahā. They are fishponds of Wailuku, Island of Maui. When I was little I went with my father to this place spoken of. I was perhaps ten years old at the time. For the King, two fishponds. I went after the time of Kamehameha Third. It was us who cared for those ponds. It was us who took the fish.

When Kamehameha Third died, it went to Kamehameha Fourth; we did not take care of them then. P. Nahaʻolelua is the one who cares for these fishponds in the ahupuaʻa of Wailuku, Maui. Keāhua is the boundary of Wailuku at the shore. I

oia kai mai kuʻu makuakane mai oia ka Aina i oleloia iho nei o Pukaulua. Aia no ia ili aina iaʻu i keia manawa. No ka Moi ke Kai. Aole poe i aeia e kii i kela ia iloko o na loko ia, no ka mea ua kapu loa ke kii i ka ia. Aia no a hu ka i-a mawaho o ka loko alaila hiki i kela mea, keia mea ke kii i ka i-a mawaho wale no o na loko. He paakai no Kolaila. He opeia ka paakai a laweia na na alii. Aole au i ike i ka aina o Kalialinui e oleloia nei. Aole au i hele i Kalialinui e laweia ai. Ua ike au ia Kamaomao, ua koke no ia Pohaku. Ke Ahupuaa o Wailuku, Maui nei o ko Hawaii Pae Aina.

am the one who has stewardship of sea (fishery); it is from my father; that land mentioned is Pukaulua. I have that land section at this time. The fishery is for the King. People are not allowed to take the fish from within the fishponds, because the harvesting of fish is restricted. Though when the fish overflow from the ponds, then this person and that person can harvest the fish that are on the outside of the ponds. There is also salt there. The salt is bundled up and taken by the chiefs. I do not know the land of Kalialinui, spoken of. I did not go to take things from Kalialinui. I know of Kamaʻomaʻo, the stone is close to pig-cairn (boundary marker) of Wailuku, Maui of the Hawaiian Islands…

Ninau e kela aoao o W.C. Jones ka loio o ka mea pale.

Ua hoohuliia kanaka i ke kukulu ana i ka pa, mawaho o na loko ia, ma Oopuola. O Kihapiilani ke Alii o Maui ia manawa, nana no i hoohuli na kanaka i ke kukulu ana i ka pa. Ua ike au i ka pohaku o Makaku.

Men were sought out to construct the wall outside of the ponds, at ʻOʻopuola. Kīhāpiʻilani was the Chief of Maui at that time, it was he who sought out the men to build the wall. I know of the stone of Makaku.

O kuʻu lohe he pohaku kela no na uhane e hui ai. Pela mai ka olelo a kekahi poe. Ame Kamaomao kekahi, ua hele makou e ohi i mao no na alii i mea e ala ai na Kapa Aahu o lakou. Aole poe kanaka e ae o no kanaka wale iho la no o Wailuku, Maui, Hawaii Pae Aina.

What I heard was that it is a stone where the spirits gather. That is what some people say. And Kamaʻomaʻo is one also; we used to go gather maʻo [a native hibiscus] for the chiefs, as something with which they would scent their Kapa Clothing. No other people, only the people of

Wailuku, Maui, Hawaiian Islands...

Napela hoohikiia a olelo mai.
I Honokowai kuu wahi i hanau ai o ka mokupuni o Maui, H.P.A. Noho au ma Wailuku i ka wa o Kamehameha mua, ma ia wa. Mai laila mai koʻu noho ana ma Wailuku nei a hiki wale i keia wa. Ua ike au ia Kanaha he loko ia aia ma Wailuku, a he loko i-a e ae no kekahi i kapaia o Mauoni, ma ia wahi hookahi no i haiia ae la. Oia kuʻu manawa i ike mua ai i ka wa o Kamehameha mua a hiki wale i keia manawa. Ua hele au ilaila a ua ike maoli au. He Luna holoholona au no ke Aupuni.

Na Kauka Judd wau i hoonoho mai, a o Keoni Ana no kekahi i hoonoho mai iaʻu i Luna holoholona no ke Aupuni. He nui ka i-a maloko oia mau loko ia i kuʻu wa e noho Luna ana. O ke Konohiki o Wailuku ke lawe i ka ia. Aole mea e ae. He paakai no ko na loko.

Ua ike no au ia Makaku. Aia ia aina i Wailuku nei, Maui. Elua paha mile ke kaawale aku mai Kula aku. [page 11]

Ua kuhikuhiia wau ina palena o Hamakua & Haliimaile. O Kaawa, Kiha, ame Humphreys, oia na mea i hai mai iaʻu ina palena o ua mau aina la. Aia nae ia mau aina iloko o Wailuku, Maui. O Naea ke Alii ia manawa, apau oia noho mai o Namakaeha. A mahope mai hoi o Namakaeha lilo iho la o Keahi ke Konohiki, a keia manawa hoi ka mea Hanohano P. Nahaolelua. He aina o Kamaomao no Wailuku nei, kokoke loa i Makaku, mauka iho oia mau loko i-a o Wailuku, Maui.

Ninauia e ka loio W.C. Jones o ka aoao pale. Aia o Kalialinui ma uka loa aku. Ua lohe au i ka Aina o Kalialinui. A ua ike au ina hale olaila. Aole kamaaina i kuhikuhi mai iaʻu ina palena o Kalialinui. I ka M.H.1846. Koʻu ike ana.

Hoomaha ka aoao hoopii, oia hoi na Komisina o na Aina Lei Alii.

Ua waiho mai o Makalena ke Ana Aina i ke ana ame ke kii o keia aina o Wailuku ame na kamaaina i hele pu ai me ia eia na inoa o lakou. Kiha, Kuihelani, ame kekahi poe e ae he nui wale. Nolaila ua ae mai na aoao i elua o keia hihia o E. Mayor ka mea nana i ana i ke kii o Kalialinui ame na mea i hoakakaia maloko oia palapala Kii. Ua hoopaneeia ka Aha a hiki i ka hora Elua o ke Awakea o keia la.

Hoike ma ka aoao pale o Campbell ame Turton.

Hikiau hoohikiia a olelo mai.	Hikiau Sworn and Stated:
Ua noho au ma keia wahi, mai ia Kamehameha mua mai (Maui) 94, oʻu makahiki. Ua ike no au ina palena makai nei o Kalialinui. I ka wa i make ai o Kamehameha mua lilo iho ia Kamehameha Elua.	I have lived at this place since the time of Kamehameha the first (on Maui), I am 94 years old. I have seen the boundaries of Kalialinui. When Kamehameha the first died, it was obtained by Kamehameha the second.
Pii makou o Liholiho ame Auwae i uka nei i ka pana iole. Makai mai o ka palena o Kalialinui e pili ana me Wailuku oia no o Aiuhini.	We climbed up with Liholiho and ʻAuwae, to shoot ʻiole in the uplands. On the shoreward section, Kalialinui, bounds with Wailuku, at Aiuhini…

A moe aku la i Keonekapoo. Oia wale iho la no kaʻu mea i ike. Ua ike au ia Puukoae. Oia ka palena o Kula me Kalialinui. Ua loihi loa o Puukoae mai Aiuhini mai. Aia o Aiuhini ma kai loa. He mau pohaku kekahi ma Aiuhini. Hiki no iaʻu ke kuhikuhi, aka imua o P. Nahaolelua. Auwae ke Konohiki ia manawa o makou i ike ai. Make o Auwae ma Owa Wailuku nei. Aole au i ike i ka palena o Kalialinui.

Noi mai o W.C. Jones imua o ka Aha e waiho hoona ma ia ka Aha, no ka lawe i ka ike a ka makou hoike i manaonui ai ai ma Honolulu, Oahu, aole o makou. Aole o makou hoike e ae e lawe mai ana, oia wale no, ua ae kela aoao. [page 12]

b. Haliimaile Ahupuaa, District of Hamakuapoko, Island of Maui, Boundary Commission, Maui, Volume No. 1, pps. 191-194

Ahupuaa o Haliimaile ma ka apana o Makawao, Maui
No. 60

Hale Hookolokolo, Wailuku, Maui, Oct. 14, 1880
Ua noho ka Aha o ka Komisina o na Palena Aina o Maui, Molokai, ame Lanai. ma ka Hale Hookolokolo ma Wailuku, Maui, ma ka la 14 o Okatoba M.H.1880, ma ka hora 10 o ke kakahiaka, e like me ka hoolaha ana ma na nupepa ko Hawaii Pae Aina, o ka la 9 o Okatoba M.H.1880. ma ka Helu 41, Buke III a ma

ka nupepa Haole “Hawaiian Gazette”, no ka hooponopono ana i na palena o Haliimaile ma Makawao, Maui ko Hawaii Pae Aina, ma ke noi ana mai o S.B. Dole Esquire ma ka Palapala Hoopii i waihoia mai ma ka la 28 o Aperila M.H. 1880.

Ua hoomaopopoia ka Palapala Hoopii. Ua kaheaia ka poe kue i keia nonoi ana mai a S.B. Dole Esquire, aohe poe kue i hele mai.

O W.O. Smith Esquire ka loio a kokua hoi ma ka aoao o ka mea hoopii

Ua nonoi mai ke kokua o ka mea hoopii e hooholo keia Aha i na palena o Haliimaile e like me na palena a W.D. Alexander ka Luna Ana Aina nui o ke Aupuni. A ua ae ka Aha i keia nonoi ana mai.

L. Aholo, Komisina o na Palena Aina ma Maui, Molokai ame Lanai. [page 191]

Notes of Survey of Boundaries of the Ahupuaa of Haliimaile, Maui

Beginning at an Iron stake in the road from Makawao to Kahului at the common corner of the East Maui Plantation of the Hobron Plantation and of Royal Patent 2324:2 to Kekahuna from which the granite post on Piiholo bears S 55° 39’ E true, the Boundary runs:

1. N 62° 57’ W true (N 71° 20’ W magn) 1854 feet to a kukui tree, along land purchased by T.H. Hobron from the Haiku Sugar Co. (according to W.H. Pease’s survey corrected); thence
2. N 73° 26’ W true (N 82° W magn) 5509 feet; and
3. N 38° 12’ W true (N 46° W magn) 1202 feet along the same to a corner of Alexander and Baldwin’s purchase from Haiku Sugar Co. (which is 158 feet S 36° 45’ E true from a granite post by the road to Kahului); thence
4. N 51° 24’ W true 10939 feet along Alexander & Baldwin Purchase to the boundary of land sold by the Haiku Sugar Co. to a company of 28 natives; thence
5. S 51° 15’ W true (S 43° W magn) 1619 feet along land sold to natives, to iron pin; thence
6. N 89° 45’ w (S 81° 15’ west magn) 300 feet along land sold to natives to the rock called Olopua in a ravine, which forms the Boundary between this land and Wailuku; thence
7. S 26º 40’ E true (S 35 1/2° E magn) along said ravine 1304 feet along

Wailuku to a place called Puupili; thence

8. S 21° 17 E true (S 30° E magn) 1680 feet along ravine to a marked rock called Kaioleakalani about 170 ft above the road to Kahului; thence
9. S 17° 04' E true (S 25 3/4° E magn) 1592 ft to a pile of stones at Kauhiana or West side of the ravine; thence [page 192]
10. S 22° 15' E true (S 40 3/4° E magn) 1390 ft to a marked rock by the path at Puhinali [Puuhinale]; thence
11. S 35° 07' E true (S 42 1/4° E magn) 3508 ft to a wiliwili tree on West bank of the gulch, which is the corner of Wailuku and the district of Kula. From this point the middle of this gulch is the boundary between Haliimaile & Kula; thence
12. N 70° 03' E true (N 61 1/2° E magn) 330 ft to large marked rock in the wall at the bottom of the ravine; thence
13. S 54° 50' E true [(S 63 1/4° Magn] 558 ft to the junction of two stone walls in the gulch; thence
14. S 57° 29' E true 482 ft along the bottom of the gulch to corner of stone wall; thence
15. S 2° 40' E true 878 feet along bottom of the gulch;
16. S 37° 41' E true 1400 ft along bottom of the gulch;
17. S 50° 12' E true 824 ft along bottom of the gulch;
18. S 47° 33' E true 1108 ft along bottom of the gulch;
19. S 75° 42' E true 958 ft along bottom of the gulch; thence
20. S 64° 43' East true 247 feet along bottom of gulch to the corner of the former Brewer Plantation; thence
21. S 52° 44' E true 1995 ft along the gulch;
22. S 59° 12' E true 1058 ft along the gulch;
23. S 72° 28' E true 1653 ft along the gulch;
24. S 32° 02' E true 2738 ft along the gulch;
25. S 14° 53' E true 2475 ft along the gulch;
26. S 40° 54' E true 506 ft along the gulch to the top of falls in the gulch, which is the corner of the former Brewer Plantation & of the land purchased from Mrs. Haalelea by J. Clark; thence
27. S 81° 52' E true 376 ft along the bottom of the gulch;
28. S 60° 57' E true 528 ft along the same to the boundary of Makawao; thence
29. N 35° 29' E true 521 ft along Grant 216; thence
30. N 14° 33' E true 1678 ft along the same, along an ancient ulumaika course, to an iron stake at the corner of the former Brewer Plantation and of Grants 216 & 499; thence
31. N 53° 49' E true (N 46 E magn) 4200 f along Grants 499 & 216; thence

32. N 53° 28' E true 1248 ft along Grant 641 to East Maui Plantation; thence
33. N 43° 15' E Magnetic 1627 ft along Grant 64; [page 193]
34. N 52° 30' E magnetic 1455 ft along Grant 64 to S.W. bank of the Maliko gulch; thence
35. N 36° E magnetic 980 ft along Grant 64, down the pali to the bottom of the deep gulch, separating this land from Haiku;
36. Thence the boundary follows down to centre of the Maliko gulch in a North-Westerly direction to the upper Southeast corner of Hamakuapoko;
37. Beginning again at the starting point of this description at the iron stake in the Makawao corner near a School house, run N 60° 07' E true (N 51° 21' E magn) 2655 ft along Grant 2342 to Kekahuna & Grant 187 to John Richardson, & thence
38. N 69° 33' East true (N 58 1/2° magnc) 1002 ft to the bottom of Maliko gulch to the southeast upper corner of Hamakuapoko mentioned above.

Total area = 4230 Acres, more or less.
Makawao, June 21, 1879
W.D. Alexander, Surveyor

L. Aholo
Commissioner of Bounds for the Islands of Maui
Molokai & Lanai.
Lahaina, Oct. 16, 1880

c. *Wailuku Ahupuaa (Aina Lei Alii) District of Wailuku, Island of Maui, Boundary Commission, Maui, Volume 1, p. 13, No. 1, Maui, Palena Aina a ke Komisina, Palapala keia o na palena o ke Ahupuaa o Wailuku o Maui*

Ma ka noi ana mai a ke Komisina o na Aina Lei Alii (Jno O. Dominis) kiaaina o Oahu, a ma ka mana hoi i haawiia mai iaʻu ma ke kanawai i Luna Komisina no na palena aina o Maui, a ma keia ke hooholo nei au ina palena o ke Ahupuaa o Wailuku ma ka Apana o Wailuku o ka Mokupuni o Maui, ke hoakakaia aku nei malalo penei.

Ua haawi malalo o kuʻu lima ma Lahaina i keia la Elua o Maraki o ka M.H. 1871

P. Nahaolelua, Komisina o na Palena Aina o ka mokupuni o Maui

Eia na palena o Wailuku i anaia e J.W. Makalena. E hoomaka ana ma ke kihi Akau loa o Wailuku ma kahi i kapaia Kapukaulua, ma ka Puupohaku iwaena o

ke one 3 4/10 kaulahao mai ke kai. A mailaila ka moe ana ae o ka Hao Kuhikuhi o ke panana i kahi oioi loa o Puukoae i Kahakuloa
Akau 66° 30' Komohana ame kahi oioi loa o Piiholo i Makawao
Hema 63° 30' Hikina a holo
Hema 17° 30' Hikina 16 1/10 kaulahao i kahi i kapaia o Keonekapoo
Hema 48° Hikina 46 9/10 kaulahao i ka Poopohaku i ka nuku o kahawai, a holo ma ke kahawai
Hema 34° Hikina 14 2/10 kaulahao ma Hamakuapoko ai Haliimaile, i ka pohaku i kapaia o Olopua
Hema 35° Hikina 20 kaulahao i ka pohaku o Puuiki
Hema 29° Hikina 35 4/10 kaulahao i ka pohaku i kapaia Kaioleokalani kokoke i ke alanui ma Kapapakaloa
Hema 25° Hikina 25 kaulahao iluna o kahonua
Akau 41° Hikina 73 9/10 kaulahao ma ka honua a hiki i ke kumu Wiliwili ka palena o Wailuku me Kula ma ke Ahupuaa o Nahokuula [Hokuula] kahi i kapaia o Puahinale me Kaulehulehu, alaila holo ma Kula
Hema 27° 30' Komohana 81 kaulahao ma Hokuula, Napukalani, na Kauau a hiki i Keahua ma ke kumu laau Akoko i ka puupohaku
Hema 20° 15' Komohana 91 8/10 kaulahao ma Keahua na Omaopio i ka puupohaku i ka laau Akoko alaila holo
Hema 23° Hikina 141 8/10 kaulahao ma na Omaopio ma ka lihi makai o ka Mahina Palaoa o Kekipi ma a hiki i kapohaku i kapaia o Puukoae
Hema 30° 30' Komohana 43 3/10 kaulahao ma Omaopio a hiki i ka huinao na alanui o Wailuku me Waikapu e pii ai i uka o Kula ma Pulehu i kai mai o Waihonu ka huina alanui keia i oleloia e na Luna Hoona ma ka lakou olelo hooholo no ka palena mawaena o Wailuku me Waikapu, alaila holo pololei e like me ka lakou hooholo ana
Akau 76° Komohana hiki i kahi i kapaia o Pohakoi
Akau 85° Komohana 80 7/10 kaulahao
Hema 86° 15' Komohana 16 8/10 kaulahao hiki i ke kumu o ka Lapaokailio pili keia mau aoao me Waikapu.

d. Wailuku Ahupuaa, District of Wailuku, Island of Maui, Boundary Commission, Maui, Volume No. 1, pps. 216-219, Ahupuaa o Wailuku, No. 65

Hale Hookolokolo Wailuku, Maui, Sept. 21, 1882
Ua noho ka Aha Komisina o na mokupuni o Maui, Molokai a me Lanai, ma ka Hale Hookolokolo ma Wailuku Maui, ma ka la 21st. o Dekatemaba, M.H. 1882, ma ka hora 10 o ke kakahiaka, e like me ka Hoolahaia ana ma na nupepa "Ka Elele Poakolu" a me na nupepa haole "The P.C. Advertiser".

Ua hiki mai o F.F. Porter, ma ka aoao o Claus Spreckles ka mea hoopii. A o Meekapu nona iho. O M.D. Monsarrat ma ka aoao o na Aina Lei Alii a ma ka aoao o na Kahu o ka Waiwai o ka Moi Lunalilo.

Hookakaia ka Palapala Hoopii, a ninauia ka poe kue. Aohe poe i hiki mai.

Hookaka mai o Meekapu i kekahi mau mea, a pau kana ua laweia mai o M.D. Monsarrat i Hoike a Hoohikiia a hai mai.

He Ana Aina kau hana, nau i ana ke Ahupuaa o Wailuku nei. Aole au i hele a puni o Wailuku nei, aka, ua lawe au i na palena i apono mua ia, ma ka hooponoponoia ana o na palena o Hamakuapoko, Pulehunui e pili ana me Wailuku nei. A ua hooponoponoia e au na palena e pili la me Waiehu, mai loko mai o na palena i hooholo mua ia.

Hoike mai la o M.D. Monsarrat no ka aoao o na Kahu Waiwai o ka Moi Lunalilo, a me na Komisina o na Aina Lei Alii, ua ae lakou i keia mau palena, ma keia palapala ana o M.D. Monsarrat. Aole mea kue. [page 216]

Survey of the Ahupuaa of Wailuku, Maui

Beginning at a red wood post and hill of stones on the sea shore adjoining the land of Hamakuapoko at the place called Kapukaulua. From which post the Government survey station on Puunene bears S 8° 15’ W true and running.

1. S 9° 39’ E true 1062 feet along Hamakuapoko to Keonekapoo
2. S 40° 7’ E true 3018 feet along Hamakuapoko to a pile of stones at Nukukahawai;
3. S 22° 3’ E true 934 feet to a large rock called Olopua which forms the corner of Wailuku, Haliimaile and Hamakuapoko; thence
4. S 26° 40’ E true (South 35 1/2° East Magn) 1304 feet along Haliimaile to Puupili; thence
5. S 21° 17’ E true (S 30 E magnc) 1680 feet along the ravine to marked rock called Kaioleakalani, about 170 feet S of the way to Kahului; thence
6. S 17° 4’ E true (S 25 3/4 E magn) 1592 feet to a pile of stones at Kauhiana, on West side of the ravine; thence
7. S 32° 18’ E true (S 40 3/4 E magnc) 1390 feet to a marked rock by the path at Puhinali;
8. S 35° 7’ E true (S 42 1/4 E magn) 3508 feet to a wiliwili tree on West bank

of the gulch, which is the corner of Wailuku, Haliimaile and the District of Kula; thence

9. S 36° 27' W true 5346 feet along Kula;
10. S 29° 21' W true 6059 feet along Kula;
11. S 28° 36' W true 932 feet along Kula to a concrete post marked with a cross at the north West corner of Kalialinui and Wailuku; From which the government survey station on Puu o Koha bears S 38° 25' E true; thence
12. S 28° 36' W true 8376 feet along Kalialinui to lots of large rock called Puukoae; thence
13. S 36° 41' W true 3060.5 feet along Kalialinui to a granite post at the corner of Kalialinui, Wailuku and Pulehunui; thence when the government Survey Station on Puu Hele bears South 82° 6' W true; thence
14. N 64° 5' W true 36030 feet along Pulehunui and Waikapu to Pohakoi, a marked rock a short distance West of road to Waikapu; thence
15. N 13° 45' W true (N 85° West magn) 5326.2 feet along Waikapu up ridge;
16. N 82° 30 W true (S 86° 15' W magn) 408.8 feet along [page 217] Waikapu to a stone post on the crest of the ridge known as Kalapakailio;
17. Thence along up the center of this ridge along Waikapu always following the water shed to the ridge forming the head of Olowalu Valley;
18. Thence following said ridge dividing this from Olowalu Valley;
19. Thence around by the ridge forming the head of Wailuku Valley to the head of the land of the land of Waihee;
20. Thence along the dividing ridge between the Wailuku and Waihee Valleys to the head of Waiehu; Thence
21. S 70° 39' E true 3366 feet along Waiehu down ridge;
22. N 80° 36' E true 2161.5 feet along same to junction of ridge called Kahoolewa;
23. N 63° 36' E true 6385.5 feet along same;
24. N 85° 6' E true 3445.3 feet along same to end of ridge; thence
25. N 89° 51' E true 1039.5 feet along same to black rock marked thus [arrow to right] at edge of gulch; thence
26. N 71° 21' E true 427.7 feet along Waiehu along edge of gulch;
27. N 16° 51' E true 569.6 feet along same to point near a large block stone marked [arrow to right];
28. N 66° 36' E true 803.9 feet along same;
29. N 46° 6' E true 937.2 feet along Waiehu;
30. N 46° 21' E true 1029.6 feet along Waiehu;
31. N 49° 36' E true 1025 feet along Waiehu to stone marked thus [arrow to right];

32. N 20° 30' W true 128 feet along Waiehu;
33. N 22° 15' E true 244 feet along Waiehu;
34. N 11° 44' W true 310 feet along Waiehu;
35. N 57° 50' E true 264 feet along Waiehu;
36. S 44° 30' E true 753 feet along Waiehu along stone wall;
37. N 73° 00' E true 674 along Waiehu along stone wall to tall stone marked [arrow to right] bears S 70° 21' W true 1458.6 feet; thence
38. S 66° 6' E true 1607.8 feet crossing the Government road to stone marked [arrow to right] at sand hills; thence
39. N 77° 52' E true 1589.3 feet along Waiehu across sandy hollow to stone marked [arrow to right]; thence
40. N 65° 45' E true 1083.7 feet along Waiehu to a stone marked [arrow to right] at sea shore; [page 218]
41. Thence along sea shore to initial point.

Area 24000 acres more or less.

Notes from various Boundary Certificates and Government Survey Maps by M.D. Monsarrat, Surveyor

Honolulu July 22nd, 1882
S. Aholo, Commissioner of Boundries for the island of Maui, Molokai and Lanai.
Lahaina, Maui
September 25, 1882

2. Ka Moolelo o Kihapiilani (The Tradition of Kihapiʻilani)

In 1884, native historian Moses Manu, a contributor to accounts published by Abraham Fornander (1918 & 1996), published *"Ka Moolelo o Kihapiilani"* in *Ku Okoa* (January 12 to August 23, 1884). A part of the account includes reference to Kihapiʻilani's rise to rule over Maui and construction of the great fishpond complex of Kanahā in Kahului. The following excerpt, translated by Maly, is a synopsis of Manu's narratives:

> …Upon securing his rule over Maui, Kihapiʻilani determined that he was going to build a *heiau,* a house for the gods… Kihapiʻilani then called upon the chiefs and commoners alike, having them gather the *ʻalā makahinu* (dense basalt stones) to build an *alanu* (trail).
>
> The trail began at the stream of Kawaipapa and Pihehe and entered the *hala* forest of Kahalaowaka. From that place, it went to the forest of ʻAkialaʻa at Honomāʻele… The trail was also set out at Kaupō, from the stream (gulch) of

> Manawainui to Kumunui. That was the extent of the work of the king and the people. He then began the paving in the forest of ʻOʻopuloa [i.e., ʻOʻopuola], at Koʻolau, extending from Kawahinepeʻe to Kaloa, then on to Pāpaʻaʻea, and on to Kaʻohekanu at Hāmākua Loa…
>
> Now when the King (Kihapiʻilani) completed his work in this area, he moved and lived at Kahului, where he began the collection of stones for the *kuapā* (fishpond walls) of Mauoni and Kanahā. He is the one who caused the water in those two ponds to be separated and given two names. The *kuapā* is still there to this day, but a large portion of it has been lost, covered under the sands flying in the winds. When this work was completed, Kihapiʻilani then departed for Waiehu and ʻĀʻāpueo… (Manu in *Nupepa Ku Okoa,* August 23, 1884: 4; Maly and Maly 2003: 81)

3. He Moolelo Kaao Hawaii no Laukaieie… (A Hawaiian Tradition of Laukaieie…) Fishery Resources on Hawaiʻi, Maui, and Oʻahu

Manu published "He Moolelo Kaao Hawaii no Laukaieie…" in *Nupepa Ka Oiaio* between January 5, 1894 and September 13, 1895. The following is excerpted from the longer narratives which describe the travels of Laukaieie, her younger brother Makanikeʻoe, and their companions. This tradition includes descriptions of fisheries and aquatic resources, history, and mele interspersed with account from other traditions and references to nineteenth century events.

> From [Makawao] he then traveled to the cool pond of Kālena and then he went to the top of the hill, Piʻiholo, from where he could look out upon the beauty of the land. While he was atop Piʻiholo the *ʻūkiukiu* mist rains and the *ʻulalena* surrounded him, and the *līhau* dropped from the leaves of the *koa* of Kokomo and the famous *kukui* grove of Lilikoʻi. There, while upon the hill he saw two young women whose features were like that of Hinauluʻōhiʻa [a goddess of the forests and water at Waipiʻo, Hawaiʻi] sitting along the side of the stream of ʻAlelele. In his mysterious manner, Makanikeoe appeared before these two young women. Startled, they dove into the stream of ʻAlelele and entered a cave, and in a short time these mysterious women arose below Waiʻalalā. There, the women took their mysterious body forms and Makanikeoe called out to them. He learned that their names were Lauhuki and Kiliʻoe, and that they were the *moʻo* guardians of the cool waters of Kālena and all of the ponds at Makawao. For them the lines of the *mele* were composed:

Ka helena a wahine i ka pali	The women travel along the cliffs
I ka luna o Piʻiholo i ʻAlelele	At the heights of Piʻiholo and ʻAlelele
O Lauhuki ma lāua o Kilioe.	They are Lauhuki and Kiliʻoe

After exchanging their greetings, Makanikeoe passed through the cave by which the women traveled to Waiʻalalā. He then continued underground till he reached the sea fronting Māliko. He arose at the eastern point of Māliko, which is the boundary between Hāmākualoa and Hāmākuapoko. From here, the path of our traveler passed before Kūʻau and Pāʻia and he then arrived at Kapukaʻulua, the boundary between Hāmākuapoko and Wailuku. <u>There, Makanikeoe saw a deep pit in the sea which he entered and followed to the ponds of Kanahā and Mauoni, those famous ponds that are near Kahului. The ponds were made by the commoners in the time of the chief Kihapiʻilani</u>… (Manu in *Nupepa Ka Oiaio*, December 28, 1894; Maly and Maly 2003: 88)

4. Na Kamahele Pii Kuahiwi (The Far-Reaching Mountain Climbers [of Maui])

In 1897, a narrative about a visit to Waiehu was published in the Hilo-based Hawaii Herald. The article identifies the following food resources in the Waiehu area:

- ʻOʻopu – freshwater or saltwater goby[8]
- Puaʻa – pig or pork
- ʻŌpae ʻoehaʻa (o ke kahawai) – clawed shrimp (*Macrobrachim grandimanus*) (from the freshwater stream)
- Iʻa maka – raw fish

[8] ʻOʻopu is also a name of a wind from Waiheʻe, Maui.

Figure 11. Image from Hawaii Herald (Hilo, Hawaii), August 19, 1897

The Far-Reaching Mountain Climbers
—
May One Not Lose their Life to the Aeo in the Rain and the Wind
---
Loving Memories for 33 and more Years that have gone by.

And if so, come sit here, and immediately thereafter all troubles will have been gone, and entered into this small house appropriate for only the two of them, and there is a small veranda there for the two of them, and they dressed in what they had—a muʻumuʻu for that one old woman, woman for me, a woman's block-print for Kaha, and blue jeans for Kanuha, and shortly after reposed for a time from weariness and were startled upon being woken at those particular elders eating, after eating they returned to sleep, and upon being startled awake again, indeed it is the Sabbath day, and the outside is filled with people, and oh how embarassing, and here we are sitting still inside, until perhaps 10:00 that all those people had gone to pray, and that elderly man then went along as well since he was a lay church official.

We are considering the things that were necessary that our destitute be clothed, because this is a Sabbath day. It is these people who came to see us who announced our issues at the luakini, and spread the news around Waiʻehu and Waiheʻe. At the noon hour of the Sabbath, an open-hearted person full of love and friendship came with a package of clothing to supply us, and sitting outside and calling out with a loving voice, since that door of ours was closed. "Where are those troubled people?" I responded quickly, "Here we are inside." At that time, I quickly opened the door and that person was sitting outside, we exchanged aloha, and they responded, "When I heard about your troubles, about those who did not have clothing and the misfortune that fell upon some of you on the mountain, therefore, I brought clothes for you all, and we may return to the place where I live.

At that time, we dressed in the clothes, and everything was appropriate, and we spread forth our thanks upon him, and upon his invitation to us we requested the grace of that adopted father for his approval with our giving many thanks to the both of them with aloha, and they released us with kindness. And we returned to the beautiful home of S. W. Kanehailua, he had a home close to the cliff, and it was a home similar to a truly Western one. And when his mother saw us, her call was heard, "Come!" and upon arrival the house was prepared with everything for comfort--ʻoʻopu, pork, ʻōpae ʻoehaʻa (clawed shrimp) from the stream, raw fish, and we ate until satiated at the kindness of these friends and hosts of that place. And when we finished eating, we relaxed in conversation about this mountain climbing and the problems we faced in the mountains and the kinds of people at Waiehu. And the mother of the house responded, "My man here is from Kaʻanapali, and I am from here in Waiehu, and I am explaining to you, the people of this place are stingy, and they do not return favors and gifts." We understand it certainly is that which makes Kanehailua goodhearted, being from someplace else.

While we were at leisure with the hosts of that home, I am thinking of how indebted we are to these friends and those elders, and I set my thoughts to bring them to a lodging house of mine without divulging this to my friends and our hosts, and the

passing of time would tell. Our hosts asked when we would return, and I answered that if they had a horse ready, I would like to return now, because my thoughts were deeply troubled about kmy father, what might his thoughts be about my problem? They replied that they had one horse ready, and if in the morning of the next day, then there would be enough horses for us.

Let us leave this story, dear reader, and I will turn to the portion pertaining to my family. In the afternoon of the Sabbath day that we were in Waiehu, D.D. Baldwin arrived in Lahaina and he made known my problem to my father, demonstrating nonetheless that it was not my thoughts that were the problem. When my father heard about this issue, he sent a child to quickly find horses, late in the afternoon one was found, and at dawn on Monday my father left Lahaina, at 8am visited Waikapu to have breakfast. While he was at Waikapu, we left Waiʻehu at 6am of the same morning, and we arrived at Waikapu just after 8am and we passed on the road and missed my father (heading) for Waiehu. At 10:00 he arrived in Waiehu and heard that he missed us, not a problem. Then, he turned around with the thought to travel slowly. We arrived in Lahaina at 3pm and my father arrived at 11:00 at night, and we met him there with happiness. When I met my students, many tears fell and they wrote a lamentation song for me.

On Monday of the second week of July, I wrote a letter to Mr. Kanehailua requesting a lodging along with giving him my many thanks, and also giving my aloha to the adopted father of ours, and received a reply of approval. And at that time until this letter arrived, we continued visiting. They passed on with the child there and left the grandchild with the child-in-law and seems to be still doing well. When some time passed, I ordered that they come, and it was done, and we all lived together for almost one year. This was the favorite family of W.H. Wilimana, the one to whom the famous saying around Maui is attributed, do not “swing freely.” While we were living there at Lahaina, not a single person saw my friends, greetings only and it finished there. I thought that I had passed my debt to these friends, the one who gave so much helpand returned home here. And this is the end of this story, with the sharing also, of my Hawaiʻi friends who scaled the mountain, they two have passed on, and my white Hawaiʻi friends, here they are living on. With aloha to the Editor and the typesetting children.

Lahaina, June 15, ‘97. D.K. (Translation by Pono Fernandez)

D. Natural Resources

This section discusses the natural resources within the project area, specifically those natural resources that may have cultural significance or use. These natural resources were identified through the biological assessment prepared for the project and through primary research into historic resources.

Robert W. Hobdy, environmental consultant, prepared a February 2021 biological resources study. This study explains regarding the site:

This land was formerly used for sugar cane agriculture and more recently for macadamia nut production but has lain fallow for well over a decade and is overgrown with remnant trees and dense tall grassland. The project area lies above Kahekili Highway to the south of Waiehu Stream at elevations ranging from 50 feet up to 270 feet above sea level. The land is gently to moderately sloping. Soils are characterized as Iao silty clay, 0 – 3% and 3 – 7% slopes (1aC & 1aB), and Wailuku Silty Clay, 7 – 15% slopes (WvC) which are deep, well-drained alluvial soils (Foote et al, 1972). Rainfall averages between 25 inches and 30 inches per year, with most falling during the winter months (Armstrong, 1983) (Hobdy 2021).

1. Flora

In the Botanical Survey conducted within the project area, 69 total plant species were discovered and four of these species were common within the area – making up "about 95% of the plant life" (Hobdy 2021). Only three species recorded of the 69 identifed flora are native to Hawaiʻi, including ʻuhaloa (*Waltheria indica*), moa (*Psilotum nudum*), and pōpolo (*Solanum americanum*) (Hobdy 2021). All three indigenous species are present on all of the Hawaiian Islands and are not of conservation or environmental concern.

ʻUhaloa is primarily a medicinal plant. The leaves, stems and roots were pounded, strained and used as a gargle for sore throats, which is a practice that continues today (Abbott 1992). ʻUhaloa was also combined with other plants to create a tonic for young and older children, and seldom adults (Krauss 1993). Canoe builders would also occasionally add the sap of ʻuhaloa to a concoction of kukui root, ʻakoko, and banana inflorescence to create a paint that would stain the hull (Krauss 1993). This native weed remains abundant throughout the Hawaiian Islands and is still treasured as a natural and safe tonic for bodily ailments today.

Moa was traditionally used in lei (Krauss 1993) and continues to be uses contemporaneously in lei. Krauss (1993) describes moa as "a slender, more of less erect, shrubby or tufted perennial up to about one foot tall, with many successively two-forked branches that are ridged longitudinally." The name moa, also meaning chicken, was given to this fern because the forked branches looked like chicken feet. The plant also had medicinal purposes and would be used as a laxative or to treat respiratory infections. The spores would also be gathered and uses to prevent chaffing.

Pōpolo is an extremely important medicinal plant, but it also functioned in other aspects of Hawaiian culture. Pōpolo is a member of the nightshade family that grows between one to three feet high and produces purplish black, edible berries (Krauss 1993). These berries were

consumed by the ancient Hawaiians as a refreshment on journeys and during times of famine but were not an essential staple to the Hawaiian diet (Krauss 1993). Dyes were also created from both the berries and the leaves, producing blackish purple dye from the former and green dye from the latter (Hiroa 1957). The most significant contribution of pōpolo to Hawaiian culture is as a medicinal treatment.

The juices of the leaves and berries were used alone or in mixtures to heal all respiratory disorders, skin eruptions, and cuts and wounds when mixed with salt (Abbott 1992). The young leaves were eaten to prevent bloating and cure coughs, and served well as a tonic when dried and steeped (Krauss 1993). A compress of the mashed leaves were also applied to the eyes for a variety of problems, including inflammation (Krauss 1993). Additionally, the pōpolo leaves were applied to tender areas as they were sunned, which was a treatment utilized by ancient Hawaiians for sore muscles, joints and tendons (Abbott 1992).

2. Fauna

Hobdy (2021) notes that the "tall and dense grassland and forest is not suitable for Hawaii's native forest birds, sea birds, water birds, or nēnē, and none were seen." Twelve non-native bird species were identified over three site visits (Hobdy 2021). Hobdy identified four non-native mammals: domestic dogs (*Canis familiaris*), axis deer (*Axis axis*), mongoose (*Herpestes auropunctatus*) and feral pigs (*Sus scrofa*). Ample effort was made to identify the presence of peʻapeʻa (*Lasiurus cinereus*), but "no bat activity was detected with the use of [devices]" (Hobdy 2021).

Fourteen species of insects were identified during the biological assessment. Two specifies were indigenous to the Hawaiian Islands: the globe skimmer (*Anax junius*) and green darner (*Pantala flavescens*), both are referred to pinao in the Hawaiian language. Neither are of conservation concern.

While no seabirds were identified on property, Hobdy (2021) notes that: there are native seabirds, the Endangered Hawaiian petrel (*Pterodroma sandwichensis*) and the Threatened Newell's shearwater (*Puffinus newelli*) that fly over these lowlands on the way to their burrows high in the mountains. These seabirds, and especially the fledglings, are attracted to bright lights in the evenings and early dawn hours and can become disoriented and crash. They are then vulnerable to injury, vehicle strikes and predators. It is recommended that any significant outdoor lighting in any proposed development on this property be shielded to direct the light downward to minimize disorientation of these protected seabirds." The Hawaiian petrel is referred to as ʻUaʻu and the shearwater is referred to as ʻUaʻu kani in the Hawaiian language.

3. Other Environmental Features

a. Waiehu Stream

Waiehu Stream is one of the four water sources that make up Nā Wai ʻEha. Practitioners continue to work the protect and restore these waters. As describes by this group:

> "Kaulana ʻo Nā Wai ʻEhā" "Famous are the Four Great Waters of Waikapū, Wailuku, Waiehu, and Waiheʻe." This well-known saying attests to the traditional, historical, and cultural significance of the four ahupuaʻa within the moku of Wailuku and their fresh water resources. Nā Wai ʻEhā, was once the largest contiguously cultivated loʻi kalo growing region in all of Hawaiʻi. It also served as the primary ritual, political, and population center of Maui. The vast water resources of Mauna Kahālāwai (West Maui Mountains) supplied these four streams with the life giving waters of Kāne. This allowed the Hawaiian population of this area to develop expansive irrigation and agricultural systems unique to Hawaiʻi. The rich history of Nā Wai ʻEhā, is directly linked to the abundance of wai. Hawaiians thrived for many generations in this region by cultivating loʻi kalo (wetland kalo), fishing in natural and manmade inland fishponds, gathering native stream life such as ʻoʻopu, hīhīwai, and ʻōpae, and collecting drinking water from springs (Hui o Nā Wai ʻEha).

b. Rain Names

Akana and Gonzalez in *Hānau Ka Ua: Hawaiian Rain Names* explain the significance of the wind and rain in Native Hawaiian culture:

> In the mind…of our Hawaiian kūpuna [(ancestors)], every being and every thing in the universe was born. Our kūpuna respected nature because we, as kānaka, are related to all that surrounds us – to plants and creatures, to rocks and sea, to sky and earth, and to natural phenomena, including rain and wind. This worldview is evident in a birth chant for Queen Emma, "Hānau ke aliʻi, hānau ka ua me ka makani" (The chiefess was born, the rain and wind, too, were born). Our kūpuna had an intimate relationship with the elements. They were keen observers of their environment, with all of its life-giving and life-taking forces. They had a nuanced understanding of the rains of their home. They knew that one place could have several different rains, and that each rain was distinguishable from another. They knew when a particular rain would fall, its color, duration, intensity, the path it would take, the sound it made on the trees, the scent it carried, and the effect it had on people (Akana and Gonzalez 2015: xv).

To the Native Hawaiians, no two rains are ever the same. Rain can be distinguished based on its intensity, the way it falls, and its duration, among other things. The following are a collection of rains that occur within Wailuku moku. Moʻolelo, ʻōlelo noʻeau (traditional sayings), mele, oli (chants), etc., associated with the particular rain name are also provided to give insight into the importance and cultural significance that the different types of rains have to the Native Hawaiian people.

i. Kiliʻoʻopu Rain

Kiliʻoʻopu rain is associated with Wailuku, Maui and is also the name of a wind.

Rain of Waiheʻe, Maui

Kuʻu kāne mai ka ua Kiliʻoʻopu o Waiheʻe	*My dear husband from the Kiliʻoʻopu rain of Waiheʻe*
ʻAuʻau ka ʻuhane i ka wai o Nīʻaukawa	*The spirit bathes in the water of Nīʻaukawa*

From a kanikau (lament) for Kamakaokalani (Akana and Gonzalez 2015: 83).

Rain of Waikapū, Maui

Ua Kiliʻoʻopu – Waikapū, Maui.
From a list of rain names and their descriptions (Akana and Gonzalez 2015: 84).

Rain of Wailuku, Maui

Ua Kiliʻoʻpu – Wailuku, Maui.

From a list of rain names and their descriptions (Akana and Gonzalez 2015: 84).

ii. ʻUlalena Rain

ʻUlalena or Ulalenalena rain is probably related to Lena and is associated with Lilikoʻi and Piʻiholo, Maui. It is also found on other parts of Maui and on Kahoʻolawe, Oʻahu, and Kauaʻi. Also the name of a hill in Hāmākualoa, Maui. "ʻUla lena" means "yellowish-red" (Akana and Gonzalez 2015: 262).

Rain of Wailuku, Maui

Pau ʻole koʻu mahalo i ka laulā o Kamaʻomaʻo	*My admiration is endless for the expanse of Kamaʻomaʻo*
Ka hālana maikaʻi a Keālia	*The fine rising of the waters of Keālia*
Ka hemolele o ka ua ʻUlalena	*The perfection of the ʻUlalena rain*
Lena ka pua o ka māmane pala luhiehu i ka lā	*Yellow are the blossoms of the māmane, soft and lovely in the sun*

From a mele mākaʻikaʻi (travel chant) for ʻEmalani Kaleleonālani by Kaleipaʻihala (Akana and Gonzalez 2015: 267).

iii. Hōʻehaʻili Rain

Hōʻehaʻili rain is associated with Waiehu, Maui and is also found on Kauaʻi. "Hōʻeha ʻili" means "to hurt the skin." It is both the name of a specific rain and a generally descriptive term; its various usages are determined by the context (Akana and Gonzalez 2015: 36).

Rain of Waiehu, Maui

Ka ua Hōʻehaʻili o Waiehu.	*The skin-hurting [Hōʻehaʻili] rain of Waiehu.*

An ʻōlelo noʻeau (Akana and Gonzalez 2015: 37).

He aloha, he lihaliha, he kūmākena	*Loving, heartsick, grief-stricken*
He ʻū iā ʻoe	*Mourning for you*
E Hon. Iosepa Kahoʻoluhi	*O Hon. Joseph Kahoʻoluhi*
Nāwahīokalaniʻōpuʻu	*Nāwahīokalaniʻōpuʻu*
A haʻo ē!	*We shall truly miss you!*
I uē ʻia mai nei ʻoe e Nā Wai ʻEhā	*You have been mourned by the lands of the four waters*
E ka makani Kiliʻoʻopu o Waiheʻe	*By the Kiliʻoʻopu wind of Waiheʻe*
Ka ua Hōʻehaʻili o Waiehu	*And the Hōʻehaʻili rain of Waiehu*

From a message of condolence for the passing of Joseph Nāwahīokalaniʻōpuʻu from people of Nā Wai ʻEhā, Maui (Akana and Gonzalez 2015: 37).

iV. Nāulu Rain

A rain that falls when it is calm, associated with East Maui (Akana and Gonzalez 2015: 191).

Rain of Kula, Maui

Ke hoʻi nei ka ʻuhane i ka malu niu	*The spirit s returning to the shade of the niu trees*
o Lele	*of Lele*
I ka malu kuawa o Wailuku	*To the shelter of Wailuku Valley*
I ka ua Nāulu noe anu o Kula	*To the cold, misty Nāulu rain of Kula*
I ka ua noe uahi moe i ke pili	*To the smoky, misty rain that rests upn the pili*
I pili ʻia ka ua me ka lā	*grass*
Ke anu hoʻi me ke koʻekoʻe	*Joined are the rain and the sun*
	The cold and the chill

A kanikau for L.L. Ua written by the same's students at the Lahainaluna Seminary (Akana and Gonzalez 2015: 192)

V. Līlīlehua

Sterling's *Sites of Maui* identified Līlīlehua as the name of a wind and rain famous in Waiehu, Maui (Sterling 1998: 71).

c. Wind Name

The name Iʻa-iki was identified for the Wailuku area. The name Iʻa-iki means "little fish." It is also said that the name of the wind of Wailuku is "Makani-lawe-malie, the wind that takes it easy" (Sterling 1998: 62).

d. Wai (Fresh Water)

Fresh water (wai) is of tremendous significance to Native Hawaiians. It is closely associated with a variety of Hawaiian gods. According to traditional accounts, Kāne and Kanaloa were the "water finders:" "Ka-ne and Kanaloa were the water-finders, opening springs and pools over all the islands, each pool known now as Ka-Wai-a-ke-Akua (The water provided by a god)" (Westervelt 1915: 38). Kāne is widely known to be closely associated with all forms of water, as outlined in the mele "He Mele No Kane."

There was no element more important or precious than water. There was no god more powerful than Kāne. Pua Kanahele recounts the oli "ʻO Kāne, ʻo wai ia aliʻi o Hawaiʻi?" and notes of the oli: "The chant begins with Kāne and focuses on this deity as the connective force of all the poʻe akua, or god family. All the entities mentioned in each paukū, or verse, are a manifestation of Kāne" (2011: 24). The association between water and Kāne is logical considering certain interpretations of Hawaiian mythology identify Kāne as the most powerful of all the Hawaiian gods.

Further investigation into the relationship between Kāne and Pele would be appropriate and helpful. Some interpretations identify Kāne as Pele's father (Westervelt 1915). A full analysis of the different perspectives on Pele and Kāne would be helpful to refining an approach in developing community education programs for geothermal energy and culture. A brief analysis is provided below.

He Mele No Kane asks:

E ui aku ana au ia oe,	One question I ask of you:
Aia i hea ka Wai a Kane?	Where flows the water of Kane?
Aia i lalo, i ka honua, i ka Wai hu,	Deep in the ground, in the gushing spring,
I ka wai kau a Kane me Kanaloa-	In the ducts of Kane and Kanaloa,
He waipuna, he wai e inu,	A well spring of water, to quaff,
He wai e mana, he wai e ola,	A water of magic power- The water of life!
E ola no, ea!	Life! O give us this life!

This mele and other mo'olelo are clear: Kāne is water. It is deeply valued among the Hawaiian people. The only exceptions may be mist, known to be associated with Lilinoa, and snow, associated with Poliahu. There is an extensive body of traditional knowledge about the expeditions of Kāne and Kanaloa during which Kāne drove his ʻōʻō (digging stick) into the earth in search of water.

There is heightened sensitivity regarding water in East Maui, where the project is located. Contemporaneous protections around water as a "public trust resource" extend back to the Kingdom, where the concept of owning water contradicted Hawaiian cultural values and traditions. Under the monarchy, control of water was reserved for use by the people who lived on and worked the land. The use of surface water was strictly controlled through the kapu system to ensure that all land tenants enjoyed an abundant availability of water. Farming, particularly kalo or taro, occurred regularly, especially in places with notably fertile lands like those found in the watersheds of East Maui. As early as 1839, the public use of water was codified by Kauikeaouli, Kamehameha III. His "Respecting Water for Irrigation" law stated: "In all places which are watered by irrigation, those farms which have no formally received a division of water, shall, when this new regulation respecting lands is circulated, be supplied in accordance with this law, the design of which is to correct in full all those abuses which men have introduced. All those farms which were formally denied a division of water, shall receive their equal proportion. Those bounties which God has provided for the several places should be equally distributed, in order that there may be an equal distribution of happiness among all those who labor in those places" (Cited in *Reppun v. Board of Water Supply*, 656

P.2d 57 1982). This public right eventually found its way into existing law, where the Hawaii Water Code continues to recognize and protect traditional farming and mahi ʻai (farmers).

It is critical for this CIA to consider impacts to cultural practices, even when the practices may take place outside the project area if project activities within the APE have the potential to impact traditional practices and customs. In this particular case, it is appropriate to carefully consider the impact water usage may have on farmers and other practicers within the watershed(s) from which the water for this project will be drawn. If the water usage potentially results in an allocation of water that diverts that resources from cultural and/or traditionally uses, that potential impact should be considered.

e. Pauku Kalo

Pauku Kalo is the name of a bathing spot in Waiehu (Sterling 1998).

F. Intanigble Cultural Resoures

It is important to note that Honua Consulting's unique methodology divides cultural resources into two categories: biocultural resources and built environment resources. We define biocultural resources as elements that exist naturally in Hawaiʻi without human contact. These resources and their significance can be shown, proven, and observed through oral histories and literature. We define built environment resources as elements that exist through human interaction with biocultural resources whose existence and history can be defined, examined, and proven through anthropological and archaeological observation. Utilizing this methodology is critical in the preparation of a CIA as many resources, such as those related to akua (Hawaiian gods), do not necessarily result in material evidence, but nonetheless are significant to members of the Native Hawaiian community.

Hawaiian culture views natural and cultural resources as being one and the same: without the resources provided by nature, cultural resources could and would not be procured. From a Hawaiian perspective, all natural and cultural resources are interrelated, and all natural and cultural resources are culturally significant. Kepā Maly, ethnographer and Hawaiian language scholar, points out, "In any culturally sensitive discussion on land use in Hawaii, one must understand that Hawaiian culture evolved in close partnership with its natural environment. Thus, Hawaiian culture does not have a clear dividing line of where culture ends and nature begins" (Maly 2001: 1).

1. ʻŌlelo Noʻeau

ʻŌlelo noʻeau are another source of cultural information about the area. ʻŌlelo noʻeau literally means "wise saying" and they encompass a wide variety of literary techniques and multiple layers of meaning common in the Hawaiian language. Considered to be the highest form of cultural expression in old Hawaiʻi, ʻōlelo noʻeau bring us closer to understanding the everyday thoughts, customs, and lives of those that created them.

The ʻōlelo noʻeau presented here relate to Kahului, and its larger ahupuaʻa, namely Wailuku. These ʻōlelo noʻeau are found in Pukui's *ʻŌlelo Noʻeau: Hawaiian Proverbs & Poetical Sayings* (1983). The number preceding each saying is provided.

1711 Ke inu aku la paha aʻu ʻĀlapa i ka wai o Wailuku.
My ʻĀlapa warriors must now be drinking the water of Wailuku.
Said when an expected success has turned into a failure. This was a remark made by Kalaniōpuʻu to his wife Kalola and son Kiwalaʻō, in the belief that his selected warriors, the ʻĀlapa, were winning in their battle against Kahekili. Instead they were utterly destroyed.

1722 Ke kai holu o Kahului.
The swaying sea of Kahului.
Refers to Kahului, Maui.

2300 Na wai ʻehā.
The four wai.
A poetic term for these places on Maui: Wailuku, Waiehu, Waiheʻe, Waikapū, each of which has a flowing water (wai).

2351 Nūnū lawe leka o Kahului.
Letter-carrying pigeon of Kahului.
In 1893 carrier pigeons arrived at Kahului, Maui. One was brought to Honolulu and released with a ltter tied to its neck. It flew back to Kahului. This was of such great interest to the people that a song was written and a quilt design made to commermorate the event.

2578 Pākāhi ka nehu a Kapiʻioho.
The nehu of Kapiʻioho are divided, one to a person.
Kapiʻioho, ruler of Molokaʻi, had two ponds, Mauʻoni and Kanaha, built on his land at Kahului, Maui. The men who were brought from Molokaʻi and Oʻahu to build the ponds were fed on food brought over from Molokaʻi. The drain on that island was often so

great that the men were reduced to eating nehu fish, freshwater ʻōpae and poi. The saying is used when poi is plentiful but fish is scarce and has to be carefully rationed.

2647 Pili ka hanu o Wailuku.
Wailuku holds its breath.
Said of one who is speechless or petrified with either fear or extreme cold. There is a play on luku (destruction). Refers to Wailuku, Maui.

2912 Wailuku i ka malu he kauwa.
Wailuku in the shelter of the valleys.
Wailuku, Maui, reposes in the shelter of the clouds and the valley.

2. Mele

Honua Consulting completed searches of mele written about the ahupuaʻa of Kahului.[9] Maui historian Inez Ashdown wrote in 1976 about the importance of mele:

> The natives of Hawaiʻi Neʻi saw the Creator in everything and the Haku Mele or Music Masters delighted in presenting the chants and songs, mele and oli, to inspire the people. Such mele tell of God's assistant spirits which, to the imaginative natives, represented the winds, rains, and so on. Each spirit of creation was depicted as male or female and was given a personality and a name indicative of purpose. Hence the name of the volcanic action creating and cleansing the earth. She is beautiful, alluring, desirable. She also is unpredictable because she is tempermental and usually full of fiery emotions. She is an old woman asking help when she lies to test mortals, and woe betide anyone who is rude or inconsiderate of this form of an older person to whom respect and Aloha must be given (Ashdown 1976: 3).

[9] It should be noted that there are numerous mele about the larger Wailuku area that have not been included in this assessment as they did not yield information closely associated with the project area.

The following mele was written by Palani Vaughan in honor of the first passenger train service in Hawaiʻi, which was between the town of Kahului and city of Wailuku on Maui on July 29, 1879. Railroad building in Hawaiʻi was the result of the encouragement by King David Kalākaua (Vaughn 2015).

Kaʻa Ahi Kahului – by Palani Vaughn

Eia ka moʻolelo pōkole	Here is the short story
No ke kaʻa ahi mua o Hawaiʻi Nei	About the first train in Hawaiʻi
Chūkū-chūkū maila, chūkū-chūkū maila	Choo-choo, choo-choo
Koʻehu (kuehu) aku ma ke alahao	Stirring dust along the tracks
Hūlō, Hūlō, no Ka Lani e	Hurrah! Hurrah! for the chief
No Ka Lani ʻO Kalākaua	For the chief, Kalākaua
Ke mea i kākau kona inoa	The one who signed his name
Ma ka Palapala no ka chūkū-chūkū	On the Act for the Railroad
Lohe mai e nā keiki hānau o ka ʻāina	Listen, oh children of the land
Lohe mai i ka moʻolelo chūkū	Listen to the train story
A i ko ʻoukou Ka Lani hope	And (hear) about your last King
Ka mea i kākau kona inoa	The one who signed his name
Hui:	Chorus:
Wū-wū Kaʻa Ahi Kahului	Woo-woo! Kahului Railroad
Ke alahao a i Wailuku	Tracks all the way to Wailuku
Wū-wū Kaʻa Ahi Kahului	Woo-woo! Kahului Railroad
Chūkū-chūkū mua o Hawaiʻi	The first train of Hawaiʻi

The following mele for Queen Emma Naʻea Rooke was composed as a greeting for her on the occasion of her trip to Maui in 1882. As her ship entered Kahului Harbor, lehua blossoms were floated on the water to greet the Queen (Verse 2). Lucy Kamalalehua Peabody, a companion of the queen, says this was written by Sylvester Kalama, who was aboard the ship that took the queen to Maui. Charles E. King credits this mele to Nuʻuanu. After the death of her husband, Alexander Liholiho Kamehameha IV, Emma campaigned for the royal office, losing the election to David Kalākaua. Her campaign headquarters was in Nuʻuanu Valley, and many believe this was used as the composer's name. The Queen was always addressed as Emma or Emalani, but was called Kalanikaumaka (the chiefess to whom everyone looks) by her immediate family. Upon the tragic death of her son, Prince Albert in 1862, she asked her people to call her Kaleleokalani, the flight of the heavenly one. When her husband, Kamehameha IV died a year later, she asked that the name be changed to the plural form, Kaleleonālani (Nuʻuanu and Kalama 2015).

Kaleleonālani (Flight of the Royal Ones) – by Nuʻuanu / Sylvester Kalama

Welo ana e ka hae Hawaiʻi	The Hawaiian flag is waving
Hāliʻi lua i ka ʻili kai	Over the surface of the sea
E haʻi mai ana i ka lono	Telling the news
Ke kuini Emalani ko luna	Queen Emma is on board
Hui:	Chorus:
Kaleleonālani kou inoa	Kaleleonālani is your name
A he hiwahiwa ʻoe na ka lāhui	You are beloved by the nation
A he lani ʻoia la no ʻoukou	She is the chiefess for all of you
A he milimili hoʻi na mākou	And cherished by us
A waho o na nalu o Kōlea	Outside the surf of Kōlea
ʻIke ʻia i ka nani o Kahului	The beauty of Kahului is seen
ʻAʻohe mea nani ʻole o laila	There is not a thing without beauty
Ua nuʻa ka lehua ʻau i ke kai	Even lehua blossoms floated out to sea
Ui aʻe nei Emalani	A question from Emalani
Pehea mai la ʻoukou	How are all of you?
Ka manawa kupono kēia	This is a suitable time (to land)
E nā hoa hele o ke kai loa	My traveling companions on the high seas

The following mele was composed by Alice Johnson as a celebration of the beauty and majesty of Maui. The mele features key locations throughout Maui including Kahului and its wharf,

ʻĪao, and Haleakalā while praising Maui as the best of the Hawaiian Islands because of the unforgettable beauty it offers (Johnson 1938).

Aloha ʻIa No ʻO Maui – by Alice Johnson

Aloha ʻia nō ʻo Maui	How we love Maui
Nā hono aʻo Piʻilani	Beloved land of Chief Piʻilani
Uluwehi i ka pua roselani ē	She is decked with wreaths of roses
Nā pua ʻala onaona	And other fragrant flowers
Kaulani ʻoe e Kahului	You are famed Kahului
Ke kai holuholu ē	For your rolling waves
A me ka uapo hoʻokipa malihini ē	And for your wharf which welcomes visitors
I kou ʻāina nani ē	To your beautiful isle
Haʻaheo wale hoʻi ʻoe	Oh, how proud you look
Kepaniwai o ʻĪao	O water course of ʻĪao
Mākaʻikaʻi mau ʻia ana lā	You are constantly being visisted
E nā malihini ē	By many strangers
Kilakila Haleakalā	Majestic is Haleakalā
Kuahiwi nani o Maui	Beautiful mountain of Maui
Kaulana kona inoa puni Hawaiʻi	Whose name is known throughout Hawaiʻi
Ke alanui kīkeʻekeʻe	For its winding road
Haʻina mai ka puana	The end of my song I sing
ʻO Maui nō e ka ʻoi	Of Maui, best of the islands
Me kona nani hoʻohenoheno	Whose beauty woos us all
He nani poina ʻole	Her beauty we cannot forget

The following mele honors the Inter-Island Steamer, Hualālai, that operated between the islands in the 1930's. This steamer was named for the famous Kona volcano of the same name (Akiu 2015).

Hualālai – by Roger Akiu

Kaulana e ka holo, e, e, e	Famous is the journey
O Hualālai lā	Of Hualālai
Mana kai holo holo e	Sailing on the powerful current in the sea

Aʻo Kahului lā e	Of Kahului
O ka helena ana ia lā, e, e, e	The appearance
A ka wahine uʻi lā e, e, e	Of this beautiful woman
E kilohi iho ʻoe lā e	(I) stare at you, then look down
He malino i ke kai	At the calm sea
E kūlana hiehie lā, e, e, e	Distinguished
Kō Hualālai lā, e, e, e	Is Hualālai
Kohu kakela nui lani ʻike kai	Recognized as the castle of the sea
Nani wale ke ʻike aku	Beautiful to see
Haulani ke Hualālai lā, e, e, e	Constantly moving is Hualālai
Ke kuini hoi ike kai, e, e, e	The queen of the sea
Na ale ka moana kou hoa pili	Friend of the waves
ʻAe kohu ai ka helena	Ruler of her travels
Haʻina mai ana ka puana, e, e, e	Tell the refrain
No Hualālai lā, e, e, e	Of Hualālai
Kakela hiehie lani ike kai	Castle of the sea
Nani wale ke ike aku	Beautiful to see

Written by Eddie Kamae and Pilahi Paki then recorded by Eddie Kamae and the Sons of Hawaʻi, this succeeding mele expresses a smell that one who travels on the island of Maui will experience when traveling from Kahului to Lahaina. This scent is caused by the residue of burnt cane that is emptied into the ocean at Launuipoko, the area between the village of Olowalu and Lahaina. To experience this scent is what Hawaiians call Kela Mea Whiffa (Kamae and Paki 1975).

Kela Mea Whiffa (The Breath of Love) – by Eddie Kamae and Pilahi Paki

Mai Kahului komo Lahaina	From Kahului to Lahaina
Ke ala onaona i hanu	The fragrance that one breathes
Naue aku au ma Olowalu	As we go along pass Olowalu
He noʻe au no ke kanaka	A rare experience awaits all
Hale nui me ka ihu pinana	Then, the big house with the smoke stack
Ike aku au i ke kapulu	Where activities seldom cease
A hanu au i na mea lepo	Sends its natural products
Maluhi au kela mea whiffa	To stay at kela mea whiffa

Hui:	Chorus:
ʻAuhea e kela mea whiffa	Where is kela mea whiffa
Oia hanu a ke aloha	The breath of love
Ma ke lauko a kiawe	Between sugar cane and kiawe
A malaila kou manaʻo	For this is where you'll find me
ʻAuhea e kela mea whiffa	Where is kela mea whiffa
Oia hanu a ke aloha	The breath of love
Ma ke lauko a kiawe me ea	Between sugar cane and kiawe
Kōpaʻa ka poʻe haole	Sugar cane introduced by foreigners
Ulu ana a nui hewahewa	And grown in abundance
Mala nui nā lau uliuli	Acres and acres of green stuff
Ike ʻoe a mamao	You see all around you
Puhipuhi ia nā mala ko	The burning of the cane at the fields
I maha hoʻi ke ʻohi	Makes it easier to harvest
ʻAuhea ʻoe mea whiffa	Where are my sweet whiffa
Ma Launiupoko kela mea whiffa	At Launuipoko kela mea whiffa

G. Cultural Practices

Prior to contact and modernization, a range of cultural practices likely took place in the project area. These practices would have been predominantly related to traditional agriculture and aquaculture and were obstructed beginning in the 19th century by Western modernization.

1. Mahiʻai Kalo (Taro Farmers)

Handy, Handy, and Pūkui (1991) describe Waiehu:

> This is the second valley of the famous Na Wai Eha of western Maui, and it is watered by twin streams. The canefields now extend throughout this region, continuously from Waihee on the lower slopes; but above Waiehu and Puakala from the upper roads following the iriigation ditches well toward the upper limits of the cane, a few old plantations still persist. Some are used for raising wet taro, some for truck gardening. However, except for these few patches the old terrances of the upper slopes are entirely ploughed under.

2. Surfing

It is noted: “The chiefs of Wailuku passed their time in the surf of Kehu and Kaʻakau, those of Waiehu and Napoko in the surfs of Niukukahi and ʻAʻawa” (cited in Sterling 1998).

3. Puʻuhonua and Heiau

Waiehu was known to have multiple puʻuhonua (sites of refuge) and heiau.

Table 3. List of Puʻuhonua and Heiau in Waiehu

Site	Type	Description
Poaiwai	Puʻuhonua and heiau	Puʻuhonua and heiau of Poaiwa, land of Waiehu. At the end of the ridge between noth and south Waiehu, 7000 feet from the sea, and just below the irrigation ditch. Seen in the distance by the stones were said to have been removed (Sterling 1998: 72)
Halelau	Heiau	Mauka to Waiehu Camp in cane fields. Obliterated by modern cemetary (Sterling 1998: 72)
Malumaluakua	Heiau	Head of south Waiehu Gulch. A grove of kukui trees surrounding a level spot without evidences of walls or platforms. A large rock in the center may have served for sacrificial purposes (Sterling 1998: 72)
Kukuikomo	Heiau	On right between North and South Waiehu Gulches. Another heiau without walls or platforms (Sterling 1998: 73)
Puukoa	Heiau	Near pond on ridge south of Waiehu Camp. Destroyed (Sterling 1998: 73)

4. Geographic Features

The point in Waiehu is called Ka Lae o Kehoni. It is explained in Sterling (1998): "At the point of Kehoni was a site for wrestling matches for Kahekili and his son. The name of the ridge above this place is Malama and the level land below is now the golf links… There was a large flat shiny rock there that people sought but could never find. Here the chiefess Namahana was born. That is perhaps why the place was called Kehoni" (Sterling 1998: 72).

V. Oral Records, Interviews and Consultations

A. Oral Histories and Past Studies

In 2003, co-author of this study Kepā Maly and his wife Onaona Maly conducted an extensive historical study for the Nature Conservancy entitled *Ka Hana Lawaiʻa a me nā Koʻa o Nā Kai ʻEwalu*, which contained extensive oral history interviews that were reviewed for this assessment.

One interviewee was James Tatsuo Tanaka, a Japanese fisherman residing in ʻĪao Valley on Maui. He discussed the small weke he used to see in Wailuku and how ʻoama have declined. He specifically references how the plantation harmed the fisheries: "the spawning areas for the *weke*, *moi*, mullet and things like that, they got all polluted, mostly from the fertilizing, when the big rain comes and water going into the ocean" (Maly and Maly 2003). He also interviewed Robert "Bobby" Luʻuwai, a known kupuna fisherman from the Mākena area. He spoke about in the old days; fishermen respected each others' fishing areas. He noted that "it was that unspoken rule, that you never go in front of another person's house." He specifically noted that Kahului fishermen had their own fishing area in the Kahului waters (Maly and Maly 2003). No other interviews in Maly and Maly's study yielded additional information on Kahului.

B. Interviews by Kahu Charles Maxwell (2004)

In 2004, Maxwell interviews seven individuals as cultural informants. A number of these individuals have since passed away.

1. Marcello S. Dadez

March 24. 2004 at 2:30 p.m., interviewed at his place of residence:

He stated that he moved to Waihe'e in the 1960's and can remember when there was sugar cane on the project property. Later, they had macadamia nuts growing there. He does not have any knowledge of Hawaiian practices on the property.

2. Ester Kailihiwa Santos

March 27. 2004 at 10:30 a.m., interviewed at 2087 Mokuhau Rd., Wailuku:

She related that she was born and raised in Waihe'e and remembers the project area because she passed it almost everyday throughout her life. She also remembers when there were sugar cane fields growing in the project area, and later they planted macadamia trees for the nuts. She did not have any information about Hawaiian practices on the property, except for the burials that were found in front of the project property, at Waiehu Heights.

3. Ernest F. Santos

March 27, 2004 at 10:30 a.m., interviewed at his home:

He related that he was born in Upper Waihe'e Valley on June 3, 1920. His father used to take care of the water ditches that were used to irrigate the sugar cane. The only thing left on the property is an old Portuguese bread oven, and it is still there today. There was no electricity, and instead, kerosene lamps were used. He recalls that the Spreckels Ditch ran from Waihe'e Valley, through the Waiehu valleys, to the reservoir in Waikapii. He went on to say that he remembers the property and traveled throughout the area. He did not know of any Hawaiian ceremonies that took place on the property or any burials that might be there, and had nothing further to add.

4. Susan Kanegai Lord

March 28, 2004 at 10:40a.m., interviewed on Kahekili highway, fronting the Chinese cemetery (across this proiect property). Waiehu:

She was born on the project property on March 6, 1943 in Upper Waiehu. Her property is in the middle-top of the property on Maluhia Road, which is accessed from a cane haul road. They own 3 acres within the project property and have been promised by the owner, Sterling Kim, that he will give them access to their property. Prior to the macadamia nuts, the project area was into sugar cane. She does not personally know of any burials. However, she heard that there are burials on the project property where the Kapalu family lived, and that the Miyahira boys knew of a burial site in the project area. She stated that they told the archaeologist about the burials, but he could not find it. {refer to Eric Ogg's statement (the archaeologist who did they survey)} She continued by saying that their property was kuleana

wal (water rights), so they have several taro patches on their property. Also, Mary Kaina, who is her neighbor on Maluhia Road, might have some information on the burials within the project area.

5. Mary J. Kapalu Kaina

March 28. 2004 at 6:l5 p.m.:

She was born in the project area on June 26, 1942. She grew up in the area and did not have any indication of burials on the site. She mentioned that her boyfriend, Robert Kaipo Houpo, worked on the property in the past and might have information.

6. Robert Kaipo Houpo

March 28, 2004:

He was born on April 17, 1951 in Upper Waiehu and has lived all of his life in the area. He had worked in the cane field when cane was the crop and took care of the water ditches in the area. He remembers seeing stone piles but had no indication that there were any burials in the area, and had nothing further to add.

C. Interview with Kumu Hula Hokulani Holt-Padilla by Kahu Dane Kiyoshi Uluwehiokalani Maxwell (2021)

Kahu Dane Maxwell conducted a contemporaneous interview with Kumu Hula Hokulani Holt-Padilla on September 10, 2021 at 10:00 a.m. via Zoom.

Holt-Padilla was born in Honolulu and spent her childhood between Oʻahu and Maui. She is the daughter of the legendary Kumu Hula Orpha Leianaikaroselaniomaui Long Woodside, who had been born in Wailuku, Maui in 1926. Long Woodside raised her daughter Hokulani with hula, and as a result, Holt-Padilla became a lifelong dancer and practitioner. She's lived on Maui permanently since 1975 and with the blessing of her mother and aunt, opened her hālau, Paʻu O Hiʻiaka in 1976. She has been a leader in culture and community for decades, and she is particularly knowledgable about Maui and the Wailuku area.

Figure 12. Kumu Hula Hokulani Holt-Padilla, taken on Kahoʻolawe (n.d.)

Survey comments from interview (prepared by Dane Maxwell):

She was raised in the lower Waiehu area and would frequent the adjacent parcels in search of kōkoʻolau to make tea. She would often visit the Waiehu stream that borders the project area to gather ʻōpae and plums. The informant was not aware of any burials within the project area but stated that this locale was heavily disturbed during the sugar cane era and made mention of burials located in the sand dune in the adjacent properties.

D. Interview with Kevin Brown by Kahu Dane Kiyoshi Uluwehiokalani Maxwell (2022)

Interviewer: Dane Maxwell
Interviewee: Kevin Brown
Date: 3/5/2022
Location: via phone

Biography

Kevin Brown is a proud "papa" and a musician. He was born in 1962 in Wailuku, Maui. Kevin was raised in Lāhaina by his grandparents until he was in 6th grade when he moved to Waiʻehu. Kevin has strong family connections to Waiʻehu, which is where he raised his children.

Overview

Kevin Brown provided information on various traditions, customs, and natural and cultural resources that exist nearby and within the project area.

General Discussion

Kevin Brown is associated with the project area through his family. His father was raised near the project area (Waiʻehu) by his Aunty Kaʻi who lived there all her life. Her father was Kealoha Poʻohina and he gave his daughter the family property. His ʻohana has been there for over 5 generations. Kevin's grandmother was a historian and was very knowledgeable about Waiʻehu. He learned a lot from his grandparents, when they wanted them to know things.

Cultural Resources

Kevin discussed Puʻu Poliʻala. He shared that there is rock with a plaque on it near the puʻu. Kevin shared that a random guy was the one who made the plaque and placed the rock there after he learned ʻike from his papa and father.

Kevin shared that he was taught that in traditional times the poi from Poliʻala was extra sweet and was the only poi royalty would eat. He said that Poliʻala is a sacred place and that is what made the poi so good. He shared that his father had a dream about Poliʻala and when he woke up he started to write lyrics to a song that was long forgotten called, "Wailele Waiʻehu." His dad wrote two verses from his dreams of Poliʻala.

Traditions and Customs

Kevin shared that when he was growing up his grandparents called Waiʻehu "Waiʻahu." He grew up calling that place Waiʻahu. Kevin discussed going into the mountains with his grandparents and how his grandmother taught him certain protocols to follow while exploring in the mountains. She taught him not to just go into certain places, like caves or forests, without first stating your family name and why you are there. He was taught to never take things from the mountains without permission and to always take ti leaf with him for protection. His grandmother told him not to swim in any ponds or pools if the water was swirling or moving becuase that meant there was a moʻowahine in the water. Kevin discussed that he was taught before things are cut or taken down, you have to follow certain protocols, like asking permission and stating your intentions.

Impacts

Kevin Brown shared that when he was growing up the project area and surrounding areas were mostly bare cane fields. He does not feel that the project would impact any cultural resources in the area.

Mitigation Measures and Recommendations

Kevin did not have any recommendations for mitigation measures.

VI. Impact Assessment

A. Impacts to Flora

Impacts to the built environment will largely be covered by the HRS 6E documents. Upon discovery of archaeological features, appropriate action should be taken to mitigate impacts to those features. The biological assessment did not identify flora resources of concern.

The project must also be mindful of its water consumption and ensure that its usage does not exceed the sustainable yield for any of the aquifers that it is drawing water from, as overuse of water can potentially impact mauka activities and practices such as kalo farming.

B. Impacts to Fauna

There is unlikely to be any impacts to candidate, threatened, or endangered fauna over the course of this project based on the biological assessment. Nonetheless, the project should make an effort to plant native fauna in their landscaping to repopulate the area with indigenous, endemic, and native species within the project area.

C. Impacts to Historic Sites

Impacts to historic sites and properties are being assessed by SCS in the HRS 6E Compliance documents. Should there be a potential for encountering iwi kūpuna (ancestral remains), cultural monitors should be utilized, as recommeded by Maxwell. Cultural monitors should be properly qualified lineal or cultural descendants from the area. Considering the heightened sensitivity regarding historic properties and iwi kūpuna on Maui and in this region, the project would be well-advised to ensure a thorough archaeological assessment is prepared and that the assessment is approved by the State Historic Preservation Division prior any ground-disturbing activities.

D. Impacts to Intagible Cultural Resources

Intangible cultural resources refer to those resources without physical form, such as hula or mele. As there are no known or identified cultural practices currently taking place on the property and the property has been heavily disturbed, it is unlikely the proposed activities would adversely impact intangible cultural resources on the property or in adjacent areas.

E. Impacts to Cultural Practices

It is unlikely that the project would adversely impact any cultural practices as the area has been heavily developed and no cultural practices are known to currently take place in the area or benefit from resources that exist on the project property.

Cultural practices do occur in the nearby geographic extent, specifically kalo farming. With proper conditions and BMPs, discussed below, it is unlikely the project would have any impact, direct, indirect, or cumulative, on these activities.

F. Cumulative and Indirect Impacts

Adverse cumulative and indirect impacts to cultural resources are often overlooked in CIAs, as they are difficult to assess. Cumulative impacts are cultural impacts that result from the incremental impacts of an activity when added to past, present, and reasonably foreseeable future actions and activities. Indirect impacts are impacts on cultural resources which are not a direct result of the project, but a secondary or tertiary result of the project. It is currently not anticipated that the project will have any cumulative or indirect impacts. Furthermore, it is critical that the project not result in any action, direct, indirect, or cumulative, that would potentially lead to a violation of the agreement reached between the families and farmers who use Nā Wai ʻEha (Waiheʻe River, Waiehu, ʻIao, and Waikapu streams, in part or in whole) and the state regarding the Interim Instream Flow Standards (IIFS) of these streams.

G. Mitigation and Best Management Practices

In the 2004 CIA, Kahu Maxwell recommended full-time monitoring “in the areas where Kahekili Highway runs parallel to the project site, 100 meters inward toward the mauka / Wailuku direction from Lower Waiehu Stream.” That recommendation is still appropriate today and for this project.

VII. Conclusion

Waiehu is rich with both pre-contact and post-contact histories. In applying *Ka Paʻakai*, no cultural, historical, or natural resources have been identified in the project area and no traditional or customary Native Hawaiian rights are currently exercised in the project area, although some customary practices do continue in the larger geographic extent of Wailuku. It should be emphasized that while there are no traditional or customary practices occurring directly within the project area, there remains a vibrant, active cultural in the surrounding area, particularly kalo farmers. Therefore, the project should take appropriate steps to ensure that its resource usage does not adversely impact these individuals, groups, or practices. While the project is unlikely to have any direct, indirect, or cumulative adverse impact on pre-contact historic properties or Hawaiian cultural practices, it would be well-advised to carefully monitor its water usage during development and operation to ensure that it does not exceed the water usage projected in its environmental assessment and impact surrounding kalo farmers and practitioners. The project also has an opportunity to enrich the area through interpretive botanical, cultural and historical programs. The project should also take appropriate steps with area experts on proper naming practices and landscaping.

A. Use of Native Plants

In the previous CIA written by CKM Cultural Resources, LLC, Maxwell recommended using native plants throughout the project area. In the previous CIA, Maxwell identified the following plants:

- Kalo
- ʻUlu
- Pili grass
- Wiliwili
- Pāʻū o Hiʻiaka
- ʻAʻaliʻi
- Huehue
- ʻIliahi

Additionally, the following plants may be possible for landscaping:

Kukui

Kukui, *Aleurites moluccana*, or candlenut trees are a Polynesian-introduced species. Kukui played a significant role regarding wearing apparel and accessories of the

ancient Hawaiians. The most popular usage of kukui is in lei kukui, the best-known lei hua (lei made from seeds and nuts). Each nut is sanded down, polished, punctured on the ends, has the inner meat removed, and then strung on a cord. The nuts are typically polished with a piece of tapa dipped in kukui-nut oil, and the finest lei kukui continue to consist of hand polished nuts. Kukui contributed to the dye used for kapa, as the fruit husk produces grayish/beige dye, the inner bark trunk produces brownish red dye, and the inner bark root produced reddish brown dye. Black dye was also produced by roasting kukui nuts and grinding them into a powder, which was then mixed with kukui oil and applied to the kapa until the color penetrated every fiber. The ancient Hawaiians applied a technique of painting kapa that involved a charcoal bag consisting of piece of kapa filled with roasted and ground kukui nuts, and the "bag" was brushed over the surface of kapa to produce a grayish coloring. In addition to clothes, kukui nuts were also used in tattoos. The charcoal of the kukui nut and the kukui fruit juice created black pigmentation, and the ancient Hawaiians expressed grief by tattooing a black spot or line on the tongue with a bamboo sliver dipped in these kukui concoctions. Kukui is also a prized canoe plant, brought over by Polynesians who first migrated to Hawaiʻi hundreds of years ago. Canoes would be carved from the trunks of these trees.

Maʻo

Maʻo, *Gossypium tomentosum*, also known as Hawaiian Cotton, is an endemic shrub and vulnerable species in the islands. This coastal plan blooms a beautiful bright yellow flower throughout the year. Used for both seed and flower lei traditionally, one of the most important cultural uses of maʻo was as a dye utilized by traditional kapa (barkcloth) makers. The leaves of the maʻo plant would be utilized to make a green dye to decorate and adorn the kapa. Kapa continues to be made by master practitioners throughout Hawaiʻi today.

Pōhinahina

Pōhinahina, *Vitex rotundifolia*, is an indigenous sprawling shrub with small purple flowers and silvery-green leaves that were traditionally used to protect kapa from insects. The flower gives off a gentle, pleasing scent. The flowers and leaves from this plant can be used to create lei poʻo (head lei).

Naupaka

The naupaka, *Scaevola taccada*, is a distinct and storied indigenous shrub in Hawaiʻi. If you look closely at the naupaka, all the flowers appear to be only half of a flower. This is because according to traditional Hawaiian legend, the naupaka comes from the

story of two young lovers. These two young lovers were deeply devoted to each other, yet the man attracted the attention of the volcano goddess, Pele. When the man refused Pele's advances, she chased him to the mountains, where she threw fire at him. She then chases his female lover into the sea. Taking pity on the couple, Pele's sisters stepped in and transformed the man into the mountain naupaka, its flowers only growing half a flower, and the woman into the coastal naupaka. The two half flowers are said to represent the young couple.

Naiʻo

Naiʻo, *Myoporum sandwicense*, is an endemic tree or shrub, also commonly known as false sandalwood. It is known to sometimes have a pleasantly spicy sandalwood-like fragrance that emanates from its delicate, small, white-pink flowers. A particularly hard wood, traditionally the wood of the naiʻo tree would be used in the building of traditional hale (homes) for the posts, rafters, or frames. It also was used to create netting for fishing.

Loulu

Loulu, *Pritchardia spp.,* are native single trunked palm trees. The trees are identifiable by their fan-shaped leaves. The wood from taller species were hard enough to fashion into spears by Hawaiians in traditional times. The fruit of the tree, known as hāwane, were gathered by climbing notches on the tree. Once gathered, the young fruits were peeled and enjoyed, as the interior of the fruit are similar to coconuts. The fronds of the tree, known as lau hāwane, were woven by practitioners to fashion fans or papale (hats). It is even said that one species of loulu would be used customarily for a traditional sport similar to hand gliding!

Hala

Another prized canoe plant, hala, *Pandanus tectorius*, produces sturdy leaves of the were used to make sails and kaula (cordage) for traditional waʻa (canoes). The leaves contined to be widely used by practitioners to fashion hats, mats, bags, and jewelry. The fruit of the tree is pulled apart to make beautiful lei, mostly for special occasions. These lei are symbols of significant transitions and are given with great intention. The seeds and fruit are eligible, and traditional the fruit was known for its medicinal properties. The roots of the tree also had numerous medicinal properties.

Kamani

Kamani, *Calophyllum inophyllum*, is a tree valued for its hard, dark wood. The kamani wood has long been used for calabashes or bowls. Many poi bowls were fashioned out of kamani. The flowers give off a gentle orange scent and have been used to scent kapa. This versatile tree was also used for oil and perfumes. The nut from the tree would also be made into a whistle as used as a traditional instrument.

B. *Ka Pa‘akai* Analysis

Based on the guidelines set forth in *Ka Pa‘akai*, the Hawai‘i Supreme Court provided government agencies an analytical framework to ensure the protection and preservation of traditional and customary Native Hawaiian rights while reasonably accommodating competing private development interests. This is accomplished through:

1) The identification of valued cultural, historical, or natural resources in the project area, including the extent to which traditional and customary Native Hawaiian rights are exercised in the project area;
2) The extent to which those resources—including traditional and customary Native Hawaiian rights—will be affected or impaired by the proposed action; and
3) The feasible action, if any, to be taken to reasonably protect Native Hawaiian rights if they are found to exist.

This assessment thoroughly identified valued cultural, historical, and natural resources in the project area and an appropriate, larger geographic extent, including the extent to which traditional and customary Native Hawaiian rights are exercised in the project area. The study concludes that while there are no resources in the direct project area, there are resources in the larger geographic extent. They have been discussed in the Impact Assessment in Section VI. Also included in the Impact Assessment section is a thorough assessment of the extent to which the identified resources and practices, including traditional and customary Native Hawaiian rights, may potentially be affected or impaired by the proposed action.

Based on this extensive identification effort and thorough analysis, which included interviews with a number of cultural experts and area practitioners, there is a negligible potential for the project to have a direct, adverse impact on valued cultural, historical, or natural resources in the project area or larger geographic extent. Additionally, there is a negliable potential for the project to have a direct, adverse impact on traditional or customary Native Hawaiian rights in the project area or in the larger geographic extent, largely in part to the extensive commercial agricultural use of the project area for over 100 years. It is unfortunate, but any cultural practices that may have not occurred in the project area or surrounding area were likely discontinued after the land was taken by foreign companies for plantation use. Cultural resources that may have once existed in the project area were likely irreparably destroyed by decades of agricultural use. Any potential for an adverse indirect or cumulative impact in the larger geographic extent can be minimized through the conditions and BMPs recommended herein, some of which have already been embraced by the applicant and integrated into the project design. These conditions and BMPs constitute feasible action that may be reasonably taken to protect Native Hawaiian rights and cultural rights in the larger geographic extent.

Additionally, based on the imput of practitioners interviewed for this assessment, the project redesigned the landscaping and design themes to better integrate native plants, Hawaiian-inspired motifs, and other design elements to honor Maui's unique cultural heritage while focusing on the place-based history of Waiehu. The purpose of these efforts is to honor and respect the culture of the area while utilizing an opportunity to educate visitors about native culture, history, and flora.

C. Conclusion

While there are currently no known cultural resources or cultural practices occurring within the boundaries of the project area, the project should nonetheless embrace all opportunities to honor both the traditional history and modern history of the region, which the local residents of Maui take great pride in perpetuating. To this end, the project is urged to continue to work closely with area practitioners and cultural experts. The Hawaiian culture remains a thriving living culture in the larger Wailuku area and there are numerous practitioners, organizations, and initiatives that would add value to this housing project.

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Appendix I: Glossary of Hawaiian Terms

The following list of terms were used throughout this report. All definitions were compiled using Pukui and Elbert's *Hawaiian Dictionary* (1986).

Ahupuaʻa	Land division usually extending from the uplands to the sea, so called because the boundary was marked by a heap (ahu) of stones surmounted by an image of a pig (puaʻa), or because a pig or orther tribute was laid on the altar as tax to the chief.
ʻĀina	Land, earth.
Akua	1. God, goddess, spirit, ghost. 2. Divine, supernatural, godly.
Ala	Path, road, trail.
Aliʻi	1. Chief, chiefess, ruler, monarch. 2. Royal, regal. 3. To act as chief, reign.
ʻAumakua	Family or personal gods, deified ancestors who might assume the shape of sharks, owls, hawks, dogs, plants, etc. A symbiotic relationship existed; mortals did not harm or eat them, and the ʻaumakua warned or reprimanded mortals in dreams, visions, and calls.
ʻAumākua	Plural of ʻaumakua.
ʻAuwai	Irrigation ditch, canal.
Haku mele	Poet, composer; to compose song or chant.
Hālau	1. Long house, as for canoes or hula instruction; meeting house. 2. Large, numerous; much.
Hale	House, building, institution, lodge, station, hall.
Hale pili	House thatched with pili grass.
Heiau	Pre-Christian place of worship, shrine. Some heiau were elaborately constructed stone platforms, other simple earth terraces.
Hula	A Polynesian dance form accompanied by chant or song.
ʻIli	Land section, next in importance to ahupuaʻa and usually a subdivision of an ahupuaʻa.
ʻIli kūpono	A nearly independent ʻili land division within an ahupuaʻa, paying tribute to the ruling chief and not to the chief of the ahupuaʻa. Transfer of the ahupuaʻa from one chief to another did not include the ʻili kūpono located within its boundaries.
Iwi	Bone, carcass. The bones of the dead, considered the most cherished possession, were hidden, and hence there are many figurative expressions with iwi meaning life, old age.
Kalo	Taro (*Colocasia esculenta*), a kind of aroid cultivated since ancient times for food, spreading wildly from the tropics of the Old World. In

	Hawaiʻi, taro has been the staple from earliest times to the present, and here its culture developed greatly, including more than 300 forms. All parts of the plant are eaten, its starchy root principally as poi, and its leaves as lūʻau.
Kanaka	Human being, man, person, individual, party, mankind, population.
Kānaka	Plural of kanaka.
Kāne	Male, husband, male sweetheart, man; brother-in-law of a woman.
Kanikau	1. Dirge, lamentation, chant of mourning, lament. 2. To chant, wail, mourn.
Kapu	1. Taboo, prohibition. 2. Special privilege or exemption from ordinary taboo. 3. Sacredness, prohibited, forbidden, sacred, holy, consecrated. 4. No trespassing, keep out.
Kuleana	Right, privilege, concern, responsibility, title, business, property, estate, portion, jurisdiction, authority, liability, interest, claim, ownership, tenure, affair, province.
Kumu	Teacher, tutor, manual, primer, model, pattern.
Kumu hula	Hula teacher.
Kupuna	Grandparent, ancestor, relative or close friend of the grandparent's generation, grandaunt, granduncle.
Kūpuna	Plural of kupuna.
Limu	A general name for all kinds of plants living under water, both fresh and salt, also algae growing in any damp place in the air, as on the ground, on rocks, and on other plants; also mosses, liverworts, lichens.
Loʻi	Irrigated terrace, especially for taro, but also for rice and paddy.
Loko iʻa	Traditional Hawaiian fishpond.
Lua	A type of dangerous hand-to-hand fighting in which the fighters broke bones, dislocated bones at the joints, and inflicted severe pain by pressing on nerve centers. There was much leaping, and (rarely) quick turns of spears. Many of the techniques were secret. Lua holds were named. Lua experts were bodyguards to chiefs.
Mahi ʻai	Farmer, planter; to farm, cultivate; agricultural.
Makai	On the seaside, toward the sea, in the direction of the sea.
Māla	Garden, plantation, patch, cultivated field, as māla ʻai, māla kalo, māla kō, māla kūlina.
Mālama	To take care of, tend, attend, care for, preserve, protect, beware, save, maintain.
Manaʻo	Thought, idea, belief, opinion, theory, thesis, intention, meaning, suggestion, mind, desire, want; to think, estimate, anticipate, expect, suppose, mediate, deem, consider.

Mauka	Inland, upland, towards the mountain.
Mele	1. Song, anthem, or chant of any kind. 2. Poem, poetry. 3. To sing, chant.
Mele mākaʻikaʻi	Travel chant.
Mōʻī	King, sovereign, monarch, majesty, ruler, queen.
Moku	1. District, island, islet, section, forest, grove, clump, fragment. 2. To be cut, severed, amputated, broken in two.
Moʻo	Lizard, reptile of any kind, dragon, serpent.
Moʻolelo	Story, tale, myth, history, tradition, literature, legend, journal, log, yard, fable, essay, chronicle, record, article.
Moʻowahine	Female lizard deity.
Nīʻau-piʻo	Offspring of the marriage of a high-born brother and sister, or half-brother and half-sister.
ʻOhana	Family, relative, kin group; related.
ʻŌlelo noʻeau	Proverb, wise saying, traditional saying.
Oli	Chant that was not danced to, especially with prolonged phrases chanted in one breath, often with a trill at the end of each phrase; to chant thus.
ʻŌʻō	Digging stick, digging implement, spade.
Pae ʻāina	Group of islands, archipelago.
Piʻo	Marriage of full brother and sister of nīʻaupiʻo rank, presumably the highest possible rank. Their offspring had the rank of naha, which is less than piʻo but probably more than nīʻaupiʻo. Later piʻo included marriage with half-sibling.
Pueo	Hawaiian short-eared owl (*Asio flammeus sandwichensis*), regarded often as a benevolent ʻaumakua.
Wai	Water, liquid or liquor of any kind other than sea water.
Wahi pana	A sacred and celebrated/legendary place.
Wahine	Woman, lady, wife; sister-in-law, female cousin-in-law of a man.
Wao	1. Realm. 2. A general term for inland region usually forested but not precipitous and often uninhabited.

Appendix 8

Market Study

MARKET AND PRODUCT EVALUATION, IMPROVED LOT AND LAND VALUATION, AND HIGHEST-AND-BEST-USE DETERMINATION FOR WAIEHU ON MAUI, HAWAII

(DRAFT)

AUGUST 2021

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STATEMENT OF PURPOSE

Tuesday, July 20, 2021

Brad Cook
GENOVA CONSTRUCTION DEVELOPMENT
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Dear Brad:

This report presents methods and advisory services applied to regional and site-specific examinations and forecasts as it pertains to the envisioned Waiehu master plan on the island of Maui, Hawaii. The report presents a summary of how economic, socio-economic and demographic factors are examined and applied to the master plan to generate the requested supportable product segments, pricing structures and absorption potential for Waiehu. The report includes a determination of highest and best uses in both for-sale and for-rent product formats, such that the highest return on investment is generated. The report accounts for all restrictions associated with a 100% Workforce Housing community.

Brad, thank you for employing my services. I look forward to formally presenting this report to you and your team. Please call me at your convenience with any questions or concerns.

Best Wishes,

Mark Boud
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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

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This section provides a brief summary and conclusions associated with all recommendations presented in this report.

- The Maui economy is dominated by Accommodation and Food Service jobs. Despite the pandemic-related devastation to this sector, Years 2021 and 2022 are likely to be banner post-pandemic job growth years, with enormous positive pressures on Trade, Transportation and Tourism-related jobs. In addition, health-related jobs, anchored by Maui Memorial Medical Center (pictured below) are likely to expand. This hospital is within close proximity of the site and will positively influence demand for housing at the site from local medical professionals.

- Employment was severely disrupted in Maui County as the economy shut down in March-May, 2020. Almost 30,000 jobs were lost in March through May, leading to an astounding 32.9% unemployment rate in April 2020. This region was hit especially hard due to exposure to those industries (Leisure/Hospitality, Trade, Entertainment) which were hit hard by the pandemic. A total of 12,805 jobs were regained from June through December, dropping the unemployment rate to 13.4%. A partial V-shaped rebound in jobs has been manifest. A new government cash infusion has begun which has contributed to holding up the rental market, but YTD job growth has been slow until June. During June and July, the Maui economy has surged as the partial lifting of restrictions has caused a record level of visitors. This surge is likely to continue, boosting the Maui economy to full recovery mid-2022, and strong growth projected to continue through Year 2025 due to the continued recovery, age migration patterns, increased discretionary income and projected strong national economic growth due to infrastructural and other public spending.

- Mortgage rates have reached all time lows. During 3rd quarter 2021, 30-year fixed rates have remained well below 3.0%. For the new home market, that translates to an average drop in monthly mortgage costs of 11.5% from the assumed 4.5% fixed rate reached in Year 2019. Going forward, there will be a bias toward rising rates as unprecedented increases in the money supply eventually causes inflation. Indeed, there is an increasing risk of hyper-inflation due to the influx of cash, high national debt loads and government instability, and this longer-term hyper-inflation will lead to higher mortgage rates. There is danger to even a mild increase in mortgage rates, as it will cause existing home sales volume to slow as more homeowners stay in place to preserve their historically low fixed rate. The result is less competition for new home sales, but also less generation of buyers who are dependent upon equity rollover, and there is increasing risk of a downward price correction commensurate with rising rates. The entry level market is not as sensitive to increases in mortgage rates because they do not have a low fixed rate loan already in place. These entry-level buyers are also apt to choose an adjustable rate mortgage as rates rise. Smaller, entry-level housing (including attached housing) should dominate the product profile at the subject community.

- The median price of condominiums for the entire island was $635,000 in June – 26.2% higher than June 2020. for single-family sales, the median was $1,117,500 – an astounding 44.5% higher than the year previous. These averages reflect the impact of a greater share of resort sales, but also the intense pricing pressures that currently exist on the island. An indication that price appreciation will continue at a high level in the near-term is the enormous drop in inventory. Single-family housing inventory has dropped by 46.4% during the past 12 months, while Condo/Townhome inventory has dropped by 69.8%. Extremely low levels of inventory are likely to continue as a combination of high demand and very little housing construction continue to deplete housing inventory levels.

EXECUTIVE SUMMARY (cont.)

For purposes of this report, a total of 9 for-sale product lines were set forth, with an additional 5 product lines explored in for-rent formats. The product assumptions and densities set forth by WHA were employed as general guidelines to the recommended product definitions but were then expanded to more effectively take advantage of Workforce Housing restrictions. Product type, unit size, mix, market-supported prices and rents, restricted prices and rents, layout characteristics, densities and targeted absorption rates are presented in the report and summarized on the table below:

Category	3-Sty Walk-up Stacked Flat	Flats/Towns	Townhomes 26'x55'	Duplex 30'x55' Lot	Motorcourt 36'x60' Lot	Bungalow 40'x72' Lot	SFD 42'x80' Lot	SFD 45'x90' Lot	SFD 50'x100' Lot Mulit-gen	Rental 3-Sty Walk-up Stacked Flat	Rental Flats/Towns	Rental Townhomes	Rental Motorcourt 36'x60' Lot	Rental Bungalow 40'x72' Lot
Product Assumptions														
Restricted Price 100% AMI Rent 50% AMI	$375,803	$425,752	$560,316	$580,139	$607,890	$607,890	$607,890	$607,890	$607,890	$1,019/mo.	$1,129/mo.	$1,305/mo.	$1,391/mo.	$1,669/mo.
Restricted Price 120% AMI Rent 100% AMI	$451,011	$510,956	$672,358	$696,144	$729,445	$729,445	$729,445	$729,445	$729,445	$2,038/mo.	$2,259/mo.	$2,608/mo.	$2,781/mo.	$2,781/mo.
Restricted Price 140% AMI Rent 120% AMI	$526,219	$596,160	$784,506	$812,260	$851,115	$851,115	$851,115	$851,115	$851,115	$2,445/mo.	$2,710/mo.	$3,130/mo.	$3,337/mo.	$3,337/mo.
Recommended Market Price (Avg.)	$273,700	$340,625	$435,847	$512,110	$622,555	$752,355	$899,885	$1,053,190	$1,363,005	$1,749/mo.	$1,994/mo.	$2,292/mo.	$2,809/mo.	$2,964/mo.
Options Revenue (2.5% to 10%)	$13,700	$17,000	$21,800	$38,400	$62,300	$75,200	$90,000	$105,300	$136,300	$40/mo.	$50/mo.	$60/mo.	$70/mo.	$70/mo.
Lower of Restricted vs. Market Price	**$287,400**	**$357,625**	**$457,647**	**$550,510**	**$684,855**	**$827,555**	**$851,115**	**$851,115**	**$851,115**	**$88,446**	**$328,296**	**$400,368**	**$506,298**	**$541,752**
Home Square Footage	696sf	884sf	1,095sf	1,208sf	1,408sf	1,631sf	1,881sf	2,120sf	2,585sf	721sf	884sf	1,095sf	1,408sf	1,631sf
Typical Density	32.0/acre	18.0/acre	14.5/acre	11.5/acre	10.0/acre	8.3/acre	7.1/acre	5.9/acre	4.8/acre	32.0/acre	18.0/acre	14.5/acre	10.0/acre	8.3/acre
Saleable/Leaseable SF/Acre	22,280sf	15,908sf	15,878sf	13,886sf	14,075sf	13,570sf	13,414sf	12,541sf	12,386sf	23,086sf	15,908sf	15,878sf	14,075sf	13,570sf
Monthly HOA	$391/mo.	$429/mo.	$474/mo.	$173/mo.	$120/mo.	$130/mo.	$146/mo.	$157/mo.	$180/mo.	$0/mo.	$0/mo.	$0/mo.	$0/mo.	$0/mo.
Monthly Absorption	4.0/mo.	3.0/mo.	1.9/mo.	2.3/mo.	2.0/mo.	1.8/mo.	1.5/mo.	1.3/mo.	1.0/mo.	8.4/mo.	10.0/mo.	6.0/mo.	6.0/mo.	4.0/mo.

Much more detail regarding these recommendations are provided in the body of the report. These recommendations generally position each product line between or slightly below the local market area's attached housing price line and single-family housing price line. The market rate prices and rents are calibrated to the monthly absorption targets shown at the bottom of the table. The restricted pricing and rents shown are those required for Workforce Housing. The targeted absorption rates combine with pricing/rental rate recommendations and residual land values shown on the following page to determine the community's highest and best residential uses in terms of mix. It is this 'optimized' mix that generates the highest return on investment for the client.

EXECUTIVE SUMMARY (cont.)

The table below presents the optimized land plan as it pertains to a maximum net residential acreage estimate of 89.7 acres. As shown the optimized land plan develops all available acres and a total of 1,174 homes. This mix also conforms with the 30% BMI/80% BMI+MI constraint, leaving 20% of the mix for AMI product. As shown, all rental product lines are excluded from the mix due to the severe losses caused by the 50% **Very Low Income** rental constraints, but the for-sale mix is expanded to include higher density product that more effectively takes advantage of Workforce Housing constraints. This optimal mix generates a net present value that exceeds the WHA land plan by $15.421mm or 26.7%. The optimized mix also reduces the absorption window, and it produces less exposure to a single product segment. The result is a more balanced approach that translates to reduced risk and a significantly higher yield. Given these considerations, it is recommended that WHA's currently proposed product mix be revised toward the optimized mix as much as possible, resulting in the aforementioned benefits.

Product Type	Product Description	Highest & Best Product Mix: Mix	% Mix	Acres	Average Home Size	Total Price	Density (DU/Acre)	Target Sales	Years to Sell	Total Value Estimate: Total ($000)	Per Acre	Per Lot	Present Value Estimate: Total ($000)	Per Acre	Per Lot
OPTIMIZED MIX WITH RESTRICTED PRICING															
100%	3-Sty Walk-up Stacked Flat	287	24%	9.0	696sf	$287,400	32.0/acre	48/yr.	8.0 yrs.	$11,593	$1,294,413	$40,450	$6,513	$727,274	$22,727
100%	Flats/Towns	195	17%	10.8	884sf	$357,625	18.0/acre	36/yr.	6.4 yrs.	$12,758	$1,178,128	$65,452	$7,850	$724,874	$40,271
100%	Townhomes 26'x55'	111	9%	7.7	1,095sf	$457,647	14.5/acre	23/yr.	7.0 yrs.	$9,019	$1,173,776	$80,950	$5,376	$699,608	$48,249
100%	Duplex 30'x55' Lot	165	14%	14.3	1,208sf	$550,510	11.5/acre	27/yr.	7.1 yrs.	$18,721	$1,304,786	$113,460	$11,055	$770,461	$66,997
120%	Motorcourt 36'x60' Lot	181	15%	18.1	1,408sf	$684,855	10.0/acre	24/yr.	7.5 yrs.	$27,559	$1,523,319	$152,332	$15,874	$877,444	$87,744
140%	Bungalow 40'x72' Lot	155	13%	18.6	1,631sf	$827,555	8.3/acre	21/yr.	7.4 yrs.	$30,775	$1,651,696	$198,551	$17,889	$960,098	$115,414
140%	SFD 42'x80' Lot	80	7%	11.2	1,881sf	$851,115	7.1/acre	18/yr.	4.4 yrs.	$12,260	$1,096,610	$153,794	$8,517	$761,829	$106,843
140%	SFD 45'x90' Lot	-	-	-	2,120sf	$851,115	5.9/acre	15/yr.	0.0 yrs.	$0	$500,238	$84,563	$0	$0	$0
140%	SFD 50'x100' Lot Mulit-gen	-	-	-	2,585sf	$851,115	4.8/acre	12/yr.	0.0 yrs.	$0	($220,476)	($46,013)	$0	$0	$0
50%	Rental 3-Sty Walk-up Stacked Flat	-	-	-	721sf	$88,446	32.0/acre	101/yr.	3.0 yrs.	$0	($2,752,266)	($86,008)	$0	$0	$0
100%	Rental Flats/Towns	-	-	-	884sf	$328,296	18.0/acre	120/yr.	4.0 yrs.	$0	$1,060,040	$58,891	$0	$0	$0
100%	Rental Townhomes	-	-	-	1,095sf	$400,368	14.5/acre	72/yr.	2.0 yrs.	$0	$965,253	$66,569	$0	$0	$0
120%	Rental Motorcourt 36'x60' Lot	-	-	-	1,408sf	$506,298	10.0/acre	72/yr.	2.0 yrs.	$0	$792,764	$79,276	$0	$0	$0
120%	Rental Bungalow 40'x72' Lot	-	-	-	1,631sf	$541,752	8.3/acre	48/yr.	2.0 yrs.	$0	$492,081	$59,153	$0	$0	$0
	Overall	1,174	100%	89.7	1,004sf	$463,721	13.1/acre	636/yr.	8.0 yrs.	$122,684	$1,138,459	$93,669	$73,073	$814,458	$62,266
	30%+ BMI	758	65%	41.8	687sf	$295,791	18.1/acre	224/yr.	8.0 yrs.	$52,091	$4,951,104	$300,312	$30,793	$2,922,216	$178,243
	80% MI+BMI	939	80%	59.9	826sf	$370,763	15.7/acre	276/yr.	7.5 yrs.	$79,650	$6,474,422	$452,644	$46,667	$3,799,660	$265,988
	20% AMI	235	20%	29.8	1,716sf	$835,557	7.9/acre	360/yr.	7.5 yrs.	$43,034	$3,028,067	$390,896	$26,406	$1,721,927	$222,257
			Units	Acres						Increase in Present Value with Optimized Mix			$15,421	$193,478	-$14,398
	Parameters		752 du	89.7 ac									26.7%	31.2%	-18.8%
	Assumed Discount Rate:			15.0%											

Note: Assumes 1Q'24 market entry.
Source: Real Estate Analytics

SITE REVIEW AND LOCAL/REGIONAL ECONOMIC AND MARKET SUMMARIES

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SITE AND GENERAL AREA DESCRIPTION

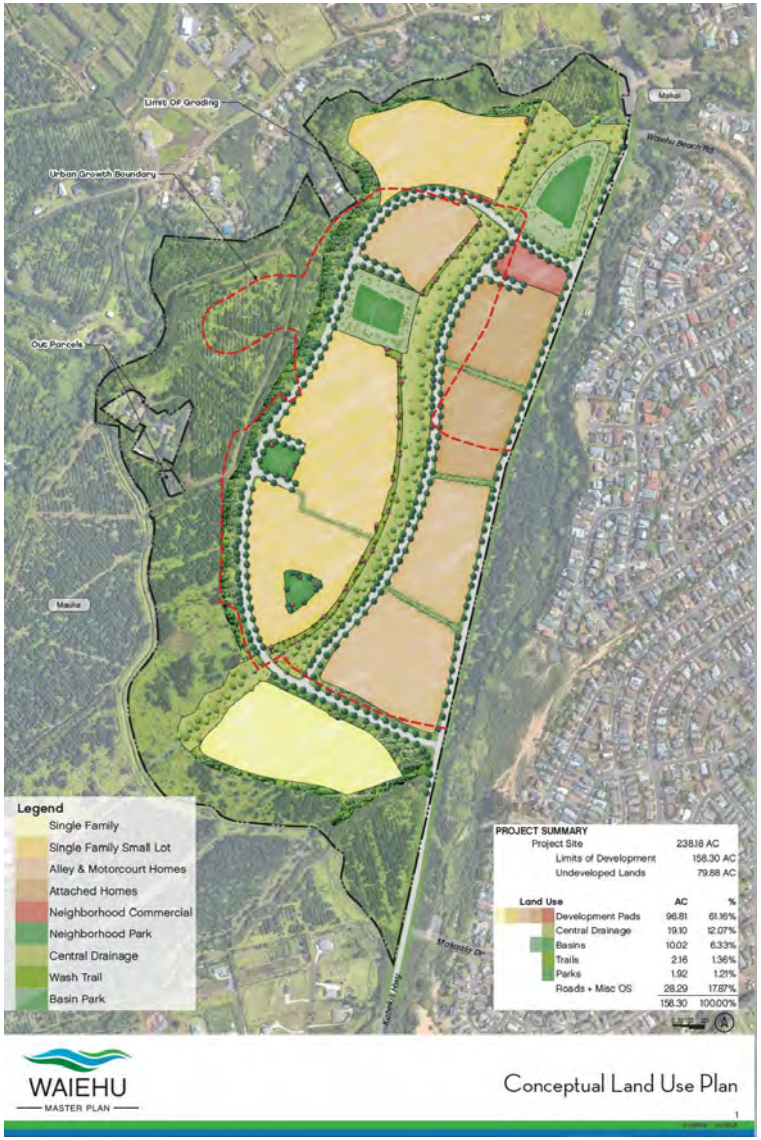
The map and illustration to the right and the table below set forth the general land plan constraints and acreage allotment for Waiehu:

Development Pads	96.81	61.16%
Central Drainage	19.10	12.07%
Basins	10.02	6.33%
Trails	2.16	1.36%
Parks	1.92	1.21%
Roads + Misc OS	28.29	17.87%
	158.30	100.00%

As shown, approximately 97 acres are designated for development at various densities and product types, including a small commercial pad. Though the site area is generally flat, there is some elevational gains from west to east and from north to south. Kahekili Hwy is generally below grade on both sides. From Kahekili Hwy, tall grasses and a high berm give way to thick vegetation and trees, including occasional tall pines. The interior of the site is generally heavily wooded, with at least one dry streambed and occasional openings in the brush.

Ocean views are likely evident from the highest elevations of the site, generally, areas currently designated for single-family development along the eastern side of the open space corridor, on the mauka side of the development.

Overall, the site area is highly appealing, appears to be readily developable, and is effectively situated relative to local services, shopping and job centers.



SITE AND GENERAL AREA DESCRIPTION (cont.)

The subject site is generally surrounded by lower density residential uses, agriculture and foothill flora. North of the site, along Malaihi Road, are older residential parcels – many in poor condition and many with agricultural overlays. Directly east of the site are overgrown hillsides leading to foothills and coastal tropical mountains. South and southeast of the site are lower density DHHL homesteads – many with agricultural overlays, and some offering new and impressive architecture and design. To the west is Waiehu Terrace – a large subdivision of single-family homes which began development in the early 1990s.

Wailuku Town Center, located approximately 1.0 mile southwest of the site, offers the nearest neighborhood shopping, with a Sack-N-Save, several ethnic markets, eateries, shops and services. Foodland and Safeway neighborhood centers are located along Main Street and High Street, a short distance south of the site.

The appealing and well-established master plans of Kehalani and Maui Lani are located a short distance to the south. Kehalani is generally located in the foothills, with appealing territorial, ocean and mauka views. Maui Lani is golf-oriented and is located nearer to flat, basin land. Both master plans are well established and currently offer actively selling neighborhoods by Towne Hawaii, with DR Horton and Stanford Carr also being recently active.

Main job centers in Wailuku and Kahului are within a short distance of the site.

Wailuku Elementary School, Iao Intermediate School and Baldwin High School are all located in Wailuku, a short distance south of the site. All schools post only average or below average performance scores. Private schools, including Kamehameha Schools, are located within a convenient distance from the site.

The Kahului Airport is located about 7.0 miles southwest of the site, approximately a 20-minute drive.

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PRELIMINARY LAND PLAN BY WHA

A preliminary concept for the master plan, provided by WHA, is shown to the right and summarized below:

Residential Land Use Summary

Typology	Description	Lot Size	Lot SF	SF Range	DU/ AC	DU	AC	Product %
Townhomes	2 Story with Garages	26 x 55	1430	1050 - 1200	14.2	108	7.60	14.36%
Duplex	2 Story w/ car ports	30 x 55	1650	1100 - 1300	11.4	76	6.68	10.11%
Motorcourts	Drive Alley / yards	36 x 60	2160	1500 - 2000	11.6	126	10.85	16.76%
Bungalow	Alley Homes	40 x 80	3200	1400 - 1700	10.5	134	12.73	17.82%
SFD Small Lot	SFD Front Load	42 x 80	3360	1800 - 2100	6.3	149	23.81	19.81%
SFD Small Lot	SFD Front Load	45 x 90	4050	2100 - 2500	6.3	101	15.97	13.43%
SFD Lot	SFD Front Loaded	50 x 100	5000	2400 - 3000	4.8	58	12.08	7.71%
						752	89.72	100.00%

As shown, this preliminary plotting generates 752 homes on 89.72 acres. The plan generates lot sizes/densities commensurate with affordable product – generally in attached and high-density detached formats. These concepts are not necessarily new to the island, having been implemented or planned for select parcels at Kamalani, Kehalani, Maui Lani and select other locations on Maui.

Densities and unit counts for Waiehu could obviously be increased beyond that shown above via implementation of 3-story walk-up condominiums or apartments, and this concept in for-sale and for-rent formats is explored in the report in terms of viability, land value and yield.

With some variation, all of the above product concepts are 'tested' in terms of viability, unit size, home characteristics, price, density, etc. in the comparative land valuation analysis and Highest-and-Best-Use analysis for Waiehu. The result is a mix of product concepts by unit count that ensures the highest return on investment for the client.

THE KAHULUI-WAILUKU-LAHAINA, HI CBSA (MAUI) ECONOMY

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The Maui economy is dominated by Accommodation and Food Service jobs, but this share is declining over time – from about 30% of all jobs in Year 2000 to a current estimated share of 26%. Trade (both Wholesale and Retail) remains at about 15.5% of the job base, with Government representing a stable 13.5% of all jobs. Professional and Business Service jobs are growing (about 9.5% of jobs) and Healthcare is growing (about 7.5% of jobs). Construction jobs represent a stable 5.5% of jobs while Transportation/Utilities represents a growing 5% of jobs. Manufacturing, including Agricultural Processing, represents only about 1.5% of jobs – half of what it was in Year 2000.

Years 2021 and 2022 are likely to be banner post-pandemic job growth years, with enormous positive pressures on Trade, Transportation and Tourism-related jobs. Health-related jobs, anchored by **Maui Memorial Medical Center** (pictured below) are likely to expand. This hospital is within close proximity of the site and will positively influence demand for housing at the site from local medical professionals.

WAIEHU, MAUI - AUGUST 2021

Employer	Year Established	Total Employees
Maui Memorial Medical Center	1884	1,666
Grand Wailea Resort	1991	1,432
Four Seasons Resort (Wailea)	1990	985
Hyatt Regency Resort	1980	790
Westin Maui Resort	1972	731
Fairmont Kea Lani Resort	1991	715
The Ritz-Carlton, Kapalua	1992	703
Four Seasons Resort (Lanai)	1991	658
Hale Makua Health Services	1946	456
Kaiser Foundation Health	1958	422
Aqua-Aston Hospitality	1948	420
Roberts Hawaii	1941	362
Wailea Beach Marriott Resort	1976	325
Securitas Security Services	1961	313
Kamehameha Schools Maui	1996	287
Kaanapali Beach Hotel	1964	249
Maui Economic Opportunity	1965	235
Kula Hospital	1909	225
VIP Foodservice	1950	177
Maui Ocean Center	1998	122
Maui Brewing Company	2005	100

Source: Hawaii Department of Labor and Industrial Relations.

MAUI TOURISM

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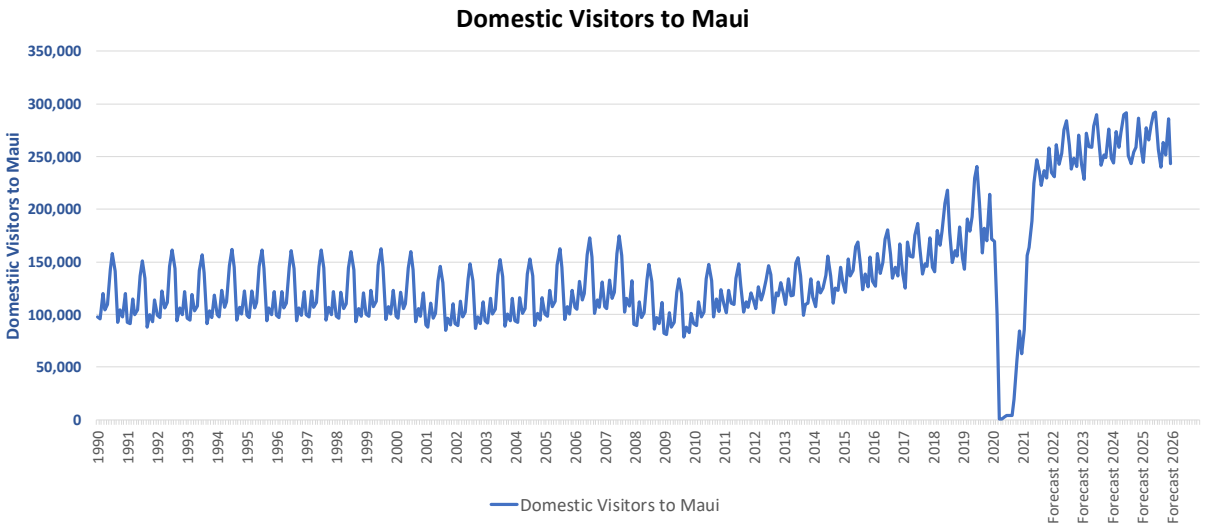
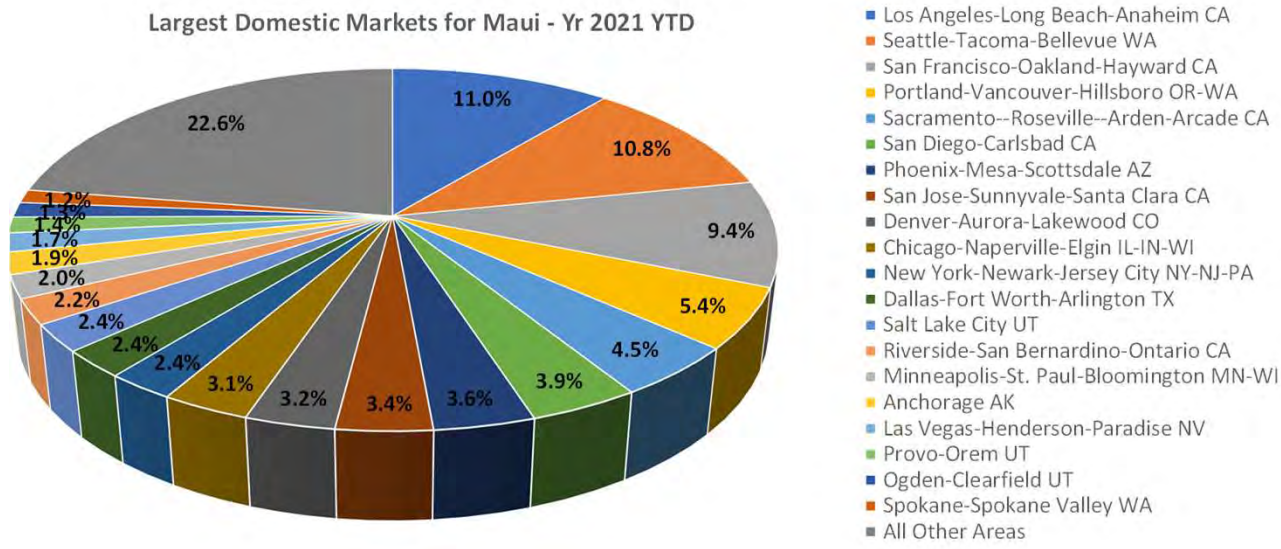
The travel industry essentially halted during the pandemic, with only a few hundred arrivals to Maui during the March-August 2020 timeframe. Travel began to return in October 2020, with a sharp jump in Year 2021. Indeed, July travel to Maui has reached new records for daily arrivals as a surge of visitors have come to the island, with an estimate of almost 250,000 visiting Maui in July '21. This surge is likely to continue in the near-term, riding a high plateau for the next few years as increased discretionary income combines with work-vacations to increase travel. Travelers are still required to show proof of negative Covid-19 tests or proof of vaccination, but an increasing number of visitors are willing to submit to the added health and safety measures.

As immunity passports are increasingly introduced and herd immunity approaches, there is likely to be a continued surge in travel to the island. Most visitors are coming from California, with Southern California producing the largest market share of visitors at 11%, followed by Seattle at 10.8%, then the Bay Area at 9.4%.

WAIEHU, MAUI - AUGUST 2021



Source: Hawaii Visitors Bureau; Hawaii.gov; Real Estate Analytics



KAHULUI-WAILUKU-LAHAINA, HI CBSA (MAUI) EMPLOYMENT

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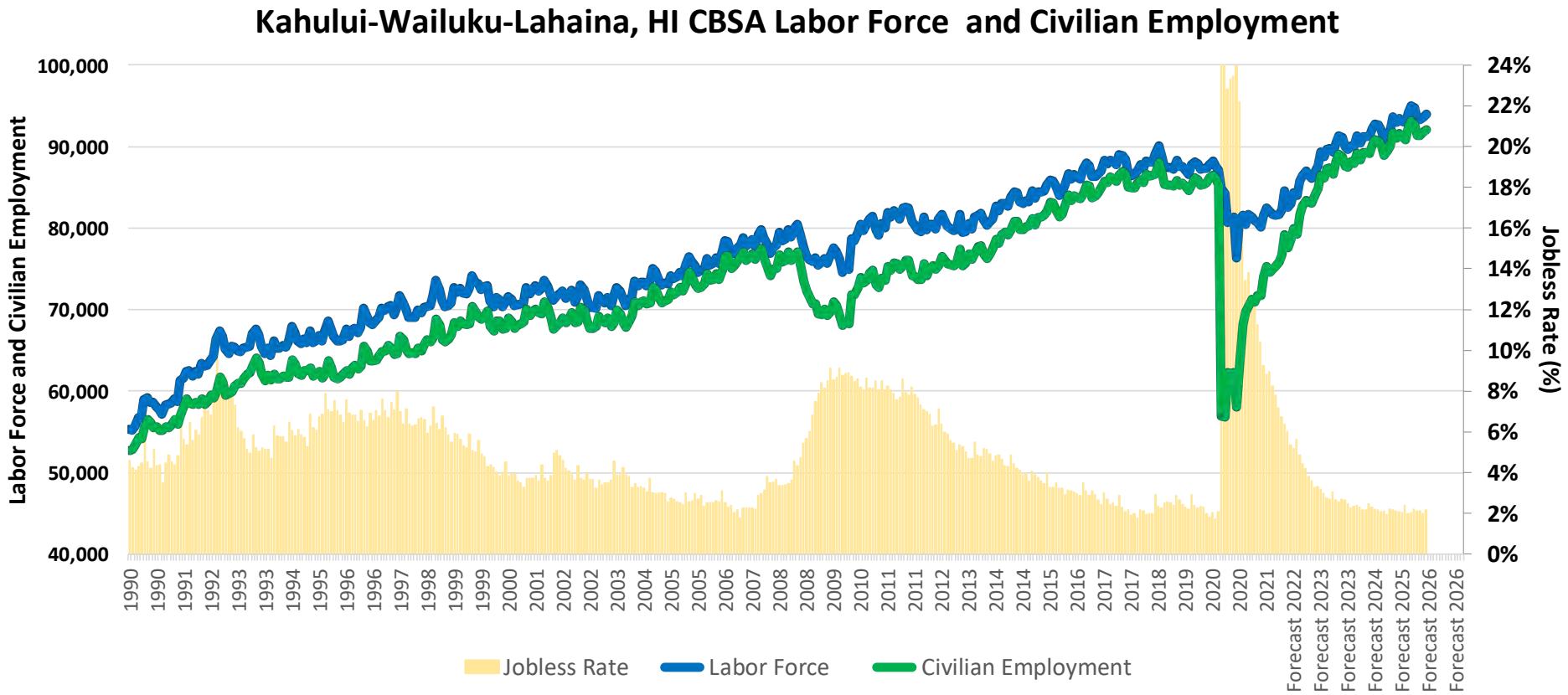
As shown below, employment was severely disrupted in Maui County as the economy shut down in March-May. Almost 30,000 jobs were lost in March through May, leading to an astounding 32.9% unemployment rate in April 2020. This region was hit especially hard due to exposure to those industries (Leisure/Hospitality, Trade, Entertainment) which were hit hard by the pandemic. A total of 12,805 jobs were regained from June through December, dropping the unemployment rate to 13.4%. A partial V-shaped rebound in jobs has been manifest. A new government cash infusion has begun which has contributed to holding up the rental market, but YTD job growth has been slow until June. During June and July, the Maui economy has surged as the partial lifting of restrictions has caused a record level of visitors. This surge is likely to continue, boosting the Maui economy to full recovery mid-2022, and strong growth projected to continue through Year 2025 due to the continued recovery, age migration patterns, increased discretionary income and projected strong national economic growth due to infrastructural and other public spending.



FORECAST HOUSING MORTGAGE RATES

Robbins Boud
Real Estate Analytics

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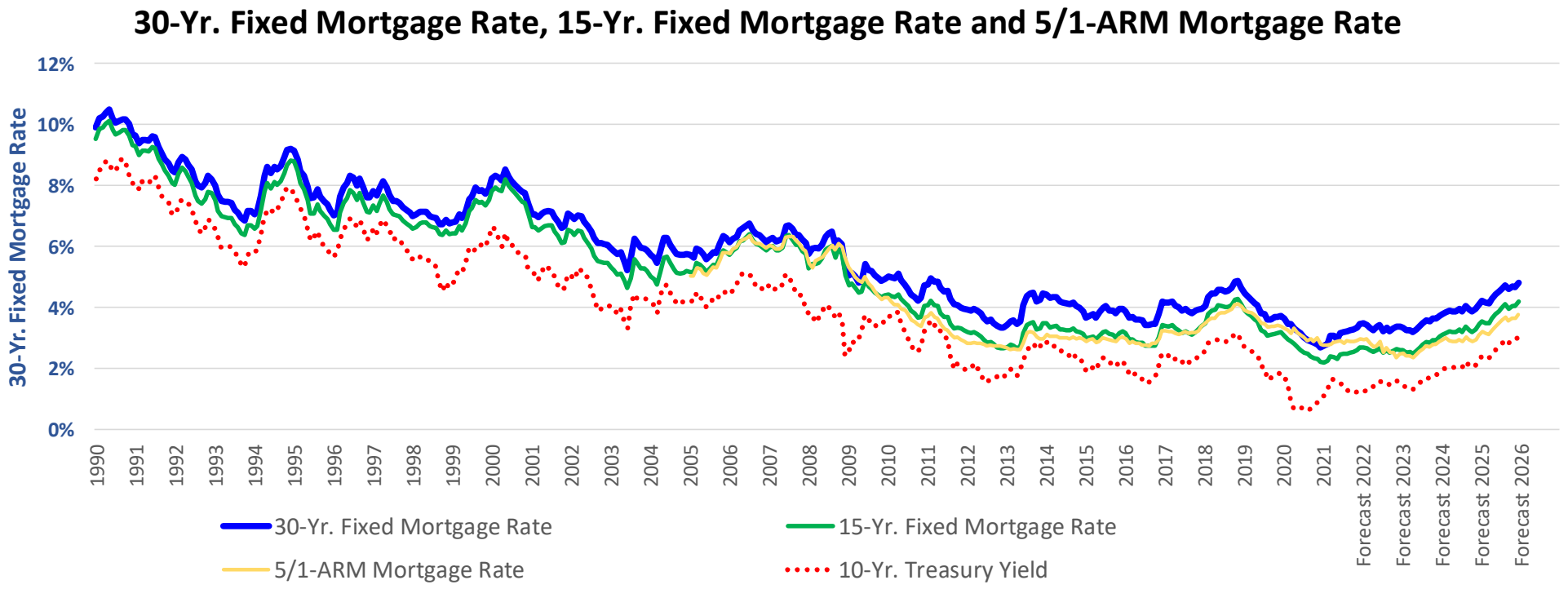
Mortgage rates have reached all time lows. During 3rd quarter 2021, 30-year fixed rates have remained well below 3.0%. For the new home market, that translates to an average drop in monthly mortgage costs of 11.5% from the assumed 4.5% fixed rate reached in Year 2019. Going forward, there will be a bias toward rising rates as unprecedented increases in the money supply eventually causes inflation. Indeed, there is an increasing risk of hyper-inflation due to the influx of cash, high national debt loads and government instability, and this longer-term hyper-inflation will lead to higher mortgage rates. There is danger to even a mild increase in mortgage rates, as it will cause existing home sales volume to slow as more homeowners stay in place to preserve their historically low fixed rate. The result is less competition for new home sales, but also less generation of buyers who are dependent upon equity rollover, and there is increasing risk of a downward price correction commensurate with rising rates. The entry level market is not as sensitive to increases in mortgage rates because they do not have a low fixed rate loan already in place. These entry-level buyers are also apt to choose an adjustable rate mortgage as rates rise. The second home market will also not be as dramatically impacted as the primary home market. Smaller, entry-level housing (including attached housing) should dominate the product profile at the subject community.



Source: Freddie Mac; Real Estate Analytics; Statistica; The Balance

REGIONAL HOUSING SUPPLY VS. ECONOMIC-GENERATED (RAW) HOUSING DEMAND

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Real Estate Analytics

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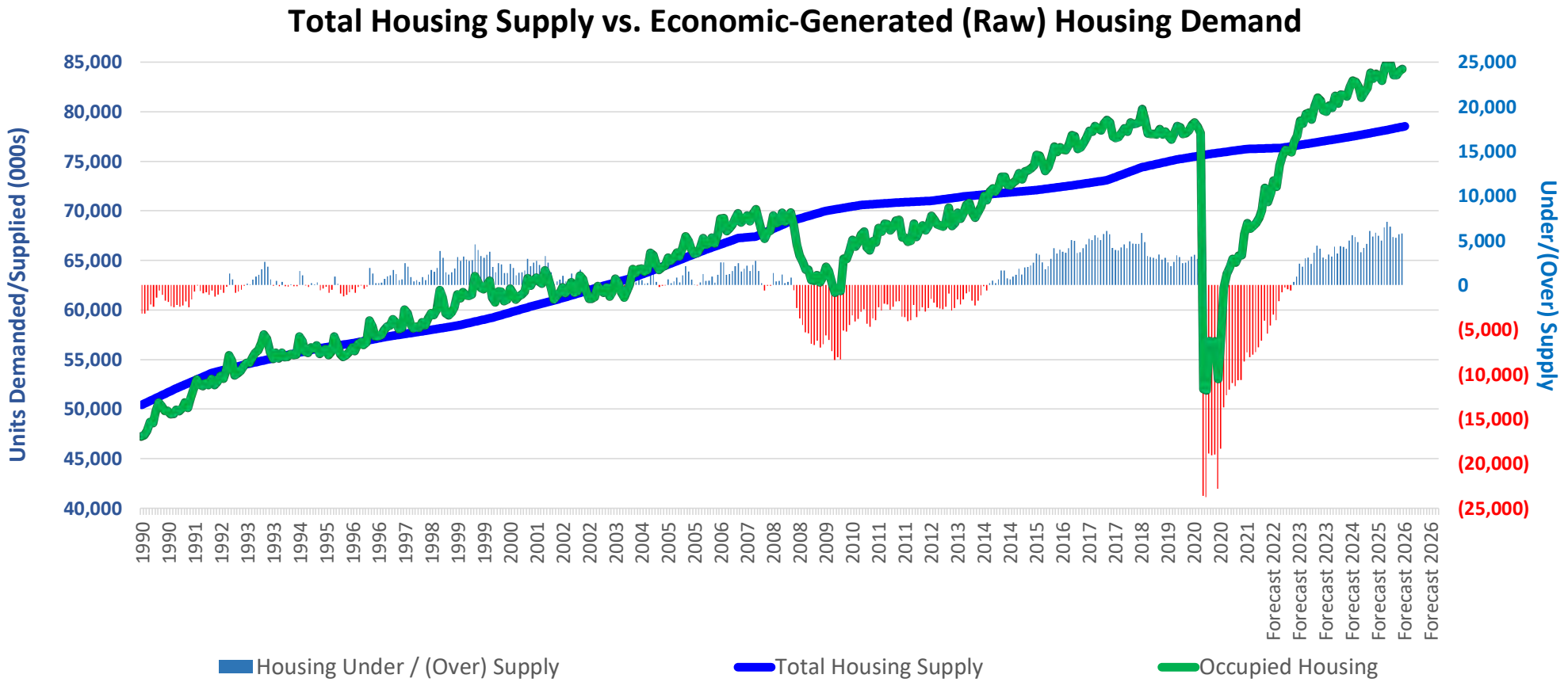
Total housing supply trends (shown by the blue curve) are supplied by the Bureau of the Census while the 5-year housing forecast is provided by Real Estate Analytics. Economic-generated (raw) housing demand is derived by applying long-term trends in jobs-to-housing ratios to the current rate of job growth. This simple model reflects the severe disruption in raw housing demand caused by abrupt and massive job losses. Almost all of the lost level of demand, however, has already been recouped, and predicted job growth is likely to keep raw housing demand well above current and forecast levels of supply, ensuring increasing levels of pent-up demand once the market normalizes from the current disruption.



Source: Census Bureau; Robbins Boud Real Estate Analytics

SUMMARY OF LOCAL HOUSING MARKET ACTIVITY

For purposes of this report, newer attached and hi-density detached home communities in select areas of Maui were visited and recent sales activity was generated. The table below is a summary of these communities. A full description of each housing development, including recent sales, is offered in **Appendix B** to this report.

Development Name / Dev. / Location	Type	Year Built	20/21 Sold	Rate	DOM	Home Size Range Low	Home Size Range High	Base Price	Base Premium	Price Per Sq.Ft.	Price Premium	HOA Fees	Photo
Kamalani-Armstrong Kihalani Place, Kihei	Condo/Townhome	2018	28	1.6/mo.	88.1	755sf to	1,180sf	$395,000 to	$625,000	$465/sf to	$634/sf	$427/mo.	
Highlands-DR Horton Ka'Ikena Loop, Kehalani	Single Family 7,105 av. Lot Size	2019	10	0.6/mo.	97.7	1,502sf to	1,743sf	$659,000 to	$980,000	$410/sf to	$652/sf	$69/mo.	
Ke' Alohilani-DR Horton Kehalani Mauika Pkwy, Kehalani	Single Family 8,465 av. Lot Size	2017	9	0.5/mo.	73.7	1,502sf to	1,907sf	$691,000 to	$1,200,000	$397/sf to	$665/sf	$68/mo.	
Anuhea-Towne Kehalani Mauika Pkwy, Kehalani	Single Family 5,000 av. Lot Size	2021	57 Lottery	4.8/mo.	Lottery	1,529sf to	1,998sf	$699,000 to	$832,000	$457/sf to	$416/sf	$66/mo.	
Ilima-Towne Kehalani Mauika Pkwy, Kehalani	Single Family 5,000 av. Lot Size	2020	49 Lottery	4.1/mo.	Lottery	1,391sf to	1,998sf	$671,000 to	$832,000	$381/sf to	$530/sf	$66/mo.	

SUMMARY OF LOCAL HOUSING MARKET ACTIVITY (cont.)

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As shown, both market rate and workforce housing communities were audited, offering contract between the price lines associated with both. The absorption levels shown for each community tends to be understated, being held back by a severe lack of housing supply – either in the form of listings or new home construction. In both cases, it is the lack of supply that is holding back absorption. Only Anuhea and Ilima (Towne Dev) which are selling new product, come close to describing true absorption potential. Both new home programs have

Development Name / Dev. / Location	Type	Year Built	20/21 Sold	Rate	DOM	Home Size Range Low	Home Size Range High	Base Price	Base Premium	Price Per Sq.Ft.	Price Premium	HOA Fees	Photo
The Parkways-Towne Maui Lani	Single Family 6,560 av. Lot Size	2017	16	0.9/mo.	127.8	1,382sf	2,487sf	$648,750	$1,060,000	$374/sf	$585/sf	$102/mo.	
Traditions-DR Horton Maui Lani	Single Family 3,415 av. Lot Size	2013	15	0.8/mo.	45.9	1,298sf	1,532sf	$620,000	$790,000	$437/sf	$594/sf	$102/mo.	
Kamani-Towne Maui Lani	Paired Homes	2018	6	0.3/mo.	131.0	1,425sf	1,457sf	$599,000	$645,000	$411/sf	$443/sf	$87/mo.	
Ho'ole'a Terrace-Stanford Carr Kehalani	Condo/Town	2012	18	1.0/mo.	97.4	751sf	953sf	$400,000	$515,000	$498/sf	$585/sf	$101/mo.	
Iliahi-Towne Kehalani	Condo/Town	2005	8	0.4/mo.	84.8	1,242sf	1,258sf	$490,000	$582,000	$390/sf	$469/sf	$184/mo.	

SUMMARY OF LOCAL HOUSING MARKET ACTIVITY (cont.)

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been selling each phase by lottery, averaging over 4.0 home sales per month. If new home construction can keep pace with demand, targeted rates of sales for almost all product types priced below $1.0mm could average at least between 2.0 and 4.0 new home sales per month. The observed sales rates at Ilima and Anuhea support and validate the targeted rates of sales employed in the recommendations section of this report.

Development Name / Dev. / Location	Type	Year Built	20/21 Sold	Rate	DOM	Home Size Range Low	Home Size Range High	Base Price	Base Premium	Price Per Sq.Ft.	Price Premium	HOA Fees	Photo
Kehalani Gardens-S.Carr Kehalani	Condo/Town	2005	14	0.8/mo.	54.9	935sf	1,133sf	$405,000	$515,000	$410/sf	$510/sf	$153/mo.	
Kalama Kai-Armstrong Kihei	Condominium Workforce	2019	8	0.4/mo.	151.0	844sf	977sf	$372,600	$550,000	$441/sf	$652/sf	$476/mo.	
Heritage-West Maui Land Maui Lani	Single Family Workforce	2021	Lottery		-	1,102sf	1,616sf	$461,900	$634,000	$392/sf	$482/sf	TBD	
Waiale Elua-West Maui Land Waiale	Single Family Workforce	2020	Lottery		-	1,056sf	1,469sf	$310,000	$650,000	$278/sf	$442/sf	$0/mo.	

Source: Field audit by Real Estate Analytics; Redfin; County Recorder.

SUMMARY OF LOCAL HOUSING TRANSACTIONS

Robbins Boud
Real Estate Analytics

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For purposes of examining the housing market in Competitive Market Area (CMA) defined as the Wailuku/Waiehu market area, all Year-To-Date housing listings and transactions were compiled. The table to the right presents the summary of this compilation.

Average Condominium/Townhome sales prices were $475,315 the area for 904sf at $543/sf. Single Family sales prices were much higher, with an average sold price of $869,613 for 1,746sf at $527/sf. Median figures were a bit lower.

The number of listings is shockingly low – only 13 condo/townhome listings and 23 single family listings. The low number of listings reflects intense demand for housing in the current market atmosphere.

Average HOA for condominium/townhome product is $408 while the average for single family homes is only $90. One of the challenges associated with attached housing is the high HOA fees – often making smaller single family homes a relative bargain.

The price of housing on Maui has begun to climb at a rapid rate while inventory levels continue to fall, as shown on the following page.

2021 YEAR-TO-DATE WAILUKU/WAIEHU HOUSING MARKET ACTIVITY

Home List/Sales Category	No.	List or Sold Price	Living Area	Price/ Sq.Ft.	Bed-rooms	Baths	Lot Size	Year Built	DOM	HOA
By Average										
Grand Totals and Overall Averages:	283	$696,140	1,369sf	$535/sf	2.8	2.1	13,166	1988	96	$311
Totals and Averages for Listings:	36	$743,575	1,429sf	$540/sf	3.1	2.0	9,559	1977	58	$483
Totals and Averages for Condo/TH Listings:	13	$322,992	670sf	$489/sf	1.4	1.3	-	1976	94	$634
Totals and Averages for SFD Listings:	23	$981,296	1,858sf	$569/sf	4.0	2.4	9,559	1978	37	$90
Totals and Averages for All Sales:	247	$689,226	1,361sf	$535/sf	2.7	2.1	13,785	1990	102	$293
Totals and Averages for Condo/TH Sales:	113	$475,315	904sf	$543/sf	2.1	1.8	-	1991	110	$408
Totals and Averages for SFD Sales:	134	$869,613	1,746sf	$527/sf	3.3	2.4	13,785	1988	96	$90
By Median										
Grand Totals and Overall Median:	283	$680,000	1,242sf	$503/sf	3.0	2.0	7,658	1993	64	$189
Totals and Median for Listings:	36	$657,500	1,116sf	$519/sf	3.0	1.8	7,989	1975	39	$520
Totals and Median for Condo/TH Listings:	13	$335,000	586sf	$409/sf	1.0	1.0	-	1975	69	$557
Totals and Median for SFD Listings:	23	$899,000	1,774sf	$539/sf	4.0	2.5	7,989	1980	33	$109
Totals and Median for All Sales:	247	$680,000	1,242sf	$501/sf	3.0	2.0	7,543	1994	66	$125
Totals and Median for Condo/TH Sales:	113	$457,500	830sf	$497/sf	2.0	2.0	-	1993	83	$388
Totals and Median for SFD Sales:	134	$798,588	1,639sf	$502/sf	3.0	2.0	7,543	1998	62	$75

Source: Real Estate Analytics; Redfin; County Recorder

SUMMARY OF MAUI COUNTY HOUSING MARKET ACTIVITY

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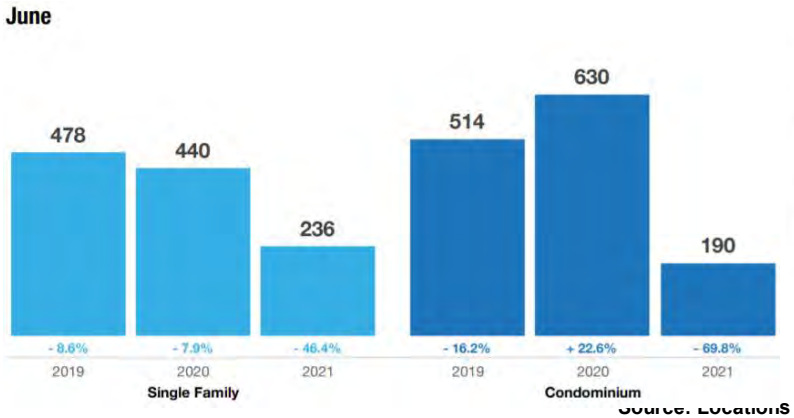
For the entire Island, pertinent housing market statistics are provided by the Realtors Association of Maui.

As shown, the median price of condominiums for the entire island was $635,000 in June – 26.2% higher than June 2020. for single-family sales, the median was $1,117,500 – an astounding 44.5% higher than the year previous. These averages reflect the impact of a greater share of resort sales, but also the intense pricing pressures that currently exist on the island.

An indication that price appreciation will continue at a high level in the near-term is the enormous drop in inventory. Single-family housing inventory has dropped by 46.4% during the past 12 months, while Condo/Townhome inventory has dropped by 69.8%. Extremely low levels of inventory are likely to continue as a combination of high demand and very little housing construction continues to deplete housing inventory levels.

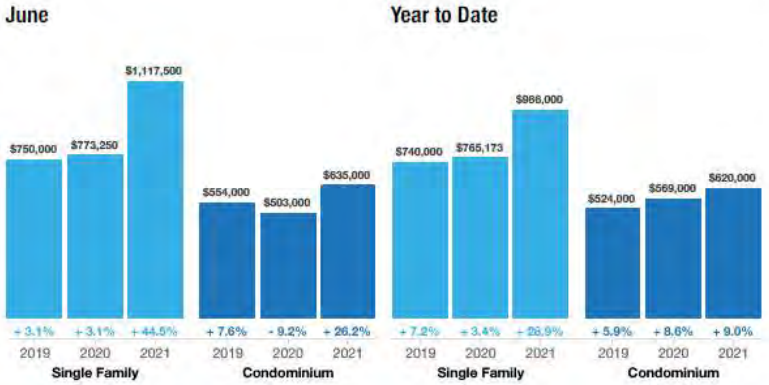


Source: Locations Hawaii

Median Sales Price

Point at which half of the sales sold for more and half sold for less, not accounting for seller concessions, in a given month.

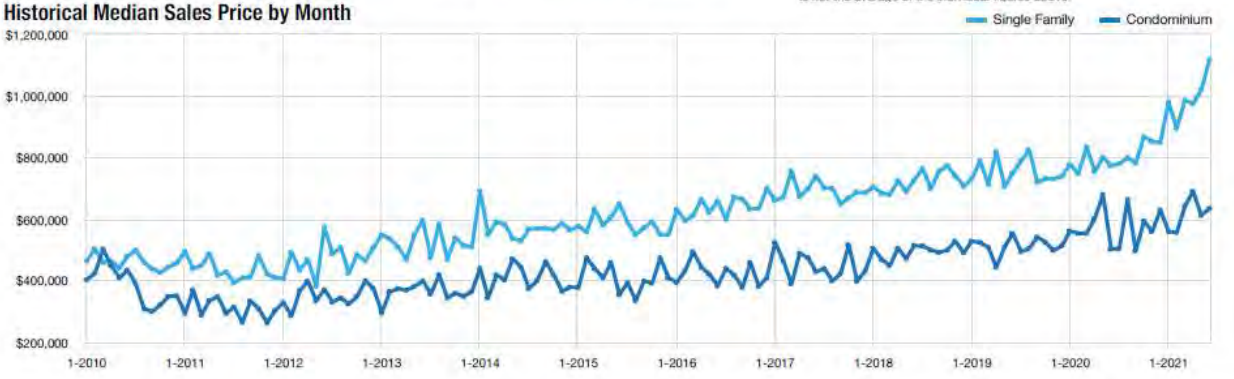
REALTORS® ASSOCIATION OF MAUI, INC.



Median Sales Price	Single Family	Year-Over-Year Change	Condominium	Year-Over-Year Change
Jul-2020	$779,690	- 1.1%	$505,000	+ 2.0%
Aug-2020	$799,000	- 3.2%	$663,500	+ 31.5%
Sep-2020	$782,500	+ 8.8%	$497,500	- 8.3%
Oct-2020	$867,500	+ 18.5%	$593,900	+ 13.1%
Nov-2020	$852,500	+ 16.8%	$560,500	+ 12.3%
Dec-2020	$849,000	+ 14.7%	$630,000	+ 22.5%
Jan-2021	$980,000	+ 26.0%	$560,000	- 0.4%
Feb-2021	$895,000	+ 19.8%	$556,990	+ 0.6%
Mar-2021	$985,000	+ 18.0%	$642,500	+ 15.8%
Apr-2021	$975,000	+ 29.2%	$690,000	+ 14.5%
May-2021	$1,019,000	+ 27.4%	$612,500	- 9.9%
Jun-2021	**$1,117,500**	**+ 44.5%**	**$635,000**	**+ 26.2%**
12-Month Avg*	$893,500	+ 18.3%	$610,000	+ 14.6%

* Median Sales Price for all properties from July 2020 through June 2021. This is not the average of the individual figures above.

Historical Median Sales Price by Month



Current as of July 6, 2021. All data from the REALTORS® Association of Maui, Inc. Report © 2021 ShowingTime. | 8

SUMMARY OF SELECT NEWER APARTMENT COMMUNITIES

Robbins Boud
Real Estate Analytics

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Eight newer apartment communities were visited and audited in the Wailuku/Kahului/Kihei market areas. The table below is a summary of these communities.

Map No.	Community	Type	Year Built	Density	No. of Units	Avail. Units	% Vacant	Type	Mix	Vacant	% Vacan	Interior Sq.Ft.	Base Rent	Base Rent/SF	Parking	Amenities / Notes	Photo
1	Lokenani Hale	4-story	2005	63/ac.	61	1	1.6%	Studio	0	0	-				Open	Air Conditioning, Clubhouse, Laundry Facilities, Property Manager on Site, Security System, Wheelchair Accessible (Rooms)	
	https://halemahaolu.org/housing/lokelani-hale/	Affordable						1 Bed	61	1	1.6%	480sf	$743/mo.	$1.55/sf			
	8082439272	Rent Restricted						2 Bed	0	0	-						
	1889 Loke St							3 Bed	0	0	-						
	Wailuku							Total/Avg.	61	1	1.6%	480sf	$743/mo.	$1.55/sf			
2	Kenolio Apartments	4-story	2020	37/ac.	186	0	0.0%	Studio	0	0	-				Open	A/C, Ceiling Fans, Patio/Balcony, Computer center, fitness center, BBQ/Picnic, tot lot, Community room w/ Kitchen.	
	https://www.eahhousing.org/apartments/kenolio	Affordable						1 Bed	60	0	0.0%	679sf	$1,056/mo.	$1.56/sf	and		
	808.762-2028	Rent Restricted						2 Bed	68	0	0.0%	908sf	$1,248/mo.	$1.37/sf	Garage		
	116 Nokahea Loop	30% and 60% of AMI						3 Bed	46	0	0.0%	1,141sf	$1,423/mo.	$1.25/sf			
	Kihei							Total/Avg.	174	0	0.0%	891sf	$1,228/mo.	$1.40/sf			
3	Kahului Town Terrace	4-story	1991	29/ac.	72	0	0.0%	Studio	0	0	-				Open	Air Conditioning, Courtyard, Playground	
	https://www.eahhousing.org/apartments/kahului	Affordable						1 Bed	38	0	0.0%	670sf	$1,309/mo.	$1.95/sf	and		
	8088718444	Rent Restricted						2 Bed	28	0	0.0%	886sf	$1,542/mo.	$1.74/sf	Covered		
	170 Hoohana St							3 Bed	6	0	0.0%	1,074sf	$1,760/mo.	$1.64/sf			
	Kahului							Total/Avg.	72	0	0.0%	788sf	$1,437/mo.	$1.84/sf			
4	The Waterfront Apartments at Kahului	4-story	2008	35/ac.	113	1	0.9%	Studio	2	0	0.0%	275sf	$1,466/mo.	$5.33/sf	Open	Air Conditioning, Clubhouse, Courtyard, Laundry Facilities, Picnic Area, Property Manager on Site, Gated, Grill, Laundry Service, Wi-Fi, Wheelchair Accessible (Rooms)	
	https://www.waterfrontkahului.com/	Market						1 Bed	107	0	0.0%	500sf	$1,826/mo.	$3.65/sf			
	8088562900							2 Bed	4	1	25.0%	762sf	$1,993/mo.	$2.62/sf			
	50 Vevau St							3 Bed	0	0							
	Kahului							Total/Avg.	113	1	0.9%	505sf	$1,826/mo.	$3.65/sf			
5	Piilani Garden Apartments	4-story	2002	15/ac.	200	0	0.0%	Studio	0	0	-				Open	Air Conditioning, Day Care, Laundry Facilities, Property Manager on Site, Walking/Biking Trails, Storage Space, Wheelchair Accessible (Rooms)	
	https://www.piilanigardensmaui.com/	Market						1 Bed	0	0	-				and		
	8088741800							2 Bed	200	0	0.0%	817sf	$1,908/mo.	$2.34/sf	Port		
	150 Manino Cir							3 Bed	0	0	-						
	Kihei							Total/Avg.	200	0	0.0%	817sf	$1,908/mo.	$2.34/sf			

SUMMARY OF SELECT NEWER APARTMENT COMMUNITIES (cont.)

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As shown, both Affordable and Market rate apartments were audited. Affordable apartments have only 1 unit currently available of 307 affordable units surveyed. The vacancy rate for market rate apartments is also low, with only a 3.5% vacancy rate. Market rate apartments are offered at about twice the rate as affordable apartments, yet the low vacancy rates for both subsidized and market rate units reflects severe levels of pent-up demand for housing in this market area.

Map No.	Community	Type	Year Built	Density	No. of Units	Avail. Units	% Vacant	Type	Mix	Vacant	% Vacan	Interior Sq.Ft.	Base Rent	Base Rent/SF	Parking	Amenities / Notes	Photo
6	Kalama Heights (Senior) https://www.holidayseniorliving.com/senior-apartments/hawaii/ka 8085184017 101 Kanani Rd Kihei	4-story Market **Senior**	2000	18/ac.	123	21	17.1%	Studio 1 Bed 2 Bed 3 Bed Total/Avg.	40 83 0 0 123	7 14 0 0 21	17.5% 16.9% - - 17.1%	433sf 735sf 637sf	$3,758/mo. $4,684/mo. $4,383/mo.	$8.68/sf $6.37/sf $7.12/sf	Open	Air Conditioning, Fitness Center, Laundry Facilities, Property Manager on Site, Gameroom, Laundry Service, Maid Service, Media Center/Movie Theatre, Planned Social Activities, Walking/Biking Trails, Lounge, Meal Service, Multi Use Room, Patio, Wheelchair Accessible (Rooms)	
7	Paradise Gardens Apartments https://www.paradisegardensmaui.com/ 8088797066 851 S Kihei Rd Kihei	4-story Market	1990	23/ac.	200	0	0.0%	Studio 1 Bed 2 Bed 3 Bed Total/Avg.	0 120 80 0 200	0 0 0 0 0	- 0.0% 0.0% - 0.0%	 605sf 795sf 681sf	 $1,570/mo. $1,734/mo. $1,636/mo.	 $2.60/sf $2.18/sf $2.43/sf	Open	Air Conditioning, Laundry Facilities, Playground, Patio, Window Coverings	
8	Wailea Apartments (Proposed) https://halemahaolu.org/housing/lokelani-hale/ Okolani Dr Wailea	4-story Market	2024	20/ac.	289	TBD		Studio 1 Bed 2 Bed 3 Bed Total/Avg.	Mix of one and two bedroom apartments planned.							Anticipated opening Year 2024	
	Waikoloa, HI 96738			**Grand Total/Overall Avg for Active Apartments:**					**943**	**23**	**2.4%**	**717sf**	**$1,926/mo.**	**$2.88/sf**			
								Affordable Apartments:	**307**	**1**	**0.3%**	**785sf**	**$1,181/mo.**	**$1.54/sf**			
								Market Rate Apartments:	**636**	**22**	**3.5%**	**684sf**	**$2,286/mo.**	**$3.52/sf**			

Source: Costar; various internet sources and Field audit by Real Estate Analytics

MAUI APARTMENT TRENDS AND FORECASTS

Robbins Boud
Real Estate Analytics

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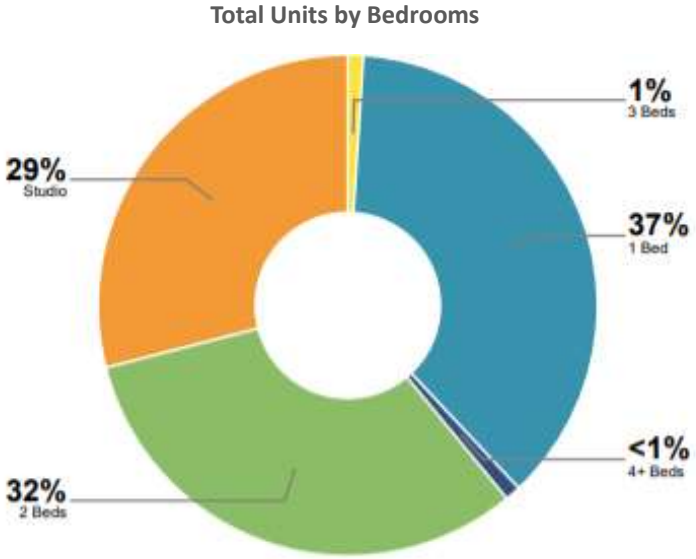
A total of 85 apartment communities are tracked by Costar on the Maui. Though not comprehensive, Costar tracks the majority of larger, newer apartment communities on the island, as well as new construction, absorption, inventory, lease rates, cap rates, etc. Below are pertinent statistics associated with the local apartment market:

INVENTORY UNITS	UNDER CONSTRUCTION UNITS	12 MO ABSORPTION UNITS	VACANCY RATE	MARKET RENT/UNIT	MARKET SALE PRICE/UNIT	MARKET CAP RATE
2,873	0	38	2.1%	$1,797	$362K	4.7%
Prior Period 2,873	Prior Period 0	Prior Period (16)	Prior Period 3.4%	Prior Period $1,695	Prior Period $334K	Prior Period 4.7%

As shown, there are 2,873 apartment units being tracked at these 85b communities. There is essentially no new construction this year (or last year). Absorption has increased during the past 12 months while vacancies have fallen to extremely low levels – helped by subsidies. Rents are up 6.0% during the past 12 months, and the sale price per unit number is up 8.4%. The cap rate has remained constant. The vast majority of rental units are studios, 1-bedroom and 2-bedroom units. Very few 3- and 4-bedroom rental units exist. Given the economic disruption on the island, the apartment market has held up surprisingly well, reflecting government subsidies and very little construction.



PRODUCT AND PRICING RECOMMENDATIONS, AND DETERMINATION OF HIGHEST AND BEST RESIDENTIAL USES

GENERAL PRODUCT AND PRICING RECOMMENDATIONS AND RESTRICTIONS

TOC

For purposes of this report, the product segments set forth by WHA were explored and employed as general guidelines to the recommended product definitions shown on the following pages. To WHA's product template was added higher density for-sale product concepts and a full array of rental concepts. Not all of these added product lines were ultimately recommended by the consultant, but all were tested against the assumed Workforce Housing constraints to determine the optimal product mix that will generate the highest return on investment. Indeed, all rental products were ultimately discarded from the optimal mix due to the losses caused by these constraints, but the rental array is still included in the event that Maui County forces the development of rental product as part of the mix. As part of the recommended array, restricted prices and rents are presented based on the US Department of Housing and Urban Development's (HUD) pricing and rental guidelines and Maui County's requirements and in order to qualify for the desired Exemptions.

On the tables presented on the following pages are shown these price and rent restrictions based on 50%, 60%, 80%, 100%, 120% and 140% of Area Median Income (AMI). Also shown are market-supported prices set forth by the consultant that are calibrated to builder-accepted rates of absorption, and those market prices that fall below AMI restrictions are identified. As shown on these tables, product type, unit size, mix, base and average price (incorporating view and other premiums), layout characteristics, densities and targeted absorption rates are presented.

These various pricing/rental rate restrictions and recommendations are employed in determining the highest and best residential uses and optimized product mix such that land yield and profitability are maximized. This maximization depends upon the restrictions the County places on the client in terms of Workforce Housing. The County's general requirements are presented to the right and on the following page (as taken from Maui County's Workforce Housing Policy (MCC Chapter 2.96):

Requirements: Developers are required to provide residential workforce housing units equal to at least ***25% of the total number of market rate units proposed***. Developers are required to enter into a residential workforce housing agreement with the Department of Housing and Human Concerns to set the method by which the developer will meet the requirements.

Requirements may be met by one or a combination of the following:

a. ***Offer for sale units*** as residential workforce housing within the community plan area.
b. ***Offer for rent units*** as residential workforce housing within the community plan area.
c. Convey units to a ***qualified housing provider***.
d. ***Pay a fee or provide land*** in lieu of providing residential workforce housing units.

Timing and Deed Restrictions: Developers are required to make residential workforce housing units (both ownership and rental) ***available for occupancy either before or concurrently with market rate units***. ***Ownership units are subject to deed restrictions for durations ranging 5 to 10 years***, depending on income group. ***Rental units are subject to deed restrictions and must remain affordable for 30 years*** from initial occupancy.

Other deed restrictions include:

	Ownership	Rental
• Units must be owner-occupied.	√	
• The owner must notify the County upon a decision to sell and the County shall have the first option to purchase the unit or rental development.	√	√
• Restrictions on maximum resale price.	√	
• Any new owner must comply with deed restrictions.	√	√
• At the end of the 30 year affordability period, the owner must offer the County the right to purchase the property at market value.		√

GENERAL PRODUCT AND PRICING RECOMMENDATIONS AND RESTRICTIONS (cont.)

A **Workforce Housing Unit** is directed toward one of the income groups listed to the right. For purposes of this report, it is assumed that the quality of the house and cost of construction remains consistent for housing directed toward all income groups.

There are additional restrictions associated with income group distributions, as presented below (taken from MCC Chapter 2.96):

Income group distribution.

1. Unless an exemption is granted by the director, the percentage of ownership units within each income group shall be as follows:
   a. Thirty percent of the ownership units shall be for "below-moderate income" residents.
   b. Fifty percent of the ownership units shall be for "moderate income" residents.
   c. Twenty percent of the ownership units shall be for "above-moderate income" residents.
2. Unless an exemption is granted by the director, the percentage of rental units within each income group shall be as follows:
   a. One-third of the rental units shall be for "very low income" and "low income" residents.
   b. One-third of the rental units shall be for "below-moderate income" residents.
   c. One-third of the rental units shall be for "moderate income" residents.

In addition, it is assumed that the client will seek Exemptions associated with permit fees and impact fees and expedited approval, requiring that 100% of all housing be offered as Workforce housing.

The optimized product mix presented in this study conforms to these restrictions.

Definitions:

Residential workforce housing unit – A unit or lot sold or rented to residents within one of the following income groups as established by the Department of Housing and Human Concerns:

1. *Very low income* – Gross annual family income is 50% or less of area median income (AMI).
2. *Low income* – Gross annual family income is 51% to 80% of AMI.
3. *Below moderate income* – Gross annual family income is 81% to 100% of AMI.
4. *Moderate income* – Gross annual family income is 101% to 120% of AMI.
5. *Above moderate income* – Gross annual family income is 121% to 140% of AMI.

Median family income – Middle income in a series of incomes ranked from smallest to largest as determined by HUD (United States Department of Housing and Urban Development) for the County, or as adjusted by the Department of Housing and Human Concerns for Hana, Lanai and Molokai.

Qualified housing provider – Community land trust, nonprofit agency, or other private or public organization, agency, or entity authorized and designated by the Department of Housing and Human Concerns to provide residential workforce housing required under the Residential Workforce Housing Policy.

The full Residential Workforce Housing Policy can be accessed on the Housing Division's webpage at https://www.mauicounty.gov/251/Housing-Division.

County of Maui
Department of Housing and Human Concerns
Housing Division
(808) 270-7351
housing.hhc@co.maui.hi.us

AFFORDABILITY CONSTRAINTS

Each Year, the Hawaii Housing Finance Development Corporation (HHFDC) presents affordability constraints. Price and Rent constraints are based on bedroom count. Monthly costs associated with price constraints assume a 30-year mortgage and a 30% loan-to-value inclusive of principle and interest. For purposes of this study, a 4.0% 30-year fixed rate was assumed.

The tables below and to the right present the HHFDC's Affordable/Restricted Price and Rent Guidelines for Year 2021 based on 50% to 140% of AMI. These HHFDC guidelines were used to set forth a range of restricted prices and rents on the recommendations tables presented previously.

AFFORDABLE RENT GUIDELINES
(BY UNIT SIZE & PERCENTAGE OF MEDIAN FAMILY INCOME)

% of Median	UNIT SIZE (NO. OF BEDROOMS)					
	0	1	2	3	4	5
50%	$839	$899	$1079	$1247	$1391	$1534
80%	$1,343	$1,439	$1,726	$1,995	$2,225	$2,455
100%	$1,678	$1,798	$2,158	$2,493	$2,781	$3,069
120%	$2,014	$2,158	$2,589	$2,992	$3,337	$3,683
140%	$2,350	$2,517	$3,021	$3,491	$3,894	$4,296

MAUI COUNTY AMI PRICING RESTRICTIONSHOUSING
FOR SINGLE-FAMILY AND MULTI-FAMILY HOUSING

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Single-Family		Percent of Median Income				
		Low Income		Below	Moderate	Above
		(51% to 80%)		(81% to	(101% to	(121% to
Prevailing Int. Rate	No. of Bedrooms	60% $57,540	80% $76,720	100% $95,900	120% $115,080	140% $134,260
4.00%	1	$222,040	$296,030	$370,020	$444,010	$518,070
	2	$269,620	$359,465	$449,310	$539,155	$629,085
	3	$317,200	$422,900	$528,600	$634,300	$740,100
	4	$364,780	$486,335	$607,890	$729,445	$851,115
4.50%	1	$209,160	$278,950	$348,670	$418,390	$488,110
	2	$253,980	$338,725	$423,385	$508,045	$592,705
	3	$298,800	$398,500	$498,100	$597,700	$697,300
	4	$343,620	$458,275	$572,815	$687,355	$801,895
5.00%	1	$197,470	$263,270	$329,070	$394,870	$460,740
	2	$239,785	$319,685	$399,585	$479,485	$559,470
	3	$282,100	$376,100	$470,100	$564,100	$658,200
	4	$324,415	$432,515	$540,615	$648,715	$756,930

Multi-Family		Percent of Median Income				
		Low Income		Below	Moderate	Above
		(51% to 80%)		(81% to	(101% to	(121% to
Prevailing Int. Rate	No. of Bedrooms	60% $57,540	80% $76,720	100% $95,900	120% $115,080	140% $134,260
4.00%	1	$199,850	$266,420	$332,990	$399,630	$466,270
	2	$242,675	$323,510	$404,345	$485,265	$566,185
	3	$285,500	$380,600	$475,700	$570,900	$666,100
	4	$328,325	$437,690	$547,055	$656,535	$766,015
4.50%	1	$188,230	$251,090	$313,810	$376,530	$439,320
	2	$228,565	$304,895	$381,055	$457,215	$533,460
	3	$268,900	$358,700	$448,300	$537,900	$627,600
	4	$309,235	$412,505	$515,545	$618,585	$721,740
5.00%	1	$177,730	$236,950	$296,170	$355,390	$414,680
	2	$215,815	$287,725	$359,635	$431,545	$503,540
	3	$253,900	$338,500	$423,100	$507,700	$592,400
	4	$291,985	$389,275	$486,565	$583,855	$681,260

Source: Housing Division Department of Housing and Human Concerns (DHHC) County of Maui.

FOR-SALE PRODUCT AND PRICING RECOMMENDATIONS

Robbins Boud
Real Estate Analytics

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Shown on the tables below and on the following page are all for-sale product recommendations and associated restricted and market-rate pricing. As shown, the restricted prices are presented based on 60% to 140% of AMI. Those restricted prices that fall below market prices are highlighted in light red while the balance of restricted prices that are higher than current market prices are highlighted in light orange. Market rate pricing recommendations are shown in green and are calibrated to the targeted sales rates shown.

	FLOOR PLAN			RESTRICTED PRICING					PRODUCT AND MARKET PRICING RECOMMENDATIONS								Min				DUs /
		Unit	Lanai or	BASED ON % OF AMI					Market Price		Price Per Sq.Ft.		No. of	Bed-		Parking	Lot Size	Density	Assoc.	Monthly	Density /
PRODUCT LINE	#	Size	Roof Deck	60%	80%	100%	120%	140%	Base	Average	Base	Average	Levels	Rooms	Baths	Spaces	(Sq.Ft.)	(DU/Acre)	Dues	Payment*	Sales Target
3-Sty Walk-up Stacked Flat	1	450 sf	50 sf	$199,850	$266,420	$332,990	$399,630	$466,270	$203,000	$210,300	$451/sf	$467/sf	1	Studio	1.0	1.0 Space	800 sf	32.0/ac.	$340/mo.	$1,213/mo.	287 du
3-Sty Walk-up Stacked Flat	2	600 sf	50 sf	$199,850	$266,420	$332,990	$399,630	$466,270	$240,000	$248,600	$400/sf	$414/sf	1	1	1.0	1.0 Space	800 sf	32.0/ac.	$370/mo.	$1,402/mo.	32.0/ac.
3-Sty Walk-up Stacked Flat	3	725 sf	50 sf	$242,675	$323,510	$404,345	$485,265	$566,185	$271,000	$280,700	$374/sf	$387/sf	1	2	1.0	2.0 Spaces	800 sf	32.0/ac.	$400/mo.	$1,566/mo.	4.0/mo.
3-Sty Walk-up Stacked Flat	4	850 sf	50 sf	$242,675	$323,510	$404,345	$485,265	$566,185	$303,000	$313,800	$356/sf	$369/sf	1	2	2.0	2.0 Spaces	800 sf	32.0/ac.	$420/mo.	$1,723/mo.	
3-Sty Walk-up Stacked Flat	**Avg:**	**696 sf**	**50 sf**	**$225,545**	**$300,674**	**$375,803**	**$451,011**	**$526,219**	**$264,250**	**$273,700**	**$380/sf**	**$393/sf**	**1.0**	**1.5**	**1.3**	**1.5 Car**	**800 sf**	**32.0/ac.**	**$391/mo.**	**$1,527/mo.**	
Flats/Towns	1	750 sf	50 sf	$242,675	$323,510	$404,345	$485,265	$566,185	$298,000	$303,700	$397.33	$404.93	1	2	1.0	2.0 Spaces	1,500 sf	18.0/ac.	$400/mo.	$1,661/mo.	195 du
Flats/Towns	2	875 sf	50 sf	$242,675	$323,510	$404,345	$485,265	$566,185	$332,000	$338,400	$379.43	$386.74	1	2	2.0	2.0 Spaces	1,500 sf	18.0/ac.	$430/mo.	$1,835/mo.	18.0/ac.
Flats/Towns	3	1,050 sf	75 sf	$285,500	$380,600	$475,700	$570,900	$666,100	$379,000	$386,300	$360.95	$367.90	2	3	2.0	2.0 Spaces	1,500 sf	18.0/ac.	$460/mo.	$2,064/mo.	3.0/mo.
Flats/Towns	**Avg:**	**884 sf**	**58 sf**	**$255,523**	**$340,637**	**$425,752**	**$510,956**	**$596,160**	**$334,200**	**$340,625**	**$378.16**	**$385.43**	**1.3**	**0.3**	**1.7**	**2.0 Car**	**1,500 sf**	**18.0/ac.**	**$429/mo.**	**$1,843/mo.**	
Townhomes 26'x55'	1	925 sf	50 sf	$317,200	$422,900	$528,600	$634,300	$740,100	$377,000	$384,300	$407.57	$415.46	2	3	2.0	1+Port	1,430 sf	14.5/ac.	$440/mo.	$2,036/mo.	111 du
Townhomes 26'x55'	2	1,075 sf	75 sf	$317,200	$422,900	$528,600	$634,300	$740,100	$422,000	$430,100	$392.56	$400.09	2	3	2.5	1+Port	1,430 sf	14.5/ac.	$470/mo.	$2,256/mo.	14.5/ac.
Townhomes 26'x55'	3	1,225 sf	75 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$466,000	$475,000	$380.41	$387.76	2	4	2.5	1+Port	1,430 sf	14.5/ac.	$500/mo.	$2,473/mo.	2.5/mo.
Townhomes 26'x55'	**Avg:**	**1,095 sf**	**68 sf**	**$336,232**	**$448,274**	**$560,316**	**$672,358**	**$784,506**	**$427,600**	**$435,847**	**$390.50**	**$398.03**	**2.0**	**2.5**	**2.3**	**1+Port**	**1,430 sf**	**14.5/ac.**	**$474/mo.**	**$2,284/mo.**	
Duplex 30'x55' Lot	1	1,000 sf	100 sf	$317,200	$422,900	$528,600	$634,300	$740,100	$434,000	$444,700	$434.00	$444.70	1 Dom	3	2.0	1+Port	1,650 sf	11.5/ac.	$150/mo.	$1,997/mo.	165 du
Duplex 30'x55' Lot	2	1,250 sf	100 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$513,000	$525,700	$410.40	$420.56	2	4	2.5	1+Port	1,650 sf	11.5/ac.	$180/mo.	$2,363/mo.	11.5/ac.
Duplex 30'x55' Lot	3	1,400 sf	100 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$561,000	$574,900	$400.71	$410.64	2	4	2.5	2.0 Car	1,650 sf	11.5/ac.	$190/mo.	$2,577/mo.	2.25/mo.
Duplex 30'x55' Lot	**Avg:**	**1,208 sf**	**100 sf**	**$348,127**	**$464,133**	**$580,139**	**$696,144**	**$812,260**	**$499,750**	**$512,110**	**$413.87**	**$424.11**	**2.0**	**3.7**	**2.3**	**1.5 Car**	**1,650 sf**	**11.5/ac.**	**$173/mo.**	**$2,299/mo.**	
Motorcourt 36'x60' Lot	1	1,200 sf	125 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$536,000	$549,300	$446.67	$457.75	1 Dom	4/3+den	2.0	2.0 Car	2,160 sf	10.0/ac.	$110/mo.	$2,391/mo.	181 du
Motorcourt 36'x60' Lot	2	1,450 sf	125 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$622,000	$637,400	$428.97	$439.59	2	4	2.5	2.0 Car	2,160 sf	10.0/ac.	$120/mo.	$2,767/mo.	10.0/ac.
Motorcourt 36'x60' Lot	3	1,600 sf	125 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$674,000	$690,700	$421.25	$431.69	2	4	2.5	2.0 Car	2,160 sf	10.0/ac.	$130/mo.	$2,998/mo.	2.00/mo.
Motorcourt 36'x60' Lot	**Avg:**	**1,408 sf**	**125 sf**	**$364,780**	**$486,335**	**$607,890**	**$729,445**	**$851,115**	**$607,500**	**$622,555**	**$431.62**	**$442.31**	**2.0**	**3.7**	**2.3**	**1.8 Car**	**2,160 sf**	**10.0/ac.**	**$120/mo.**	**$2,705/mo.**	
Bungalow 40'x72' Lot	1	1,400 sf	150 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$649,000	$665,100	$463.57	$475.07	1 Dom	4	2.0	2.0 Car	2,880 sf	8.3/ac.	$120/mo.	$2,882/mo.	155 du
Bungalow 40'x72' Lot	2	1,675 sf	150 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$750,000	$768,600	$447.76	$458.87	2	4	2.5	2.0 Car	2,880 sf	8.3/ac.	$130/mo.	$3,322/mo.	8.3/ac.
Bungalow 40'x72' Lot	3	1,850 sf	150 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$815,000	$835,200	$440.54	$451.46	2	4+loft	2.5	2.0 Car	2,880 sf	8.3/ac.	$140/mo.	$3,608/mo.	1.75/mo.
Bungalow 40'x72' Lot	**Avg:**	**1,631 sf**	**150 sf**	**$364,780**	**$486,335**	**$607,890**	**$729,445**	**$851,115**	**$734,150**	**$752,355**	**$450.05**	**$461.21**	**2.0**	**4.0**	**2.3**	**2.0 Car**	**2,880 sf**	**8.3/ac.**	**$130/mo.**	**$3,254/mo.**	

FOR-SALE PRODUCT AND PRICING RECOMMENDATIONS

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Below is a continuation of the proposed for-sale product array that was tested for purposes of determining optimal yield. Shown in the final column is the mix associated with optimal yield, assumed achievable densities and the targeted rates of sales. In cases where the mix is zero (0), this product type was ultimately discarded from the recommendations.

	FLOOR PLAN			RESTRICTED PRICING					PRODUCT AND MARKET PRICING RECOMMENDATIONS								Min				DUs /
				BASED ON % OF AMI					Market Price		Price Per Sq.Ft.		No. of	Bed-		Parking	Lot Size	Density	Assoc.	Monthly	Density /
PRODUCT LINE	#	Unit Size	Lanai or Roof Deck	60%	80%	100%	120%	140%	Base	Average	Base	Average	Levels	Rooms	Baths	Spaces	(Sq.Ft.)	(DU/Acre)	Dues	Payment*	Sales Target
SFD 42'x80' Lot	1	1,650 sf	200 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$779,000	$807,300	$472.12	$489.27	1 Dom	4	2.0	2.0 Car	3,360 sf	7.1/ac.	$130/mo.	$3,482/mo.	80 du
SFD 42'x80' Lot	2	1,925 sf	200 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$885,000	$917,200	$459.74	$476.47	2	4+loft	2.5	2.0 Car	3,360 sf	7.1/ac.	$150/mo.	$3,959/mo.	7.1/ac.
SFD 42'x80' Lot	3	2,100 sf	200 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$953,000	$987,700	$453.81	$470.33	2	4+loft	2.5	2.0 Car	3,360 sf	7.1/ac.	$160/mo.	$4,262/mo.	1.50/mo.
SFD 42'x80' Lot	**Avg:**	**1,881 sf**	**200 sf**	**$364,780**	**$486,335**	**$607,890**	**$729,445**	**$851,115**	**$868,300**	**$899,885**	**$461.55**	**$478.34**	**2.0**	**4.0**	**2.3**	**2.0 Car**	**3,360 sf**	**7.1/ac.**	**$146/mo.**	**$3,883/mo.**	
SFD 45'x90' Lot	1	1,800 sf	200 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$878,000	$917,700	$487.78	$509.83	1 Dom	4+loft	2.0	2.0 Car	4,050 sf	5.9/ac.	$140/mo.	$3,951/mo.	0 du
SFD 45'x90' Lot	2	2,200 sf	200 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$1,040,000	$1,087,100	$472.73	$494.14	2	5/4+den	2.5	2.0 Car	4,050 sf	5.9/ac.	$160/mo.	$4,674/mo.	5.9/ac.
SFD 45'x90' Lot	3	2,400 sf	200 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$1,121,000	$1,171,700	$467.08	$488.21	2	5/4+den	2.5	2.0 Car	4,050 sf	5.9/ac.	$170/mo.	$5,036/mo.	1.25/mo.
SFD 45'x90' Lot	**Avg:**	**2,120 sf**	**200 sf**	**$364,780**	**$486,335**	**$607,890**	**$729,445**	**$851,115**	**$1,007,600**	**$1,053,190**	**$475.28**	**$496.79**	**2.0**	**4.0**	**2.3**	**2.0 Car**	**4,050 sf**	**5.9/ac.**	**$157/mo.**	**$4,742/mo.**	
SFD 50'x100' Lot Mulit-gen	1	2,250 sf	200 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$1,142,000	$1,208,100	$507.56	$536.93	1 Dom	3+studio	2.5	2.0 Car	5,000 sf	4.8/ac.	$160/mo.	$5,177/mo.	0 du
SFD 50'x100' Lot Mulit-gen	2	2,650 sf	200 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$1,317,000	$1,393,200	$496.98	$525.74	2	4+studio	3.5	2.0 Car	5,000 sf	4.8/ac.	$180/mo.	$5,965/mo.	4.8/ac.
SFD 50'x100' Lot Mulit-gen	3	2,900 sf	200 sf	$364,780	$486,335	$607,890	$729,445	$851,115	$1,426,000	$1,508,500	$491.72	$520.17	2	4+studio	3.5	2.0 Car	5,000 sf	4.8/ac.	$200/mo.	$6,464/mo.	1.00/mo.
SFD 50'x100' Lot Mulit-gen	**Avg:**	**2,585 sf**	**200 sf**	**$364,780**	**$486,335**	**$607,890**	**$729,445**	**$851,115**	**$1,288,450**	**$1,363,005**	**$498.43**	**$527.27**	**2.0**	**4.0**	**3.2**	**2.0 Car**	**5,000 sf**	**4.8/ac.**	**$180/mo.**	**$6,101/mo.**	

Source: Real Estate Analytics

Notes: **Monthly costs assume 80% LTV, 4.00% fixed rate 30-yr. mortgage.**

FOR-RENT PRODUCT AND RENTAL RATE RECOMMENDATIONS

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The table below presents proposed rental product lines, all of which were ultimately discarded due to the severe restrictions associated with **Very Low Income** (<50% AMI) rents and the associated losses in land value that these restricted rents caused.

PRODUCT LINE	FLOOR PLAN #	Unit Size	Lanai or Roof Deck	RESTRICTED PRICING BASED ON % OF AMI 50%	80%	100%	120%	140%	PRODUCT AND RENT RECOMMENDATIONS Monthly Rent (Market) Base	Average	Rent Per Sq.Ft. Base	Average	No. of Levels	Bed-Rooms	Baths	Parking Spaces[1]	DUs / Density / Fill Target
Rental 3-Sty Walk-up Stacked Flat	1	450 sf	50 sf	$839/mo.	$1,343/mo.	$1,678/mo.	$2,014/mo.	$2,350/mo.	$1,520/mo.	$1,560/mo.	$3.38/mo.	$3.47/mo.	1	Studio	1	1.0 Space	0 du
Rental 3-Sty Walk-up Stacked Flat	2	600 sf	50 sf	$899/mo.	$1,439/mo.	$1,798/mo.	$2,158/mo.	$2,517/mo.	$1,620/mo.	$1,660/mo.	$2.70/mo.	$2.77/mo.	1	1	1	1.0 Space	32.0/ac.
Rental 3-Sty Walk-up Stacked Flat	3	725 sf	50 sf	$1,079/mo.	$1,726/mo.	$2,158/mo.	$2,589/mo.	$3,021/mo.	$1,710/mo.	$1,750/mo.	$2.36/mo.	$2.41/mo.	1	2	1	2.0 Spaces	12.0/mo.
Rental 3-Sty Walk-up Stacked Flat	4	850 sf	50 sf	$1,079/mo.	$1,726/mo.	$2,158/mo.	$2,589/mo.	$3,021/mo.	$1,800/mo.	$1,840/mo.	$2.12/mo.	$2.16/mo.	1	2	2	2.0 Spaces	
Rental 3-Sty Walk-up Stacked Flat	**Avg:**	**721 sf**	**50 sf**	**$1,019/mo.**	**$1,630/mo.**	**$2,038/mo.**	**$2,445/mo.**	**$2,853/mo.**	**$1,709/mo.**	**$1,749/mo.**	**$2.37/mo.**	**$2.42/mo.**	**1.0**	**1.7**	**1.3**	**1.5 Car**	
Rental Flats/Towns	1	750 sf	50 sf	$1,079/mo.	$1,726/mo.	$2,158/mo.	$2,589/mo.	$3,021/mo.	$1,810/mo.	$1,890/mo.	$2.41/mo.	$2.52/mo.	1	2	1.0	2.0 Spaces	0 du
Rental Flats/Towns	2	875 sf	50 sf	$1,079/mo.	$1,726/mo.	$2,158/mo.	$2,589/mo.	$3,021/mo.	$1,900/mo.	$1,990/mo.	$2.17/mo.	$2.27/mo.	1	2	2.0	2.0 Spaces	18.0/ac.
Rental Flats/Towns	3	1,050 sf	75 sf	$1,247/mo.	$1,995/mo.	$2,493/mo.	$2,992/mo.	$3,491/mo.	$2,030/mo.	$2,120/mo.	$1.93/mo.	$2.02/mo.	2	3	2.0	2.0 Spaces	10.00/mo.
Rental Flats/Towns	**Avg:**	**884 sf**	**58 sf**	**$1,129/mo.**	**$1,807/mo.**	**$2,259/mo.**	**$2,710/mo.**	**$3,162/mo.**	**$1,908/mo.**	**$1,994/mo.**	**$2.16/mo.**	**$2.26/mo.**	**1.3**	**2.3**	**1.7**	2.0 Spaces	
Rental Townhomes	1	925 sf	50 sf	$1,247/mo.	$1,995/mo.	$2,493/mo.	$2,992/mo.	$3,491/mo.	$2,080/mo.	$2,160/mo.	$2.25/mo.	$2.34/mo.	2	3	2.0	1+Port	0 du
Rental Townhomes	2	1,075 sf	75 sf	$1,247/mo.	$1,995/mo.	$2,493/mo.	$2,992/mo.	$3,491/mo.	$2,200/mo.	$2,280/mo.	$2.05/mo.	$2.12/mo.	2	3	2.5	1+Port	14.5/ac.
Rental Townhomes	3	1,225 sf	75 sf	$1,391/mo.	$2,225/mo.	$2,781/mo.	$3,337/mo.	$3,894/mo.	$2,310/mo.	$2,390/mo.	$1.89/mo.	$1.95/mo.	2	4	2.5	1+Port	8.0/mo.
Rental Townhomes	**Avg:**	**1,095 sf**	**68 sf**	**$1,305/mo.**	**$2,087/mo.**	**$2,608/mo.**	**$3,130/mo.**	**$3,652/mo.**	**$2,212/mo.**	**$2,292/mo.**	**$2.02/mo.**	**$2.09/mo.**	**2.0**	**3.4**	**2.4**	**1+Port**	
Rental Motorcourt 36'x60' Lot	1	1,200 sf	125 sf	$1,391/mo.	$2,225/mo.	$2,781/mo.	$3,337/mo.	$3,894/mo.	$2,480/mo.	$2,620/mo.	$2.07/mo.	$2.18/mo.	1 Dom	4/3+den	2.0	2.0 Car	0 du
Rental Motorcourt 36'x60' Lot	2	1,450 sf	125 sf	$1,391/mo.	$2,225/mo.	$2,781/mo.	$3,337/mo.	$3,894/mo.	$2,690/mo.	$2,850/mo.	$1.86/mo.	$1.97/mo.	2	4	2.5	2.0 Car	10.0/ac.
Rental Motorcourt 36'x60' Lot	3	1,600 sf	125 sf	$1,391/mo.	$2,225/mo.	$2,781/mo.	$3,337/mo.	$3,894/mo.	$2,820/mo.	$2,980/mo.	$1.76/mo.	$1.86/mo.	2	4	2.5	2.0 Car	6.00/mo.
Rental Motorcourt 36'x60' Lot	**Avg:**	**1,408 sf**	**125 sf**	**$1,391/mo.**	**$2,225/mo.**	**$2,781/mo.**	**$3,337/mo.**	**$3,894/mo.**	**$2,656/mo.**	**$2,809/mo.**	**$1.89/mo.**	**$2.00/mo.**	**1.7**	**4.0**	**2.3**	**2.0 Car**	
Rental Bungalow 40'x72' Lot	1	1,400 sf	150 sf	$1,391/mo.	$2,225/mo.	$2,781/mo.	$3,337/mo.	$3,894/mo.	$2,760/mo.	$2,760/mo.	$1.97/mo.	$1.97/mo.	1 Dom	4	2	2.0 Car	0 du
Rental Bungalow 40'x72' Lot	2	1,675 sf	150 sf	$1,391/mo.	$2,225/mo.	$2,781/mo.	$3,337/mo.	$3,894/mo.	$3,000/mo.	$3,000/mo.	$1.79/mo.	$1.79/mo.	2	4	3	2.0 Car	8.3/ac.
Rental Bungalow 40'x72' Lot	3	1,850 sf	150 sf	$1,391/mo.	$2,225/mo.	$2,781/mo.	$3,337/mo.	$3,894/mo.	$3,160/mo.	$3,160/mo.	$1.71/mo.	$1.71/mo.	2	4+loft	3	2.0 Car	4.00/mo.
Rental Bungalow 40'x72' Lot	**Avg:**	**1,631 sf**	**150 sf**	**$1,669/mo.**	**$2,225/mo.**	**$2,781/mo.**	**$3,337/mo.**	**$3,894/mo.**	**$2,964/mo.**	**$2,964/mo.**	**$1.82/mo.**	**$1.82/mo.**	**1.7**	**4.0**	**2.3**	**2.0 Car**	

Source: Real Estate Analytics

ESTIMATED LOT PREMIUMS

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Lot premiums remain somewhat difficult to ascertain at the site because the land remains unimproved and access is limited. There are, however, general guidelines that can be followed in order to generate an effective method for determining the weighted average prices (which incorporate lot and view premiums) on the tables shown on the preceding pages. The table below presents this premium methodology. Major site area characteristics (view premiums, lot size variations, corner situations, etc.) were identified and assigned a range of viable premiums. These ranges of premiums are typical for this market area and are based on years of market observation. By estimating the percentage share of lots that are likely to be exposed to each premium category, a weighted average premium was ascertained. As shown, weighted average premiums range from 1.9% of base price for townhomes, to a high of 5.8% of base price for SFD product on 50'x100' lots. These weighted average premium estimates were applied to base prices to generate the weighted average pricing recommendations shown on preceding pages.

		PRODUCT MIX BY PREMIUM CATEGORY								
Premium Category	**% Range of Base**	3-Sty Walk-up Stacked Flat	Flats/Towns	Townhomes 26'x55'	Duplex 30'x55' Lot	Motorcourt 36'x60' Lot	Bungalow 40'x72' Lot	SFD 42'x80' Lot	SFD 45'x90' Lot	SFD 50'x100' Lot Mulit-gen
Minor Ocean View	10.0% to 12.0%							5.0%	7.5%	10.0%
Full Mauka View	5.0% to 6.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	15.0%	20.0%	25.0%
Partial Mauka View	3.0% to 4.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	22.5%	30.0%	37.5%
Minor Mauka View	1.0% to 2.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	15.0%	20.0%	25.0%
Top Floor Premium	3.0% to 4.0%	33.0%								
Bottom Floor Premium	1.0% to 2.0%	33.0%								
Cnr or End Unit or Cul de Sac	1.0% to 3.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
XX Large Lot	3.0% to 4.0%				5.0%	5.0%	5.0%	5.0%	5.0%	10.0%
X Large Lot	2.0% to 3.0%				10.0%	10.0%	10.0%	10.0%	10.0%	15.0%
Large Lot	1.0% to 2.0%				15.0%	15.0%	15.0%	15.0%	15.0%	20.0%
Adjacent to Park/Greenbelt	1.0% to 3.0%	10.0%	10.0%	10.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Weighted Average Premium		**3.6%**	**1.9%**	**1.9%**	**2.5%**	**2.5%**	**2.5%**	**3.6%**	**4.5%**	**5.8%**

Source: Real Estate Analtyics

COMPETITIVE MARKET POSITIONING (FOR-SALE)

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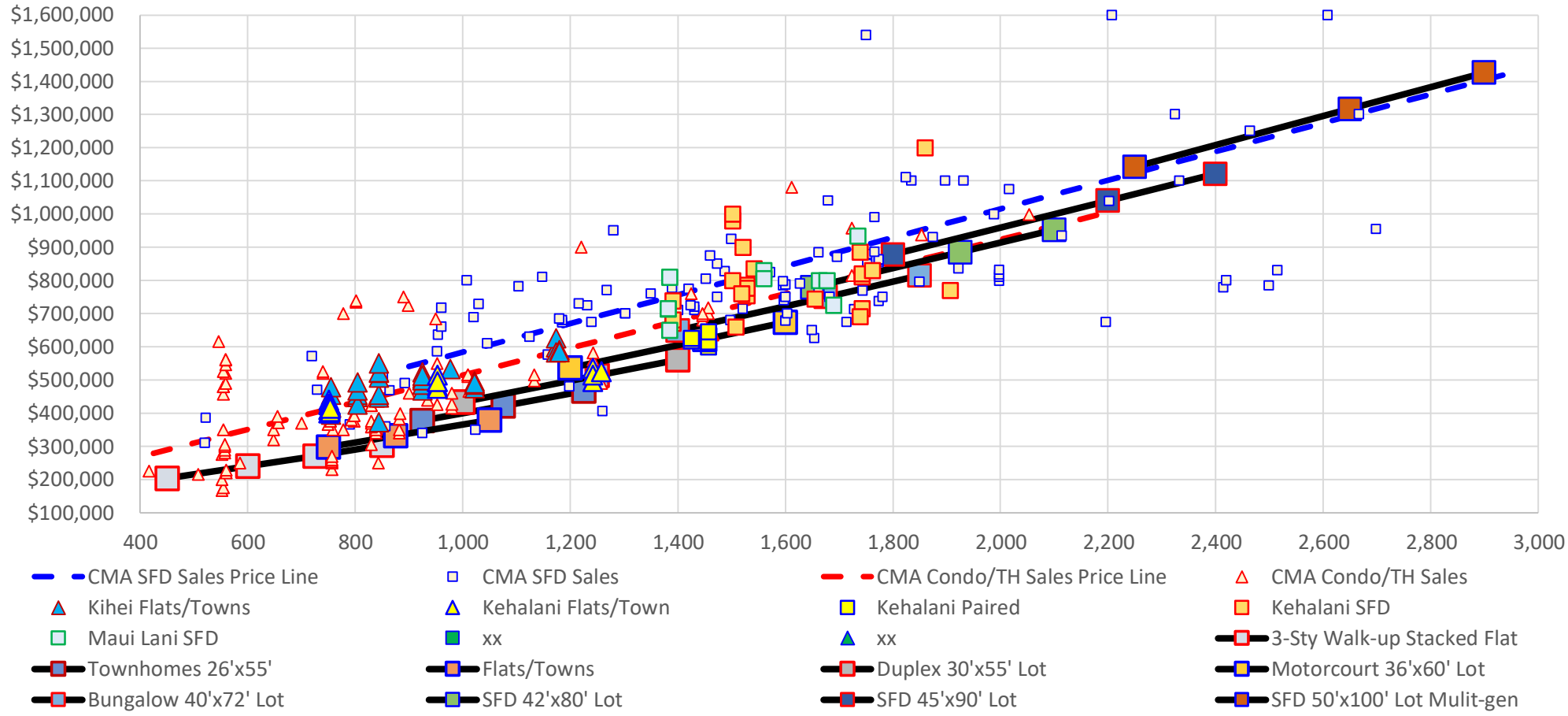
The chart below presents product and pricing recommendations relative to the new home market price line observed for this market area. As shown, product and market-rate pricing recommendations are in harmony with the current pricing structure observed in this market.

Waiehu Maui Product Lines



PRODUCT COMPETITIVE MARKET POSITIONING (FOR-RENT)

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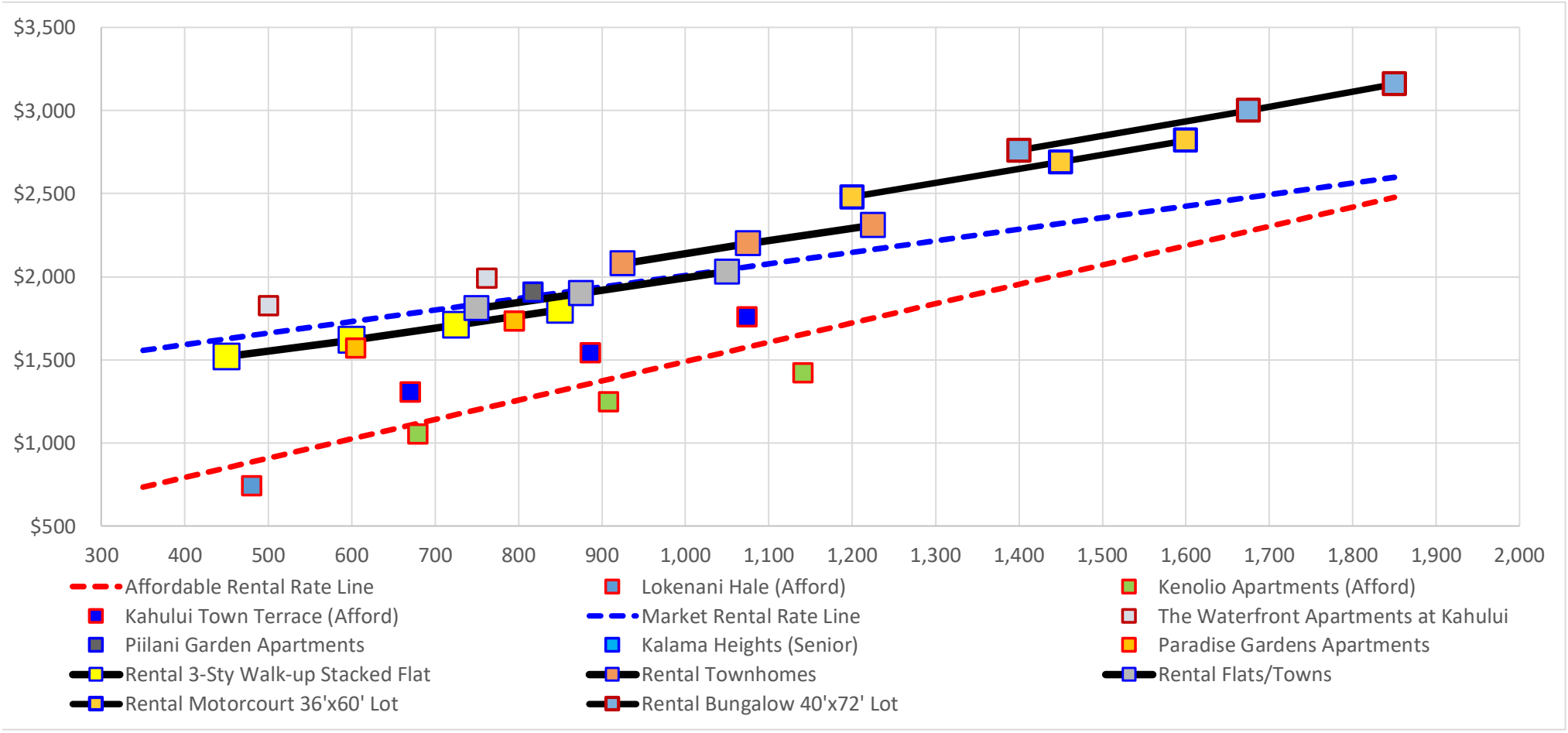
The chart below presents competitive positioning for recommended rental product concepts as they relate to rental communities within the identified market area. Listed are market-rate rentals. Restricted or Affordable rental rates are shown on a latter page of this report.

Waiehu Maui Rental Product Lines



RESIDUAL IMPROVED LOT AND LAND VALUES

Robbins Boud
Real Estate Analytics

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The tables below and on the following two pages assume market pricing that is calibrated to builder-accepted absorption rates or the required restricted pricing, whichever is lower and is associated with the assumed **Workforce Housing** constraints. The table summarizes recommended product types and subtracts from the recommended/required pricing structure all costs associated with vertical construction. For rental versions of the product lines, the monthly rental rates were annualized, then market-supported occupancy rates were applied, then the resultant amounts were capitalized at market-observed cap rates to generate the market values shown. The construction costs shown on the table are based on direct construction costs provided by RS Means, tailored to the Maui market, and selectively edited by the client based on the consultant's 30+ years of industry experience on the Islands.

Category	3-Sty Walk-up Stacked Flat	Flats/Towns	Townhomes 26'x55'	Duplex 30'x55' Lot	Motorcourt 36'x60' Lot	Bungalow 40'x72' Lot	SFD 42'x80' Lot	SFD 45'x90' Lot	SFD 50'x100' Lot Mulit-gen	Rental 3-Sty Walk-up Stacked Flat	Rental Flats/Towns	Rental Townhomes	Rental Motorcourt 36'x60' Lot	Rental Bungalow 40'x72' Lot
Product Assumptions														
Restricted Price 100% AMI Rent 50% AMI	$375,803	$425,752	$560,316	$580,139	$607,890	$607,890	$607,890	$607,890	$607,890	$1,019/mo.	$1,129/mo.	$1,305/mo.	$1,391/mo.	$1,669/mo.
Restricted Price 120% AMI Rent 100% AMI	$451,011	$510,956	$672,358	$696,144	$729,445	$729,445	$729,445	$729,445	$729,445	$2,038/mo.	$2,259/mo.	$2,608/mo.	$2,781/mo.	$2,781/mo.
Restricted Price 140% AMI Rent 120% AMI	$526,219	$596,160	$784,506	$812,260	$851,115	$851,115	$851,115	$851,115	$851,115	$2,445/mo.	$2,710/mo.	$3,130/mo.	$3,337/mo.	$3,337/mo.
Recommended Market Price (Avg.)	$273,700	$340,625	$435,847	$512,110	$622,555	$752,355	$899,885	$1,053,190	$1,363,005	$1,749/mo.	$1,994/mo.	$2,292/mo.	$2,809/mo.	$2,964/mo.
Options Revenue (2.5% to 10%)	$13,700	$17,000	$21,800	$38,400	$62,300	$75,200	$90,000	$105,300	$136,300	$40/mo.	$50/mo.	$60/mo.	$70/mo.	$70/mo.
Lower of Restricted vs. Market Price	**$287,400**	**$357,625**	**$457,647**	**$550,510**	**$684,855**	**$827,555**	**$851,115**	**$851,115**	**$851,115**	**$88,446**	**$328,296**	**$400,368**	**$506,298**	**$541,752**
Home Square Footage	696sf	884sf	1,095sf	1,208sf	1,408sf	1,631sf	1,881sf	2,120sf	2,585sf	721sf	884sf	1,095sf	1,408sf	1,631sf
Typical Density	32.0/acre	18.0/acre	14.5/acre	11.5/acre	10.0/acre	8.3/acre	7.1/acre	5.9/acre	4.8/acre	32.0/acre	18.0/acre	14.5/acre	10.0/acre	8.3/acre
Saleable/Leaseable SF/Acre	22,280sf	15,908sf	15,878sf	13,886sf	14,075sf	13,570sf	13,414sf	12,541sf	12,386sf	23,086sf	15,908sf	15,878sf	14,075sf	13,570sf
Monthly HOA	$391/mo.	$429/mo.	$474/mo.	$173/mo.	$120/mo.	$130/mo.	$146/mo.	$157/mo.	$180/mo.	$0/mo.	$0/mo.	$0/mo.	$0/mo.	$0/mo.
Monthly Absorption	4.0/mo.	3.0/mo.	1.9/mo.	2.3/mo.	2.0/mo.	1.8/mo.	1.5/mo.	1.3/mo.	1.0/mo.	8.4/mo.	10.0/mo.	6.0/mo.	6.0/mo.	4.0/mo.
Per Unit Construction Costs														
RS Means Big Island DCC/SF (2021)	$183.27	$183.27	$183.27	$183.27	$183.27	$183.27	$183.27	$183.27	$183.27	$183.27	$183.27	$183.27	$183.27	$183.27
Hawaii Home Builder Estimates	$210-$220	$210-$220	$205-$215	$200-$210	$200-$210	$200-$210	$200-$210	$200-$210	$200-$210	$210-$220	$210-$220	$205-$215	$200-$210	$200-$210
Indexed Adjustments	**1.150**	**1.100**	**1.150**	**1.150**	**1.150**	**1.150**	**1.150**	**1.175**	**1.200**	**1.125**	**1.075**	**1.125**	**1.125**	**1.125**
Total Vertical Direct Const. Cost/SF	**$210.76**	**$201.59**	**$210.76**	**$210.76**	**$210.76**	**$210.76**	**$210.76**	**$215.34**	**$219.92**	**$206.18**	**$197.01**	**$206.18**	**$206.18**	**$206.18**
Total Vertical Direct Const. Cost[(1)]	**($146,740)**	**($178,158)**	**($230,779)**	**($254,489)**	**($296,641)**	**($343,797)**	**($396,487)**	**($456,518)**	**($568,494)**	**($148,741)**	**($174,109)**	**($225,762)**	**($290,192)**	**($336,324)**
Options (60% of Revenue) -60.0%	**($8,200)**	**($10,200)**	**($13,100)**	**($23,000)**	**($37,400)**	**($45,100)**	**($54,000)**	**($63,200)**	**($81,800)**	**$0**	**$0**	**$0**	**$0**	**$0**
Cost of Site Amenities -1.00%	($2,900)	($3,600)	($4,600)	($5,500)	($6,800)	($8,300)	($8,500)	($8,500)	($8,500)	($900)	($3,300)	($4,000)	($5,100)	($5,400)
	($157,840)	**($191,958)**	**($248,479)**	**($282,989)**	**($340,841)**	**($397,197)**	**($458,987)**	**($528,218)**	**($658,794)**	**($149,641)**	**($177,409)**	**($229,762)**	**($295,292)**	**($341,724)**

RESIDUAL IMPROVED LOT AND LAND VALUES (cont.)

Robbins Boud
Real Estate Analytics

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The table below is a continuation of the residual lot value analysis, showing costs and fees subtracted from the required/recommended pricing structure in order to determine residual improved lot and land values. As part of the Workforce Housing incentive, it is assumed the client will be able to take advantage of permit and impact fee exemptions associated with a community that offers 100% of homes within the Workforce Housing pricing constraints presented in an earlier section of this report.

Category		3-Sty Walk-up Stacked Flat	Flats/Towns	Townhomes 26'x55'	Duplex 30'x55' Lot	Motorcourt 36'x60' Lot	Bungalow 40'x72' Lot	SFD 42'x80' Lot	SFD 45'x90' Lot	SFD 50'x100' Lot Mulit-gen	Rental 3-Sty Walk-up Stacked Flat	Rental Flats/Towns	Rental Townhomes	Rental Motorcourt 36'x60' Lot	Rental Bungalow 40'x72' Lot
Miscellaneous Per Unit Fees/Charges (Per Unit)[2]															
Building Permit Fee[2]															
Permit Plan Review Fee (35%)															
Fire Plan Review Fee (12.5%)															
Roads Impact Fee															
Parks Impact Fee															
Police Impact Fee															
Wastewater Impact Fee															
School Impact Fees															
Per Unit Soft Costs and Indirect Costs															
Marketing/Commissions	-5.00%	($14,400)	($17,900)	($22,900)	($27,500)	($34,200)	($41,400)	($42,600)	($42,600)	($42,600)	($4,400)	($16,400)	($20,000)	($25,300)	($27,100)
Legal	-0.75%	($2,200)	($2,700)	($3,400)	($4,100)	($5,100)	($6,200)	($6,400)	($6,400)	($6,400)	($700)	($2,500)	($3,000)	($3,800)	($4,100)
Financing	-4.00%	($11,500)	($14,300)	($18,300)	($22,000)	($27,400)	($33,100)	($34,000)	($34,000)	($34,000)	($3,500)	($13,100)	($16,000)	($20,300)	($21,700)
General/Administrative	-3.25%	($9,300)	($11,600)	($14,900)	($17,900)	($22,300)	($26,900)	($27,700)	($27,700)	($27,700)	($2,900)	($10,700)	($13,000)	($16,500)	($17,600)
Warranty	-1.00%	($2,900)	($3,600)	($4,600)	($5,500)	($6,800)	($8,300)	($8,500)	($8,500)	($8,500)	($900)	($3,300)	($4,000)	($5,100)	($5,400)
Mgmt/Supervision Expense	-2.00%	($5,700)	($7,200)	($9,200)	($11,000)	($13,700)	($16,600)	($17,000)	($17,000)	($17,000)	($1,800)	($6,600)	($8,000)	($10,100)	($10,800)
Total Soft Costs	-16.00%	**($46,000)**	**($57,300)**	**($73,300)**	**($88,000)**	**($109,500)**	**($132,500)**	**($136,200)**	**($136,200)**	**($136,200)**	**($14,200)**	**($52,600)**	**($64,000)**	**($81,100)**	**($86,700)**
Builder Margin (Per Unit)															
Builder Margin or Mgmt Fee (%)		**-15.0%**	**-12.0%**	**-12.0%**	**-12.0%**	**-12.0%**	**-12.0%**	**-12.0%**	**-12.0%**	**-12.0%**	**-12.0%**	**-12.0%**	**-10.0%**	**-10.0%**	**-10.0%**
Builder Margin or Mgmt Fee		**($43,110)**	**($42,915)**	**($54,918)**	**($66,061)**	**($82,183)**	**($99,307)**	**($102,134)**	**($102,134)**	**($102,134)**	**($10,614)**	**($39,396)**	**($40,037)**	**($50,630)**	**($54,175)**

All Fees associated with Workforce Housing are exempted as part of this analysis

RESIDUAL IMPROVED LOT AND LAND VALUES (cont.)

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All costs are subtracted from the recommended/required pricing structure to generate the lot and land values shown in the table below. These lot and land values reflect finished or improved land. The upper section (highlighted in yellow) is not discounted while the lower section (highlighted in green) discounts the values based on a 15% discount rate and a 1-year takedown of lots. As shown, discounted land values range from a low of (minus) -$2.393mm per acre for **Very Low Income** rents associated with 3-Sty Walk-up Apartments, to a high of $1.436mm for 140% Above Median Income Bungalow homes on 40'x72' lots. These lot and land values combine with forecast absorption per product line and a discount rate of 15% to lay the foundation for the highest-and-best-use analysis and optimized product mix shown on the following pages.

Category	3-Sty Walk-up Stacked Flat	Flats/Towns	Townhomes 26'x55'	Duplex 30'x55' Lot	Motorcourt 36'x60' Lot	Bungalow 40'x72' Lot	SFD 42'x80' Lot	SFD 45'x90' Lot	SFD 50'x100' Lot Mulit-gen	Rental 3-Sty Walk-up Stacked Flat	Rental Flats/Towns	Rental Townhomes	Rental Motorcourt 36'x60' Lot	Rental Bungalow 40'x72' Lot
Total Improved Lot and Land Values														
Finished Value Per Lot	$40,450	$65,452	$80,950	$113,460	$152,332	$198,551	$153,794	$84,563	($46,013)	($86,008)	$58,891	$66,569	$79,276	$59,153
Finished Lot Value % of Price	14.1%	18.3%	17.7%	20.6%	22.2%	24.0%	18.1%	9.9%	-5.4%	-97.2%	17.9%	16.6%	15.7%	10.9%
Finished Value Per Acre	$1,294,413	$1,178,128	$1,173,776	$1,304,786	$1,523,319	$1,651,696	$1,096,610	$500,238	($220,476)	($2,752,266)	$1,060,040	$965,253	$792,764	$492,081
1 Year Supply	48 lots	36 lots	23 lots	27 lots	24 lots	21 lots	18 lots	15 lots	12 lots	101 lots	120 lots	72 lots	72 lots	48 lots
Finished Present Value Per Lot[3]	$35,174	$56,914	$70,391	$98,661	$132,462	$172,653	$133,734	$73,533	($40,011)	($74,790)	$51,210	$57,886	$68,936	$51,438
Finished Lot Value % of Price	12.2%	15.9%	15.4%	17.9%	19.3%	20.9%	15.7%	8.6%	-4.7%	-84.6%	15.6%	14.5%	13.6%	9.5%
Finished Present Value Per Acre[3]	$1,125,576	$1,024,459	$1,020,675	$1,134,597	$1,324,625	$1,436,257	$953,574	$434,989	($191,718)	($2,393,275)	$921,774	$839,350	$689,360	$427,896

Note(1): Vertical DCC are based on leasable or saleable sf.

Note(2): Per Unit Fees based on residential construction fee structure provided by Maui County. Exceptions: Affordable or WF housing (Chapter 2.96 of MC Code) waived per the % of qualifying homes.

Note(3): Assumed Disc. Rate = 15%

Note: Apartment Values assume: Cap Rate = 5.0%

Occupancy = 97.5% (apartments) 95% (Towns/SFD)

Annual Maintenance Per Unit = $7,500

Source: Real Estate Analytics

HIGHEST AND BEST RESIDENTIAL USES AND LAND VALUE MAXIMIZATION

Robbins Boud
Real Estate Analytics

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The table below presents an estimate of present land value for all residential parcels at Waiehu. This estimate corresponds with the mix of product set forth by WHA as it pertains to the 90+ acres in the WHA land plan.

As shown, the planned 752 homes in various product segments is estimated to generate a present land value of $57.652mm or $620,981 per acre. This assumes up to 8.3 years to completely sell out the community. This present value estimate is based WHA's proposed product mix. This present value yield can by increased significantly by rearranging the mix to more effectively account for market demand and by expanding the product array to include those higher density product lines that more effectively take advantage of AMI constraints. This re-arrangement or optimization is presented on the following page.

Product Type	Product Description	Highest & Best Product Mix			Average Home Size	Total Price	Density (DU/Acre)	Target Sales	Years to Sell	Total Value Estimate			Present Value Estimate		
		Mix	% Mix	Acres						Total ($000)	Per Acre	Per Lot	Total ($000)	Per Acre	Per Lot
WHA PROPOSED MIX WITH RESTRICTED PRICING															
100%	Townhomes 26'x55'	108	14%	7.4	1,095sf	$457,647	14.5/acre	23/yr.	4.8 yrs.	$8,743	$1,173,776	$80,950	$5,934	$796,750	$54,948
100%	Duplex 30'x55' Lot	76	10%	6.6	1,208sf	$550,510	11.5/acre	27/yr.	2.8 yrs.	$8,623	$1,304,786	$113,460	$6,642	$1,005,096	$87,400
120%	Motorcourt 36'x60' Lot	126	17%	12.6	1,408sf	$684,855	10.0/acre	24/yr.	5.3 yrs.	$19,194	$1,523,319	$152,332	$12,671	$1,005,670	$100,567
140%	Bungalow 40'x72' Lot	134	18%	16.1	1,631sf	$827,555	8.3/acre	21/yr.	6.4 yrs.	$26,606	$1,651,696	$198,551	$16,403	$1,018,288	$122,409
140%	SFD 42'x80' Lot	149	20%	20.9	1,881sf	$851,115	7.1/acre	18/yr.	8.3 yrs.	$22,915	$1,096,610	$153,794	$12,652	$605,458	$84,913
140%	SFD 45'x90' Lot	101	13%	17.1	2,120sf	$851,115	5.9/acre	15/yr.	6.7 yrs.	$8,541	$500,238	$84,563	$5,157	$302,019	$51,055
140%	SFD 50'x100' Lot Mulit-gen	58	8%	12.1	2,585sf	$851,115	4.8/acre	12/yr.	4.8 yrs.	-$2,669	($220,476)	($46,013)	-$1,808	-$149,348	-$31,169
	Overall	**752**	**100%**	**92.8**	**1,663sf**	**$732,170**	**8.1/acre**	**636/yr.**	**8.3 yrs.**	**$91,953**	**$1,117,458**	**$122,278**	**$57,652**	**$620,981**	**$76,665**

HIGHEST AND BEST RESIDENTIAL USES AND LAND VALUE MAXIMIZATION

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The table below presents the optimized land plan as it pertains to a maximum net residential acreage estimate of 89.7 acres. As shown the optimized land plan develops all available acres and a total of 1,174 homes. This mix also conforms with the 30% BMI/80% BMI+MI constrain, leaving 20% of the mix for AMI product. As shown, all rental product lines are excluded from the mix due to the severe losses caused by the 50% **Very Low Income** rental constraints, but the for-sale mix is expanded to include higher density product that more effectively takes advantage of Workforce Housing constraints. This optimal mix generates a net present value that exceeds the WHA land plan by $15.421mm or 26.7%. The optimized mix also reduces the absorption window, and it produces less exposure to a single product segment. The result is a more balanced approach that translates to reduced risk and a significantly higher yield. Given these considerations, it is recommended that WHA's currently proposed product mix be revised toward the optimized mix as much as possible, resulting in the aforementioned benefits.

Product Type	Product Description	Highest & Best Product Mix			Average Home Size	Total Price	Density (DU/Acre)	Target Sales	Years to Sell	Total Value Estimate			Present Value Estimate		
		Mix	% Mix	Acres						Total ($000)	Per Acre	Per Lot	Total ($000)	Per Acre	Per Lot
OPTIMIZED MIX WITH RESTRICTED PRICING															
100%	3-Sty Walk-up Stacked Flat	287	24%	9.0	696sf	$287,400	32.0/acre	48/yr.	8.0 yrs.	$11,593	$1,294,413	$40,450	$6,513	$727,274	$22,727
100%	Flats/Towns	195	17%	10.8	884sf	$357,625	18.0/acre	36/yr.	6.4 yrs.	$12,758	$1,178,128	$65,452	$7,850	$724,874	$40,271
100%	Townhomes 26'x55'	111	9%	7.7	1,095sf	$457,647	14.5/acre	23/yr.	7.0 yrs.	$9,019	$1,173,776	$80,950	$5,376	$699,608	$48,249
100%	Duplex 30'x55' Lot	165	14%	14.3	1,208sf	$550,510	11.5/acre	27/yr.	7.1 yrs.	$18,721	$1,304,786	$113,460	$11,055	$770,461	$66,997
120%	Motorcourt 36'x60' Lot	181	15%	18.1	1,408sf	$684,855	10.0/acre	24/yr.	7.5 yrs.	$27,559	$1,523,319	$152,332	$15,874	$877,444	$87,744
140%	Bungalow 40'x72' Lot	155	13%	18.6	1,631sf	$827,555	8.3/acre	21/yr.	7.4 yrs.	$30,775	$1,651,696	$198,551	$17,889	$960,098	$115,414
140%	SFD 42'x80' Lot	80	7%	11.2	1,881sf	$851,115	7.1/acre	18/yr.	4.4 yrs.	$12,260	$1,096,610	$153,794	$8,517	$761,829	$106,843
140%	SFD 45'x90' Lot	-	-	-	2,120sf	$851,115	5.9/acre	15/yr.	0.0 yrs.	$0	$500,238	$84,563	$0	$0	$0
140%	SFD 50'x100' Lot Mulit-gen	-	-	-	2,585sf	$851,115	4.8/acre	12/yr.	0.0 yrs.	$0	($220,476)	($46,013)	$0	$0	$0
50%	Rental 3-Sty Walk-up Stacked Flat	-	-	-	721sf	$88,446	32.0/acre	101/yr.	3.0 yrs.	$0	($2,752,266)	($86,008)	$0	$0	$0
100%	Rental Flats/Towns	-	-	-	884sf	$328,296	18.0/acre	120/yr.	4.0 yrs.	$0	$1,060,040	$58,891	$0	$0	$0
100%	Rental Townhomes	-	-	-	1,095sf	$400,368	14.5/acre	72/yr.	2.0 yrs.	$0	$965,253	$66,569	$0	$0	$0
120%	Rental Motorcourt 36'x60' Lot	-	-	-	1,408sf	$506,298	10.0/acre	72/yr.	2.0 yrs.	$0	$792,764	$79,276	$0	$0	$0
120%	Rental Bungalow 40'x72' Lot	-	-	-	1,631sf	$541,752	8.3/acre	48/yr.	2.0 yrs.	$0	$492,081	$59,153	$0	$0	$0
	Overall	1,174	100%	89.7	1,004sf	$463,721	13.1/acre	636/yr.	8.0 yrs.	$122,684	$1,138,459	$93,669	$73,073	$814,458	$62,266
	30%+ BMI	758	65%	41.8	687sf	$295,791	18.1/acre	224/yr.	8.0 yrs.	$52,091	$4,951,104	$300,312	$30,793	$2,922,216	$178,243
	80% MI+BMI	939	80%	59.9	826sf	$370,763	15.7/acre	276/yr.	7.5 yrs.	$79,650	$6,474,422	$452,644	$46,667	$3,799,660	$265,988
	20% AMI	235	20%	29.8	1,716sf	$835,557	7.9/acre	360/yr.	7.5 yrs.	$43,034	$3,028,067	$390,896	$26,406	$1,721,927	$222,257
			Units	Acres						Increase in Present Value with Optimized Mix			$15,421	$193,478	-$14,398
	Parameters		752 du	89.7 ac									26.7%	31.2%	-18.8%
	Assumed Discount Rate:			15.0%											

Note: Assumes 1Q'24 market entry.

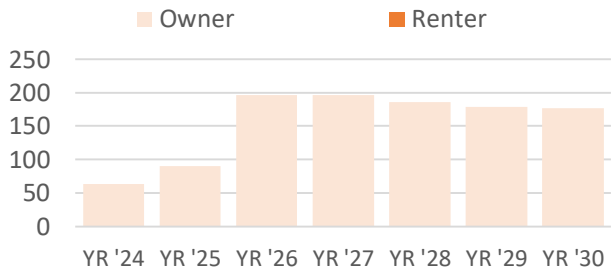
Source: Real Estate Analytics

ABSORPTION TIMELINE

The table and chart to the right present an estimated absorption timeline based on the optimized mix of product.

As shown, the annual absorption is forecast to approach 200 new homes during the peak year of absorption. This level of absorption is highly dependent upon the client's ability to construct enough homes to fill projected demand, but if the pace of construction is adequate, the absorption levels shown are viable.

Product Type	Product Description	Highest & Best Product Mix		Annual Net Sales Estimate						
		Mix	Acres	YR '24	YR '25	YR '26	YR '27	YR '28	YR '29	YR '30
OPTIMIZED PRODUCT MIX										
OWN	3-Sty Walk-up Stacked Flat	287	0.2	-	-	48	48	48	48	48
OWN	Flats/Towns	195	0.2	-	-	36	36	36	36	36
OWN	Townhomes 26'x55'	111	0.1	-	-	23	23	23	23	21
OWN	Duplex 30'x55' Lot	165	0.1	-	27	27	27	27	27	27
OWN	Motorcourt 36'x60' Lot	181	0.2	24	24	24	24	24	24	24
OWN	Bungalow 40'x72' Lot	155	0.1	21	21	21	21	21	21	21
OWN	SFD 42'x80' Lot	80	0.1	18	18	18	18	8	-	-
Overall		1,174	1.0	63	90	197	197	186	179	177
Owner		1,174	1.0	63	90	197	197	186	179	177
Renter		-	-	-	-	-	-	-	-	-



Note: Assumes 1Q'24 market entry.

Source: Real Estate Analytics

POTENTIAL FOR REDUCED PARKING RATIOS

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The advent of autonomous vehicles have enormous ramifications for future master planned communities.

The client may be in a position at Waiehu to dramatically reduce unit-to-parking ratios as autonomous vehicles enable the client to:

- Maintain a fleet of HOA-controlled autonomous vehicles available to owners and renters at MPD.
- Send idle autonomous vehicles from the HOA-controlled vehicle pool on 'Uber' or 'Lyft' assignments to generate additional revenue.
- Charge for self-parking stalls – resulting in discouraging car ownership and encouraging HOA-controlled fleet use.
- Reduce direct construction costs for high-density condominium and apartment development by implementing greatly reduced parking ratios.
- Run autonomous shuttles from the community to job centers, shopping centers and the airport.

The above are just a few of the advantages associated with autonomous vehicles. Though the recommendations and associated costs presented in this report assume traditional parking ratios, it is highly recommended that the client work with county agencies such that portions of parking areas can be converted to retail or other uses once the technological transition is complete. In addition, accommodations should be made within the community to house and operate a fleet of HOA-controlled autonomous vehicles.

APPENDIX A
REGIONAL ECONOMIC AND HOUSING MARKET TRENDS AND FORECASTS

GEOGRAPHIC DEFINITION FOR THE KAHULUI-WAILUKU-LAHAINA, HI CBSA (MAUI)

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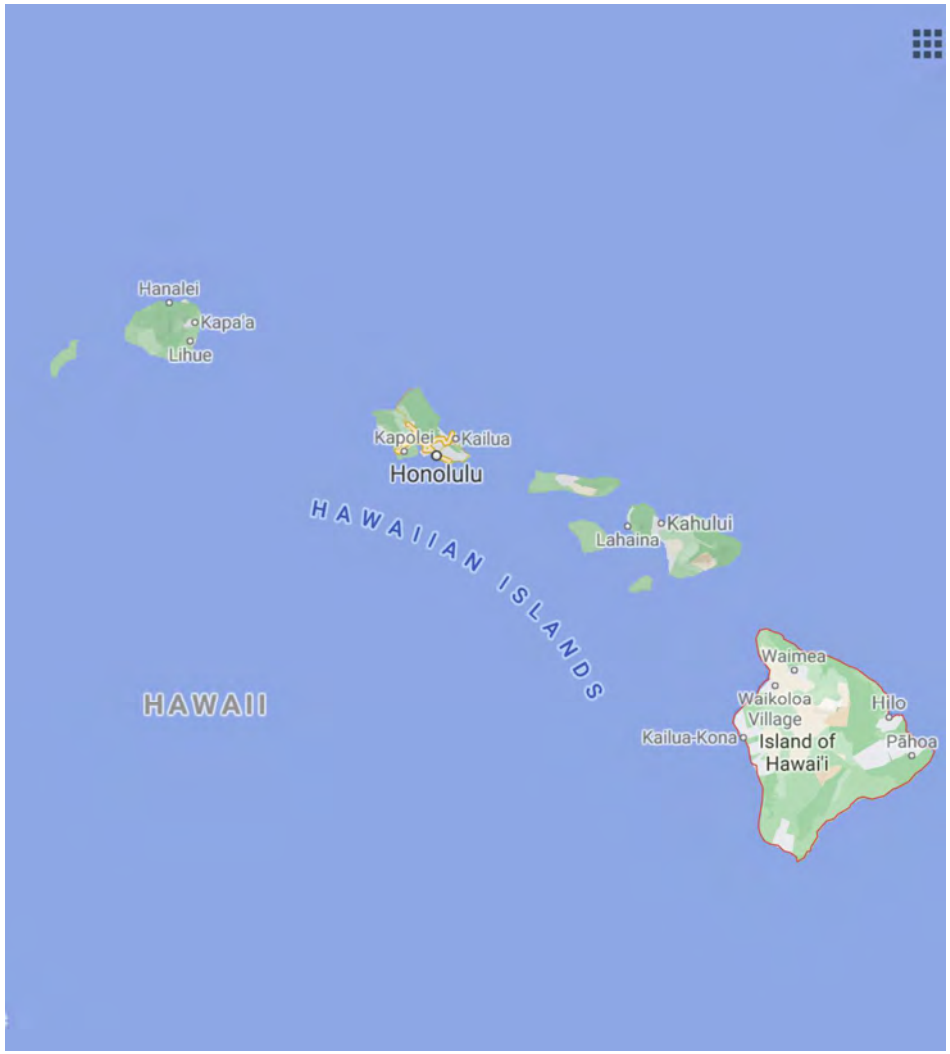
Shown below and to the side is a location map for the Kahului-Wailuku-Lahaina, HI CBSA. The CBSA, defined as Maui County, and includes the neighboring islands of Lanai and Molokai.

The CBSA is typified by very restricted growth patterns, with most new housing construction occurring in ongoing master plans or resorts.



THE KAHULUI-WAILUKU-LAHAINA, HI CBSA (MAUI) ECONOMY

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The Maui economy is dominated by Accommodation and Food Service jobs, but this share is declining over time – from about 30% of all jobs in Year 2000 to a current estimated share of 26%. Trade (both Wholesale and Retail) remains at about 15.5% of the job base, with Government representing a stable 13.5% of all jobs. Professional and Business Service jobs are growing (about 9.5% of jobs) and Healthcare is growing (about 7.5% of jobs). Construction jobs represent a stable 5.5% of jobs while Transportation/Utilities represents a growing 5% of jobs. Manufacturing, including Agricultural Processing, represents only about 1.5% of jobs – half of what it was in Year 2000.

Years 2021 and 2022 are likely to be banner post-pandemic job growth years, with enormous positive pressures on Trade, Transportation and Tourism-related jobs. Health-related jobs, anchored by Maui Memorial Medical Center (pictured below) are likely to expand. This hospital is within close proximity of the site and will positively influence demand for housing at the site

WAIEHU, MAUI - AUGUST 2021

Employer	Year Established	Total Employees
Maui Memorial Medical Center	1884	1,666
Grand Wailea Resort	1991	1,432
Four Seasons Resort (Wailea)	1990	985
Hyatt Regency Resort	1980	790
Westin Maui Resort	1972	731
Fairmont Kea Lani Resort	1991	715
The Ritz-Carlton, Kapalua	1992	703
Four Seasons Resort (Lanai)	1991	658
Hale Makua Health Services	1946	456
Kaiser Foundation Health	1958	422
Aqua-Aston Hospitality	1948	420
Roberts Hawaii	1941	362
Wailea Beach Marriott Resort	1976	325
Securitas Security Services	1961	313
Kamehameha Schools Maui	1996	287
Kaanapali Beach Hotel	1964	249
Maui Economic Opportunity	1965	235
Kula Hospital	1909	225
VIP Foodservice	1950	177
Maui Ocean Center	1998	122
Maui Brewing Company	2005	100

Source: Hawaii Department of Labor and Industrial Relations.

KAHULUI-WAILUKU-LAHAINA, HI CBSA (MAUI) EMPLOYMENT

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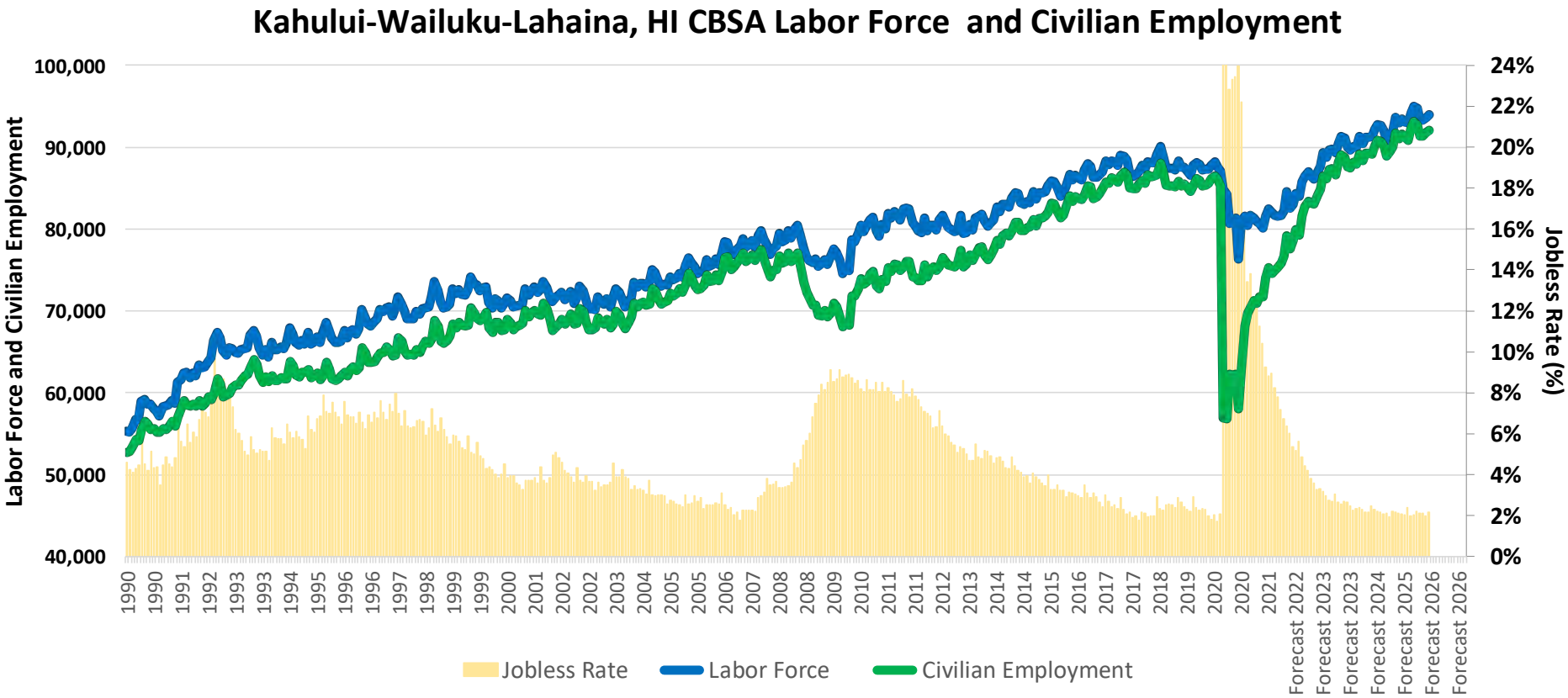
As shown below, employment was severely disrupted in Maui County as the economy shut down in March-May. Almost 30,000 jobs were lots in March through May, leading to an astounding 32.9% unemployment rate in April 2020. This region was hit especially hard due to exposure to those industries (Leisure/Hospitality, Trade, Entertainment) which were hit hard by the pandemic. A total of 12,805 jobs were regained from June through December, dropping the unemployment rate to 13.4%. A partial V-shaped rebound in jobs has been manifest. A new government cash infusion has begun which has contributed to holding up the rental market, but YTD job growth has been slow until June. During June and July, the Maui has surged as the partial lifting of restrictions has caused a record level of visitors. This surge is likely to continue, boosting the Maui economy to full recovery mid-2022, and strong growth projected to continue through Year 2025 due to the continued recovery, age migration patterns, increased discretionary income and projected strong national economic growth due to infrastructural and other public spending.



KAHULUI-WAILUKU-LAHAINA, HI CBSA (MAUI) EMPLOYMENT (cont.)

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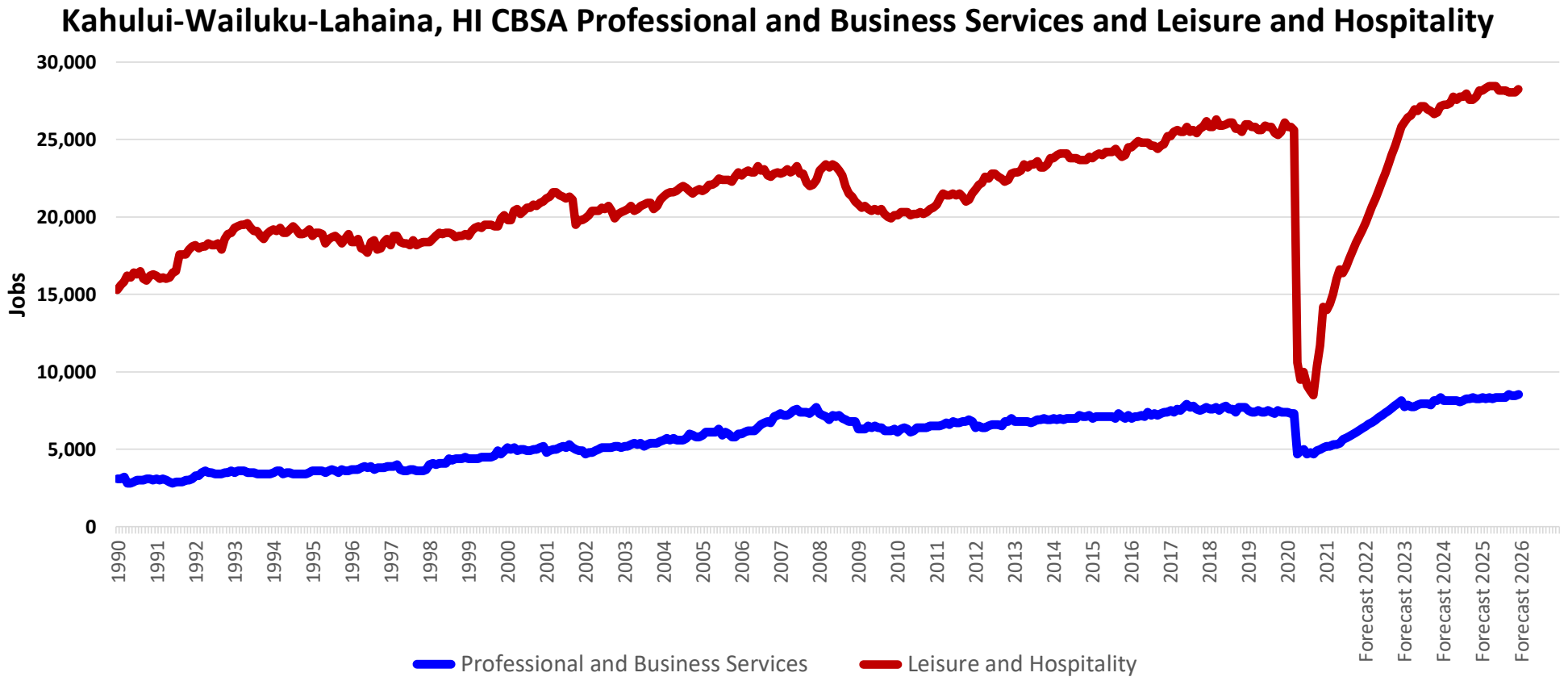
Employment losses have impacted jobs which support both homeownership and rentals, but the initial impact has been far more severe for jobs slanted toward the rental market (mainly Leisure and Hospitality jobs). Rental occupancies and rents have yet to absorb the full brunt of the impact due to government subsidies, and a significant apartment market disruption has largely been avoided. The owner market has actually improved during the pandemic as lower mortgage rates more than overcame a relatively modest disruption in owner-related jobs. The vacancies for both owner- and renter product remains extremely low, and housing shortages which plague this market have significantly reduced the potentially negative impact of any disruption. The forecast set forth in this report assumes a maximum of a 24 month economic disruption, with uneven but increasingly strong growth becoming evident as early as the 2nd half of 2021. Recovery for both sectors is strong, but it is likely to be stronger in the Leisure and Hospitality sectors as Americans' vacation demand continues to surge.



Source: Census Bureau; Bureau of Labor Statistics; Real Estate Analytics

KAHULUI-WAILUKU-LAHAINA, HI CBSA (MAUI) POPULATION

Robbins Boud
Real Estate Analytics

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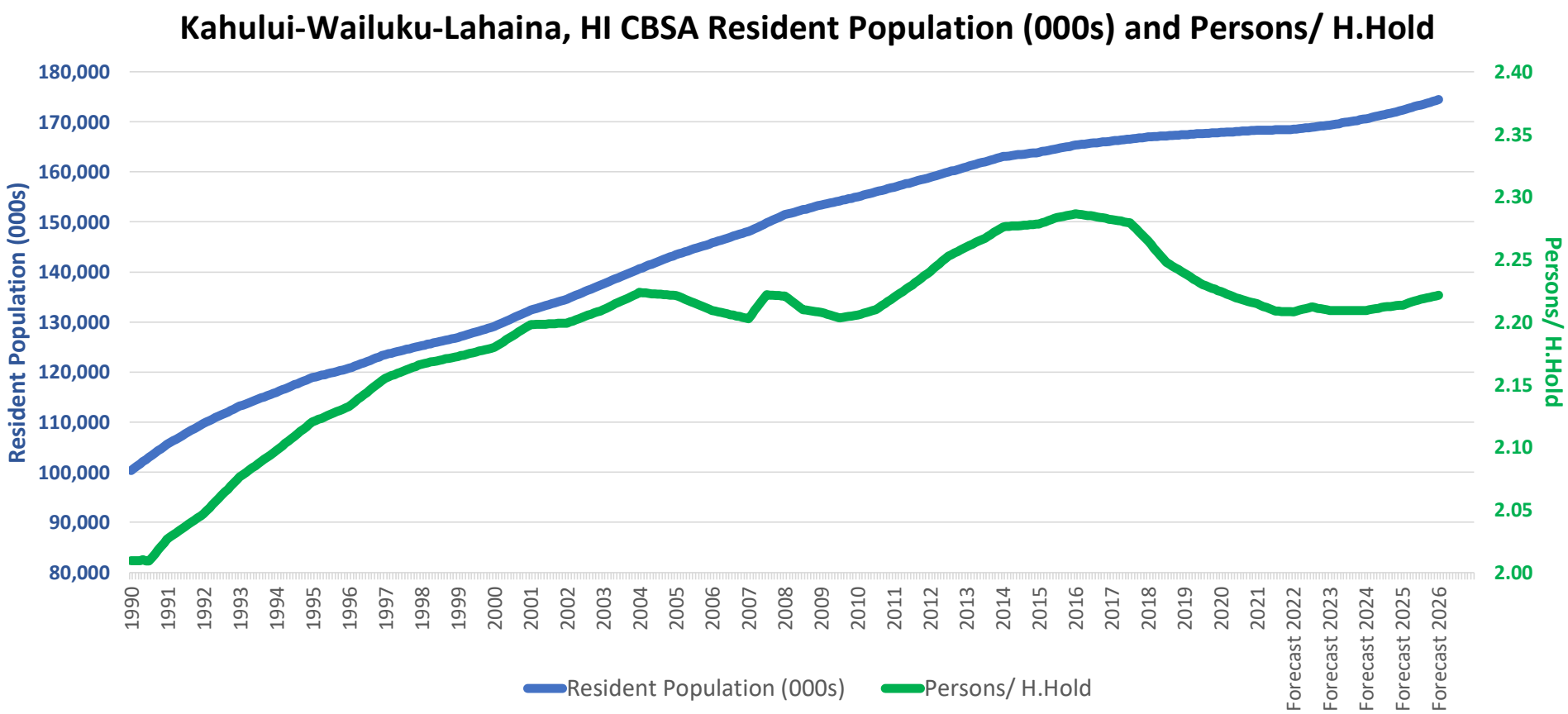
Population growth is anticipated to be flat during the balance of the pandemic as the economic disruption concludes, but as economic growth resumes, population growth will increase. Persons per household has fallen in recent quarters. Persons per household will likely rise slightly for the next few years as households 'double up' during due to reduced housing supply and reduced affordability.



Source: Census Bureau; Bureau of Labor Statistics; Real Estate Analytics

FORECAST HOUSING MORTGAGE RATES

Robbins Boud
Real Estate Analytics

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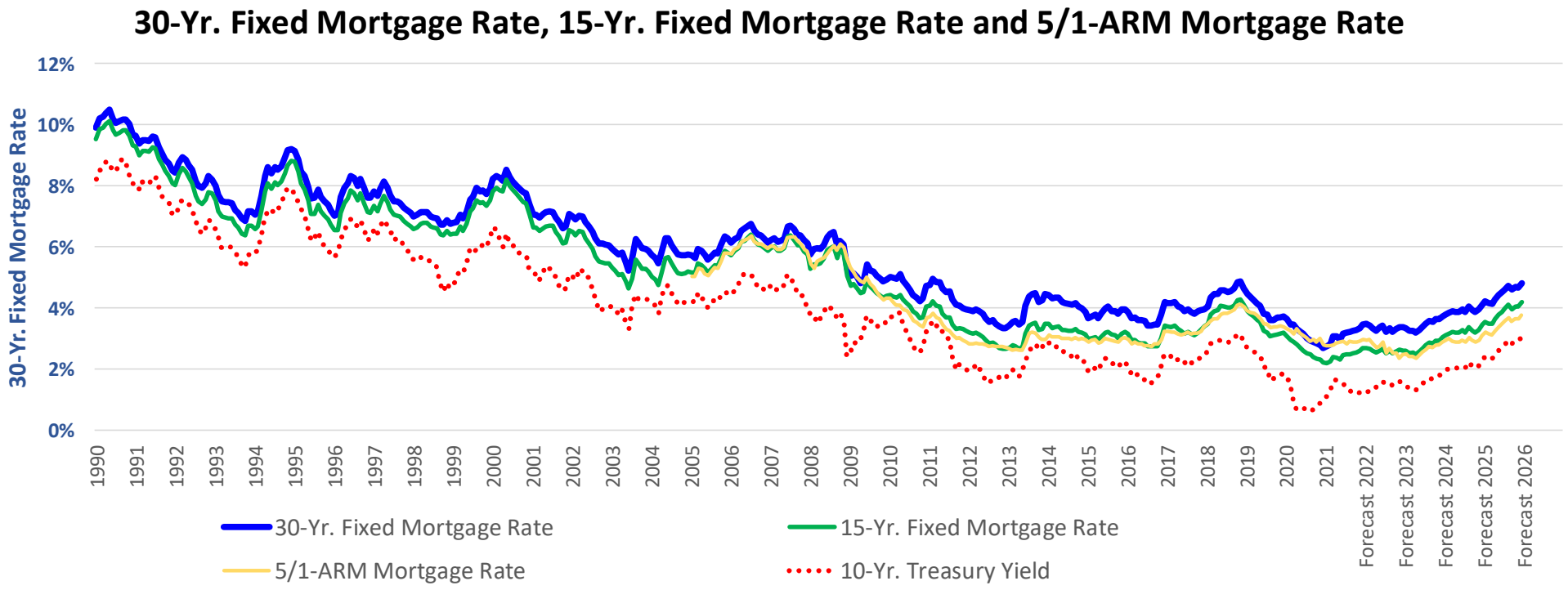
Mortgage rates have reached all time lows. During 3rd quarter 2021, 30-year fixed rates have remained well below 3.0%. For the new home market, that translates to an average drop in monthly mortgage costs of 11.5% from the assumed 4.5% fixed rate reached in Year 2019. Going forward, there will be a bias toward rising rates as unprecedented increases in the money supply eventually causes inflation. Indeed, there is an increasing risk of hyper-inflation due to the influx of cash, high national debt loads and government instability, and this longer-term hyper-inflation will lead to higher mortgage rates. There is danger to even a mild increase in mortgage rates, as it will cause existing home sales volume to slow as more homeowners stay in place to preserve their historically low fixed rate. The result is less competition for new home sales, but also less generation of buyers who are dependent upon equity rollover, and there is increasing risk of a downward price correction commensurate with rising rates. The entry level market is not as sensitive to increases in mortgage rates because they do not have a low fixed rate loan already in place. These entry-level buyers are also apt to choose an adjustable rate mortgage as rates rise. The second home market will also not be as dramatically impacted as the primary home market. Smaller, entry-level housing (including attached housing) should dominate the product profile at the subject community.



Source: Freddie Mac; Real Estate Analytics; Statistica; The Balance

REGIONAL HOUSING SUPPLY VS. ECONOMIC-GENERATED (RAW) HOUSING DEMAND

Robbins Boud
Real Estate Analytics

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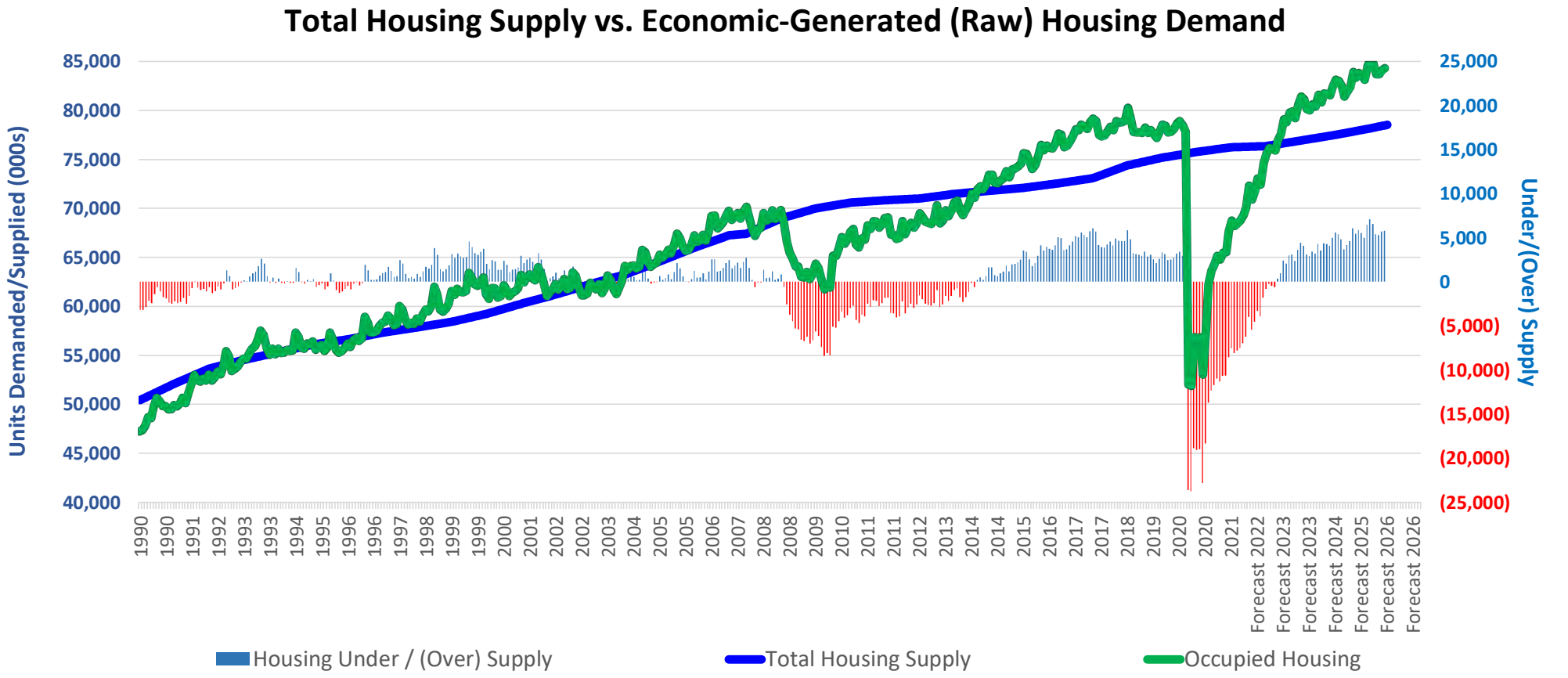
Total housing supply trends (shown by the blue curve) are supplied by the Bureau of the Census while the 5-year housing forecast is provided by Real Estate Analytics. Economic-generated (raw) housing demand is derived by applying long-term trends in jobs-to-housing ratios to the current rate of job growth. This simple model reflects the severe disruption in raw housing demand caused by abrupt and massive job losses. Almost all of the lost level of demand, however, has already been recouped, and predicted job growth is likely to keep raw housing demand well above current and forecast levels of supply, ensuring increasing levels of pent-up demand once the market normalizes from the current disruption.



Source: Census Bureau; Robbins Boud Real Estate Analytics

THE FORECAST IMPACT ON HAWAII COUNTY'S FOR-SALE HOUSING MARKET

Robbins Boud
Real Estate Analytics

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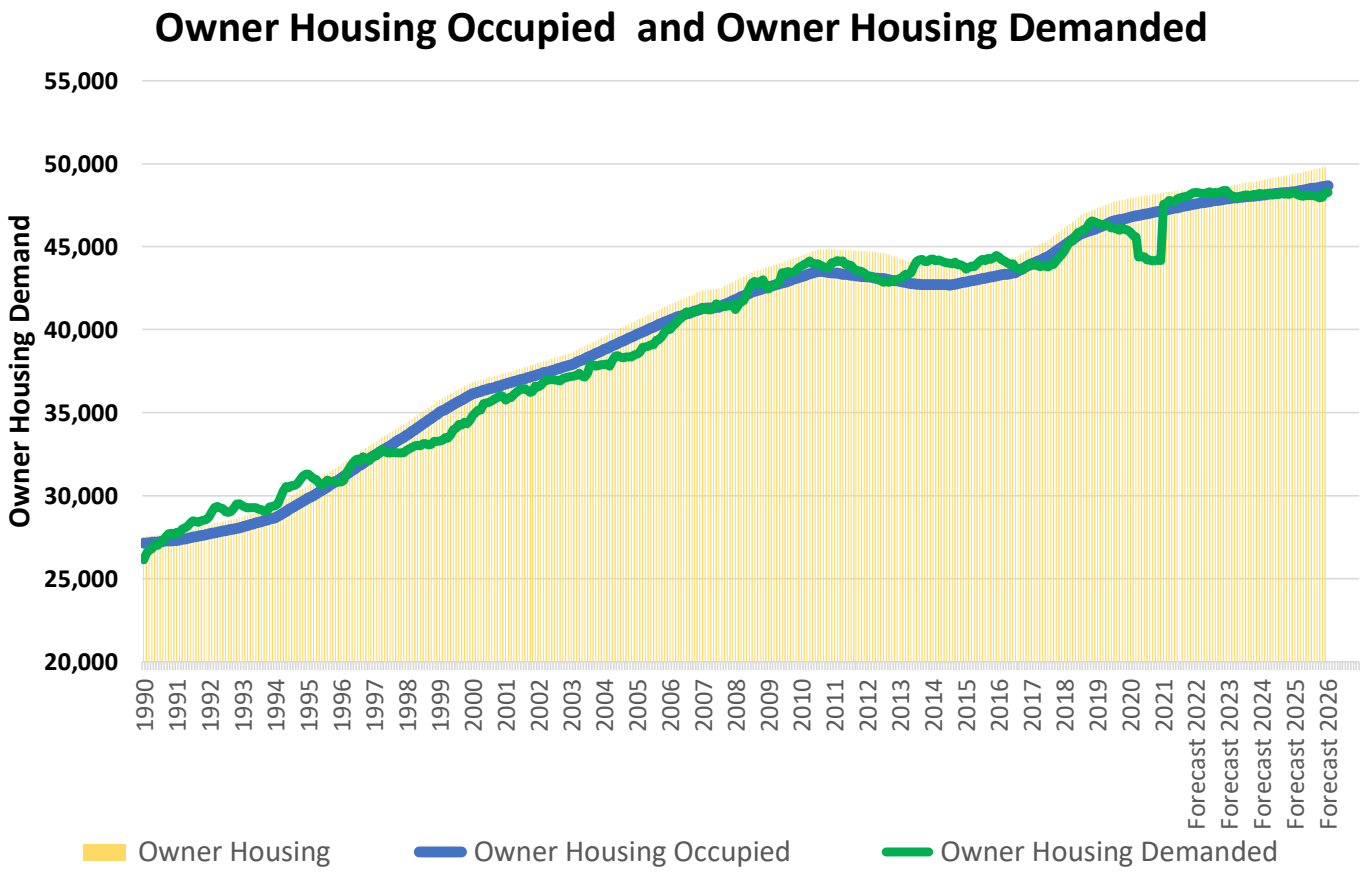
Scores of economic, socio-economic and demographic variables were examined and trended from 1990 through 5-year forecasts in order to generate a model that produces a very high R^2 correlation (0.982) to effectively and accurately forecast the housing market, inclusive of the impact of the Covid-19 pandemic. Some of the core variables examined include; Civilian Employment, Jobless Rate, Unemployment Insurance Claims, Resident Population, Persons per Household, Total Housing Supply, Residential Permits, Owner and Renter Vacancies, Household Incomes and Mortgage Rates. These and other factors were examined and combined to produce the modeled results shown to the right for the 'Owner' housing market and on the following page for the 'Renter' housing market.

As shown in the chart to the right, comparisons are made between the observed level of owner-occupied housing (shown by the blue curve) and the modeled estimate and forecast (shown by the green curve). The modeled estimates since 1990 are not always perfect, but are sufficiently accurate to lend confidence in the 5-year forecast, and from this forecast, the owner occupied housing forecast is trended.

As shown, the forecasts set forth some short-term disruption but the modeled market disruption isn't sufficient to derail the housing market in the near-term. Indeed, the impact of lower mortgage rates has resulted in unprecedented activity.

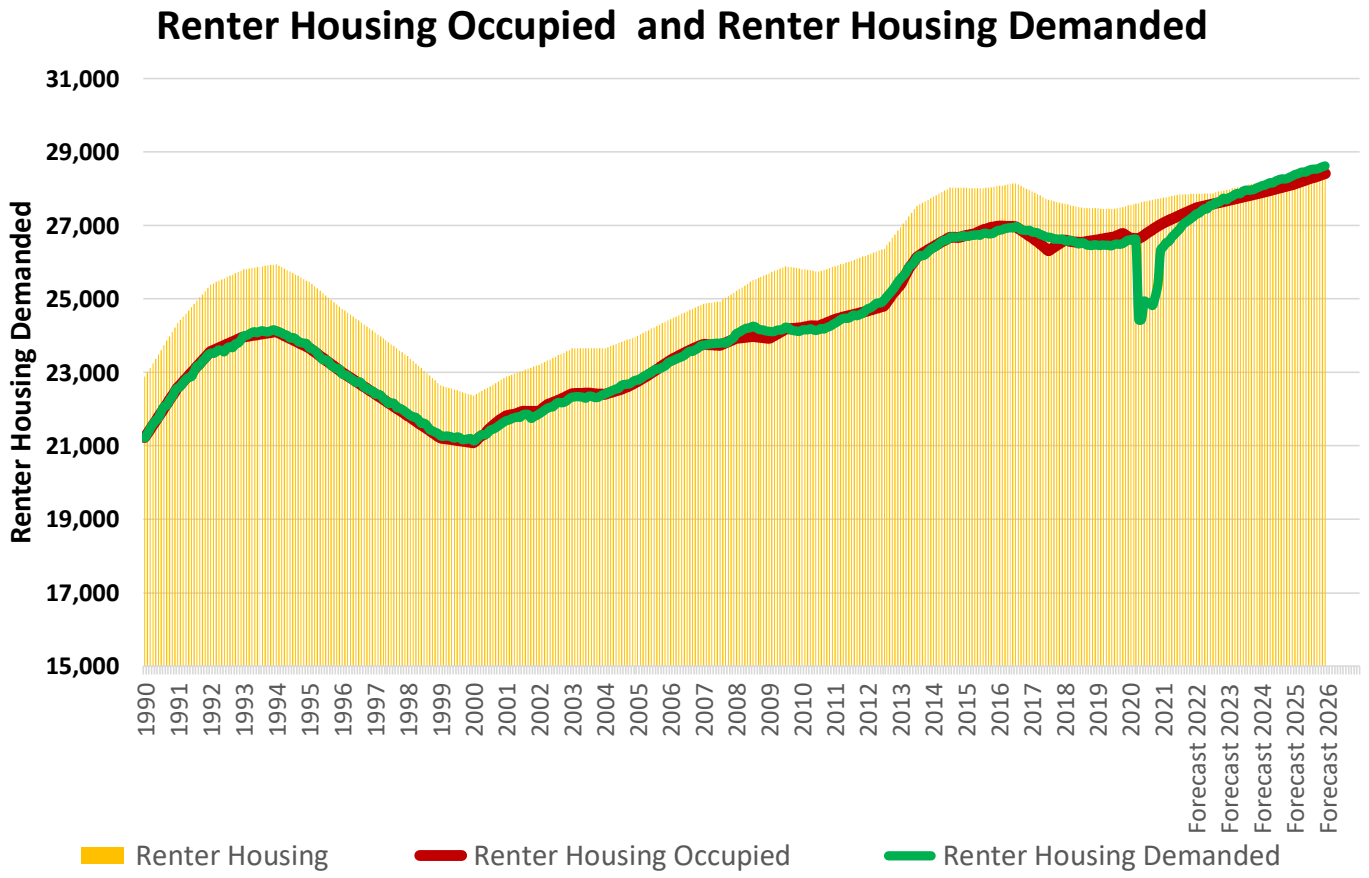


Source: Real Estate Analytics

THE FORECAST IMPACT ON HAWAII COUNTY'S FOR-RENT HOUSING MARKET (cont.)

Continuing from the previous page, the rental market actually lost inventory during much of the 1990s decade due to conversions for condominium product and the sale of single-family rentals that had accumulated during the 1980s. Since Year 2000, the rental market has generally added inventory each year with the exception of more rental conversions from 2017-2019 as foreclosure homes accumulated from Years 2008 to 2016 were sold off at a profit.

Rental inventory is slowly building again and will continue to build as rents remain high, but the gains will be slow each year due to the difficulty of profitability at rent-restricted rates.



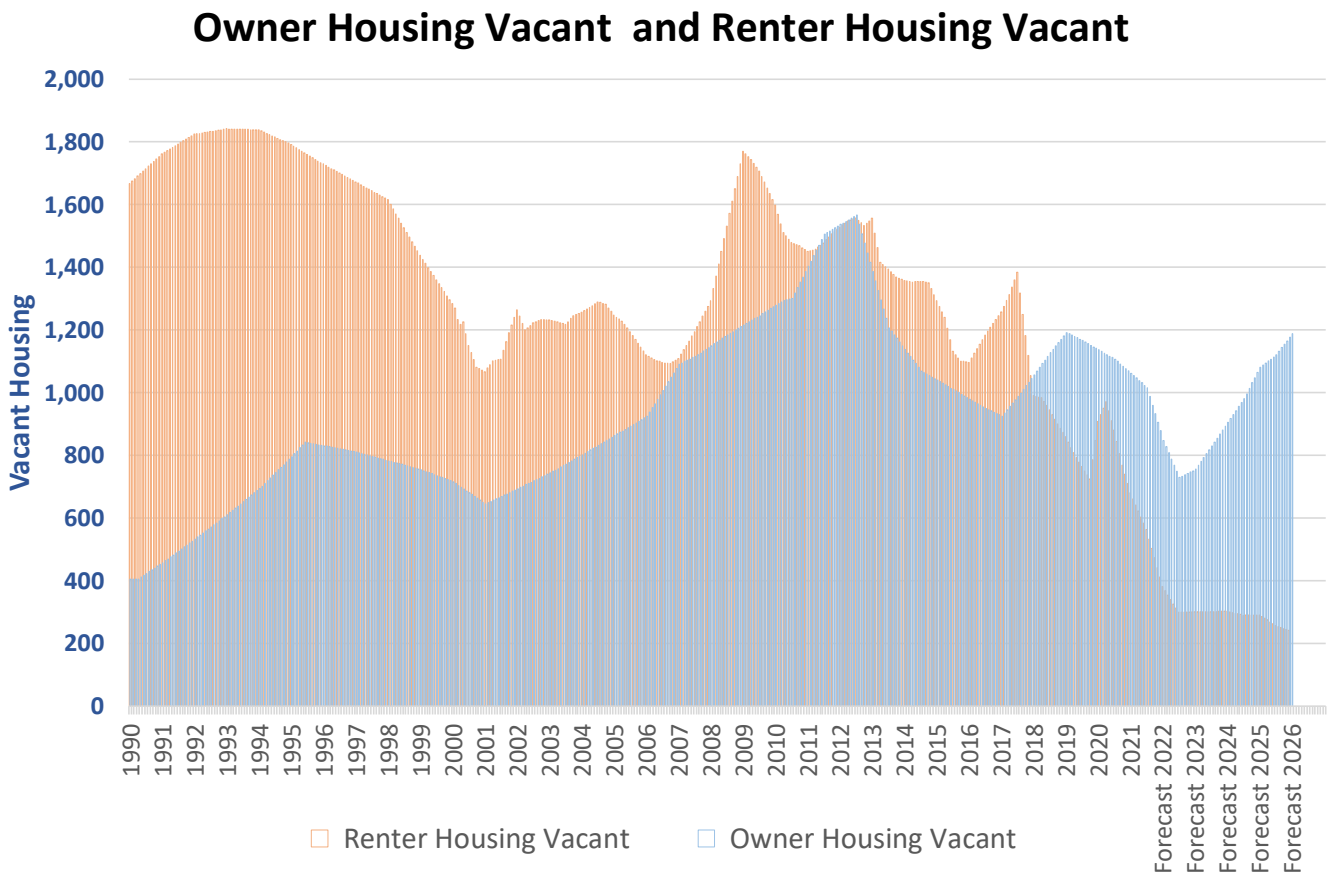
Source: Real Estate Analytics

THE FORECAST IMPACT ON HAWAII COUNTY'S HOUSING OCCUPANCIES

The vacancy patterns in the for-sale market vs. the for-rent market are shown graphically in a comparison of vacancies and projected vacancies to the right. As shown in the chart, for-rent vacancies tend to lead for-sale vacancies and/or tend to be somewhat counter-cyclical. During periods of economic expansion, renters transfer to owner housing at a faster rate than during recessionary years. During recessionary years, for-sale vacancies tend to expand as for-rent vacancies shrink.

During the next five years, apartment vacancies are forecast to recede, with a more rapid decline during Years 2022 and 2023 due to the currently severe lack of housing supply.

During and after Year 2023, mortgage rates are forecast to rise, and as they do, the for-sale market will begin to weaken while the for-rent market will remain strong in terms of occupancies and rent growth.



Source: Real Estate Analytics

THE FORECAST IMPACT ON HAWAII COUNTY'S FOR-SALE HOUSING VALUES

Robbins Boud
Real Estate Analytics

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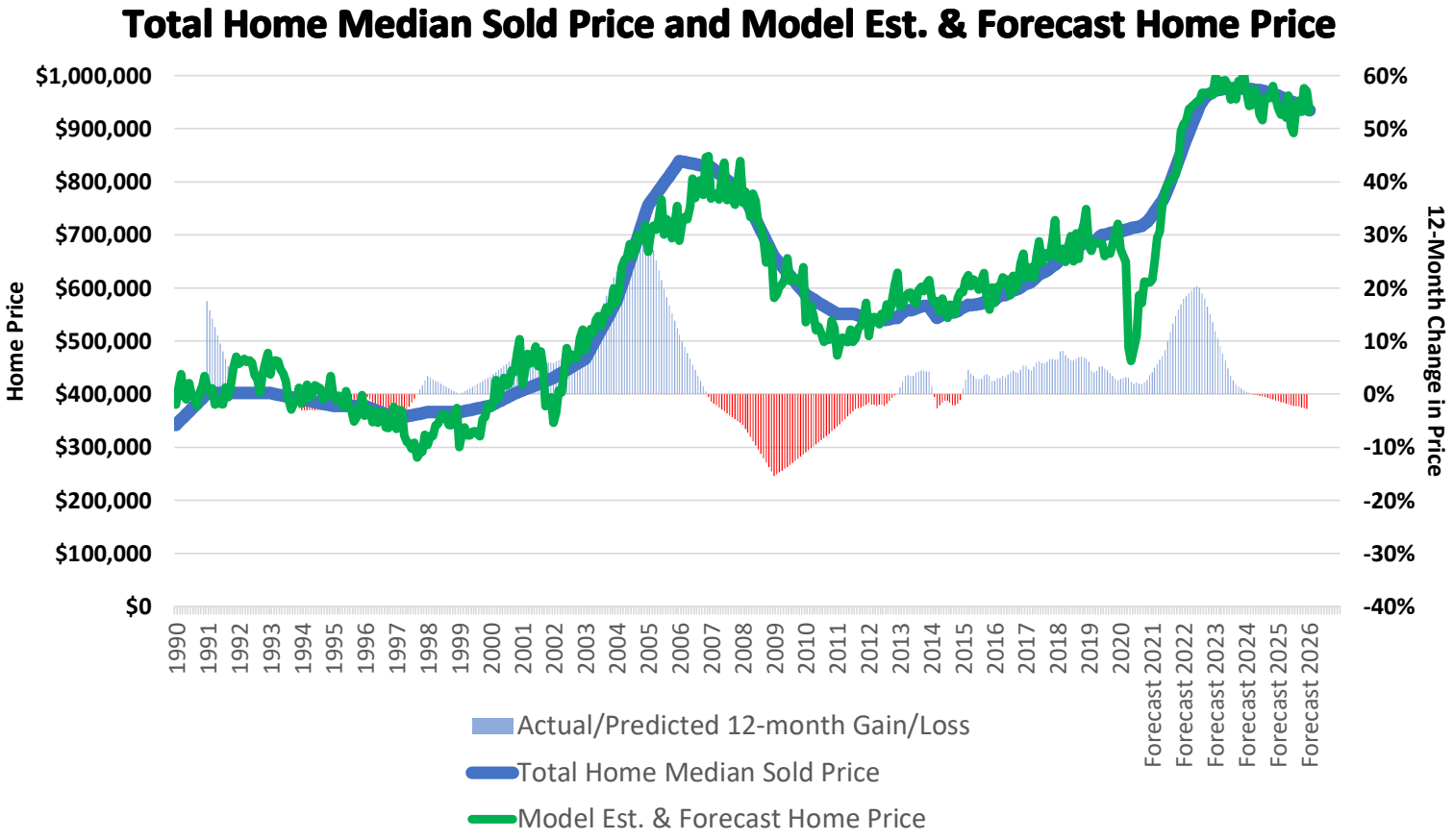
As shown in the charts to the right, the modeled sold price of housing has not fallen in reaction to severe job losses. Rather, prices have continued to climb in an atmosphere of low supply and record low mortgage rates. High rents have also contributed, causing an increase in the transition from renters to ownership as owner costs have fallen due to low rates. Thus far, the model has shown more disruption than the actual market.

Over time, as mortgage rates climb in the face of enormous levels of national debt, a weakening dollar and rising Treasury yields, the model predicts a leveling off of pricing in and after Year 2023.



Source: Census Bureau; NAR; Zillow, Real Estate Analytics

THE FORECAST IMPACT ON HAWAII COUNTY'S FOR-RENT HOUSING RENTAL RATES

Robbins Boud
Real Estate Analytics

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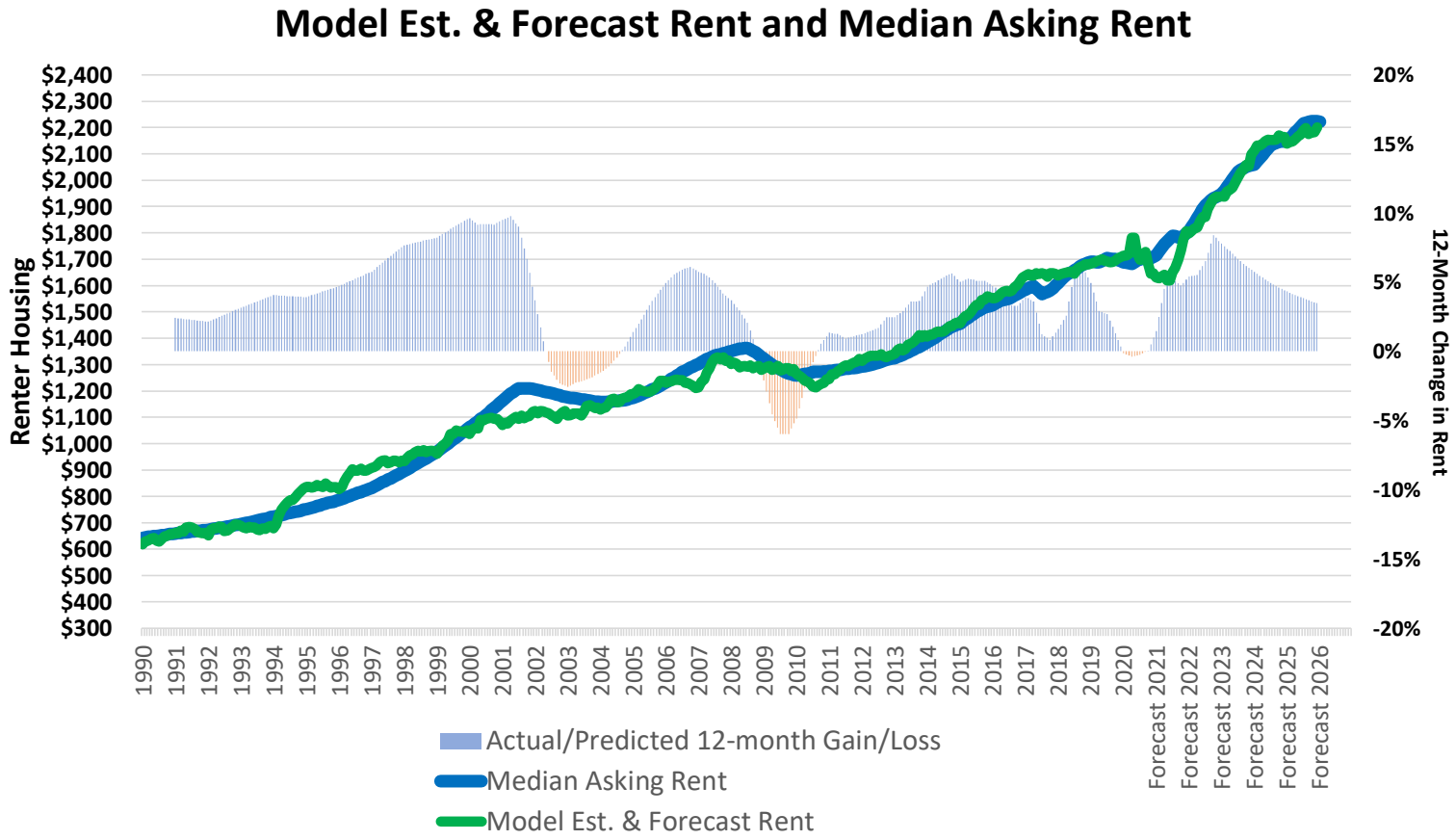
Rental rates were briefly disrupted before federal subsidies kicked in.

This disruption has already faded. Indeed, growth in rents has resumed at a healthy rate. Rents will continue to grow as economic growth resumes. Indeed, as mortgage rates increase, the rental market is likely to heat up as the for-sale market slows.



Source: Census Bureau; NAR; Zillow, Real Estate Analytics

FORECAST HOUSING PRICE AND RENTAL RATE CHANGES

Robbins Boud
Real Estate Analytics

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A numeric summary of predicted changes in for-sale housing values relative to changes in rental rates is shown in the table and chart to the right.

As shown, Year 2021 has already proven to be a very strong year in terms of price appreciation. For-sale prices have already increased over 6.0% since the beginning of Year 2021, with price appreciation for the entire year estimated to be 9.9%.

Year 2022 will be more of the same – high levels of price appreciation that will be exacerbated by the disruption in housing supply even while economic growth resumes at a faster rate as the pandemic comes to a resolution.

Solid gains in rental rates during the first half of Year 2021 will continue as the job market expands to accommodate the surge in vacationers.

Cumulatively, for-sale price appreciation will reach 30.5% from Years 2021 through 2025. During the same period, cumulative growth in rents is forecast at 26.7%.

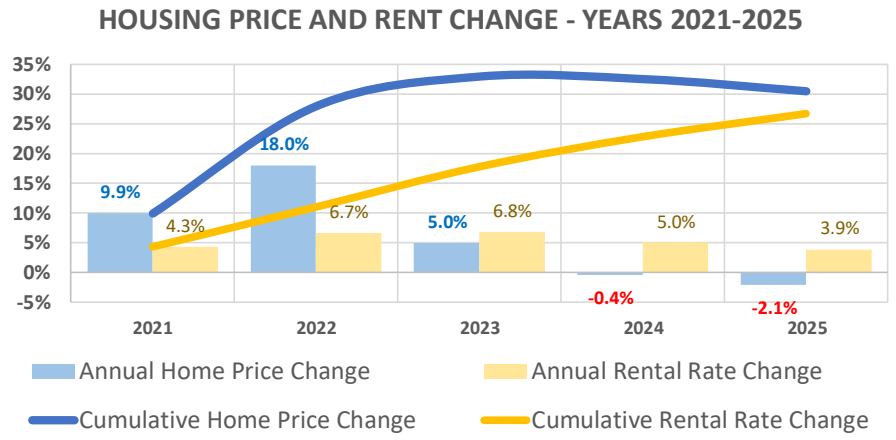
Kahului-Wailuku-Lahaina, HI CBSA

Predicted Housing Price Changes

Year	Average Price	Change Annual	Change Cum.
2020	$715,417		
2021	$786,544	**9.9%**	**9.9%**
2022	$928,344	**18.0%**	**28.0%**
2023	$974,477	**5.0%**	**32.9%**
2024	$970,735	**-0.4%**	**32.6%**
2025	$950,464	**-2.1%**	**30.5%**

Predicted Rental Rate Changes

Year	Asking Rent	Change Annual	Change Cum.
2020	$1,695/mo.		
2021	$1,768/mo.	**4.3%**	**4.3%**
2022	$1,887/mo.	**6.7%**	**11.0%**
2023	$2,015/mo.	**6.8%**	**17.8%**
2024	$2,116/mo.	**5.0%**	**22.8%**
2025	$2,198/mo.	**3.9%**	**26.7%**



Source: Real Estate Analytics

APPENDIX B – NEW HOME PROFILES

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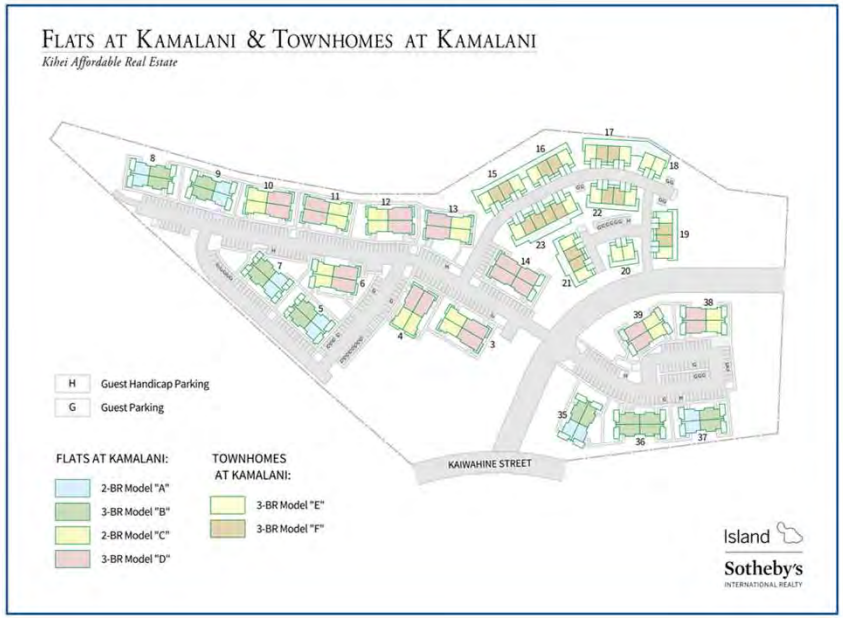
Kamalani at Kihei by Armstrong Builders

Development Name/ Community/Address	Sold Date	Sold Price	Living Area	Price/ Sq.Ft.	Bed-rooms	Baths	Lot Size	Year Built	DOM	HOA
Kamalani	May-27-2020	$419,000	755sf	$555/sf	2	1.5	-	2017	83	$341
	November-23-2020	$395,000	755sf	$523/sf	2	1.5	-	2018	196	$342
Condo/Townhome	January-21-2021	$415,000	755sf	$550/sf	2	1.5	-	2017	64	$361
Kihalani Place, Kihei	June-20-2021	$456,000	755sf	$604/sf	2	1.5	-	2018	55	$328
Year Built 2017-19	May-16-2021	$479,000	755sf	$634/sf	2	1.5	-	2017	62	$328
Armstrong Builders	April-27-2020	$449,000	804sf	$558/sf	2	2.0	-	2019	90	$384
	July-9-2020	$455,000	804sf	$566/sf	2	2.0	-	2019	148	$384
	November-11-2020	$425,000	804sf	$529/sf	2	2.0	-	2017	152	$384
	April-5-2021	$469,000	804sf	$583/sf	2	2.0	-	2018	61	$348
	July-18-2021	$493,000	804sf	$613/sf	2	2.0	-	2017	52	$348
	January-13-2021	$500,000	925sf	$541/sf	3	2.0	-	2017	27	$450
	January-25-2021	$469,000	925sf	$507/sf	3	2.0	-	2017	83	$415
	January-31-2021	$485,000	925sf	$524/sf	3	2.0	-	2018	54	$415
	July-15-2021	$523,000	925sf	$565/sf	3	2.0	-	2018	101	$439
	June-6-2021	$500,000	925sf	$541/sf	3	2.0	-	2017	53	$397
	March-10-2021	$506,000	925sf	$547/sf	3	2.0	-	2018	69	$397
	March-24-2021	$500,000	925sf	$541/sf	3	2.0	-	2018	59	$397
	May-16-2021	$513,000	925sf	$555/sf	3	2.0	-	2017	67	$397
	August-19-2020	$475,000	1,022sf	$465/sf	3	2.0	-	2017	63	$483
	December-30-2020	$495,000	1,022sf	$484/sf	3	2.0	-	2019	146	$437
	November-15-2020	$485,000	1,022sf	$475/sf	3	2.0	-	2018	103	$483
	November-22-2020	$490,000	1,022sf	$479/sf	3	2.0	-	2019	189	$483
	January-3-2021	$490,000	1,022sf	$479/sf	3	2.0	-	2017	171	$483
	December-1-2020	$599,000	1,174sf	$510/sf	3	2.5	-	2017	36	$555
	December-22-2020	$625,000	1,174sf	$532/sf	3	2.5	-	2018	70	$551
	February-2-2020	$583,000	1,174sf	$497/sf	3	2.5	-	2018	75	$521
	December-17-2020	$590,000	1,180sf	$500/sf	3	2.5	-	2017	83	$555
	July-15-2020	$584,300	1,180sf	$495/sf	3	2.5	-	2019	56	$555
Grand Totals and Overall Averages:		**$495,261**	**935sf**	**$534/sf**	**2.6**	**2.0**		**2018**	88	**$427**

Source: County Recorder, MLS, New Home Source; Real Estate Analytics; Redfin; various brokers and builders.



Highlands at Kehalani by DR Horton

Development Name/ Community/Address	Sold Date	Sold Price	Living Area	Price/ Sq.Ft.	Bed-rooms	Baths	Lot Size	Year Built	DOM	HOA
Highlands	July-1-2021	$980,000	1,502sf	$652/sf	3	2.0	8,503	2019	53	$69
	February-5-2020	$659,000	1,508sf	$437/sf	3	2.0	8,425	2019	89	-
Single Family	February-27-2020	$754,180	1,528sf	$494/sf	3	2.0	5,889	2019	74	-
Ka'Ikena Loop, Kehalani	July-30-2020	$785,000	1,528sf	$514/sf	3	2.0	6,612	2018	41	-
Year Built 2017-20	October-19-2020	$776,000	1,528sf	$508/sf	3	2.0	5,672	2019	215	-
DR Horton	November-23-2020	$835,000	1,542sf	$542/sf	3	2.0	5,567	2020	61	-
	June-28-2020	$743,360	1,655sf	$449/sf	3	2.5	7,658	2019	77	-
	July-14-2020	$811,260	1,743sf	$465/sf	3	2.5	5,920	2020	171	-
	July-30-2020	$715,260	1,743sf	$410/sf	3	2.5	9,984	2020	109	-
	September-14-2020	$819,000	1,743sf	$470/sf	3	2.5	6,817	2020	87	-
Grand Totals and Overall Averages:		**$787,806**	**1,602sf**	**$494/sf**	**3.0**	**2.2**	**7,105**	**2019**	98	**$69**

Source: County Recorder, MLS, New Home Source; Real Estate Analytics; Redfin; various brokers and builders.

Ke'Alohilani at Kehalani by DR Horton

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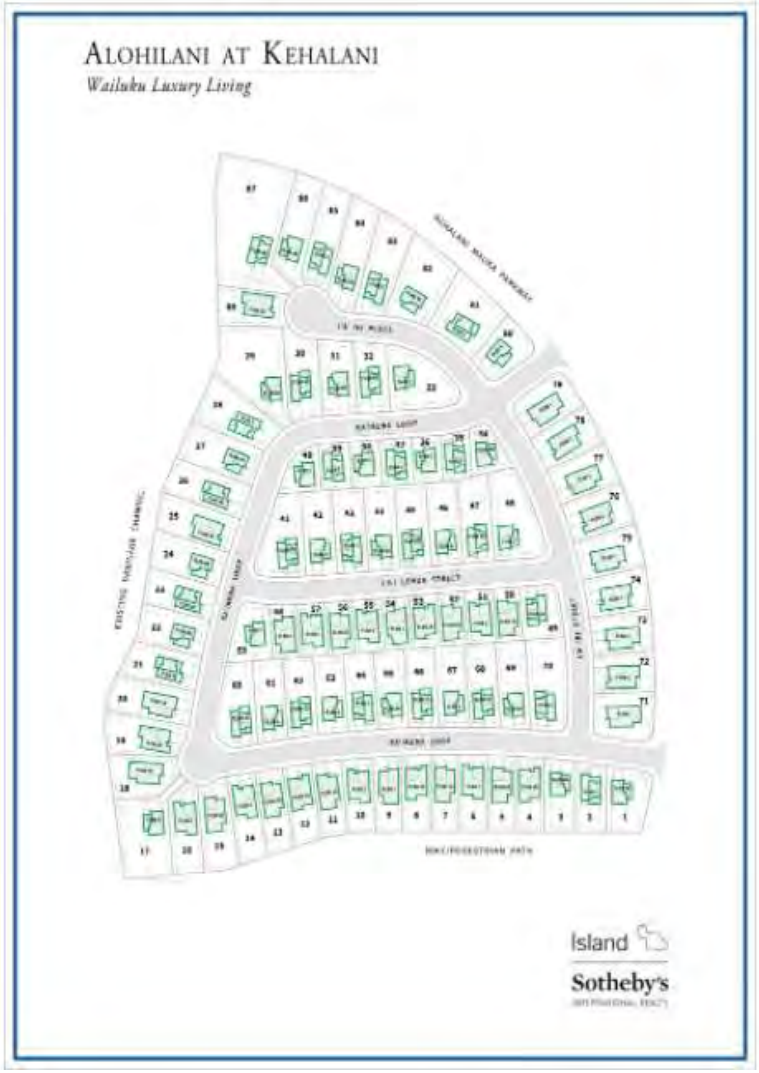
Development Name/ Community/Address	Sold Date	Sold Price	Living Area	Price/ Sq.Ft.	Bed-rooms	Baths	Lot Size	Year Built	DOM	HOA
Ke' Alohilani	June-1-2021	$999,000	1,502sf	$665	3	2.0	7,897	2017	42	$68
	October-6-2020	$800,000	1,502sf	$533	3	2.0	6,525	2017	64	-
Single Family	January-10-2021	$760,000	1,519sf	$500	3	2.0	8,059	2017	59	$75
Ka'ikena Loop, Kehalar	May-13-2021	$899,000	1,521sf	$591	3	2.0	9,113	2018	45	$68
Year Built 2017-18	April-27-2021	$885,000	1,739sf	$509	4	3.0	8,063	2017	55	-
DR Horton	August-27-2020	$691,000	1,739sf	$397	3	2.5	8,124	2018	94	$68
	February-17-2021	$829,000	1,762sf	$470	4	3.0	8,120	2017	140	$68
	March-16-2021	$1,200,000	1,860sf	$645	4	3.5	9,091	2018	29	$60
	August-13-2020	$769,000	1,907sf	$403	4	3.5	11,195	2017	135	$68
Grand Totals and Overall Averages:		**$870,222**	**1,672sf**	**$524**	**3.4**	**2.6**	**8,465**	**2017**	74	**$68**

Source: County Recorder, MLS, New Home Source; Real Estate Analytics; Redfin; various brokers and builders.



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Ilima at Kehalani by Towne Dev.

Development Name/ Community/Address	Sold Date	Sold Price	Living Area	Price/ Sq.Ft.	Bed-rooms	Baths	Lot Size	Year Built	DOM	HOA
Ilima	August-19-2020	$673,000	1,391sf	$484	3	2.0	5,458	2019	331	$65
	August-23-2020	$671,000	1,391sf	$482	3	2.0	5,571	2019	335	$65
Single Family	December-17-2020	$737,337	1,391sf	$530	3	2.0	6,412	2019	206	$68
Puaehu Street, Kehalar	July-22-2020	$681,000	1,391sf	$490	3	2.0	6,007	2019	303	$65
Year Built 2018-21	June-11-2020	$678,000	1,391sf	$487	3	2.0	6,177	2019	262	$65
Towne Dev.	October-14-2020	$726,000	1,391sf	$522	3	2.0	7,144	2019	233	$65
	September-21-2020	$696,000	1,391sf	$500	3	2.0	5,271	2019	210	$65
	April-16-2020	$751,690	1,528sf	$492	3	2.0	6,878	2019	241	-
	February-3-2020	$677,690	1,528sf	$444	3	2.0	8,450	2020	1	-
	July-16-2020	$779,690	1,528sf	$510	3	2.0	4,914	2019	164	-
	December-9-2020	$750,601	1,529sf	$491	3	2.0	8,115	2020	232	$65
	June-23-2020	$735,850	1,529sf	$481	3	2.0	8,063	2019	274	$65
	October-12-2020	$718,325	1,529sf	$470	3	2.0	5,554	2020	239	$68
	October-21-2020	$786,125	1,529sf	$514	3	2.0	8,538	2020	270	$68
	May-24-2021	$765,000	1,529sf	$500	3	2.0	8,638	2021	265	$68
	May-25-2021	$771,850	1,529sf	$505	3	2.0	9,130	2019	274	$68
	July-21-2020	$736,600	1,596sf	$462	3	2.0	5,929	2019	301	$65
	October-25-2020	$763,600	1,596sf	$478	3	2.0	8,655	2019	256	$65
	September-14-2020	$715,000	1,596sf	$448	3	2.0	5,266	2019	203	$65
	September-16-2020	$733,550	1,596sf	$460	3	2.0	5,593	2019	211	$65
	May-17-2021	$784,775	1,596sf	$492	3	2.0	7,501	2019	263	$68
	May-24-2021	$797,775	1,596sf	$500	3	2.0	7,166	2021	265	$68
	August-27-2020	$720,925	1,638sf	$440	3	2.0	5,841	2019	338	$65
	August-30-2020	$748,200	1,638sf	$457	3	2.0	6,325	2019	194	$65
	December-17-2020	$758,500	1,638sf	$463	3	2.0	6,965	2019	234	$68
	July-16-2020	$743,600	1,638sf	$454	3	2.0	6,011	2019	296	$65
	June-29-2020	$719,925	1,638sf	$440	3	2.0	5,841	2019	277	$65
	September-9-2020	$761,350	1,638sf	$465	3	2.0	5,945	2019	198	$65
	February-23-2020	$688,000	1,655sf	$416	3	2.5	8,204	2020	1	-
	June-25-2020	$708,995	1,655sf	$428	3	2.5	8,786	2019	245	-
	April-29-2020	$700,750	1,743sf	$402	3	2.5	9,879	2020	76	-
	January-23-2020	$713,305	1,743sf	$409	3	2.5	11,760	2020	1	-
	March-26-2020	$721,825	1,743sf	$414	3	2.5	28,606	2019	104	-
	April-15-2020	$767,425	1,744sf	$440	3	2.0	6,538	2019	301	$65
	February-10-2020	$746,300	1,744sf	$428	3	2.0	6,055	2019	236	$65
	February-3-2020	$744,500	1,744sf	$427	3	2.0	5,998	2019	283	$65
	February-6-2020	$787,399	1,744sf	$451	3	2.5	5,188	2019	286	$65
	January-13-2020	$750,380	1,744sf	$430	3	2.0	6,094	2019	288	-
	January-28-2020	$796,150	1,744sf	$457	3	2.0	5,188	2019	277	$65
	January-30-2020	$744,000	1,744sf	$427	3	2.0	5,972	2019	279	$65
	January-9-2020	$747,000	1,744sf	$428	3	2.0	6,477	2019	258	$65
	January-18-2021	$797,680	1,744sf	$457	3	2.0	6,473	2021	197	$68
	January-19-2021	$769,000	1,744sf	$441	3	2.0	6,412	2021	198	$68
	January-20-2021	$808,175	1,744sf	$463	3	2.0	8,041	2021	211	$68
	April-16-2020	$725,840	1,769sf	$410	4	3.0	11,692	2020	96	-
	January-23-2020	$727,665	1,769sf	$411	4	3.0	9,109	2020	1	-
	July-21-2020	$731,350	1,769sf	$413	4	3.0	9,801	2020	178	-
	February-3-2020	$712,500	1,869sf	$381	4	3.5	10,128	2019	99	-
	June-29-2020	$737,500	1,869sf	$395	4	3.5	12,907	2020	170	-
	March-19-2020	$815,500	1,869sf	$436	4	3.5	7,893	2020	97	-
	May-28-2020	$733,855	1,869sf	$393	4	3.5	9,958	2020	124	-
	January-26-2020	$787,375	1,924sf	$409	3	2.5	5,188	2019	290	$65
	January-30-2020	$761,250	1,924sf	$396	3	2.5	5,184	2019	279	$65
	January-30-2020	$777,150	1,924sf	$404	3	2.5	5,184	2019	290	$65
	May-14-2020	$758,925	1,924sf	$394	3	2.5	5,175	2019	330	$65
	May-14-2020	$766,925	1,924sf	$399	3	2.5	5,859	2019	330	$65
	July-15-2020	$798,175	1,998sf	$399	3	2.5	9,243	2019	395	$65
	April-7-2021	$817,925	1,998sf	$409	3	2.5	11,539	2020	281	$68
	February-17-2021	$799,400	1,998sf	$400	3	2.5	6,922	2020	259	$65
	February-18-2021	$809,600	1,998sf	$405	3	2.5	7,462	2020	260	$65
	February-25-2021	$832,000	1,998sf	$416	3	2.5	12,088	2019	305	$68
Grand Totals and Overall Averages:		**$748,636**	**1,689sf**	**$447**	**3.1**	**2.3**	**7,678**	**2019**	228	**$66**

Source: County Recorder, MLS, New Home Source; Real Estate Analytics; Redfin; various brokers and builders.

The Parkways at Maui Lani by Towne Dev.

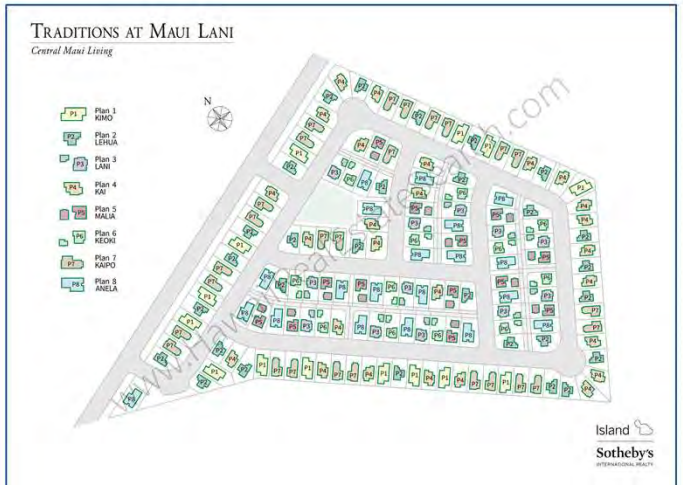
Development Name/ Community/Address	Sold Date	Sold Price	Living Area	Price/ Sq.Ft.	Bed-rooms	Baths	Lot Size	Year Built	DOM	HOA
The Parkways	June-25-2020	$714,000	1,382sf	$517	3	2.0	6,142	2017	86	$101
	October-8-2020	$715,000	1,382sf	$517	3	2.0	7,018	2014	50	$101
Single Family	February-24-2020	$648,750	1,385sf	$468	3	2.0	5,798	2019	443	$113
Maui Lani	March-21-2021	$810,000	1,385sf	$585	3	2.0	6,425	2016	31	$101
Year Built 2015-20	April-13-2021	$829,000	1,560sf	$531	3	2.0	6,199	2018	84	$102
Towne Dev.	October-1-2020	$805,000	1,560sf	$516	3	2.0	7,126	2015	66	$110
	July-16-2020	$800,000	1,663sf	$481	3	2.0	7,379	2017	179	$101
	January-1-2020	$800,000	1,677sf	$477	3	2.0	7,379	2017	-	-
	March-31-2020	$725,000	1,690sf	$429	3	2.0	6,704	2016	180	$64
	June-23-2021	$934,000	1,735sf	$538	3	2.0	6,586	2013	1	$110
	August-4-2020	$845,000	1,932sf	$437	3	2.5	5,907	2016	81	$102
	March-22-2021	$975,000	1,932sf	$505	3	2.5	6,434	2018	49	$101
	March-11-2020	$765,345	1,965sf	$389	3	2.5	6,756	2019	100	$101
	February-27-2020	$748,000	1,998sf	$374	3	2.5	5,972	2019	449	$113
	May-6-2021	$1,060,000	1,998sf	$531	3	2.5	5,362	2016	65	-
	January-7-2021	$980,000	2,487sf	$394	4	2.5	7,780	2015	53	-
Grand Totals and Overall Averages:		**$822,131**	**1,733sf**	**$481**	**3.1**	**2.2**	**6,560**	**2017**	128	**$102**

Source: County Recorder, MLS, New Home Source; Real Estate Analytics; Redfin; various brokers and builders.

Traditions at Maui Lani by DR Horton

Development Name/ Community/Address	Sold Date	Sold Price	Living Area	Price/ Sq.Ft.	Bed-rooms	Baths	Lot Size	Year Built	DOM	HOA
Traditions	MLS Listing	$755,000	1,298sf	$582	3	2.5	3,780	2013	23	$106
	March-18-2021	$695,000	1,298sf	$535	3	2.5	3,001	2013	47	$106
Maui Lani	October-22-2020	$629,000	1,298sf	$485	3	2.5	3,611	2012	105	$106
Single Family	November-9-2020	$630,000	1,310sf	$481	3	2.5	3,441	2014	90	$106
Year Built 2013	February-6-2020	$620,000	1,324sf	$468	3	2.5	3,297	2013	43	$106
DR Horton	February-15-2021	$695,000	1,331sf	$522	3	2.5	3,001	2014	49	$64
	July-11-2021	$790,000	1,331sf	$594	3	2.5	3,424	2013	67	$105
	March-2-2020	$620,000	1,331sf	$466	3	2.5	3,402	2014	78	$105
	April-29-2020	$665,000	1,455sf	$457	3	2.5	4,291	2012	1	$105
	February-22-2021	$705,000	1,519sf	$464	4	3.5	3,890	2014	1	-
	December-30-2020	$700,000	1,532sf	$457	4	3.0	3,001	2012	29	$105
	July-28-2020	$670,000	1,532sf	$437	4	3.0	3,254	2013	47	$106
	March-15-2021	$738,000	1,532sf	$482	4	3.0	3,001	2013	35	$106
Grand Totals and Overall Averages:		**$685,538**	**1,392sf**	**$495**	**3.3**	**2.7**	**3,415**	**2013**	47	**$102**
Listing Totals and Overall Averages :		**$755,000**	**1,298sf**	**$582**	**3.0**	**2.5**	**3,780**	**2013**	23	**$106**
SoldTotals and Overall Averages :		**$679,750**	**1,399sf**	**$487**	**3.3**	**2.7**	**3,385**	**2013**	49	**$102**

Source: County Recorder, MLS, New Home Source; Real Estate Analytics; Redfin; various brokers and builders.



Kamani at Kehalani by Towne Dev.

Development Name/ Community/Address	Sold Date	Sold Price	Living Area	Price/ Sq.Ft.	Bed-rooms	Baths	Lot Size	Year Built	DOM	HOA
Kamani	February-25-2021	$618,490	1,425sf	$434	3	2.5	-	2016	1	$65
	June-18-2020	$625,000	1,425sf	$439	3	2.0	-	2016	84	$194
Paired Homes	February-13-2020	$599,000	1,457sf	$411	3	2.5	-	2018	188	$65
Kehalani	February-18-2020	$609,950	1,457sf	$419	3	2.5	4,857	2020	193	$65
Towne Dev.	January-23-2020	$615,000	1,457sf	$422	3	2.5	-	2018	167	$65
Year Built 2018	January-9-2020	$645,000	1,457sf	$443	3	2.5	-	2018	153	$65
Grand Totals and Overall Averages:		**$618,740**	**1,446sf**	**$428**	**3.0**	**2.4**	**4,857**	**2018**	131	**$87**

Source: County Recorder, MLS, New Home Source; Real Estate Analytics; Redfin; various brokers and builders.

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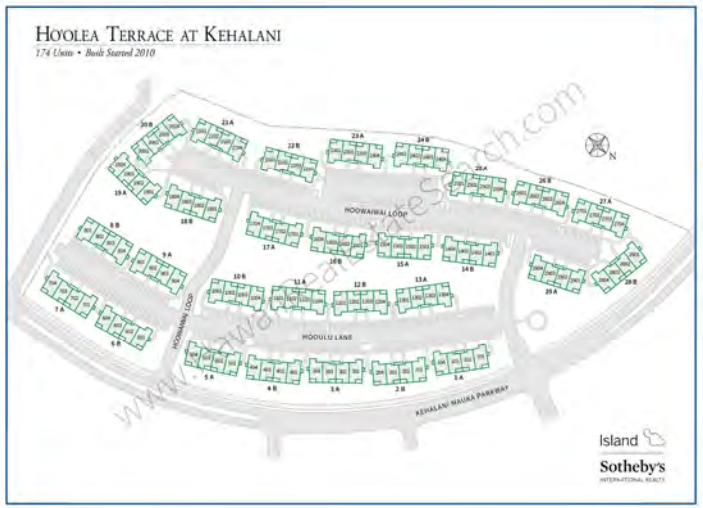
Ho'ole'a Terrace at Kehalani by Stanford Carr

Development Name/ Community/Address	Sold Date	Sold Price	Living Area	Price/ Sq.Ft.	Bed-rooms	Baths	Lot Size	Year Built	DOM	HOA
Ho'ole'a Terrace	April-6-2021	$425,000	751sf	$566	2	1.5	-	2010	124	$321
	December-10-2020	$439,000	751sf	$585	2	1.5	-	2012	91	$75
Kehalani	January-20-2021	$400,000	751sf	$533	2	1.5	-	2014	142	$65
Condo/Town	July-21-2020	$400,000	751sf	$533	2	1.5	-	2012	55	$65
Stanford Carr	July-23-2020	$410,000	751sf	$546	2	1.5	-	2013	65	$65
Year Built 2012	May-19-2021	$427,000	751sf	$569	2	1.5	-	2012	34	$65
	September-24-2020	$410,000	751sf	$546	2	1.5	-	2013	1	$75
	February-8-2021	$410,000	754sf	$544	2	1.5	-	2010	138	$65
	July-7-2021	$425,000	754sf	$564	2	1.5	-	2014	50	$65
	June-17-2020	$424,848	754sf	$563	2	1.5	-	2013	102	$65
	May-23-2021	$405,000	754sf	$537	2	1.5	-	2010	91	$65
	October-18-2020	$417,000	754sf	$553	2	1.5	-	2014	102	$85
	September-23-2020	$414,500	754sf	$550	2	1.5	-	2012	85	$65
	February-21-2021	$495,000	953sf	$519	3	2.0	-	2013	222	$65
	February-23-2021	$515,000	953sf	$540	3	2.0	-	2014	106	$65
	February-25-2021	$482,500	953sf	$506	3	2.0	-	2012	196	$65
	November-15-2020	$475,000	953sf	$498	3	2.0	-	2013	102	$419
	September-13-2020	$495,000	953sf	$519	3	2.0	-	2013	48	$65
Grand Totals and Overall Averages:		**$437,214**	**808sf**	**$543**	**2.3**	**1.6**	**#DIV/0!**	**2012**	97	**$101**

Source: County Recorder, MLS, New Home Source; Real Estate Analytics; Redfin; various brokers and builders.



Iliahi at Kehalani by Towne Dev.

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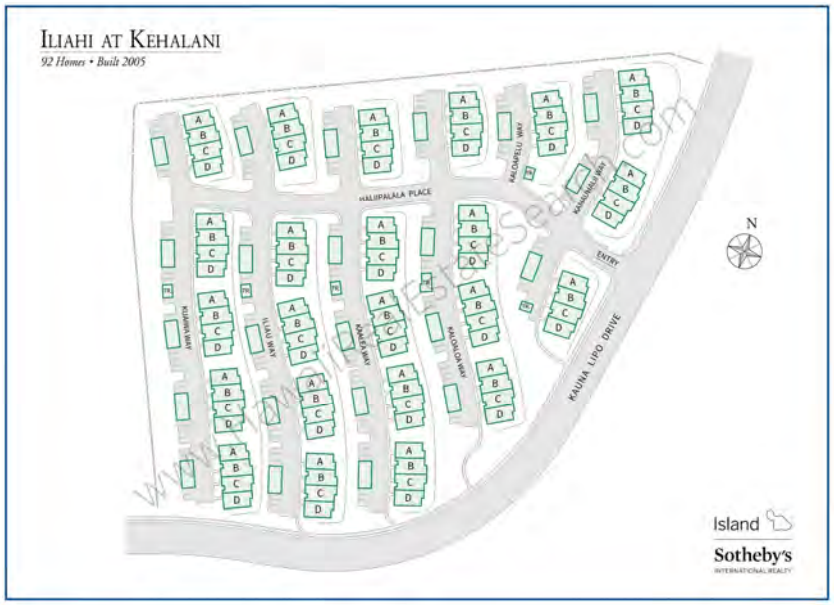
Development Name/ Community/Address	Sold Date	Sold Price	Living Area	Price/ Sq.Ft.	Bed-rooms	Baths	Lot Size	Year Built	DOM	HOA
Iliahi	April-18-2021	$535,000	1,242sf	$431	3	2.5	-	2005	38	$65
	August-13-2020	$495,000	1,242sf	$399	3	2.5	-	2005	146	$539
Kehalani	December-10-2020	$515,000	1,242sf	$415	3	2.5	-	2005	91	$539
Condo/Town	February-9-2021	$525,000	1,258sf	$417	3	2.5	-	2005	53	$65
Towne Dev.	January-20-2021	$524,000	1,258sf	$417	3	2.5	-	2005	1	$65
Year Built 2005	June-15-2021	$582,000	1,242sf	$469	3	2.5	-	2005	52	$65
	June-6-2021	$560,000	1,242sf	$451	3	2.0	-	2005	52	$65
	March-9-2021	$490,000	1,258sf	$390	3	2.5	-	2005	245	$65
Grand Totals and Overall Averages:		**$528,250**	**1,248sf**	**$423**	**3.0**	**2.4**	**#DIV/0!**	**2005**	85	**$184**

Source: County Recorder, MLS, New Home Source; Real Estate Analytics; Redfin; various brokers and builders.



Kehalani Gardens at Kehalani by Stanford Carr

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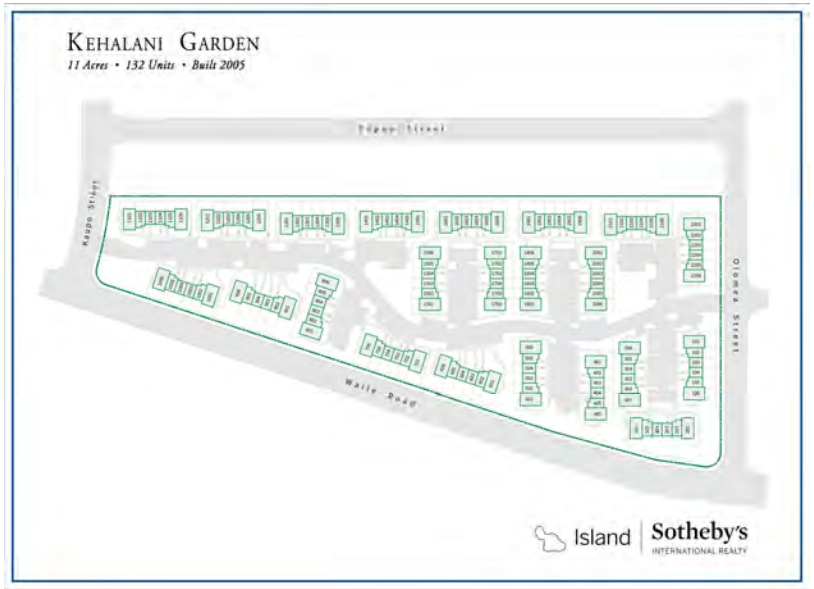
Development Name/ Community/Address	Sold Date	Sold Price	Living Area	Price/ Sq.Ft.	Bed-rooms	Baths	Lot Size	Year Built	DOM	HOA
Kehalani Garde	April-16-2020	$434,000	935sf	$464	2	2.5	-	2005	78	$65
	December-10-2020	$420,000	935sf	$449	2	2.5	-	2005	53	$65
Kehalani	February-27-2020	$430,000	935sf	$460	2	2.5	-	2005	106	$65
Condo/Town	July-30-2020	$435,000	935sf	$465	2	2.5	-	2005	39	$65
Stanford Carr	March-11-2021	$439,000	935sf	$470	2	2.5	-	-	37	$65
Year Built 2005	March-30-2020	$405,000	935sf	$433	2	2.5	-	2005	1	$456
	June-10-2021	$515,000	1,010sf	$510	3	2.0	-	2005	47	$489
	May-17-2021	$510,000	1,010sf	$505	3	2.0	-	2005	98	$65
	May-9-2021	$515,000	1,010sf	$510	3	2.0	-	2005	63	$488
	February-2-2021	$465,000	1,011sf	$460	3	2.0	-	2005	74	$65
	April-26-2021	$515,000	1,133sf	$455	3	2.5	-	2005	55	$65
	February-27-2020	$470,000	1,133sf	$415	3	2.5	-	2005	46	$65
	June-4-2020	$465,000	1,133sf	$410	3	2.5	-	2005	35	$65
	March-10-2021	$497,500	1,133sf	$439	3	2.5	-	2005	37	$65
Grand Totals and Overall Averages:		**$465,393**	**1,013sf**	**$460**	**2.6**	**2.4**	**#DIV/0!**	**2005**	55	**$153**



Source: County Recorder, MLS, New Home Source; Real Estate Analytics; Redfin; various brokers and builders.

Kalama Kai at Kihei (Affordable) by Armstrong Dev.

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Development Name/ Community/Address	Sold Date	Sold Price	Living Area	Price/ Sq.Ft.	Bed-rooms	Baths	Lot Size	Year Built	DOM	HOA
Kalama Kai	Workforce	$372,600	844sf	$441	3	2.0	-	2018	60	$535
	Workforce	$447,100	844sf	$530	3	2.0	-	2019	164	$467
Kihei	Workforce	$454,850	844sf	$539	3	2.0	-	2019	164	$467
Kanani Road	Workforce	$506,750	844sf	$600	3	2.0	-	2019	164	$467
Condominium	Workforce	$521,600	844sf	$618	3	2.0	-	2019	164	$467
Year Built 2018	Workforce	$522,750	844sf	$619	3	2.0	-	2019	164	$467
Armstrong Dev.	Workforce	$550,000	844sf	$652	3	2.0	-	2019	164	$467
	Workforce	$532,350	977sf	$545	3	2.0	-	2019	164	$467
Grand Totals and Overall Averages:		**$488,500**	**861sf**	**$568**	**3.0**	**2.0**		**2019**	151	**$476**

Source: County Recorder, MLS, New Home Source; Real Estate Analytics; Redfin; various brokers and builders.

Heritage at Kehalani (Affordable) by West Maui Land

Robbins Boud
Real Estate Analytics

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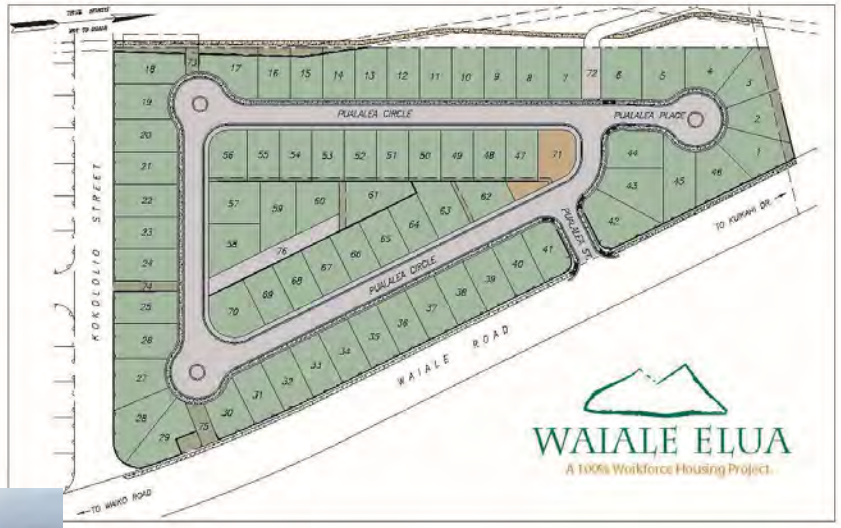
Development Name/ Community/Address	Sold Date	Afford Price	Living Area	Price/ Sq.Ft.	Bed-rooms	Baths	Lot Size	Year Built	DOM	HOA
Heritage	Workforce	$461,900	1,105sf	$418	3	2.0	3,000	2020	-	-
	Workforce	$531,185	1,102sf	$482	3	2.0	3,000	2020	-	-
Kehalani	Workforce	$554,300	1,200sf	$462	3	2.0	3,000	2020	-	-
AFFORDABLE	Workforce	$619,000	1,343sf	$461	4	2.0	3,000	2020	-	-
25 homes total	Workforce	$589,000	1,380sf	$427	4	2.5	3,000	2020	-	-
Year Built 2020	Workforce	$634,000	1,616sf	$392	4	2.5	3,000	2020	-	-
West Maui Land										
Grand Totals and Overall Averages:		**$564,898**	**1,291sf**	**$440**	**3.5**	**2.2**	**3,000**	**2020**		

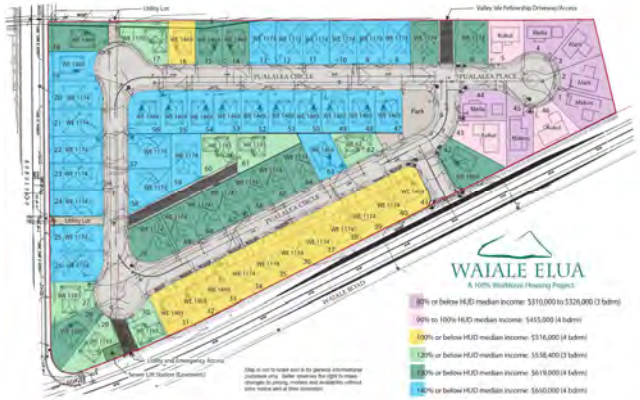
Source: County Recorder, MLS, New Home Source; Real Estate Analytics; Redfin; various brokers and builders.

Waiale Elua (Affordable) by West Maui Land

Development Name/ Community/Address	Sold Date	Sold Price	Living Area	Price/ Sq.Ft.	Bed-rooms	Baths	Lot Size	Year Built	DOM	HOA
Waiale Elua	Workforce	$310,000	1,056sf	$294	3	2.0	4,000	2020	-	$0
	Workforce	$326,000	1,174sf	$278	3	2.0	4,000	2020	-	$0
Waiale, Waikapu	Workforce	$455,000	1,159sf	$393	4	2.0	4,000	2020	-	$0
Single Family	Workforce	$516,000	1,245sf	$414	4	2.0	4,000	2020	-	$0
West Maui Land	Workforce	$538,400	1,358sf	$396	4	2.0	4,000	2020	-	$0
r	Workforce	$619,000	1,404sf	$441	4	2.0	4,000	2020	-	$0
	Workforce	$650,000	1,469sf	$442	4	2.0	4,000	2020	-	$0
Grand Totals and Overall Averages:		**$487,771**	**1,266sf**	**$380**	**3.7**	**2.0**	**4,000**	**2020**	####	**$0**

Source: County Recorder, MLS, New Home Source; Real Estate Analytics; Redfin; various brokers and builders.





BIOGRAPHY FOR MARK BOUD, PRINCIPAL

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Mark Boud is a graduate of Brigham Young University. He holds degrees in Economics and English Literature. Since graduation in 1985, Mark has been heavily involved in the analysis of commercial and residential real estate markets throughout the United States. His modeled forecasts and analytics are trusted by major builders, land developers, capital groups and financial institutions. He is quoted in the Wall Street Journal, USA Today, Forbes, Builder, Architect and other major newspapers, magazines and industry publications. Mark is a popular keynote speaker and industry panelist and is actively involved in many industry trade organizations.

Robbins Boud Real Estate Analytics (REA) was formed by Mark in Year 2020. REA is a national provider of elite real estate consulting services and online research publications. **REA**'s predecessor was **Real Estate Economics,** founded by Mark in 1995. In 2015, Mark sold Real Estate Economics to **Hanley Wood/Metrostudy** and until Year 2020, served as **Chief Economist** for these highly respected national real estate data and consulting firms. After Hanley Wood/Metrostudy merged with a major competitor, Mark left the company and formed REA for the purpose of offering his unique skill set to an elite group of retained clients.

REA's main office is in San Clemente, California with a satellite office in Utah. REA provides market analyses, feasibility studies, land optimization studies, supply/demand analyses and site-specific market reports for clients in **Hawaii, California, Washington, Utah, Arizona** and **Colorado**. REA also provides national forecasts to a wide audience of subscribers, which often lead to special consulting assignments in various markets throughout the nation.

Mark has guest-lectured at **Cornell University, Arizona State University, Southern Virginia University, University of Southern California, University of California Irvine, University of California San Diego** and **Brigham Young University**.

Mark's memberships include or have included; the **Urban Land Institute** (ULI), the **Building Industry Association**, the **Sales and Marketing Council**, the **Southern California Real Estate Research Council** and the **Northern California Real Estate Research Council**.

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Appendix 9

Traffic Impact Analysis Report

TRAFFIC IMPACT ANALYSIS REPORT
WAIEHU MASTER PLAN
WAIEHU, MAUI, HAWAII

FINAL DRAFT

June 28, 2021

Prepared for:

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TRAFFIC IMPACT ANALYSIS REPORT
WAIEHU MASTER PLAN

Waiehu, Maui, Hawaii

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June 28, 2021

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APPENDICES

AUSTIN, TSUTSUMI & ASSOCIATES, INC. CIVIL ENGINEERS • SURVEYORS
CONTINUING THE ENGINEERING PRACTICE FOUNDED BY H. A. R. AUSTIN IN 1934

TERRANCE S. ARASHIRO, P.E.
ADRIENNE W.L.H. WONG, P.E., LEED AP
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Maui Branch Manager

TRAFFIC IMPACT ANALYSIS REPORT

WAIEHU MASTER PLAN

Waiehu, Maui, Hawaii

1. INTRODUCTION

This report documents the findings of a traffic study conducted by Austin, Tsutsumi & Associates, Inc. (ATA) to evaluate the potential traffic impacts resulting from the proposed Waiehu Master Plan (hereinafter referred to as the "Project").

1.1 Location

The Project is located upon approximately 240 acres of undeveloped land to the west of Kahekili Highway in Waiehu. Figure 1.1 shows the location of the proposed Project site.

1.2 Project Description

The Project proposes to construct a 100% affordable housing Project with a total of 752 dwelling units, 568 of which will be single-family units and 184 will be multi-family dwelling units, along with approximately 17,400 square feet of retail space, and three (3) parks totaling 6.3 acres. It was assumed that the single-family lots will not allow accessory (Ohana) dwelling units. The Project will be accessed via two driveways off of Kahekili Highway. The Project South Driveway will be a T-intersection approximately 1,100 feet north of the existing Kahekili Highway/Makaala Drive intersection. The Project's North Driveway is approximately 900 feet south of the Kahekili Highway/Waiehu Beach Road intersection and will line up with the proposed access to the planned Waiehu Affordable Housing project on the east side of Kahekili Highway, ultimately forming a 4-legged intersection.

The previous Hale Mua development, which proposed development on this Project site, received Change of Zoning (CIZ) approval by the State Land Use Commission (LUC) in 2007. It is our understanding this LUC approval was rescinded in 2018. Therefore, the current landowners are preparing this updated TIAR as part of the Project's larger Environmental Assessment (EA) Report and 201H application to obtain LUC approval for a new plan. The site plan can be found in Figure 1.2.

WAIEHU MASTER PLAN TIAR

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

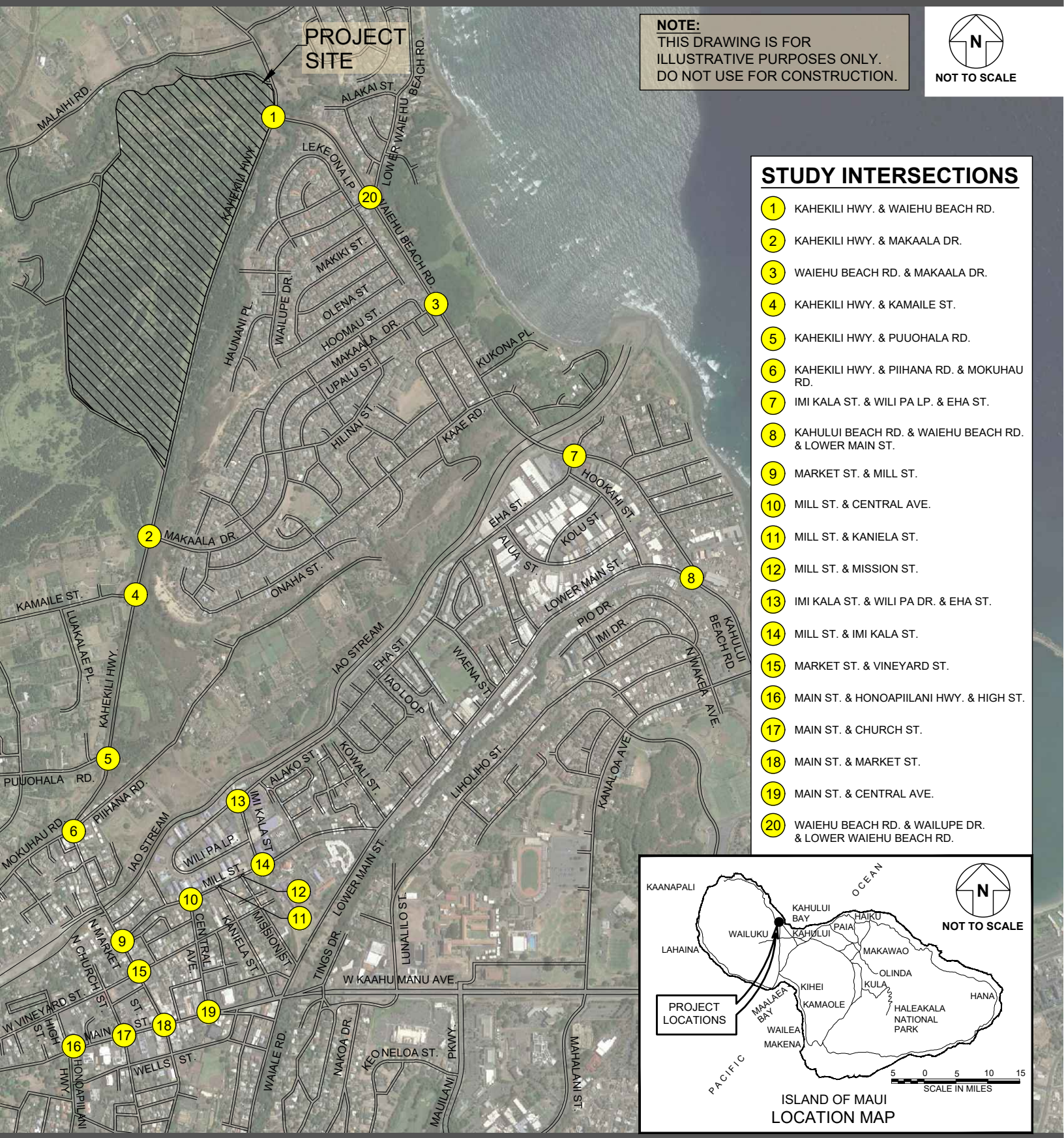


FIGURE 1.1

LOCATION MAP

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

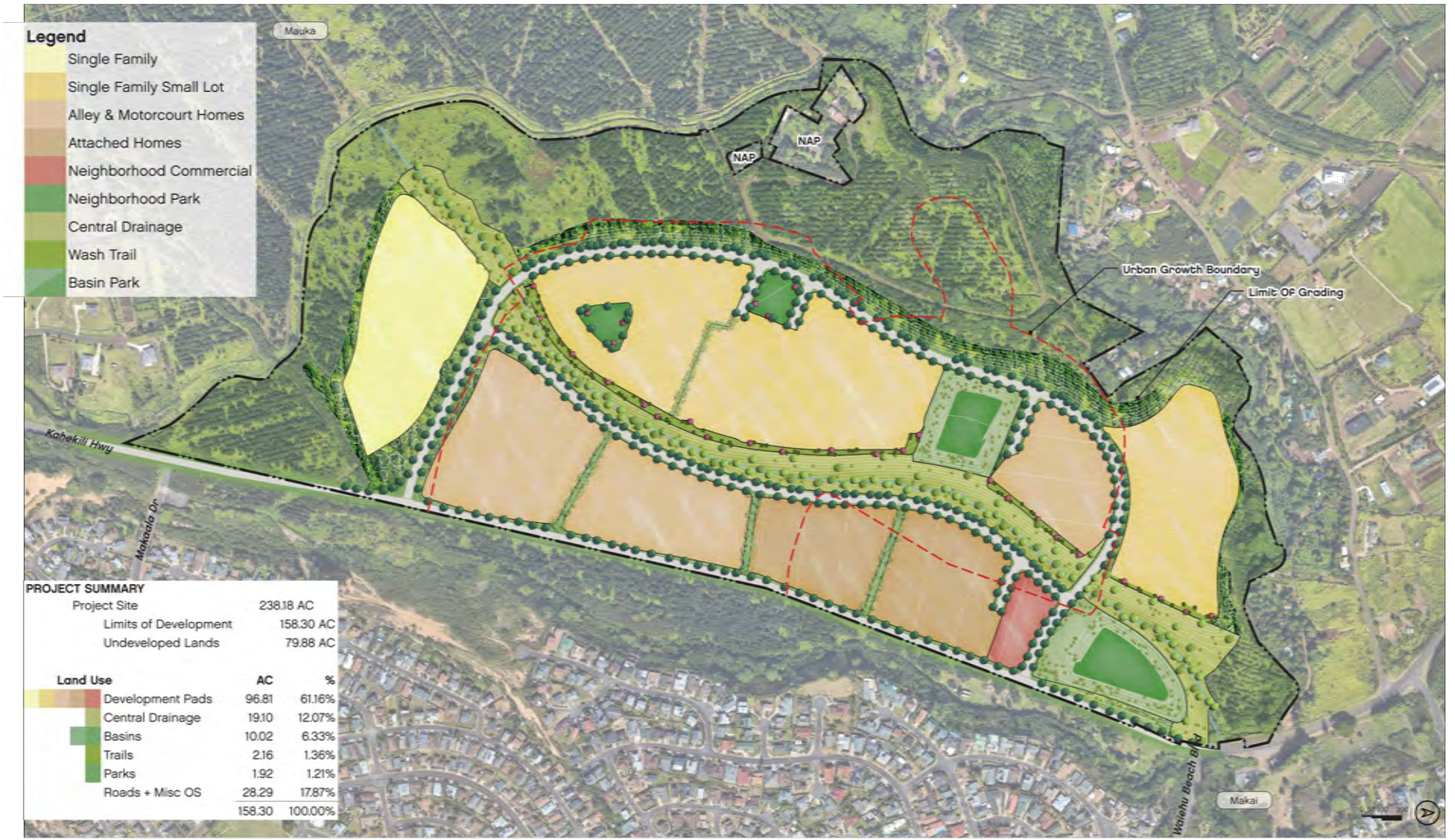


FIGURE 1.2

SITE PLAN

2. METHODOLOGY

2.1 Study Methodology

This study will address the following:

- Assess existing traffic operating conditions at key intersections during the weekday morning (AM) and afternoon (PM) peak hours of traffic within the study area.

- Traffic projections for Base Year 2030 WITHOUT Imi Kala Street Ext. & Bridge Improvement (without the Project) and WITH Imi Kala Street Ext. & Bridge Improvement (without the Project) including traffic generated by other known developments in the vicinity of the Project in addition to an ambient growth rate. These other known developments are projects that are currently under construction or known new/future developments that are anticipated to affect traffic demand and operations within the study area.

- Trip generation and traffic assignment characteristics for the proposed Project.

- Traffic projections for Future Year 2030 WITHOUT Imi Kala Street Ext. & Bridge Improvement (with the Project) and WITH Imi Kala Street Ext. & Bridge Improvement (with the Project), which includes Base Year 2030 traffic volumes plus traffic volumes generated by the Project.

- Recommendations for Base Year and Future Year roadway improvements or other mitigative measures, as appropriate, to reduce or eliminate the adverse impacts resulting from traffic generated by known developments in the region or the Project.

2.2 Intersection Analysis

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

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

3. EXISTING CONDITIONS

3.1 Roadway System

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

Central Avenue is a north-south, two-way, two-lane County roadway that begins to the north at its intersection with Mill Street and continues southward until its intersection with Main Street.

Church Street is currently a southbound, one-way, single-lane County roadway that begins to the north at its intersection with Waikahe Trail and extends to the south, terminating at its T-intersection with Kaohu Street. Marked curbside parking is available. As part of roadway improvements from the Wailuku Civic Complex (WCC), Church Street is being modified to provide two-way traffic between Vineyard Street and Main Street.

Eha Street is a two-way, two-lane, east-west County roadway that provides access to commercial, industrial and residential areas. Eha Street begins to the west at its intersection of Wili Pa Loop/Imi Kala Street and continues eastward until its intersection with Waiehu Beach Road.

High Street is a north-south, two-way, two-lane, County roadway that begins to the north at its intersection with Vineyard Street and continues southward until its intersection with Keanu Street, where it transitions to Honoapiilani Highway. The posted speed limit is 20 mph.

Imi Kala Street is a north-south, two-way, two-lane County roadway that begins to the north at its intersection with Wili Pa Loop/Eha Street and extends to the south until it terminates at its T-intersection with Mill Street. The posted speed limit is 20 mph.

Kahekili Highway is a two-way, two-lane roadway with segments in both County and State jurisdiction. The County jurisdiction starts in the Happy Valley area at its intersection with Market Street/Mokuhau Road/Piihana Road and extends northward towards Waiehu. The roadway changes from County to State jurisdiction in the area of the Kahekili Highway/Waiehu Beach Road intersection and continues northward, generally following the coastline until it transitions to Honoapiilani Highway near the Kapalua region.

Kahului Beach Road is a north-south, two-way, four-lane State roadway that begins to the north at its intersection with Waiehu Beach Road. It extends to the east until its intersection with Kaahumanu Avenue where it continues as Kane Street. The posted speed limit is 35 mph.

Kamaile Street is an east-west, two-way, two-lane County roadway that begins to the east at its T-intersection with Kahekili Highway and extends southwest until it terminates in a dead end shortly after Maunalei Place. The posted speed limit is 20 mph.

Kaniela Street is a north-south, two-way, two-lane County roadway that begins to the north at its T-intersection with Mill Street and extends to the south until it terminates at a T-intersection with Lower Main Street. There is no posted speed limit along Kaniela Street.

Lower Waiehu Beach Road is a two-way, two-lane County roadway that begins to the south at its intersection with Waiehu Beach Road/Wailupe Drive and extends northeast, generally following the coastline until it terminates at Waiehu Beach Park.

Main Street is an east-west, two-way, two-lane State roadway that provides connectivity to commercial areas in Wailuku. Main Street begins to the east at its intersection with Lower Main Street and Kaahumanu Avenue and continues westward where it splits into Iao Valley Road and West Alu Road. Marked curbside parking is available along Main Street between Central Avenue and High Street.

Makaala Drive is a two-way, two-lane County roadway that provides connection to residences in the Waiehu area. This roadway begins to the west with its intersection with Kahekili Highway and continues eastward until its intersection with Waiehu Beach Road. The posted speed limit is 20 mph.

Market Street is a north-south, two-way, two-lane County roadway that begins to the north at its intersection with Kahekili Highway/Piihana Road/Mokuhau Road, and extends southward until its intersection with Main Street. Market Street is a two-way, two-lane roadway between its northern terminus and Vineyard Street, then transitions into a one-lane, one-way northbound only roadway between Vineyard Street and Main Street. Market Street serves many businesses and homes in Wailuku Town and provides regional access to Waihee/Waiehu via Kahekili Highway.

Mill Street is an east-west, two-way, two-lane County roadway that begins to the west at its intersection with Market Street and extends westward until it terminates to the east at its intersection with Lower Main Street. Mill Street serves a number of businesses and homes in Wailuku.

Mission Street is a north-south, two-way, two-lane local County roadway that begins to the north at its T-intersection with Mill Street and extends to the south until it terminates at its T-intersection with Lower Main Street. The posted speed limit is 20 mph.

Mokuhau Road is an east-west, two-way, two-lane local County roadway that begins to the east at its intersection with Kahekili Highway/Piihana Road/Market Street, and extends westward until it terminates in a cul-de-sac near the Konko Mission of Wailuku.

Piihana Road is an east-west, two-way local County roadway that begins to the west at its intersection with Kahekili Highway/Mokuhau Road/Market Street and extends eastward for approximately one mile, where it terminates in a cul-de-sac. Piihana Road serves mostly residential and agricultural uses.

Puuohala Road is an east-west, two-way, two-lane local County roadway that begins to the east at its T-intersection with Kahekili Highway and extends to the west until it terminates in a dead end shortly after Maoi Street. The posted speed limit is 20 mph.

Vineyard Street is an east-west, two-way, two-lane County roadway that begins to the east as a cul-de-sac near the Vineyard Street/Mission Street intersection and extends westward until it transitions into Ilina Street about 600 feet west of Uhiwai Place.

Waiehu Beach Road is generally a north-south, two-way County roadway that begins to the south at its intersection with Kahului Beach Road and Lower Main Street, and extends northward and terminates at its intersection with Kahekili Highway near the Waiehu Stream. The posted speed limit is 30 mph.

Wailupe Drive is a two-way, two-lane local County roadway that provides access for residences in Waiehu Heights. Wailupe Drive begins to the east at its intersection with Waiehu Beach Road and Lower Waiehu Beach Road and extends westward and southwest until it terminates in a cul-de-sac near its intersection with Olena Street.

3.2 Existing Traffic Volumes

The hourly turning movement counts utilized in this report were recorded on the dates shown below:

- Kahekili Highway/Waiehu Beach Road (Tuesday May 1, 2018)
- Kahekili Highway/Makaala Drive (Tuesday May 1, 2018)
- Kahekili Highway/Kamaile Street (Thursday February 18, 2021)
- Kahekili Highway/Puuohala Road (Thursday February 18, 2021)
- Kahekili Highway/Market Street/Piihana Road/Mokuhau Road. (Tuesday September 20, 2016)
- Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road (Thursday February 18, 2021)
- Waiehu Beach Road/Makaala Drive (Tuesday September 20, 2016)
- Waiehu Beach Road/Eha Street (Thursday May 3, 2018)
- Waiehu Beach Road/Lower Main Street/Kahului Beach Road (Thursday May 3, 2018)
- Mill Street/Market Street (Tuesday May 1, 2018)
- Mill Street/Central Avenue (Tuesday May 1, 2018)
- Mill Street/Kaniela Street (Thursday February 18, 2021)
- Mill Street/Mission Street (Thursday February 18, 2021)
- Mill Street/Imi Kala Street (Thursday February 18, 2021)
- Imi Kala Street/Wili Pa Loop/Eha Street (Thursday February 18, 2021)
- Main Street/High Street (Tuesday, May 1, 2018)
- Main Street/Church Street (Thursday February 2, 2017)
- Main Street/Market Street (Thursday February 2, 2017)
- Main Street/Central Avenue (Tuesday May 8, 2018)
- Market Street/Vineyard Street (Thursday February 2, 2017)

Based on traffic count data, the weekday AM and PM peak hours of traffic were determined to generally occur between 6:45 AM - 7:45 AM, and 4:00 PM - 5:00 PM, respectively. Turning movement count data may be found in Appendix A.

Due to COVID-19, traffic volumes throughout the state were significantly lower than normal levels. For this reason, turning movement counts that were collected from 2016-2019, before impacts of COVID-19, were utilized for this study. Based on early consultation with State DOT and County

Department of Public Works, the use of historic counts were acceptable to use as a basis for existing conditions. A growth rate of 1.0% per year along Kahekili Highway, Waiehu Beach Road, Main Street and High Street was applied to increase regional traffic counts from 2016-2019 to constitute "Existing 2021" volumes analyzed in this study.

Previous turning movement counts were not available at five (5) of the study intersections and counts were therefore recorded in February 2021, when traffic volumes had not yet returned to pre-COVID-19 conditions. To adjust these counts to pre-COVID-19 levels, traffic counts were concurrently taken at the Waiehu Beach Road/Makaala Drive intersection in 2021 and was compared to pre-COVID 2016 volumes for that intersection to determine the calculated rate increase that should be applied to the five intersections counted in 2021.

3.3 Existing Traffic Conditions Analysis and Observations

The analysis and observations described below are based on prevailing conditions during the time at which the data was collected. For purposes of this study, the Kahekili Highway and Waiehu Beach Road corridors are assumed to be in the north-south direction except at it the Kahekili Highway/Waiehu Beach Road intersection, where the Waiehu Beach Road approach is designated in the westbound direction.

3.3.1 Regional Observations

The Waiehu area in the immediate vicinity of the Project is largely comprised of single-family homes with a few community parks. This area is served by Waiehu Beach Road and Kahekili Highway – the two regional roadways that provide access to schools and commercial areas in Kahului and Wailuku.

During the AM peak hour as residents leave for work and school, southbound Waiehu Beach Road experiences extensive queueing which stems from the Waiehu Beach Road/Eha Street intersection and at its maximum, extends over 1 mile near to the Kahekili Highway/Waiehu Beach Road intersection. The length of time in queue can vary between 6-15 minutes from the back of the maximum queue to clear the Waiehu Beach Road/Eha Street intersection. As a result of the queue spillback along Waiehu Beach Road, right-turning movements from side streets turning onto southbound Waiehu Beach Road can experience slower progression or blockages, resulting in varying lengths of side street queues. However, these right-turn vehicles were also observed to slowly but consistently filter into the Waiehu Beach Road queue, which helped to process lengthy side street queues. The congestion along Waiehu Beach Road generally lasted for about an hour and dissipated completely by 8:00 AM.

Also during the AM peak period (roughly 7:15-7:45 am), southbound traffic along Kahekili Highway was observed to queue from the Happy Valley area and extend to between Puohala Road and Makaala Drive. By 8:00 AM, all queues had dissipated. The length of time in queue can vary between 4-8 minutes. No persistent queueing was observed along Kahekili Highway or Waiehu Beach Road during the PM peak hour.

Main Street experiences relatively slow-moving stop-and-go traffic conditions due to on-street parking stalls, pedestrian crossing and numerous businesses and driveways throughout the stretch in the study area.

3.3.2 Existing Intersection Analysis

Kahekili Highway/Waiehu Beach Road

All movements operate at LOS C or better across both peak hours. All approaches are currently single shared lanes. The following operational observations were made:

- Relatively low westbound left-turn peak traffic of only 36(31) left-turners during the AM(PM) peak hours of traffic that infrequently blocked westbound right-turn progression.

- Low conflicting northbound traffic provided frequent gaps in traffic that allowed multiple westbound right-turn vehicles and southbound left-turn vehicles to proceed unimpeded.

- No lengthy queues were observed along the southbound Kahekili Highway approach due to low conflicting northbound traffic.

- Limited conflicts and delays for westbound right-turn vehicles with opposing northbound through vehicles due to lengthy gaps.

- Southbound left-turn vehicles were observed to frequently slow down or stop to allow the more critical westbound left-turn vehicles to proceed through the intersection, thereby reducing overall westbound approach delays and obstructions for right-turn vehicles. Westbound approach queues along Waiehu Beach Road were manageable, extending about 250-350 feet long at its maximum.

Although LOS operations are acceptable and queuing was observed to be moderate during the heavier AM peak hour, signal warrant analysis indicated a signal would be warranted assuming the full westbound left-turn/right-turn lane volume is included in the warrant due to the shared lane approach. However, a signal would not be warranted if separate westbound left-turn and right-turn lanes were provided and only westbound left-turn volumes are included in the warrant. Therefore, in lieu of a signal, consideration should be made to first widen the westbound Waiehu Beach Road approach to provide separate left-turn and right-turn lanes. Widening the westbound approach will store the relatively low westbound left-turn movement of only 30-35 vehicles to allow the heavier westbound right-turn movement progression through the intersection. As discussed above, observations indicate little conflicts and delays for westbound right-turners with opposing northbound through vehicles due to lengthy gaps in northbound flows.

Kahekili Highway/Makaala Drive

All movements operate adequately at LOS C or better across both peak hours. Based on observations, when southbound queues along Kahekili Highway extended beyond Makaala Drive, southbound vehicles allowed westbound left-turn vehicles to proceed through the intersection. As a result, westbound left-turn queues were observed to extend by only 5-6 cars at its maximum.

Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road

During the AM and PM peak hours, the eastbound and westbound stop-controlled movements along Wailupe Drive and Lower Waiehu Beach Road operate at LOS E/F, but at under capacity conditions. During the AM peak hour, traffic along Waiehu Beach Road was observed to queue beyond the Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road intersection. When

this occurs, right-turning movements from Wailupe Drive turning onto southbound Waiehu Beach Road can experience slower progression, but they consistently filtered into the slow-moving Waiehu Beach Road queue.

Waiehu Beach Road/Makaala Drive

All movements at the Waiehu Beach Road/Makaala Drive intersection operate at LOS D or better across both peak hours, with the exception of the eastbound right-turn movement, which operates at LOS F during the AM peak hour due to high southbound Waiehu Beach Road traffic conflicting with a high 417-vehicle right-turn volume from Makaala Drive. Extensive queueing during the AM peak hour along Waiehu Beach Road stemming from the Waiehu Beach Road/Eha Street intersection resulted in the eastbound Makaala Drive right-turn movement experiencing slower progression, but vehicles were able to consistently filter into the slow-moving southbound Waiehu Beach Road queue. Queues along Makaala Drive ranged from 10-40 vehicles long and at its longest, require 2-4 minutes to turn onto Waiehu Beach Road.

The northbound left-turn movement volume along Waiehu Beach Road exceeds 300 vehicles during the PM peak hour, but observations indicate that frequent gaps in traffic resulted in minimal delays and queues. Left-turn queues remained within the left-turn storage lane, with queues only stacking from 1-3 vehicles at a time.

Waiehu Beach Road/Eha Street/Nukuwai Place

During the AM peak hour, the Eha Street and Nukuwai Place approaches and Waiehu Beach Road northbound left-turn and southbound through movements operate at LOS F, with the southbound through movement operating over capacity. Turning movements suggest that a significantly high volume – about one-third of the total southbound Waiehu Beach Road volume in the AM peak hour – turns right onto Eha Street. An existing right-turn storage lane is provided, but is relatively short (150' long) due to the constraints of the upstream bridge over Wailuku River that limits the lengthening of this right-turn pocket. This short right-turn lane along Waiehu Beach Road leads to two issues during the AM peak hour that contributes to the lengthy AM queues along Waiehu Beach Road:

- Forces these right-turning vehicles to decelerate in the through lane, slowing progression along Waiehu Beach Road and through the intersection.

- When given a red light, southbound through vehicles will queue up in the through lane, blocking access to the right-turn lane. When this occurs, right-turning vehicles will be locked up in the same queue as through vehicles, further expanding the queues along Waiehu Beach Road.

Lower Main Street/Kahului Beach Road/Waiehu Beach Road

All movements operate at LOS D or better across both peak hours. During the PM peak hour, the westbound right-turn volume from Kahului Beach Road to Waiehu Beach Road is significantly high (821 PM peak right-turns), primarily due to commuting Waiehu/Waihee residents returning home from work. The westbound approach is currently a shared westbound through/right-turn lane, so westbound through vehicles frequently block the heavy westbound right-turn movement from accessing the slip lane, resulting in queueing in the outer westbound lane that can extend through the Kahului Beach Road/Kanaloa Avenue intersection. The queue spillback is generally

confined to the outer lane and progression along Kahului Beach Road and Kanaloa Avenue is maintained by the inner through lane.

Kahekili Highway/Kamaile Street and Kahekili Highway/Puuohala Road

All movements operate adequately at LOS C or better across both peak hours.

Kahekili Highway/Market Street/ Piihana Road/Mokuhau Road

All movements at this intersection operate at LOS D or better across both peak hours with the exception of the westbound Piihana Road approach, which operates at LOS E during the AM peak hour, though significantly under capacity. Due to the skewed alignment of this intersection, the Piihana Road approach is provided with limited sight-distance to conflicting southbound traffic along Kahekili Highway.

Imi Kala Street/Eha Street/Wili Pa Loop

The southbound Imi Kala Street approach currently ends in a stub-out which only serves the driveway of a small medical building. Therefore, turning volumes into and out of the southbound approach are minimal – less than 15 vehicles during each of the AM and PM peak hours. Volumes are also relatively low on Wili Pa Loop, which primarily serves various office/industrial uses and Eha Street, which serves a mix of residential/industrial/office uses. As a result, all movements operate at LOS B or better across both peak hours.

Market Street/Mill Street

During the AM peak hour, lengthy southbound congestion occurs along Market Street, primarily stemming from this intersection. Turning movements suggest that a significantly high volume – about half of the total southbound Market Street approach volume in the AM peak hour – turns left onto Mill Street. An existing left-turn storage lane is provided, but is relatively short (100' long). This short left-turn lane along Market Street locks up southbound left-turn vehicles in the same queue as through vehicles, lengthening the queues beyond Happy Valley.

The westbound Mill Street left-turn movement operates at LOS F during the AM and PM peak hour, and the westbound right-turn movement operates at LOS E during the PM peak hour. Observations show that mainline traffic along Market Street frequently stopped to allow the westbound left-turners to proceed, resulting in significantly less delays and queues. Average westbound approach queues were relatively minimal with only 1-4 vehicles and occasional maximum queues of 5-7 vehicles.

Mill Street/Central Avenue

All movements operate at LOS C or better across both peak hours with the exception of the northbound approach during the PM peak hour, which operates at LOS E though significantly under capacity. Left and right-turn movements into Central Avenue towards Main Street and right-turns out of Central Avenue towards Imi Kala Street are relatively high, about 200 vehicles during the AM and PM peak hours. All approaches are shared lane approaches with no storage lanes. Queues can vary based on platoons of conflicting vehicles, but no consistent congestion was observed.

Mill Street/Kaniela Street and Mill Street/Mission Street

All movements operate at LOS C or better across both peak hours.

Mill Street/Imi Kala Street

The Mill Street/Imi Kala intersection is a T-intersection which serves relatively high turning volumes due to various of businesses and residences along Wili Pa Loop and Eha Street. Despite high volumes, the eastbound left-turn movement operates at LOS A across both peak hours and the southbound right-turn movement operates at LOS C or better across both peak hours due to relatively low conflicting westbound through volumes along Mill Street. The southbound left-turn movement operates at LOS F during both peak hours, though under capacity. Signal warrant suggests that a signal is not warranted under existing conditions.

Market Street/Vineyard Street

This four-way stop controlled intersection operates adequately with all movements at LOS D or better with the exception of the northbound approach during the PM peak hour, which operates at LOS E and under capacity conditions. Based on AM observations, southbound traffic occasionally spilled back into the Market Street/Mill Street intersection, which partly contributed to heavy AM congestion on Kahekili Highway. Observations indicate that northbound queues can occur but vary in length due to on-street parking (some parallel parking), pedestrian crossing and generally slow-moving traffic < 10 mph.

Main Street/High Street

All movements operate at LOS C or better across both peak hours. During both peaks, southbound traffic can queue back from Main Street to Vineyard Street in part, due to the single shared lane approach. Traffic along the northbound approach varies during the AM peak hour due to commuter traffic and school related traffic.

Main Street/Church Street

All movements operate at LOS C or better across both peak hours. The north leg of the intersection will become a two-way street and a future signal is planned at this intersection as part of improvements for the WCC.

Main Street/Market Street

All movements operate at LOS A across both peak hours with the exception of the northbound approach, which operates at LOS E during the AM and PM peak hours primarily due to coordinated signal timings which favor progression along Main Street. All movements on the northbound approach remain under capacity during the AM and PM peak hours.

Main Street/Central Avenue

All movements at this intersection operate at LOS D or better across both peak hours with the exception of the southbound left-turn movement which operates at LOS E during the AM peak hour due to the coordinated signal timings which favor progression along Main Street. Queues

along Central Avenue can spill back near to Vineyard Street in the southbound direction for portions of the AM and PM peak periods.

See Figures 3.1A, B, and C for the laneage, volumes and LOS for Existing Conditions and Table 3.1 for a summary of LOS.

3.4 Multimodal Facilities

3.4.1 Bicycle and Pedestrian Facilities

Sidewalks are provided along the majority of roadways in the adjacent Waiehu Heights subdivision, although there is minimal connectivity to nearby Wailuku or Kahului. There are currently no sidewalks provided along Kahekili Highway in the study area.

HDOT completed the Bike Plan Hawaii Master Plan. This Bike Master Plan identifies existing and proposed bicycle facilities. The following locations provide existing bike facilities:

- Waiehu Beach Road between Kahekili Highway and Kahului Beach Road
- Kahekili Highway between Waiehu Beach Road and Piihana Road/Mokuhau Road
- Kaahumanu from Lunalilo Street, through to Hana Highway
- Kanaloa Avenue from Kahului Beach Road, through to Mahalani Street.

The Bike Plan Hawaii Master Plan identifies the following locations as future signed-shared roadways in the vicinity of the Project:

- Main Street between High Street and Kaahumanu Avenue
- Market Street between Main Street and Piihana Road/Mokuhau Road

A map of the existing and proposed pedestrian and bicycle facilities can be found in Figure 3.2.

3.4.2 Transit Accessibility Plan

The Maui Bus system offers several routes that connect the major areas in Maui. There are several routes in the Project vicinity:

- Waihee Villager Route 8 runs between Queen Kaahumanu Center in Kahului and the Richard Pablo Caldito Sr Park, via Kahului Beach Road, Waiehu Beach Road, and Kahekili Highway.
- Wailuku Loop Routes 1 and 2 serves a number of locations throughout Waiale, Waikapu and Wailuku. Near the Project, there are several stops for both routes along Makaala Drive and Waiehu Beach Road.

In the vicinity of the Project, the nearest bus stop is located along Kahekili Highway about 0.20 miles north of the Kahekili Highway/Waiehu Beach Road intersection. A map of the transit routes are shown in Figure 3.3.

WAIEHU MASTER PLAN TIAR

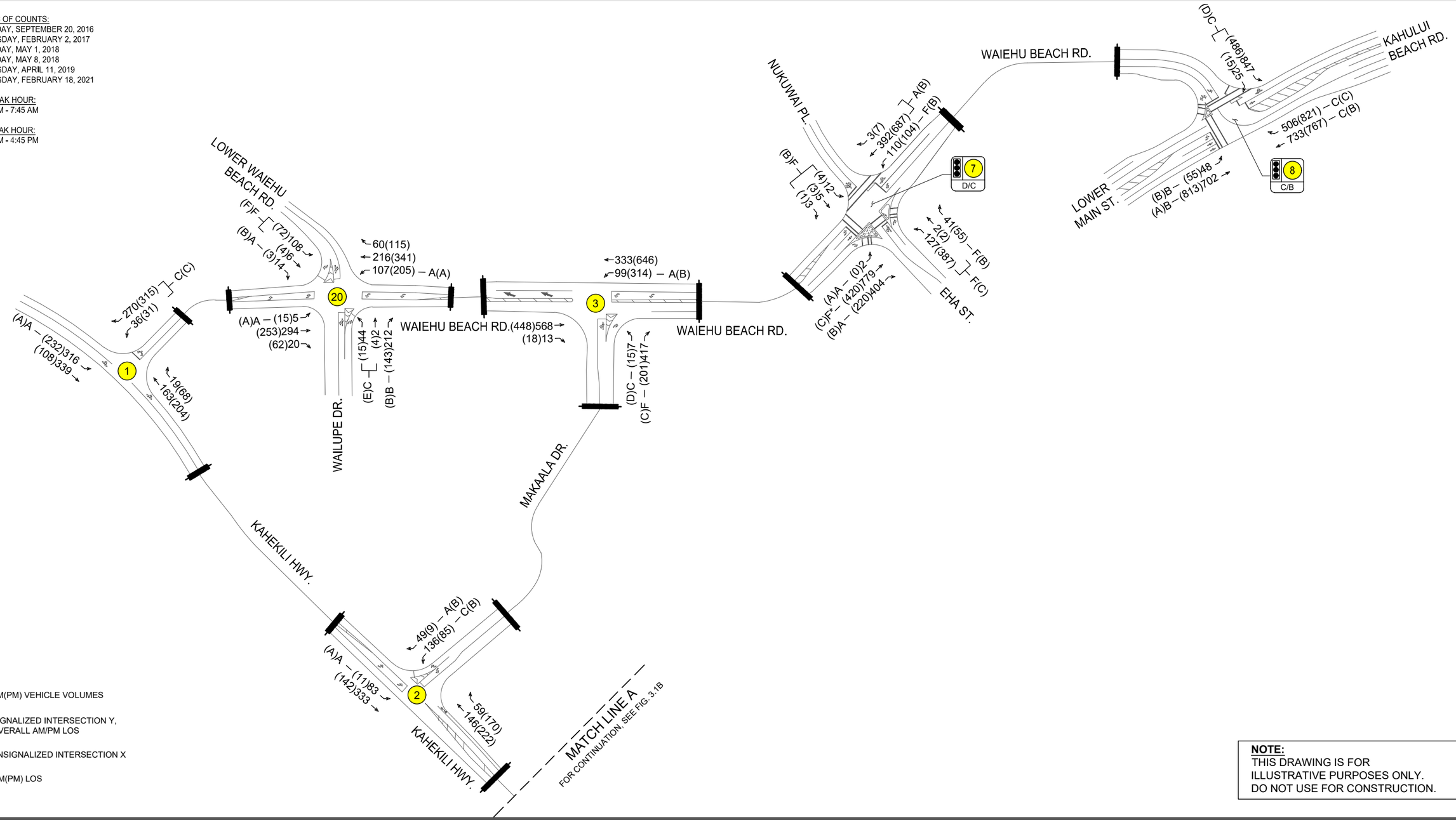
AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

N
NOT TO SCALE

DATES OF COUNTS:
TUESDAY, SEPTEMBER 20, 2016
THURSDAY, FEBRUARY 2, 2017
TUESDAY, MAY 1, 2018
TUESDAY, MAY 8, 2018
THURSDAY, APRIL 11, 2019
THURSDAY, FEBRUARY 18, 2021

AM PEAK HOUR:
6:45 AM - 7:45 AM

PM PEAK HOUR:
3:45 PM - 4:45 PM



LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

NOTE:
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FIGURE 3.1A

EXISTING CONDITIONS, LANE CONFIGURATIONS, TRAFFIC VOLUMES AND LOS - 1

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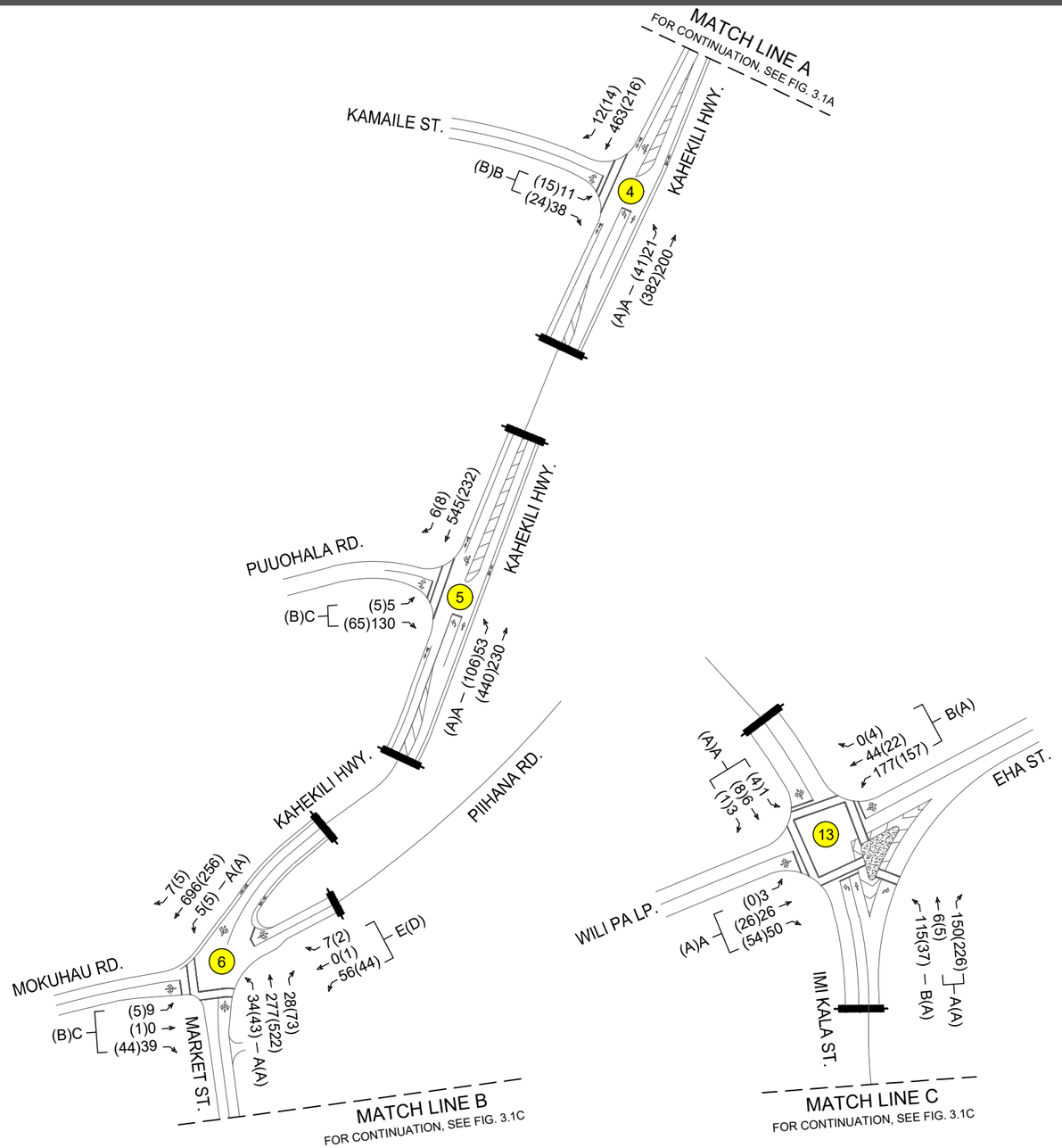
N

NOT TO SCALE

DATES OF COUNTS:
TUESDAY, SEPTEMBER 20, 2016
THURSDAY, FEBRUARY 2, 2017
TUESDAY, MAY 1, 2018
TUESDAY, MAY 8, 2018
THURSDAY, APRIL 11, 2019
THURSDAY, FEBRUARY 18, 2021

AM PEAK HOUR:
6:45 AM - 7:45 AM

PM PEAK HOUR:
3:45 PM - 4:45 PM



LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y, X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

NOTE:
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FIGURE 3.1B

EXISTING CONDITIONS, LANE CONFIGURATIONS, TRAFFIC VOLUMES AND LOS - 2

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N

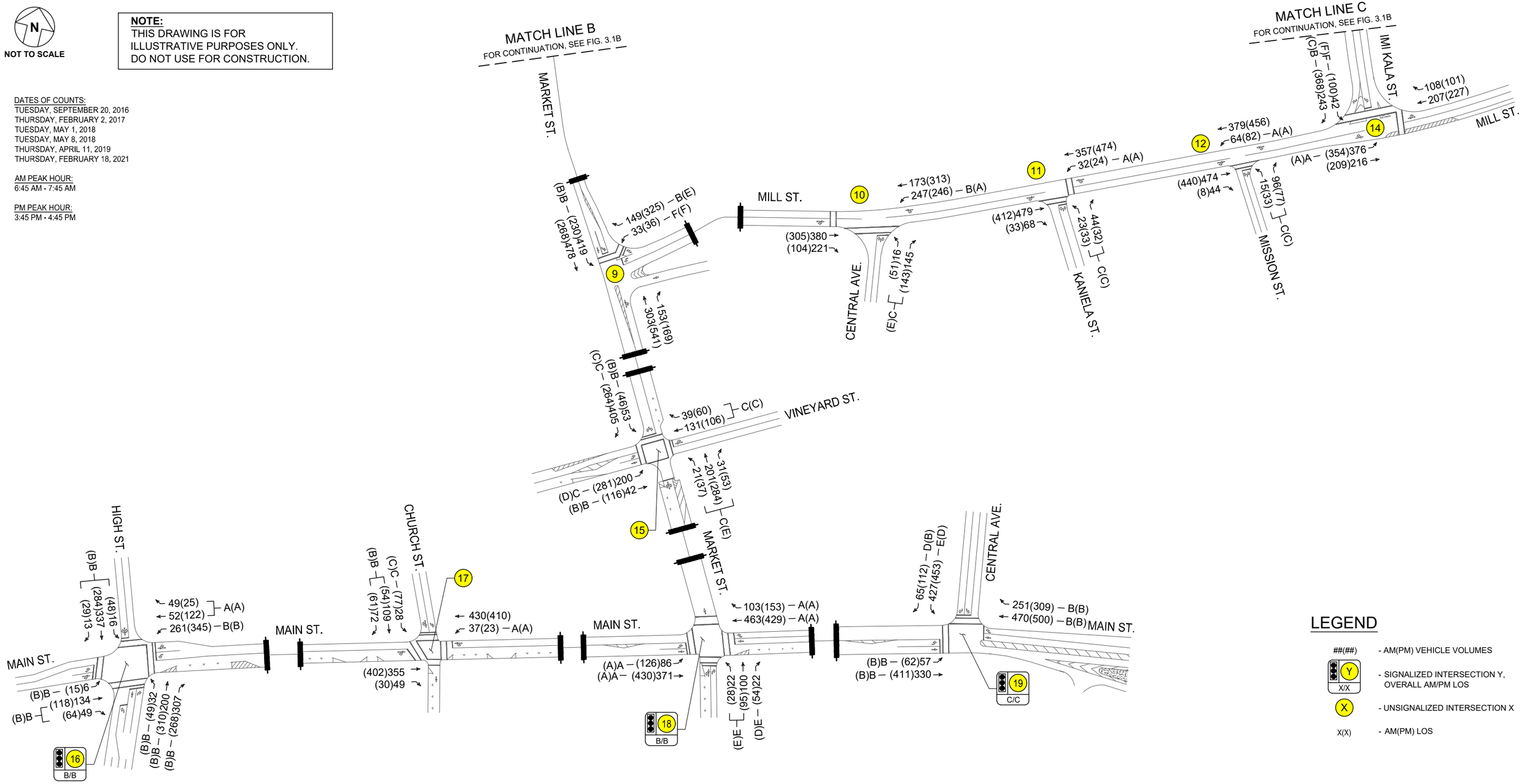
NOT TO SCALE

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

DATES OF COUNTS:
TUESDAY, SEPTEMBER 20, 2016
THURSDAY, FEBRUARY 2, 2017
TUESDAY, MAY 1, 2018
TUESDAY, MAY 8, 2018
THURSDAY, APRIL 11, 2019
THURSDAY, FEBRUARY 18, 2021

AM PEAK HOUR:
6:45 AM - 7:45 AM

PM PEAK HOUR:
3:45 PM - 4:45 PM



LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

FIGURE 3.1C

EXISTING CONDITIONS, LANE CONFIGURATIONS, TRAFFIC VOLUMES AND LOS - 3

TABLE 3.1: LOS SUMMARY TABLE
EXISTING CONDITIONS

Intersection	Existing 2021 Conditions					
	AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kahekili Hwy & Waiehu Beach Rd						
WB LT/RT	23.4	0.64	C	17.6	0.57	C
SB LT	8.5	0.25	A	8.6	0.20	A
OVERALL	8.6	-	-	8.4	-	-
2: Kahekili Hwy & Makaala Dr						
WB LT	21.6	0.41	C	13.5	0.18	B
WB RT	9.5	0.06	A	10.2	0.01	B
SB LT	7.9	0.07	A	8.2	0.01	A
OVERALL	5.0	-	-	2.1	-	-
3: Waiehu Beach Rd & Makaala Dr						
NB LT	9.3	0.11	A	10.0	0.32	B
EB LT	16.7	0.02	C	30.4	0.10	D
EB RT	55.5	0.94	F	15.1	0.38	C
OVERALL	16.8	-	-	4.1	-	-
4: Kahekili Hwy & Kamaile St.						
NB LT	8.5	0.02	A	7.8	0.03	A
EB LT/RT	13.1	0.11	B	12.1	0.08	B
OVERALL	1.1	-	-	1.2	-	-
5: Kahekili Hwy & Puuohala Rd						
NB LT	8.9	0.06	A	8.0	0.09	A
EB LT/RT	15.5	0.30	C	10.9	0.11	B
OVERALL	2.7	-	-	1.9	-	-
6: Market St/Kahekili Hwy & Piihana Rd/Mokuhau Rd						
NB LT	9.4	0.04	A	7.9	0.04	A
EB LT/TH/RT	18.7	0.17	C	11.9	0.09	B
WB LT/TH/RT	44.6	0.44	E	29.4	0.26	D
SB LT	7.9	0.00	A	8.9	0.01	A
OVERALL	3.5	-	-	2.3	-	-
7: Waiehu Beach Rd & Eha St/Nukuwai Pl.						
NB LT	105.2	0.87	F	15.4	0.29	B
NB TH/RT	5.8	0.29	A	19.6	0.78	B
EB LT/TH	106.4	0.71	F	30.0	0.70	C
EB RT	85.6	0.02	F	18.8	0.05	B
WB LT/TH/RT	86.3	0.08	F	18.4	0.01	B
SB LT	5.1	0.00	A	0.0	0.00	A
SB TH	79.7	1.07	F*	23.9	0.58	C
SB RT	9.1	0.35	A	19.1	0.29	B
OVERALL	52.2	-	D	22.5	-	C

TABLE 3.1: LOS SUMMARY TABLE
EXISTING CONDITIONS

Intersection	Existing 2021 Conditions					
	AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
8: Lower Main St/Kahului Beach Rd & Waiehu Beach Rd						
EB LT	16.0	0.24	B	16.9	0.29	B
EB TH	11.2	0.39	B	6.7	0.37	A
WB TH	24.8	0.80	C	19.3	0.80	B
WB TH/RT	25.5	0.81	C	22.8	0.85	C
SB LT/RT	29.8	0.82	C	37.5	0.77	D
OVERALL	22.9	-	C	19.7	-	B
9: Market St & Mill St.						
WB LT	191.8	0.75	F	64.3	0.40	F
WB RT	12.5	0.25	B	36.3	0.78	E
SB LT	10.8	0.43	B	11.1	0.30	B
OVERALL	8.3	-	-	10.6	-	-
10: Central Ave & Mill St.						
NB LT/RT	19.9	0.4	C	35.1	0.66	E
WB LT	10.4	0.3	B	9.2	0.24	A
OVERALL	4.9	-	-	7.8	-	-
11: Kaniela St. & Mill St.						
NB LT/RT	16.6	0.2	C	17.9	0.20	C
WB LT	8.8	0.0	A	8.4	0.02	A
OVERALL	1.4	-	-	1.4	-	-
12: Mission St. & Mill St.						
NB LT/RT	15.9	0.3	C	19.8	0.33	C
WB LT	8.8	0.1	A	8.6	0.08	A
OVERALL	2.2	-	-	2.6	-	-
13: Imi Kala St. & Eha St.						
NB LT	10.1	0.20	B	8.9	0.06	A
NB TH/RT	8.7	0.22	A	9.4	0.32	A
EB LT/TH/RT	8.2	0.11	A	8.1	0.11	A
WB LT/TH/RT	10.4	0.33	B	9.8	0.27	A
SB LT/TH/RT	8.2	0.02	A	8.3	0.02	A
OVERALL	9.5	-	A	9.3	-	A
14: Mill St. & Imi Kala St.						
EB LT	8.8	0.30	A	8.8	0.29	A
SB LT	59.2	0.42	F	129.0	0.91	F
SB RT	12.3	0.35	B	15.5	0.54	C
OVERALL	7.4	-	-	16.0	-	-
15: Market St & Vineyard St						
NB LT/TH/RT	18.8	0.55	C	43.1	0.86	E
EB LT	17.9	0.48	C	28.6	0.70	D
EB TH	11.0	0.10	B	13.4	0.27	B
WB TH/RT	15.5	0.39	C	17.5	0.42	C
SB LT	11.1	0.12	B	12.4	0.12	B
SB RT	25.0	0.75	C	19.4	0.58	C
OVERALL	19.7	-	C	27.5	-	D

TABLE 3.1: LOS SUMMARY TABLE
EXISTING CONDITIONS

Intersection	Existing 2021 Conditions					
	AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
16: Main St & High St						
NB LT	12.7	0.09	B	14.2	0.14	B
NB TH	14.0	0.37	B	16.4	0.55	B
NB RT	12.9	0.18	B	13.7	0.16	B
EB LT	15.0	0.02	B	17.3	0.04	B
EB TH/RT	17.6	0.46	B	19.9	0.48	B
WB LT	10.6	0.45	B	12.0	0.59	B
WB TH/RT	7.1	0.11	A	8.0	0.17	A
SB LT/TH/RT	16.3	0.61	B	18.1	0.66	B
OVERALL	13.9	-	B	15.2	-	B
17: Church St. & Main St						
WB LT	8.3	0.04	A	8.4	0.02	A
SB LT	20.0	0.11	C	23.2	0.30	C
SB TH/RT	14.0	0.33	B	12.4	0.20	B
OVERALL	3.2	-	-	3.2	-	-
18: Market St & Main St						
NB LT/TH	70.1	0.82	E	64.7	0.80	E
NB RT	56.2	0.01	E	52.3	0.01	D
EB LT	3.0	0.13	A	3.1	0.18	A
EB TH	2.7	0.26	A	2.9	0.30	A
WB TH	5.4	0.35	A	5.3	0.33	A
WB RT	3.8	0.07	A	4.1	0.10	A
OVERALL	11.3	-	B	10.2	-	B
19: Main St & Central Ave						
EB LT	12.6	0.13	B	11.1	0.17	B
EB TH	12.0	0.30	B	10.8	0.43	B
WB TH	18.3	0.46	B	19.2	0.64	B
WB RT	14.1	0.17	B	12.5	0.17	B
SB LT	65.2	0.92	E	40.9	0.90	D
SB RT	39.0	0.04	D	18.5	0.07	B
OVERALL	30.3	-	C	22.4	-	C
20: Waiehu Beach Rd & Wailupe Dr/Lower Waiehu Beach Rd						
NB LT	8.3	0.10	A	8.6	0.18	A
EB LT/TH	23.1	0.20	C	37.9	0.16	E
EB RT	12.5	0.32	B	11.3	0.21	B
WB LT/TH	90.6	0.82	F	149.0	0.90	F
WB RT	9.8	0.02	A	10.8	0.01	B
SB LT	7.9	0.00	A	8.4	0.02	A
OVERALL	13.9	-	-	12.7	-	-

* denotes overcapacity conditions

WAIEHU MASTER PLAN TIAR

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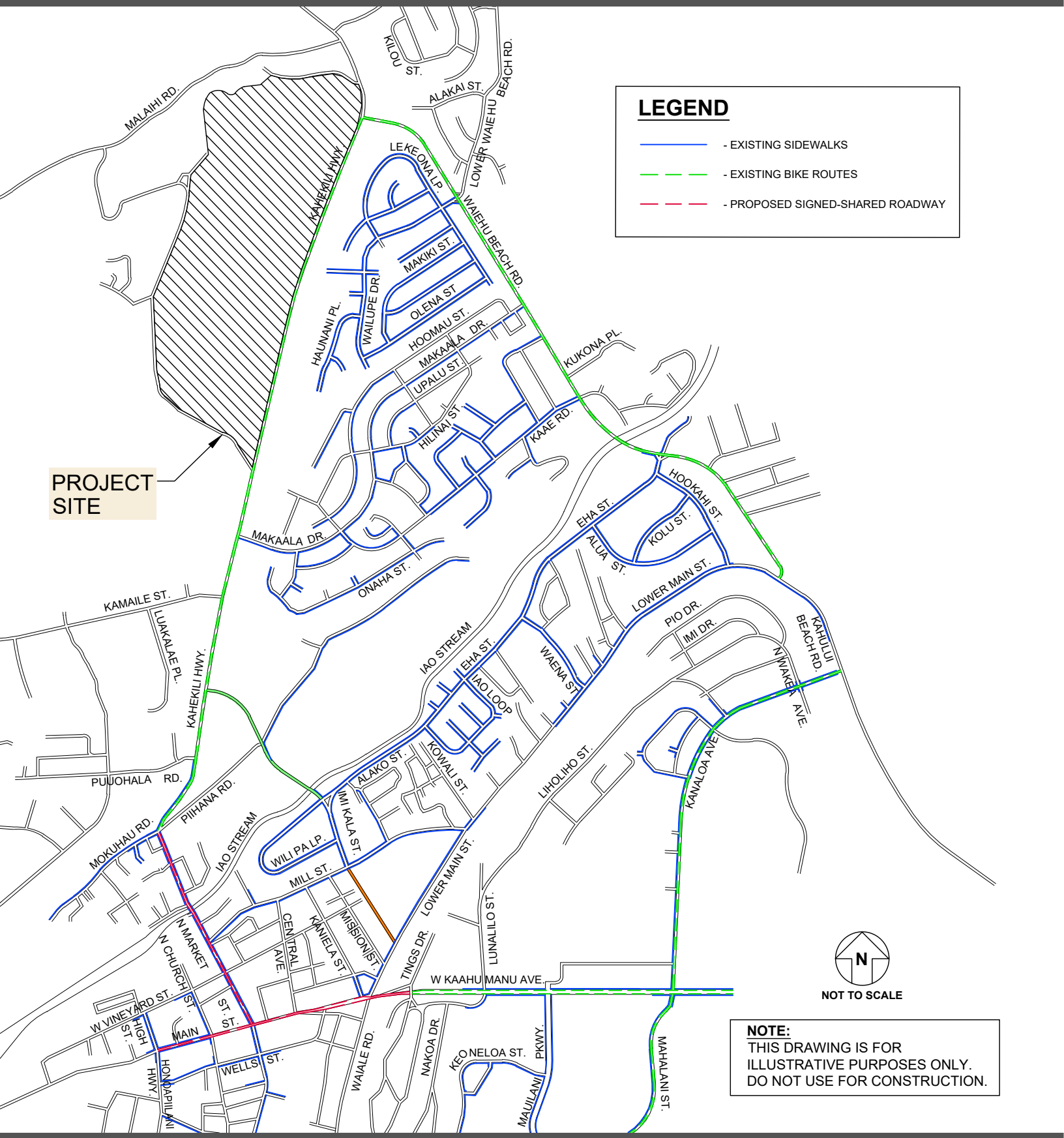

FIGURE 3.2

EXISTING PEDESTRIAN AND BICYCLE FACILITIES

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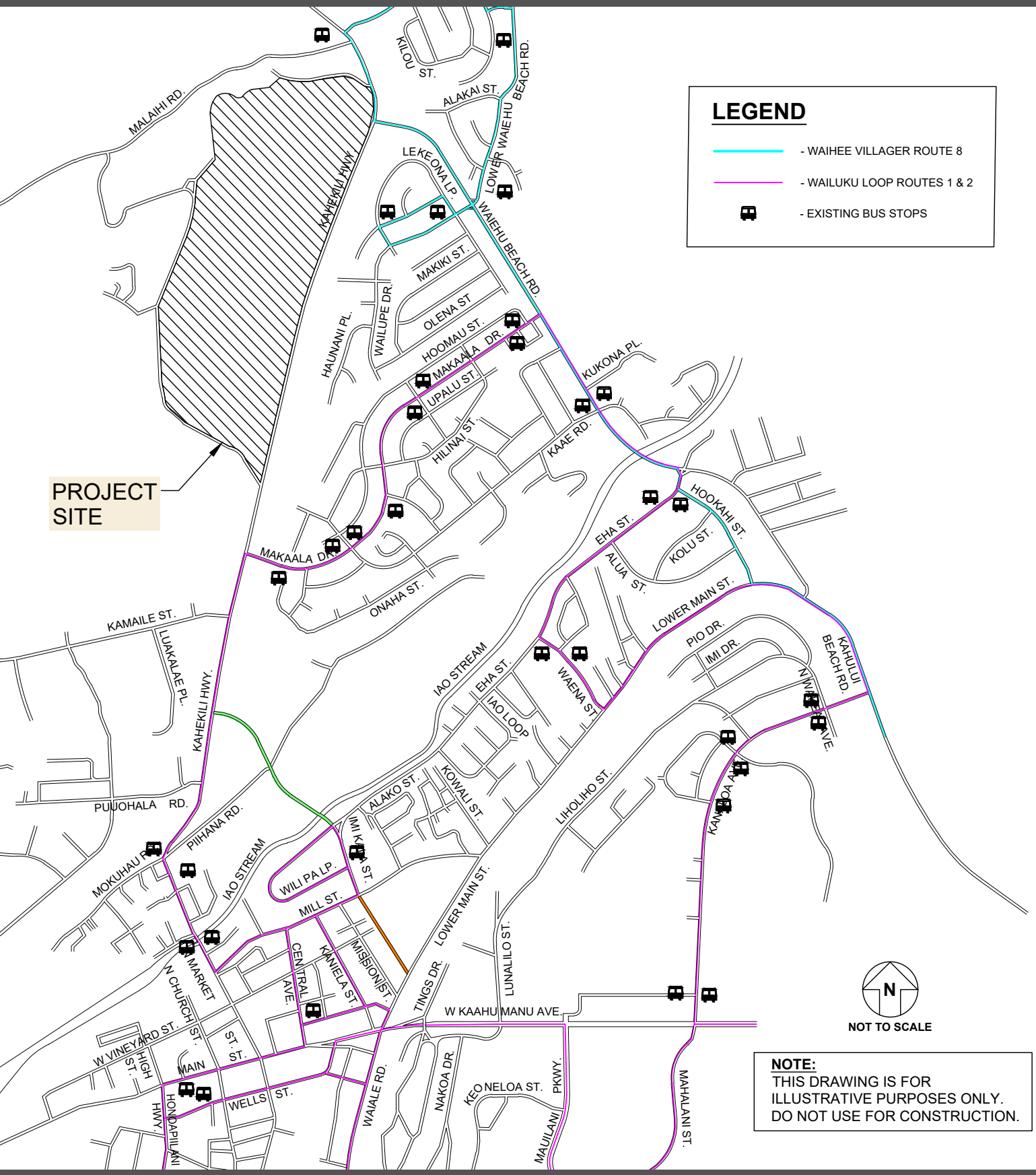

FIGURE 3.3

EXISTING TRANSIT FACILITIES

4. BASE YEAR 2030 TRAFFIC CONDITIONS

The Year 2030 was selected to reflect the completion year of the Project. Projections for Base Year 2030 traffic were based upon existing traffic counts performed by ATA, ambient regional growth, and nearby developments in the immediate vicinity of the Project.

4.1 Defacto Growth Rate

Based on historical counts collected by ATA in 2016, 2018, and 2019 and traffic counts recorded in May 2003 for the Hale Mua TIAR completed by Julian Ng, little to no growth has occurred along Kahekili Highway and Waiehu Beach Road. As a result, to remain conservative, an annual growth rate of 1.0% was applied to regional flows along Waiehu Beach Road and Kahekili Highway to accommodate for any infill development. A growth rate of 1.0% was also applied to Main Street.

4.2 Traffic Forecasts for Known Developments

The following developments are anticipated to be completed and occupied in the vicinity of Study Intersections by the Year 2030:

- Boys & Girls Clubhouse proposes a two-story clubhouse that will replace the existing covered basketball court adjacent to the Paukukalo Community Center in Waiehu.
- Wailuku Civic Complex (WCC) proposes infrastructure improvements along Church Street and Vineyard Street as part of phase 1A. Phase 1B will construct a new multi-level parking. Phase 2 of WCC, which would construct a civic building and plaza, remains uncertain due to funding concerns. As part of the WCC project, the existing parking lot access on Vineyard Street will be removed and the existing two-way driveway at Market Street and Pili Street intersection will be converted to provide entry only. Also, Church Street will be converted from its existing one-way, one-lane southbound roadway into a two-way, two-lane roadway between Main Street and Vineyard Street. Despite funding not yet being allocated for the completion of all phases, to remain conservative, all phases of WCC was assumed to be constructed by Year 2030 for purposes of this TIAR.
- Waiehu Affordable Housing proposes to construct a 120-unit affordable housing development on a roughly 13-acre site located in Waiehu, east of Kahekili Highway and south of Waiehu Beach Road, directly across from the Project site. The project will also include a 3,000 square foot (SF) non-profit building and a 3,600 SF community center.
- Wailuku Hotel proposes a 160-room hotel with café/eating establishment at the corner of Main Street/Market Street.

Table 4.1 shows the trips generated by each respective development and Figure 4.1 shows the locations of the known developments.

WAIEHU MASTER PLAN TIAR

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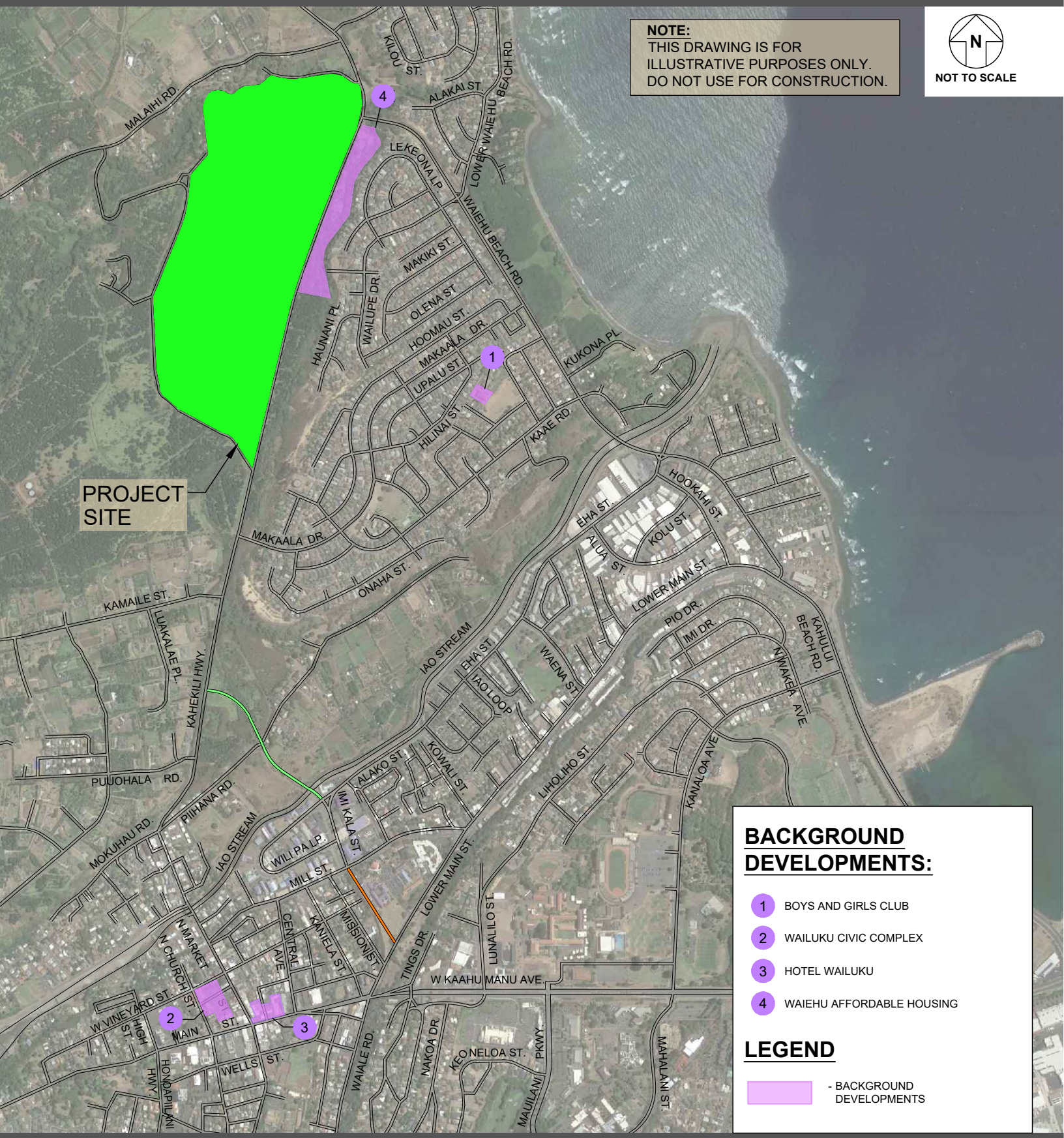

FIGURE 4.1

BACKGROUND PROJECTS

Table 4.1: Trips Generated by Known Developments

Known Development	AM Peak Hour			PM Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total
Boys & Girls Clubhouse	21	11	32	10	11	21
Wailuku Civic Complex	335	92	427	240	387	627
Waiehu Affordable Housing	19	45	64	47	32	79
Wailuku Hotel	44	31	75	49	47	96
TOTAL	**419**	**179**	**598**	**346**	**477**	**823**

4.3 Planned Roadway Improvements

The Maui Metropolitan Planning Organization prepared The Hele Mai Maui Long Range Transportation Plan 2040 dated December 2019 (hereinafter referred to as "Hele Mai Maui LRTP 2040 Plan"). The Hele Mai Maui LRTP 2040 Plan identifies various long-range transportation improvements for the island of Maui, many of which are improvements previously identified as future planned, programmed or funded improvements by Maui County or The State of Hawaii. The Hele Mai Maui LRTP 2040 Plan identifies several improvements in the Study Area including:

- Mill Street Pavement Reconstruction – Pavement along Mill Street is planned to be reconstructed. No widening capacity improvements, additional lanes or traffic control changes are planned and will therefore not impact vehicular operational conditions on Mill Street. Future intersection improvements and a possible signal have been previously identified at the Mill Street/Imi Kala Street Intersection, but is not planned as part of is reconstruction, nor is it currently budgeted for any future County-led improvement.
- Imi Kala Street Ext. & Bridge Improvement (Phase I)- This regional improvement would provide a new paved roadway between Kahekili Highway to the north and the existing Imi Kala Street/Wili Pa Loop/Eha Street intersection to the south. The existing Imi Kala Bridge will also need to be reconstructed to meet the traffic demands. These improvements will collectively be referred to as "Imi Kala Street Ext. & Bridge Improvements" and is planned to alleviate some of the traffic congestion along Kahekili Highway and Waiehu Beach Road. The Imi Kala Street Ext. & Bridge Improvements were previously tied to the conditions of approval for the former Hale Mua development. As a result, this TIAR analyzes the WITH and WITHOUT Imi Kala Street Ext. & Bridge Improvements for both Base and Future Year conditions. Figure 4.2 shows the location of the Imi Kala Street Ext. & Bridge Improvements.
- Imi Kala Street Ext. (Phase II) – This improvement is proposed by Maui County and would provide a new paved road from the existing Imi Kala Street/Mill Street intersection and traverse south, adjacent to St. Anthony School, terminating at the south end at Lower Main

Street. Based on discussions with County DPW, there is currently no timeframe for completion of this improvement and was therefore *not* included in this TIAR. Figure 4.2 shows the location of the Imi Kala Street Ext. & Bridge Improvement Phase II improvement

4.4 Base Year 2030 Analysis (WITHOUT Imi Kala Street Ext. & Bridge Improvements)

The ambient traffic growth and trips generated by background developments are anticipated to increase traffic by approximately 110 vehicles along Kahekili Highway and approximately 150-200 vehicles along Waiehu Beach Road during each of the AM and PM peak hours in the vicinity of the Project site. Based on these increases, AM queueing along both Kahekili Highway and Waiehu Beach Road is expected to persist through the Base Year Condition. All intersections will continue operating adequately similar to existing conditions, with the exception of the following:

Kahekili Highway/Waiehu Beach Road

Due to volume increases from defacto growth and trips generated by background projects, the westbound movement is anticipated to slightly worsen from LOS C(C) to LOS F(D) during the AM(PM) peak hours, though the movement will continue to operate under capacity. As previously discussed, in existing conditions, vehicles along mainline Kahekili Highway were observed to sometimes stop in the travel way to yield to westbound left-turn vehicles. It is anticipated that this behavior will be continue in the Base Year scenario, and the delay for the westbound approach may be lower than is projected in Synchro analysis.

As with the Existing conditions scenario, a signal would be warranted with Base Year volumes assuming the full westbound left-turn/right-turn lane volume is included in the warrant due to the shared lane approach. However, a signal would not be warranted if separate westbound left-turn and right-turn lanes were provided and only westbound left-turn volumes are included in the warrant. If separate right and left-turn lanes were installed, the critical westbound left-turn movement is anticipated to continue operating at LOS F(D), but will continue to serve a relatively low volume of only 40-50 peak vehicles. With the westbound right-turn and left-turns separated, the heavier right-turn movements will be able to bypass left-turn queues to continue through the intersection more efficiently. In addition, a southbound left-turn lane is warranted based on volumes and is recommended.

Kahekili Highway/Makaala Drive

Due to increased volumes, movements at this intersection will experienced increased delay; however, all movements are anticipated to operate at LOS D or better across both peak hours. A signal would only be warranted under the 70% factor, but since LOS operations are adequate, a signal is not recommended.

Waiehu Beach Road/Makaala Drive

With increased volumes along Waiehu Beach Road, it is anticipated that existing congestion described in Section 3.3.2 may worsen. During the AM peak hour, the eastbound right-turn movement is anticipated to operate at LOS F and overcapacity conditions. It is anticipated that regional congestion along Waiehu Beach Road will continue and result in intermittent progression for right-turners onto Waiehu Beach Road during heavy AM congestion times, as it did with Existing conditions. During the PM peak hour, the eastbound left-turn is anticipated to worsen to

LOS E but will continue to service a low 15 peak vehicles. This movement is also provided with a median refuge lane which shall continue to reduce eastbound left-turn delays.

Kahekili Highway/Market Street/Mokuhau Road/Piihana Road

All movements at this intersection operate at LOS C or better across both peak hours with the exception of the westbound approach, which is anticipated to operate at LOS F(E) during the AM(PM) peak hours, compared to LOS E(D) with existing conditions. The westbound approach is anticipated to continue to service a relatively low volume of approximately 50-65 peak vehicles per hour and with under capacity conditions and little to no queuing.

Waiehu Beach Road/Eha Street/Nukuwai Place

During the PM peak hour, traffic will operate adequately, similar to existing conditions.

During the AM peak hour, congestive conditions will continue to occur. All movements operating at LOS F with Existing conditions will continue operating at LOS F during the Base Year. As previously mentioned, the overcapacity conditions during the AM peak hour is primarily due to the short right-turn pocket which forces southbound right-turn vehicles to decelerate in the through lane which limits progression through the signal when the light for the southbound approach is green, and the southbound through movement queue spillback blocking access to the right-turn pocket when the light is red. Improvements to extend the southbound right-turn lane is difficult due to the existing bridge over Wailuku River that limits the lengthening of the right-turn pocket.

Market Street/Mill Street

As described in Section 3.2.2, the high volume of southbound left-turn vehicles combined with a relatively short left-turn pocket resulted in extensive queue in the southbound direction stemming from this intersection. Analysis shows the westbound left-turn movement operates at LOS F and over capacity conditions during the AM peak hour. During the PM peak hour, the westbound left-turn movement operates at LOS F and the westbound right-turn movement operates at LOS F and over capacity conditions. However as previously discussed, observations show that mainline traffic along Market Street frequently stopped to allow left-turners to proceed, resulting in significantly less delays and queues. This behavior is anticipated to continue with Base Year conditions and may result in lower delay than Synchro suggests.

Central Avenue/Mill Street

Due to increased conflicting volumes along Mill Street with Base Year conditions, it is anticipated that the northbound approach will operate at LOS F and under capacity conditions during the PM peak hour. All other movements are anticipated to operate at LOS C or better across both peak hours.

Mill Street/Imi Kala Street

With the increased volumes with Base Year conditions, the southbound left-turn is anticipated to continue to operate at LOS F during the AM peak hour and lower to LOS F and overcapacity conditions during the PM peak hour over Existing conditions. A signal is warranted with Base Year 2030 volumes. If a signal is installed, it is anticipated that all movements will operate at LOS B or better across both peak hours.

Market Street/Vineyard Street

At the Market Street/Vineyard Street intersection during the AM peak hour, the southbound right-turn lane is anticipated to lower from LOS C with existing conditions to LOS F with Base Year conditions. During the PM peak hour, the northbound approach and eastbound left-turn movement are anticipated to operate at LOS F and near-capacity conditions, and the southbound right-turn movement is anticipated to operate at LOS E. A signal is warranted with Base Year 2030 volumes, however based on discussions with Maui County, a signal may be infeasible give narrow roadway widths and limited right-of-way.

Main Street/Church Street

As part of the Wailuku Civic Complex project, Church Street will be converted from the existing one-way, one-lane roadway to a two-way, two-lane roadway and a signal will be installed. With the signal, all movements are anticipated to operate at LOS D or better across both peak hours.

Main Street/Central Avenue

Due to increases in volumes with Base Year conditions, it is anticipated that movements at this intersection will experience a slight increase in delay, though all movements are anticipated to operate similarly to Existing conditions. All movements are anticipated to operate at LOS D or better across both peak hours, with the exception of the southbound left-turn movement which is anticipated to continue to operate at LOS E during the AM peak hour as it did with Existing conditions.

Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road

Due to increased volumes along Waiehu Beach Road, it is anticipated that the westbound shared left-turn movement will operate at LOS F and overcapacity conditions during the PM peak hour. All other movements are anticipated to operate similarly to Existing conditions.

Figure 4.3A, 4.3B, and 4.3C show volumes and laneage for Base Year conditions Without the Imi Kala Street Ext. & Bridge Improvement, without improvements. Figure 4.4 shows conditions for intersections with improvements described above. A LOS Summary can be found in Table 4.1.

4.5 Base Year 2030 WITH Imi Kala Street Ext. & Bridge Improvement Analysis

As previously discussed, the Imi Kala Street Ext. & Bridge Improvement is intended to provide a third connection between Waiehu and Wailuku/Kahului and alleviate existing congestion along Kahekili Highway and Waiehu Beach Road. It is anticipated that a portion of regional vehicles (to/from Wailuku and Kahului) which currently use the Kahekili Highway/Market Street and Waiehu Beach Road/Kahului Beach Road routes will reroute to the Imi Kala Street Extension. The percentage of vehicles that will be rerouted were based partly upon capacity balancing across the three roadways – Waiehu Beach Road, Kahekili Highway, and the Imi Kala Bridge Extension. It is also anticipated that a portion of trips to/from the Wailuku Millyard or various residences/businesses off Eha Street will reroute to the Imi Kala Street Extension. In total, it is anticipated that approximately 369(173) southbound vehicles and 126(282) northbound vehicles will be rerouted to the Imi Kala Street Extension.

In general, conditions along the Waiehu Beach Road corridor and Kahekili Hwy/Market Street corridor between Puuohala Road and Mill Street improved as a result of the Imi Kala Street Extension. However, congestion will likely increase along roadways and intersections along Imi Kala Street and Eha Street.

Figure 4.5A, 4.5B, and 4.5C show trips rerouted by the Imi Kala Street Ext. & Bridge Improvement.

Kahekili Highway/Waiehu Beach Road

With the Imi Kala Street Ext. & Bridge Improvement, it is anticipated that a portion of regional southbound left-turn trips from Waihee turning left onto Waiehu Beach Road will instead reroute and continue through on Kahekili Highway to use the Imi Kala Street Extension. It is anticipated that 40%(19%) of the southbound left-turn volume would reroute to the Imi Kala Street Extension during the AM(PM) peak hours of traffic. Additionally, it is anticipated that a smaller portion of northbound traffic along Waiehu Beach Road, approximately 9(16) vehicles during the AM(PM) peak hours, would reroute to the Imi Kala Street Extension and approach the Kahekili Highway/Waiehu Beach Road intersection from northbound Kahekili Highway instead of westbound Waiehu Beach Road. As a result, the LOS of the westbound approach improved from LOS F during the AM peak hour without the Imi Kala Street Ext. & Bridge Improvement to acceptable LOS D with the Imi Kala Street Ext. & Bridge Improvement.

Since all movement LOS improves to LOS D or better, mitigation is not required, but widening of the westbound approach to provide exclusive left-turn and right-turn lanes and widening of southbound approach to provide an exclusive left-turn lane may still be considered.

Kahekili Highway/Makaala Drive

It is anticipated that a number of vehicles bound for Wailuku will be rerouted from Waiehu Beach Road to Makaala Drive to access the Imi Kala Street Extension. In addition to the 140(47) rerouted southbound regional trips along Kahekili Highway, 103(21) vehicles were rerouted to the Makaala Drive westbound left-turn movement. As a result, the westbound left-turn movement is anticipated to operate at LOS F and overcapacity conditions during the AM peak hour.

Similar to the Base Year Without Imi Kala Ext. & Bridge Improvement, a signal would only be warranted under the 70% factor. In lieu of a signal, a median refuge lane could be provided to facilitate two-stage turns for left-turners from Makaala Drive turning onto Kahekili Highway. The median refuge lane allows westbound left-turn Makaala Drive traffic to turn into the refuge lane after finding a gap in the northbound traffic and then merge into southbound traffic, requiring drivers to yield to only one direction of mainline Kahekili Highway traffic at time. With a median refuge lane, the westbound left-turn movement will improve to LOS E and below capacity conditions during the AM peak hour. The intersection should be monitored if/when the Imi Kala Ext. & Bridge Improvement is constructed to determine if a signal is warranted/needed at this intersection.

Waiehu Beach Road/Makaala Drive

With trips being rerouted away from Waiehu Beach Road onto Imi Kala Street Extension via Kahekili Highway/Makaala Drive intersection, it is anticipated that operations will improve for the eastbound right-turn movement from LOS F and overcapacity conditions with Base Year

conditions without the Imi Kala Street Ext. & Bridge Improvement, to LOS C conditions with the Imi Kala Street Ext. & Bridge Improvement.

Kahekili Highway/Market Street/Mokuhau Road/Piihana Road

The Imi Kala Street Ext. & Bridge Improvement is anticipated to reduce volumes along the mainline Kahekili Highway/Market Street by approximately 230(300) vehicles during the AM and PM peak hours. As a result, the westbound approach, which is anticipated to operate at LOS F(E) without the Imi Kala Street Ext. & Bridge Improvement, will experience an improvement in delay of approximately 40 seconds(20 seconds) to LOS E(C). All other movements will continue to operate at LOS C or better across both peak hours.

Waiehu Beach Road/Eha Street/Nukuwai Place

Due to capacity balancing as previously explained, it is anticipated that Waiehu Beach Road will experience a decrease in volumes as trips are rerouted to the Imi Kala Street Extension. On the critical southbound approach during the AM peak hour, approximately 162 southbound through vehicles and 81 southbound right-turn vehicles are anticipated to be rerouted to the Imi Kala Street Extension. The reduction in vehicles is anticipated to help reduce the queue lengths and duration of queues along Waiehu Beach Road and improve operations at the Waiehu Beach Road/Eha Street/Nukuwai Place intersection.

Turning movements during the AM peak hour, including the eastbound shared left-turn/through movement and the westbound approach, are anticipated to operate at LOS E/F. The critical southbound approach during the AM peak hour is anticipated to improve to LOS D and under capacity conditions. All other movements are anticipated to operate at LOS C or better across both peak hours. Overall, the intersection is anticipated to operate at LOS C(C) during the AM(PM) peak hours.

Market Street/Mill Street

The southbound left-turn volume and the westbound right-turn movement are anticipated to experience a significant decrease in volumes of about 126(69) and 105(227) trips during the AM and PM peak hours, respectively, as trips are rerouted to the Imi Kala Extension. As a result, the westbound approach is anticipated to experience a decrease in delay over Existing conditions, though the westbound left-turn movement is anticipated to continue to operate at LOS F but improve to under capacity conditions during both peak hours.

Mill Street/Central Avenue

This intersection is anticipated to experience a decrease in mainline Mill Street trips as vehicles are rerouted away from Mill Street via Market Street and onto the Imi Kala Street Extension. However, there is anticipated to be an increase in volumes on the westbound left-turn movement and the northbound right-turn movement of 208(42) vehicles and 18(47) vehicles respectively, as vehicles utilize this intersection to travel between the regional Main Street and the Imi Kala Street Extension. As a result, the westbound left-turn volume is anticipated to be relatively high at 467(300) vehicles during the AM(PM) peak hours; however relatively low conflicting volumes on the eastbound through and right-turn movements allow adequate gaps and all movements at this intersection will operate at LOS C or better across both peak hours.

Mill Street/Kaniela Street and Mill Street/Mission Street

During the AM peak hour, it is anticipated that the volumes of rerouted vehicles from the Imi Kala Street Extension traveling back to Mill Street via Central Avenue or other parallel streets will result in a net increase of approximately 120-130 vehicles during the AM peak hour on the westbound approach. It is anticipated that 50-60 eastbound vehicles which formerly used Mill Street to travel to destinations further east will use the Imi Kala Street Extension instead, resulting in a net decrease in volumes. Low volumes along Kaniela Street and Mission Street will be rerouted away from using Market Street to travel northward and instead using the Imi Kala Street Extension. At both intersections, all movements operate at LOS C or better across both peak hours.

Imi Kala Street/Eha Street/Wili Pa Loop

As an all-way stop controlled intersection, all movements will operate adequately at LOS C or better.

Mill Street/Imi Kala Street

A signal is warranted with Base Year 2030 conditions without the Imi Kala Street Extension, and will continue to be warranted in this scenario. If there are no improvements to the intersection, it is anticipated that the southbound left-turn movement will operate at LOS F during the AM peak hour and LOS F and overcapacity conditions during the PM peak hour. If a signal is installed, it is anticipated that all movements will operate acceptably at LOS B or better across both peak hours.

Market Street/Vineyard Street

The Imi Kala Street Extension is not anticipated to reroute any vehicles to this intersection. Therefore, operations are anticipated to be the same as the Base Year Without Imi Kala Street Ext. & Bridge Improvement scenario.

Main Street @ intersections with High Street, Church Street and Market Street

The Imi Kala Street Extension is not anticipated to reroute any vehicles at these intersection. Therefore, operations are anticipated to be the same as the Base Year Without Imi Kala Street Ext. & Bridge Improvement scenario.

Main Street/Central Avenue

Due to the regional nature of this intersection, which facilitates regional traffic to/from Main Street/Kaahumanu Avenue, it is anticipated that approximately 162(24) southbound vehicles and a lower volume of 9(16) northbound volumes will reroute to this intersection via the Imi Kala Street Extension. The intersection is anticipated to operate similarly to Base Year Without the Imi Kala Street Ext. & Bridge Improvement, with the southbound left-turn movement operating at LOS E during the AM peak hour and LOS D or better across both peak hours at all other movements.

Kahekili Highway/Imi Kala Street Extension

At the northern terminus of the Imi Kala Street Extension where it intersects with Kahekili Highway, dedicated turn lanes are recommended along Kahekili Highway for turns onto the Imi Kala Street Extension, and along the westbound Imi Kala Street Extension approach.

As previously explained, the Imi Kala Street Extension is anticipated to reroute trips from Kahekili Highway and Waiehu Beach Road to balance capacities and operations across the three connections to Wailuku. In total, it is anticipated that 369(137) trips will turn left from southbound Kahekili Highway onto the Imi Kala Street Extension and approximately 126(282) trips will turn right from the westbound Imi Kala Street Extension onto northbound Kahekili Highway. All movements at this intersection will operate at LOS B or better across both peak hours.

Figures 4.6A, 4.6B, and 4.6C show Base Year 2030 conditions with the Imi Kala Street Ext. & Bridge Improvement. A LOS Summary can be found in Table 4.2. Conditions at intersections with recommended improvements can be found in Figure 4.7.

WAIEHU MASTER PLAN TIAR

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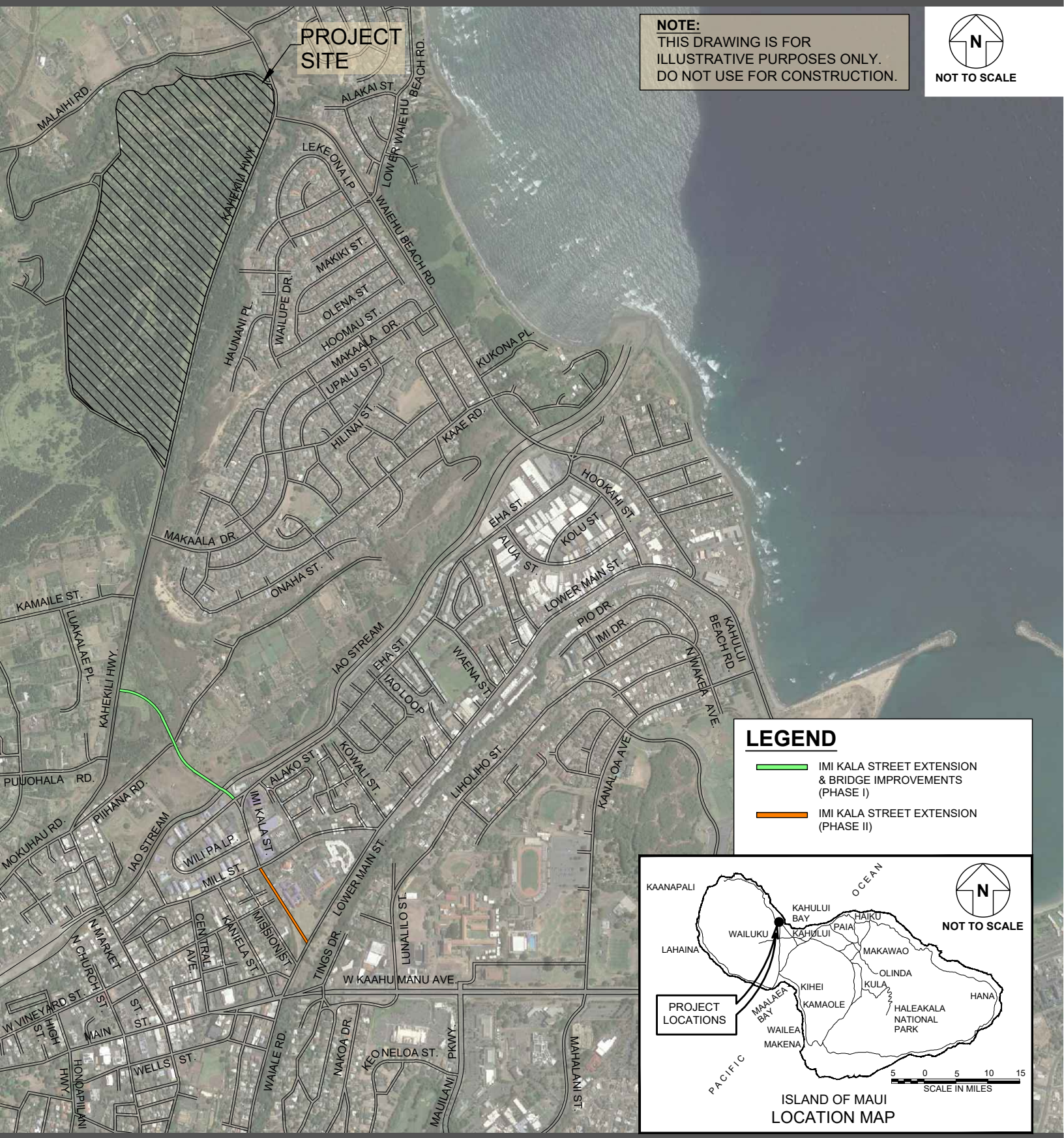

FIGURE 4.2

IMI KALA ROAD EXTENSION LOCATION

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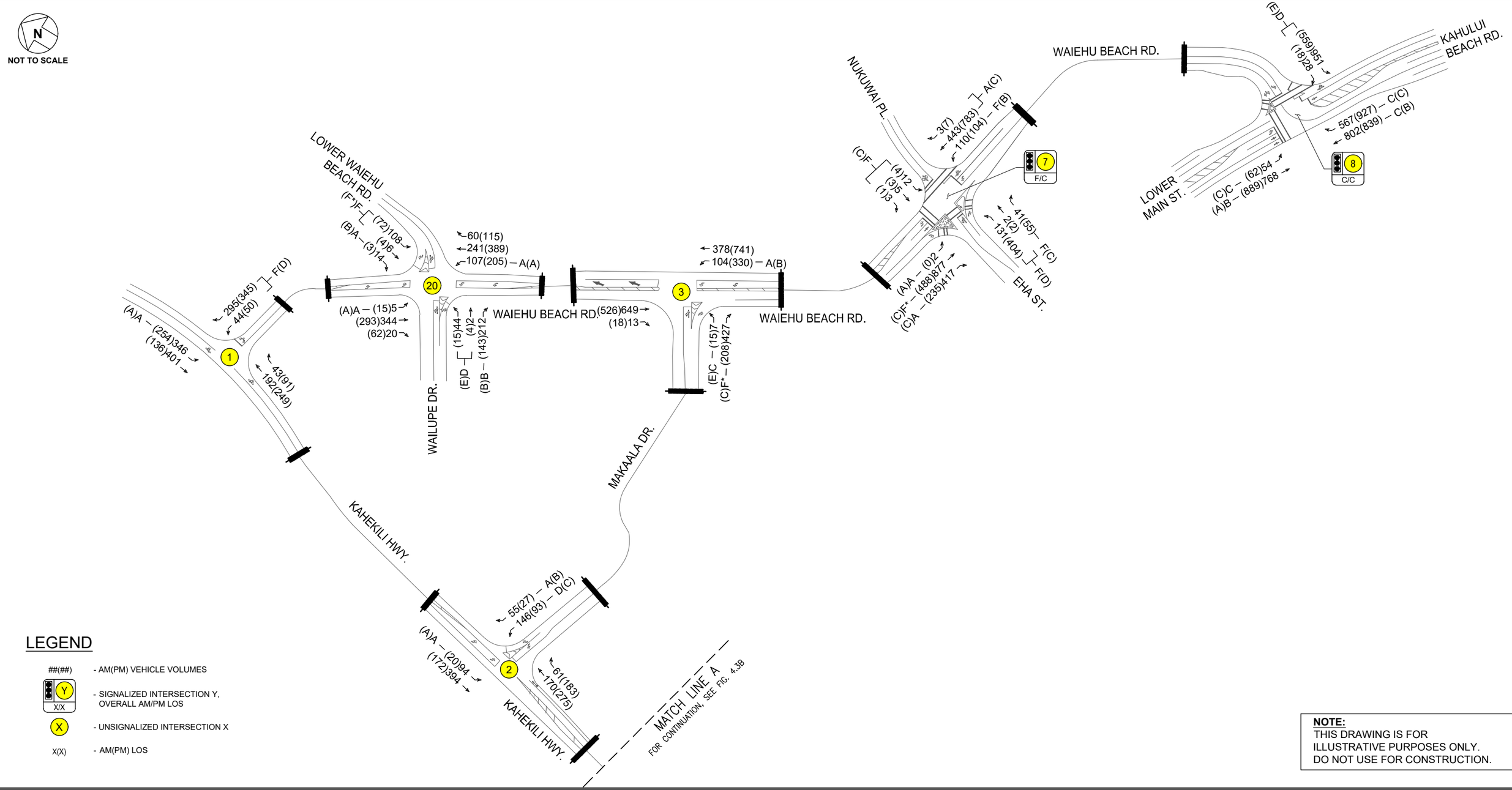

LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

NOTE:
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FIGURE 4.3A

BASE YEAR 2030 CONDITIONS WITHOUT IMI KALA STREET EXTENSION
NO IMPROVEMENTS - 1

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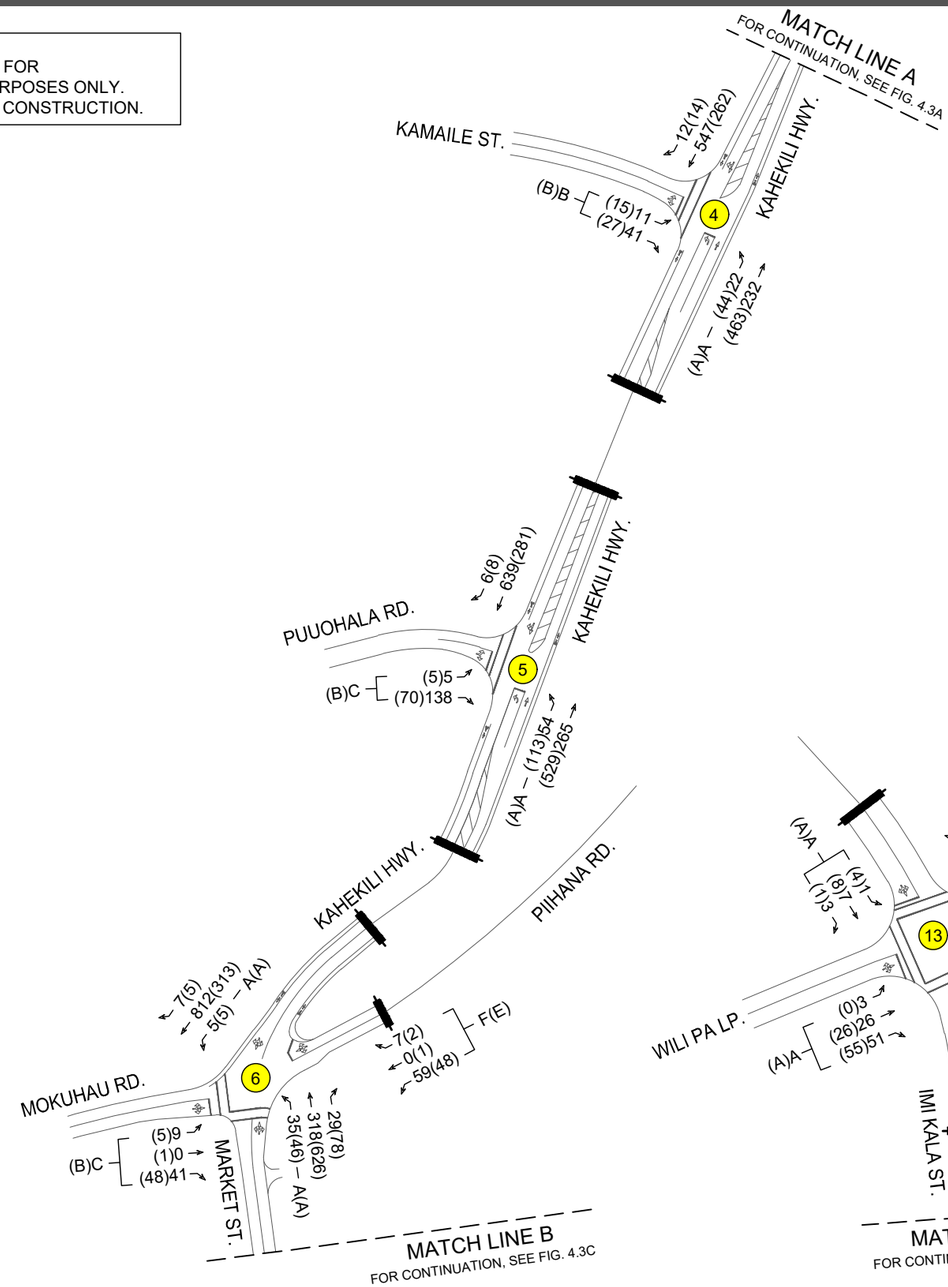

LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y, X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

FIGURE 4.3B

BASE YEAR 2030 CONDITIONS WITHOUT IMI KALA STREET EXTENSION
NO IMPROVEMENTS - 2

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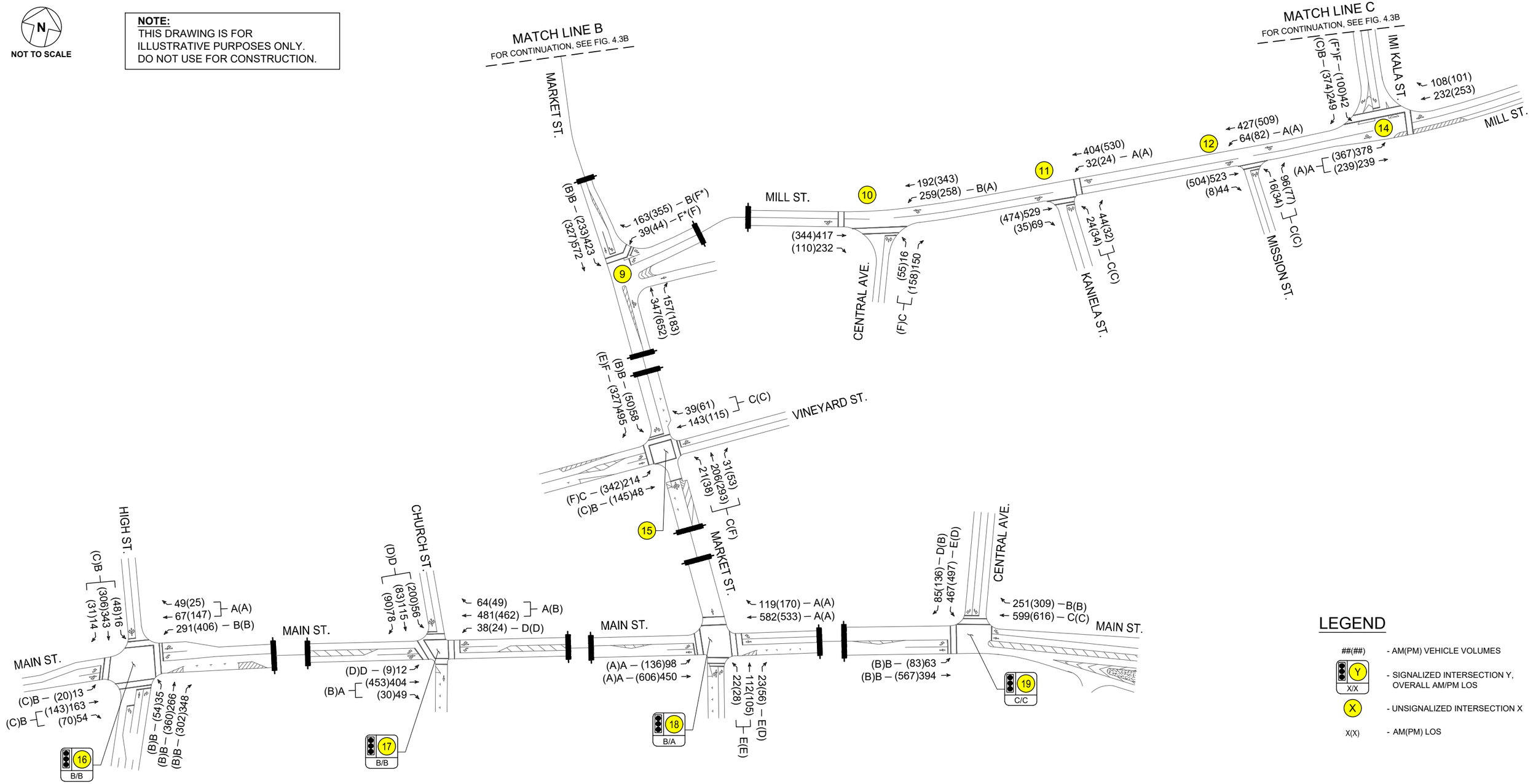

LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

FIGURE 4.3C

BASE YEAR 2030 CONDITIONS WITHOUT IMI KALA STREET EXTENSION
NO IMPROVEMENTS - 3

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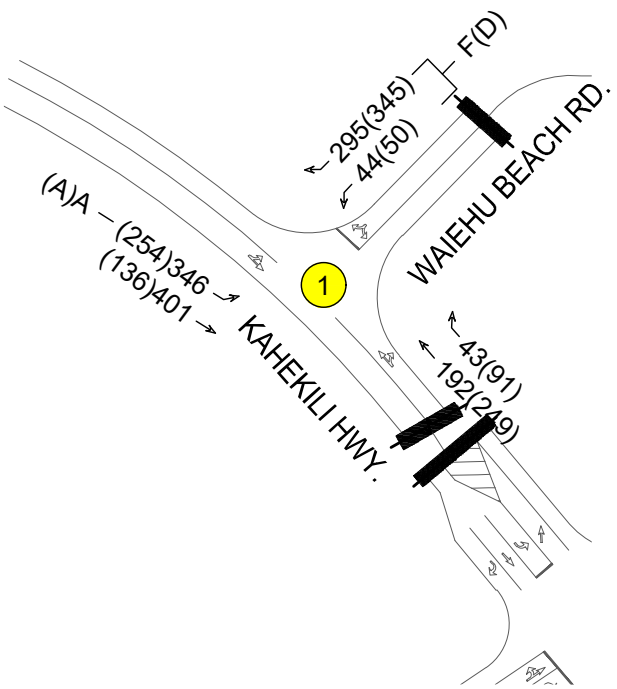
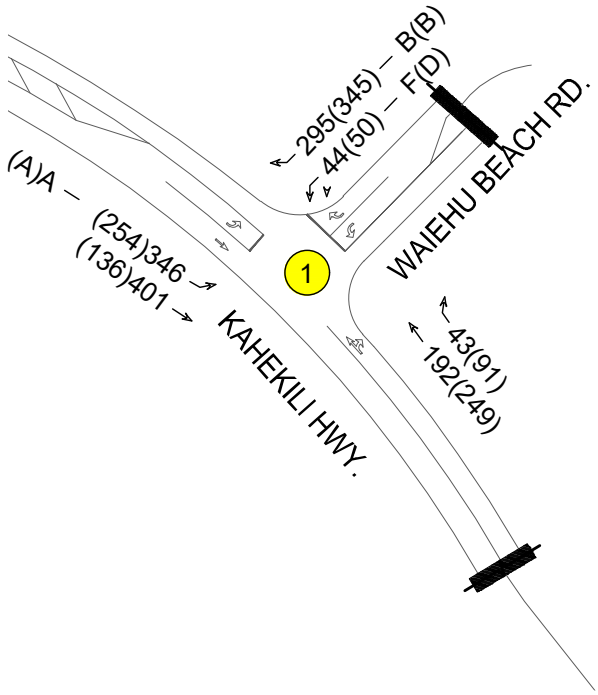
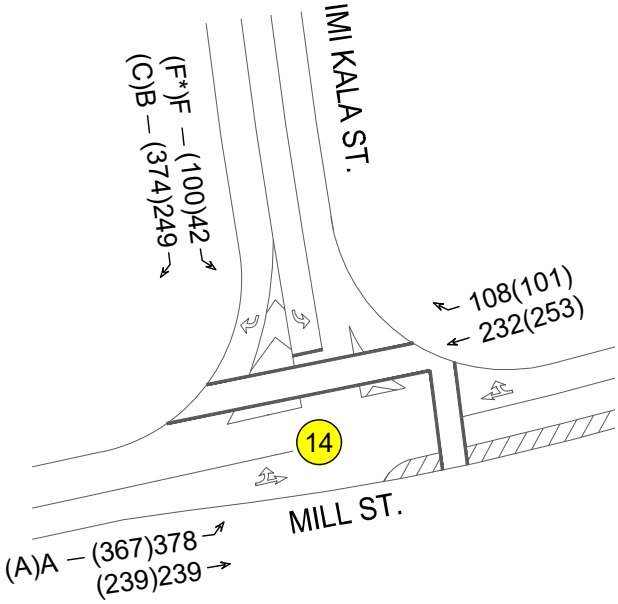
KAHEKILI HWY/WAIEHU BEACH RD
WITHOUT IMPROVEMENTS



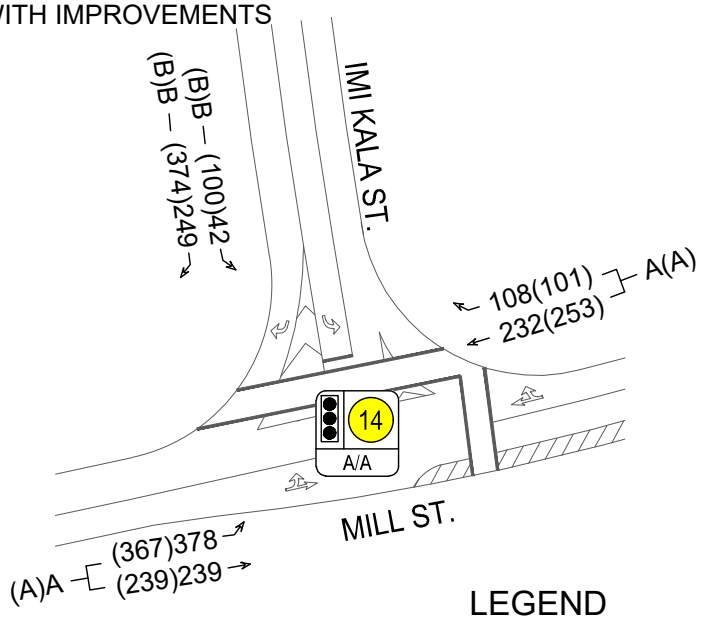
KAHEKILI HWY/WAIEHU BEACH RD
WITH IMPROVEMENTS



MILL ST./IMI KALA ST.
WITHOUT IMPROVEMENTS



MILL ST./IMI KALA ST.
WITH IMPROVEMENTS



LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

FIGURE 4.4

BASE YEAR 2030 CONDITIONS WITHOUT IMI KALA STREET EXTENSION WITH IMPROVEMENTS

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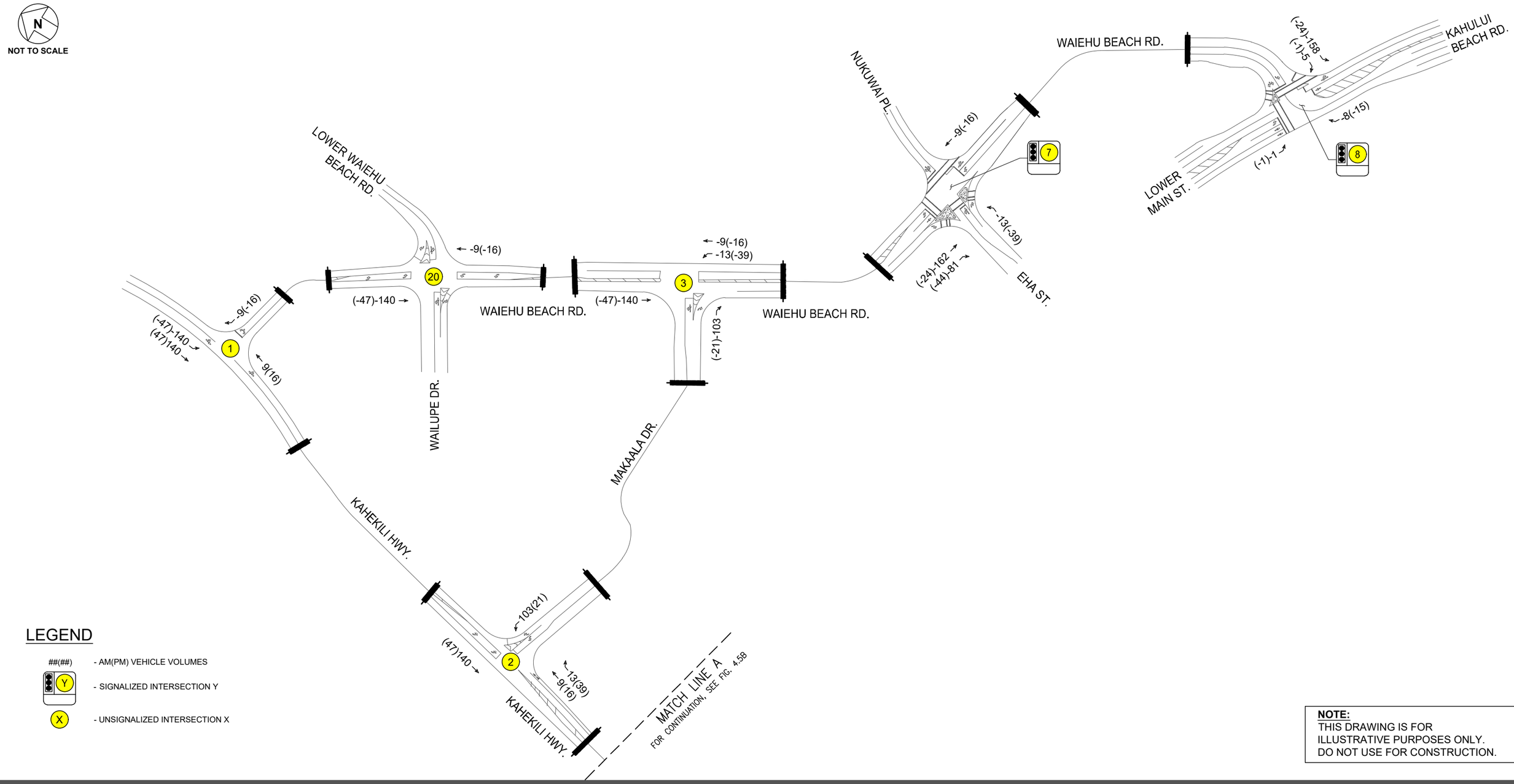

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FIGURE 4.5A

IMI KALA STREET EXTENSION REROUTES - 1

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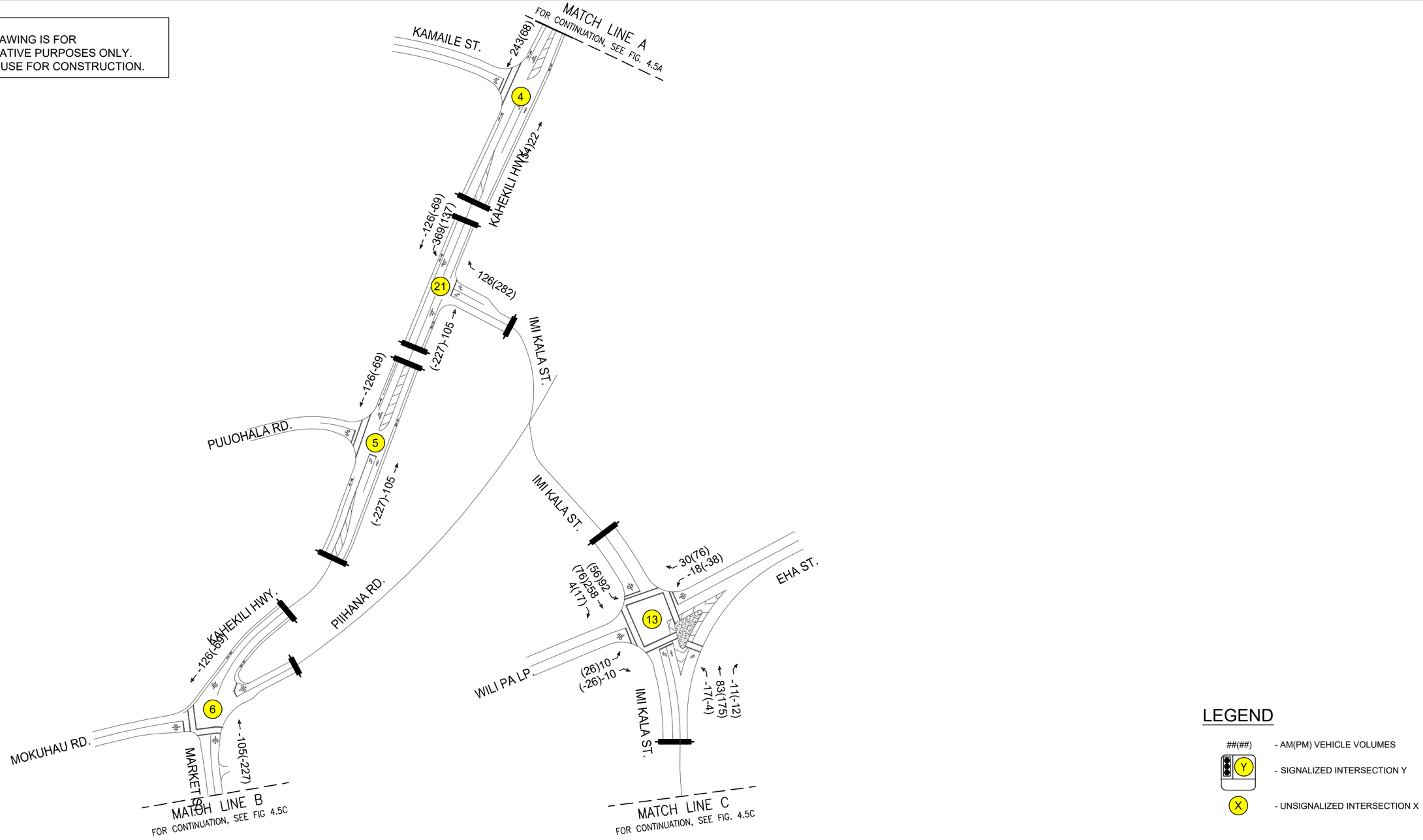

LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y	- SIGNALIZED INTERSECTION Y
X	- UNSIGNALIZED INTERSECTION X

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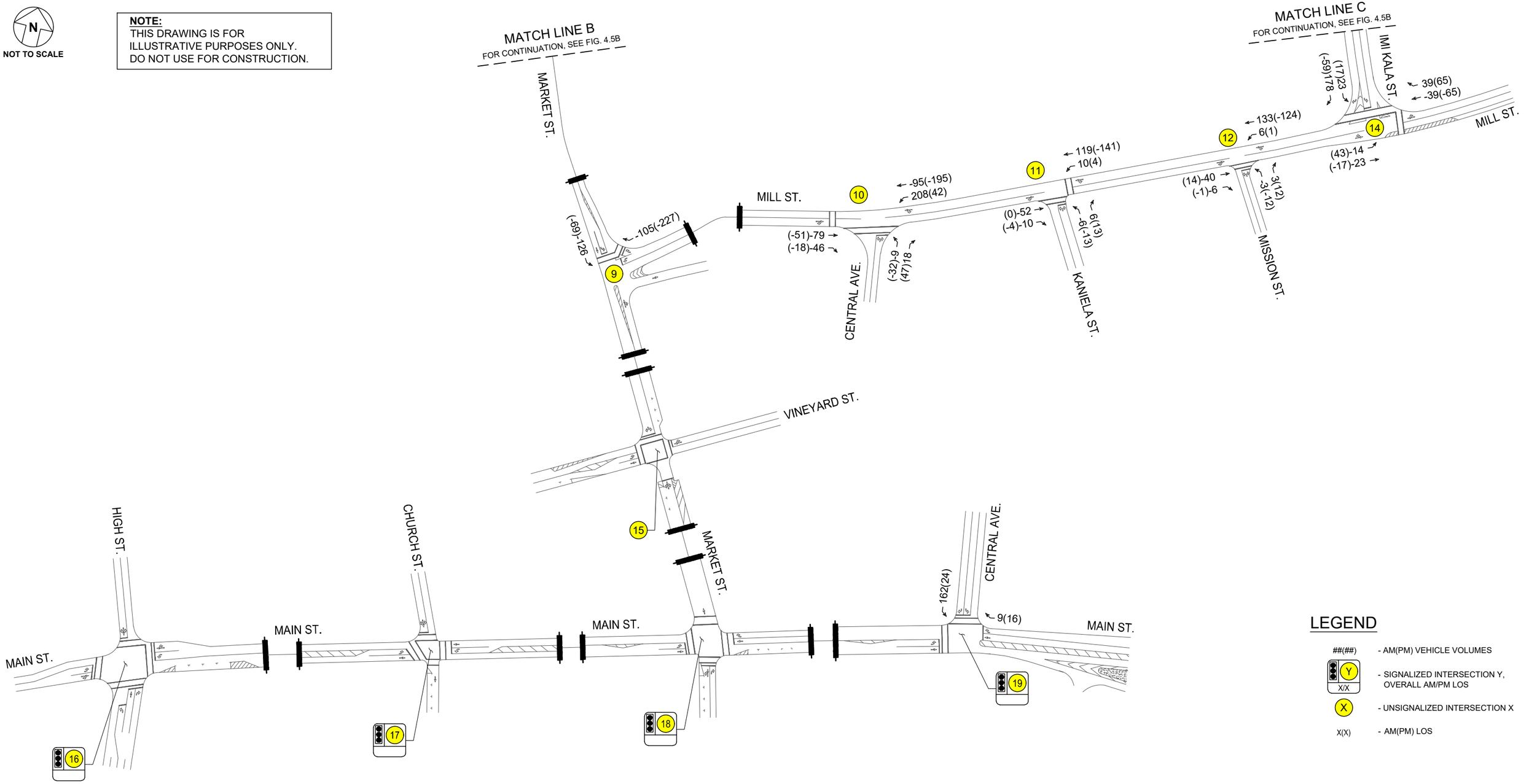

LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

FIGURE 4.5C

IMI KALA STREET EXTENSION REROUTES - 3

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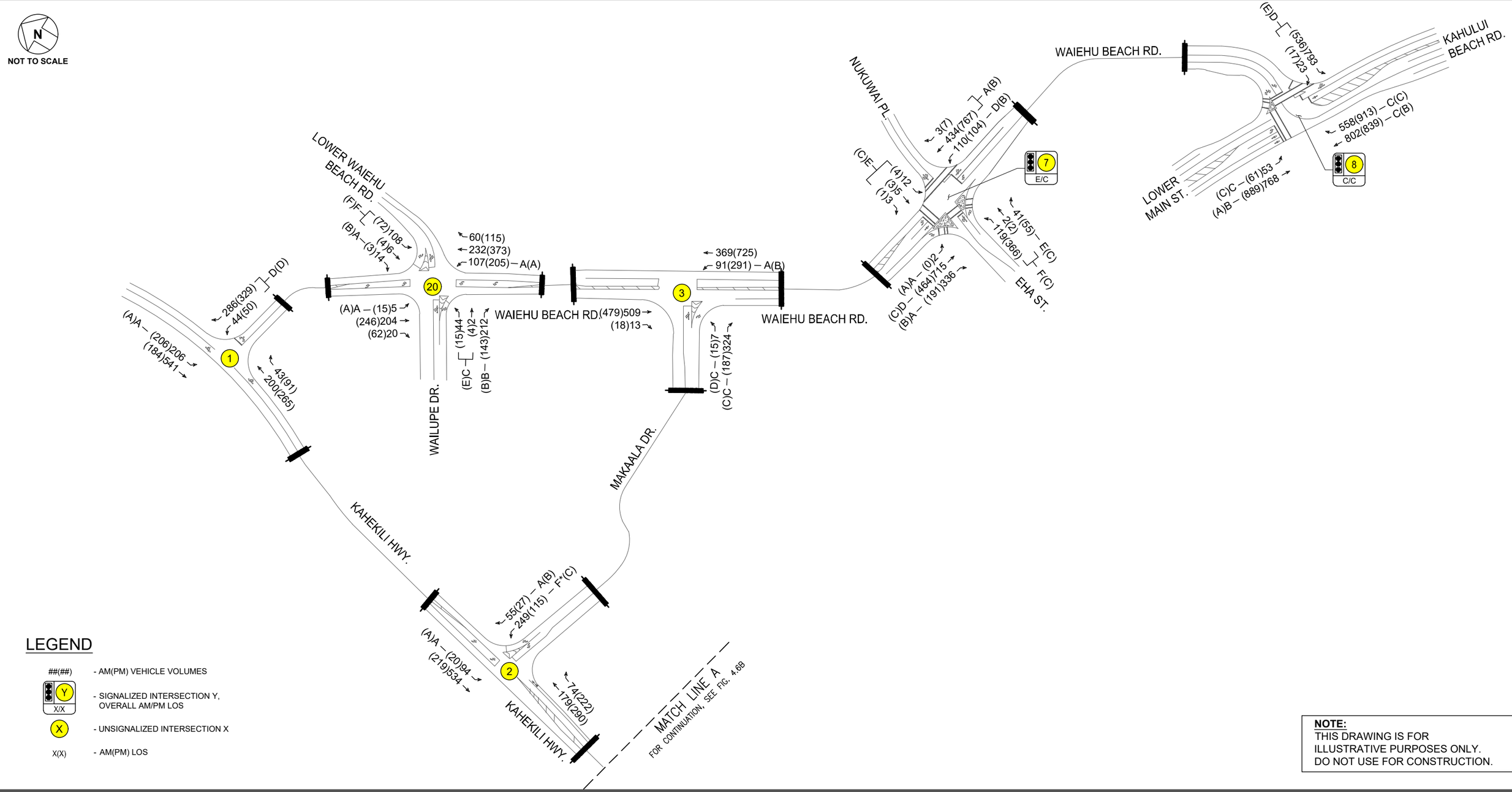

LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

NOTE:
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FIGURE 4.6A

BASE YEAR 2030 CONDITIONS WITH IMI KALA STREET EXTENSION
NO IMPROVEMENTS - 1

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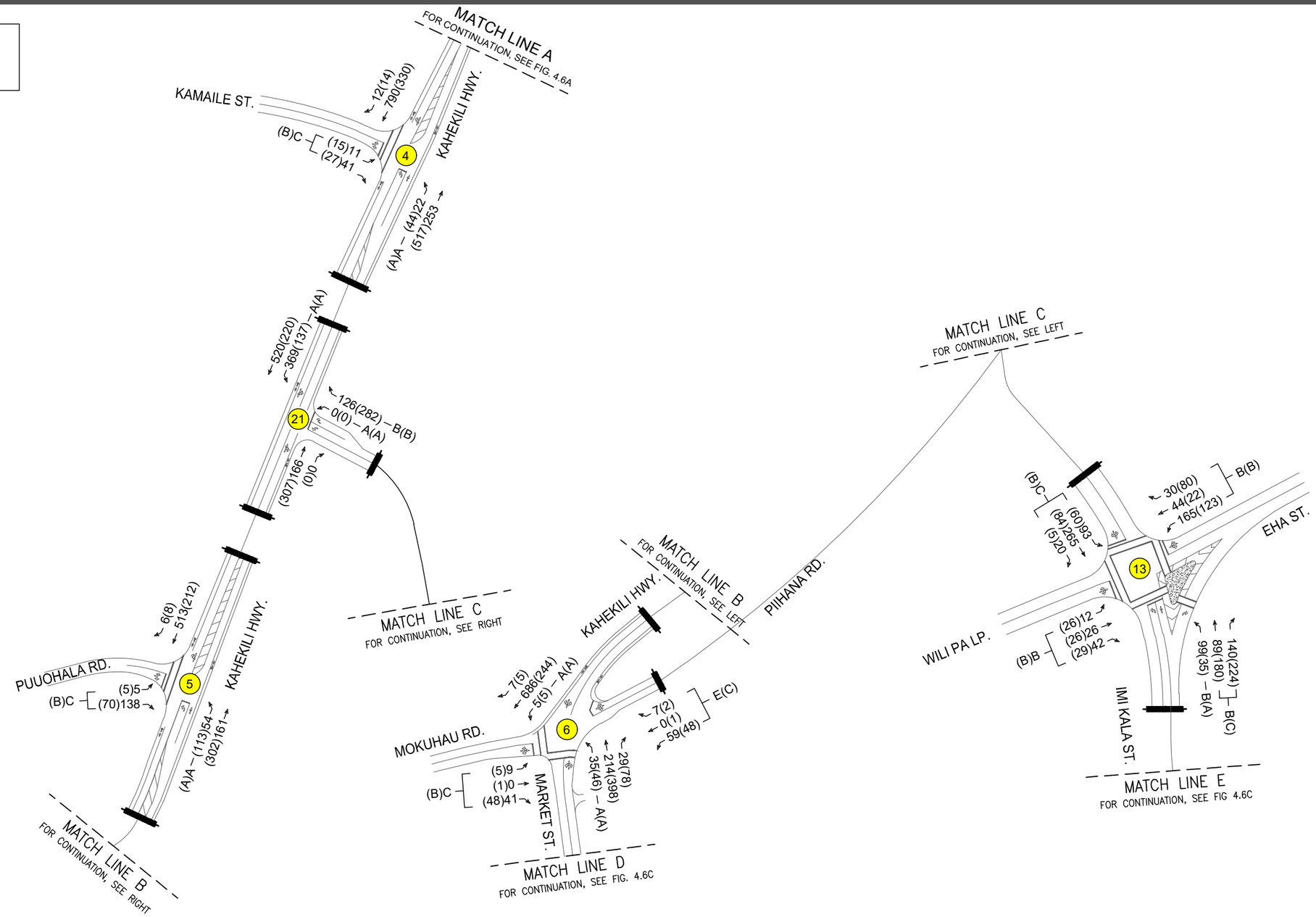
N
NOT TO SCALE

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



LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

FIGURE 4.6B

BASE YEAR 2030 CONDITIONS WITH IMI KALA STREET EXTENSION
NO IMPROVEMENTS - 2

WAIEHU MASTER PLAN TIAR

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

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NOT TO SCALE

NOTE:
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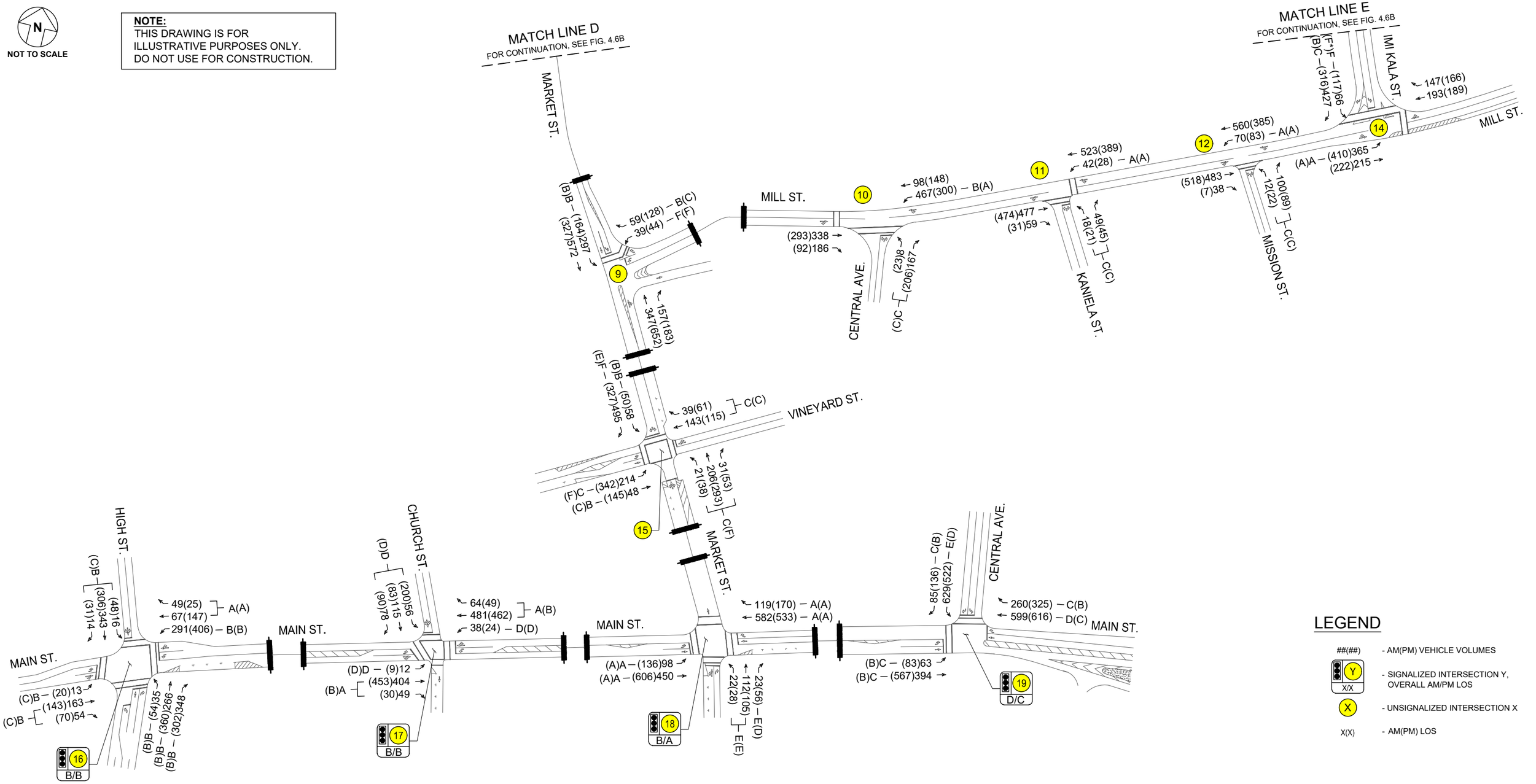


LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

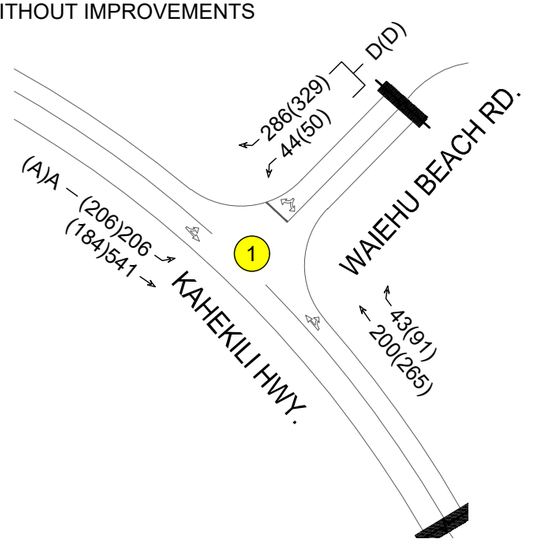
FIGURE 4.6C

BASE YEAR 2030 CONDITIONS WITH IMI KALA STREET EXTENSION
NO IMPROVEMENTS - 3

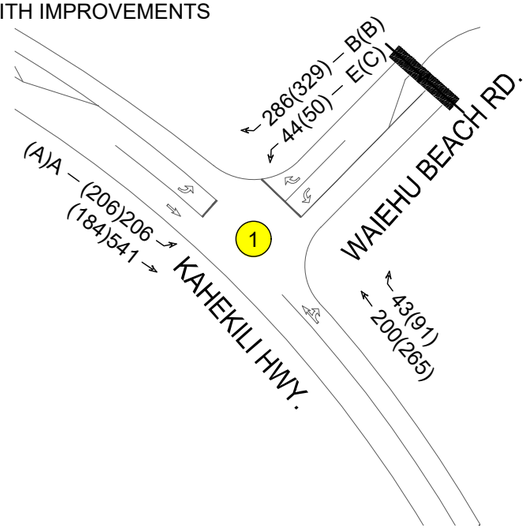
WAIEHU MASTER PLAN TIAR

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

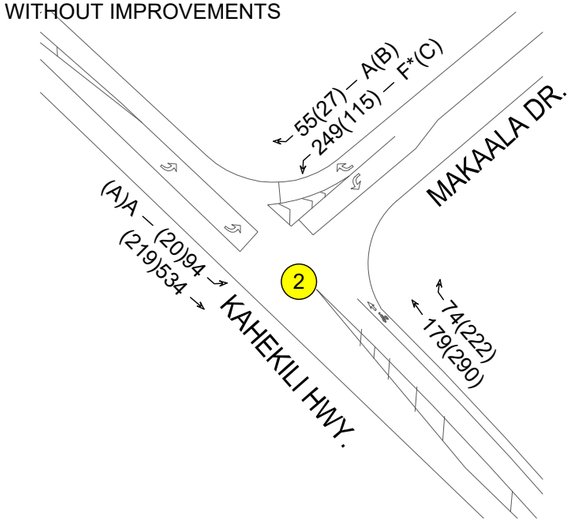
KAHEKILI HWY./WAIEHU BEACH RD.
WITHOUT IMPROVEMENTS



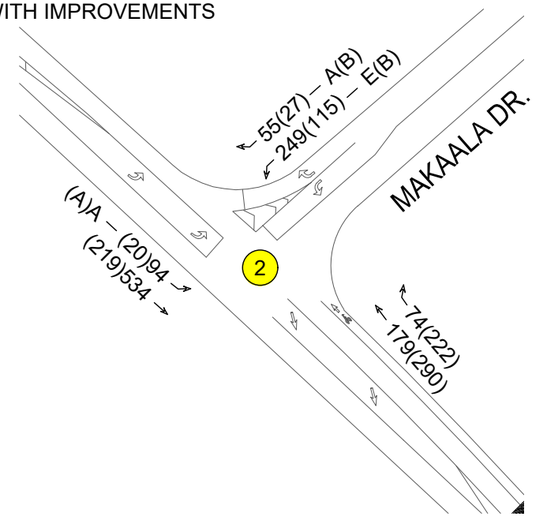
KAHEKILI HWY./WAIEHU BEACH RD.
WITH IMPROVEMENTS



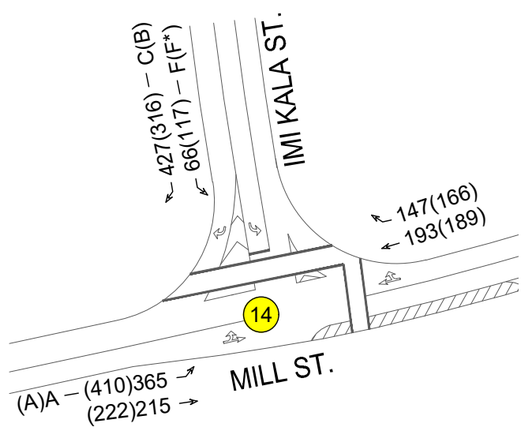
KAHEKILI HWY./MAKAALA DR.
WITHOUT IMPROVEMENTS



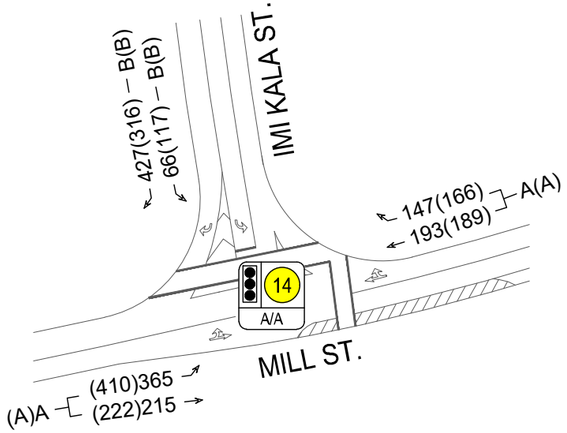
KAHEKILI HWY./MAKAALA DR.
WITH IMPROVEMENTS



MILL ST./IMI KALA ST.
WITHOUT IMPROVEMENTS



MILL ST./IMI KALA ST.
WITH IMPROVEMENTS



LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

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

FIGURE 4.7

BASE YEAR 2030 CONDITIONS WITH IMI KALA STREET EXTENSION WITH IMPROVEMENTS

TABLE 4.2: LOS SUMMARY TABLE
EXISTING CONDITIONS AND BASE YEAR 2030 WITH AND WITHOUT IMI KALA STREET EXTENSION

Intersection	Existing 2021 Conditions						Base Year 2030 NO Imi Kala St. Extension Conditions No Improvements						Base Year 2030 NO Imi Kala St. Extension Conditions With Improvements						Base Year 2030 WITH Imi Kala St. Extension Conditions No Improvements						Base Year 2030 WITH Imi Kala St. Extension Conditions With Improvements					
	AM			PM			AM			PM			AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kahekili Hwy & Waiehu Beach Rd													**Mitigation: Widen to provide westbound right-turn and left-turn lanes, and southbound left-turn lane**												**Mitigation: Widen to provide westbound right-turn and left-turn lanes, and southbound left-turn lane**					
WB LT	-	-	-	-	-	-	-	-	-	-	-	-	63.4	0.45	F	29.4	0.27	D	-	-	-	-	-	-	39.2	0.32	E	26.4	0.25	D
WB LT/RT	23.4	0.64	C	17.6	0.57	C	57.8	0.91	F	33.1	0.80	D	-	-	-	-	-	-	30.5	0.74	D	29.7	0.76	D	-	-	-	-	-	-
WB RT	-	-	-	-	-	-	-	-	-	-	-	-	12.4	0.40	B	15.3	0.52	C	-	-	-	-	-	-	12.4	0.39	B	15.3	0.51	C
SB LT	8.5	0.25	A	8.6	0.20	A	8.9	0.29	A	8.9	0.23	A	8.9	0.29	A	8.9	0.23	A	8.3	0.17	A	8.8	0.19	A	8.3	0.17	A	8.8	0.19	A
OVERALL	8.6	-	-	8.4	-	-	17.2	-	-	13.6	-	-	7.2	-	-	8.0	-	-	8.9	-	-	11.6	-	-	5.3	-	-	7.3	-	-
2: Kahekili Hwy & Makaala Dr																									**Mitigation: Provide median refuge lane for westbound left-turners**					
WB LT	21.6	0.41	C	13.5	0.18	B	28.9	0.52	D	15.7	0.23	C	Same as NO IMPROVEMENTS Conditions						137.1	1.12	F*	18.7	0.32	C	46.1	0.79	E	14.8	0.25	B
WB RT	9.5	0.06	A	10.2	0.01	B	9.7	0.07	A	10.8	0.05	B							9.8	0.07	A	11.1	0.05	B	9.8	0.07	A	11.1	0.05	B
SB LT	7.9	0.07	A	8.2	0.01	A	8.0	0.08	A	8.4	0.02	A							8.0	0.08	A	8.6	0.02	A	8.0	0.08	A	8.6	0.02	A
OVERALL	5.0	-	-	2.1	-	-	6.0	-	-	2.5	-	-							29.9	-	-	2.9	-	-	10.8	-	-	2.4	-	-
3: Waiehu Beach Rd & Makaala Dr																														
NB LT	9.3	0.11	A	10.0	0.32	B	9.7	0.13	A	10.7	0.37	B	Same as NO IMPROVEMENTS Conditions						9.0	0.10	A	10.1	0.31	B	Same as NO IMPROVEMENTS Conditions					
EB LT	16.7	0.02	C	30.4	0.10	D	18.2	0.03	C	36.3	0.12	E							16.1	0.02	C	31.5	0.11	D						
EB RT	55.5	0.94	F	15.1	0.38	C	95.7	1.07	F*	17.4	0.44	C							24.4	0.67	C	15.4	0.37	C						
OVERALL	16.8	-	-	4.1	-	-	26.6	-	-	4.2	-	-							6.7	-	-	3.7	-	-						
4: Kahekili Hwy & Kamaile St.																														
NB LT	8.5	0.02	A	7.8	0.03	A	8.8	0.03	A	8.0	0.04	A	Same as NO IMPROVEMENTS Conditions						9.8	0.03	A	8.2	0.04	A	Same as NO IMPROVEMENTS Conditions					
EB LT/RT	13.1	0.11	B	12.1	0.08	B	14.4	0.13	B	13.2	0.09	B							19.5	0.19	C	14.6	0.11	B						
OVERALL	1.1	-	-	1.2	-	-	1.1	-	-	1.1	-	-							1.1	-	-	1.0	-	-						
5: Kahekili Hwy & Puuohala Rd																														
NB LT	8.9	0.06	A	8.0	0.09	A	9.3	0.07	A	8.2	0.10	A	Same as NO IMPROVEMENTS Conditions						8.8	0.06	A	8.0	0.09	A	Same as NO IMPROVEMENTS Conditions					
EB LT/RT	15.5	0.30	C	10.9	0.11	B	18.3	0.37	C	11.7	0.13	B							15.0	0.30	C	10.6	0.11	B						
OVERALL	2.7	-	-	1.9	-	-	2.8	-	-	1.8	-	-							3.0	-	-	2.4	-	-						
6: Market St/Kahekili Hwy & Piihana Rd/Mokuhau Rd																														
NB LT	9.4	0.04	A	7.9	0.04	A	10.0	0.05	A	8.1	0.04	A	Same as NO IMPROVEMENTS Conditions						9.4	0.04	A	7.9	0.04	A	Same as NO IMPROVEMENTS Conditions					
EB LT/TH/RT	18.7	0.17	C	11.9	0.09	B	22.6	0.21	C	13.0	0.12	B							17.8	0.16	C	11.2	0.09	B						
WB LT/TH/RT	44.6	0.44	E	29.4	0.26	D	79.3	0.63	F	45.3	0.39	E							39.5	0.41	E	24.1	0.23	C						
SB LT	7.9	0.00	A	8.9	0.01	A	8.1	0.01	A	9.3	0.01	A							7.8	0.00	A	8.5	0.01	A						
OVERALL	3.5	-	-	2.3	-	-	5.1	-	-	2.9	-	-							3.6	-	-	2.6	-	-						
7: Waiehu Beach Rd & Eha St/Nukuwai Pl.																														
NB LT	105.2	0.87	F	15.4	0.29	B	105.5	0.87	F	18.0	0.32	B	Same as NO IMPROVEMENTS Conditions						49.5	0.62	D	14.5	0.29	B	Same as NO IMPROVEMENTS Conditions					
NB TH/RT	5.8	0.29	A	19.6	0.78	B	6.1	0.33	A	25.3	0.87	C							5.3	0.32	A	19.6	0.82	B						
EB LT/TH	106.4	0.71	F	30.0	0.70	C	106.5	0.71	F	35.7	0.74	D							89.7	0.69	F	32.7	0.70	C						
EB RT	85.6	0.02	F	18.8	0.05	B	85.3	0.02	F	21.8	0.05	C							68.7	0.01	E	20.7	0.05	C						
WB LT/TH/RT	86.3	0.08	F	18.4	0.01	B	86.1	0.08	F	21.4	0.01	C							69.5	0.09	E	20.4	0.01	C						
SB LT	5.1	0.00	A	0.0	0.00	A	5.4	0.00	A	0.0	0.00	A							3.3	0.00	A	0.0	0.00	A						
SB TH	79.7	1.07	F*	23.9	0.58	C	133.7	1.21	F*	27.6	0.64	C							38.0	0.96	D	22.5	0.59	C						
SB RT	9.1	0.35	A	19.1	0.29	B	9.5	0.36	A	20.9	0.31	C							5.2	0.24	A	16.2	0.20	B						
OVERALL	52.2	-	D	22.5	-	C	76.1	-	E	27.1	-	C							28.9	-	C	22.4	-	C						
8: Lower Main St/Kahului Beach Rd & Waiehu Beach Rd																														
EB LT	16.0	0.24	B	16.9	0.29	B	28.9	0.42	C	30.6	0.46	C	Same as NO IMPROVEMENTS Conditions						20.4	0.30	C	30.2	0.42	C	Same as NO IMPROVEMENTS Conditions					
EB TH	11.2	0.39	B	6.7	0.37	A	17.0	0.41	B	8.5	0.38	A							12.4	0.38	B	8.4	0.37	A						
WB TH	24.8	0.80	C	19.3	0.80	B	29.2	0.79	C	20.0	0.76	B							24.2	0.77	C	19.3	0.75	B						
WB TH/RT	25.5	0.81	C	22.8	0.85	C	30.2	0.81	C	25.9	0.86	C							25.0	0.79	C	24.0	0.84	C						
SB LT/RT	29.8	0.82	C	37.5	0.77	D	45.2	0.85	D	69.1	0.87	E							42.7	0.83	D	73.5	0.86	E						
OVERALL	22.9	-	C	19.7	-	B	31.4	-	C	27.4	-	C							26.3	-	C	27.1	-	C						
9: Market St & Mill St.																														
WB LT	191.8	0.75	F	64.3	0.40	F	378.6	1.18	F*	129.7	0.68	F	Same as NO IMPROVEMENTS Conditions						128.2	0.64	F	70.3	0.48	F	Same as NO IMPROVEMENTS Conditions					
WB RT	12.5	0.25	B	36.3	0.78	E	13.5	0.30	B	83.8	1.02	F*							11.7	0.11	B	19.8	0.37	C						
SB LT	10.8	0.43	B	11.1	0.30	B	11.4	0.45	B	12.2	0.34	B							10.1	0.32	B	11.3	0.24	B						
OVERALL	8.3	-	-	10.6	-	-	12.8	-	-	21.4	-	-							5.9	-	-	5.0	-	-						

TABLE 4.2: LOS SUMMARY TABLE
EXISTING CONDITIONS AND BASE YEAR 2030 WITH AND WITHOUT IMI KALA BRIDGE EXTENSION (CONT.)

Intersection	Existing 2021 Conditions						Base Year 2030 NO Imi Kala St. Extension Conditions No Improvements						Base Year 2030 NO Imi Kala St. Extension Conditions With Improvements						Base Year 2030 WITH Imi Kala St. Extension Conditions No Improvements						Base Year 2030 WITH Imi Kala St. Extension Conditions With Improvements					
	AM			PM			AM			PM			AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
10: Central Ave & Mill St.													Same as NO IMPROVEMENTS Conditions												Same as NO IMPROVEMENTS Conditions					
NB LT/RT	19.9	0.42	C	35.1	0.66	E	23.2	0.48	C	57.7	0.82	F							21.1	0.46	C	19.5	0.50	C						
WB LT	10.4	0.29	B	9.2	0.24	A	10.9	0.32	B	9.6	0.26	A							12.2	0.51	B	9.4	0.29	A						
OVERALL	4.9	-	-	7.8	-	-	5.3	-	-	11.6	-	-							7.4	-	-	6.9	-	-						
11: Kaniela St. & Mill St.													Same as NO IMPROVEMENTS Conditions												Same as NO IMPROVEMENTS Conditions					
NB LT/RT	16.6	0.19	C	17.9	0.20	C	18.5	0.22	C	20.9	0.24	C							17.6	0.20	C	16.0	0.18	C						
WB LT	8.8	0.04	A	8.4	0.02	A	9.0	0.04	A	8.6	0.03	A							8.8	0.05	A	8.6	0.03	A						
OVERALL	1.4	-	-	1.4	-	-	1.4	-	-	1.4	-	-							1.3	-	-	1.3	-	-						
12: Mission St. & Mill St.													Same as NO IMPROVEMENTS Conditions												Same as NO IMPROVEMENTS Conditions					
NB LT/RT	15.9	0.27	C	19.8	0.33	C	17.6	0.30	C	23.8	0.39	C							16.8	0.29	C	18.4	0.31	C						
WB LT	8.8	0.07	A	8.6	0.08	A	9.0	0.07	A	8.9	0.09	A							8.9	0.08	A	8.9	0.09	A						
OVERALL	2.2	-	-	2.6	-	-	2.2	-	-	2.8	-	-							2.0	-	-	2.5	-	-						
13: Imi Kala St. & Eha St.													Same as NO IMPROVEMENTS Conditions												Same as NO IMPROVEMENTS Conditions					
NB LT	10.1	0.20	B	8.9	0.06	A	10.1	0.21	B	8.9	0.07	A							11.3	0.21	B	9.4	0.07	A						
NB TH/RT	8.7	0.22	A	9.4	0.32	A	8.8	0.22	A	9.6	0.33	A							12.5	0.41	B	17.7	0.65	C						
EB LT/TH/RT	8.2	0.11	A	8.1	0.11	A	8.2	0.11	A	8.1	0.11	A							10.7	0.16	B	10.1	0.15	B						
WB LT/TH/RT	10.4	0.33	B	9.8	0.27	A	10.5	0.34	B	9.9	0.28	A							14.4	0.45	B	12.3	0.39	B						
SB LT/TH/RT	8.2	0.02	A	8.3	0.02	A	8.2	0.02	A	8.3	0.02	A							19.1	0.66	C	10.9	0.26	B						
OVERALL	9.5	-	A	9.3	-	A	9.6	-	A	9.4	-	A							15.1	-	C	14.2	-	B						
14: Mill St. & Imi Kala St.													**Mitigation: Monitor and install signal if warranted by future traffic growth**												**Mitigation: Monitor and install signal if warranted by future traffic growth**					
EB LT	8.8	0.30	A	8.8	0.29	A	9.0	0.31	A	9.0	0.31	A	-	-	-	-	-	-	8.7	0.29	A	8.9	0.33	A	-	-	-	-	-	-
EB LT/TH	-	-	-	-	-	-	-	-	-	-	-	-	5.1	0.66	A	6.3	0.69	A	-	-	-	-	-	-	5.4	0.64	A	6.4	0.69	A
WB TH/RT	-	-	-	-	-	-	-	-	-	-	-	-	2.4	0.21	A	2.9	0.23	A	-	-	-	-	-	-	2.8	0.19	A	2.8	0.17	A
SB LT	59.2	0.42	F	129.0	0.91	F	69.3	0.46	F	194.7	1.09	F*	15.4	0.37	B	16.8	0.55	B	78.0	0.62	F	301.5	1.37	F*	14.0	0.39	B	18.1	0.63	B
SB RT	12.3	0.35	B	15.5	0.54	C	12.8	0.37	B	16.6	0.57	C	14.2	0.18	B	14.7	0.24	B	17.3	0.62	C	13.9	0.46	B	13.4	0.28	B	14.7	0.20	B
OVERALL	7.4	-	-	16.0	-	-	7.6	-	-	20.2	-	-	5.1	-	A	6.8	-	A	11.1	-	-	30.5	-	-	5.9	-	A	7.4	-	A
15: Market St & Vineyard St													Same as NO IMPROVEMENTS Conditions												Same as NO IMPROVEMENTS Conditions					
NB LT/TH/RT	18.8	0.55	C	43.1	0.86	E	22.8	0.61	C	74.4	0.99	F							22.8	0.61	C	74.4	0.99	F						
EB LT	17.9	0.48	C	28.6	0.70	D	21.6	0.56	C	61.7	0.93	F							21.6	0.56	C	61.7	0.93	F						
EB TH	11.0	0.10	B	13.4	0.27	B	11.9	0.12	B	16.4	0.38	C							11.9	0.12	B	16.4	0.38	C						
WB TH/RT	15.5	0.39	C	17.5	0.42	C	18.4	0.46	C	22.5	0.51	C							18.4	0.46	C	22.5	0.51	C						
SB LT	11.1	0.12	B	12.4	0.12	B	11.7	0.14	B	13.6	0.14	B							11.7	0.14	B	13.6	0.14	B						
SB RT	25.0	0.75	C	19.4	0.58	C	59.8	0.97	F	35.9	0.79	E							59.8	0.97	F	35.9	0.79	E						
OVERALL	19.7	-	C	27.5	-	D	35.6	-	E	48.0	-	E							35.6	-	E	48.0	-	E						
16: Main St & High St													Same as NO IMPROVEMENTS Conditions												Same as NO IMPROVEMENTS Conditions					
NB LT	12.7	0.09	B	14.2	0.14	B	14.0	0.10	B	16.5	0.19	B							14.0	0.10	B	16.5	0.19	B						
NB TH	14.0	0.37	B	16.4	0.55	B	16.2	0.50	B	18.8	0.60	B							16.2	0.50	B	18.8	0.60	B						
NB RT	12.9	0.18	B	13.7	0.16	B	14.4	0.24	B	15.4	0.20	B							14.2	0.21	B	15.4	0.20	B						
EB LT	15.0	0.02	B	17.3	0.04	B	15.7	0.03	B	21.1	0.06	C							15.7	0.03	B	21.1	0.06	C						
EB TH/RT	17.6	0.46	B	19.9	0.48	B	18.8	0.53	B	25.0	0.58	C							18.8	0.53	B	25.0	0.58	C						
WB LT	10.6	0.45	B	12.0	0.59	B	11.2	0.51	B	15.0	0.70	B							11.2	0.51	B	15.0	0.70	B						
WB TH/RT	7.1	0.11	A	8.0	0.17	A	7.2	0.13	A	9.4	0.20	A							7.2	0.13	A	9.4	0.20	A						
SB LT/TH/RT	16.3	0.61	B	18.1	0.66	B	17.9	0.64	B	21.4	0.72	C							17.9	0.64	B	21.4	0.72	C						
OVERALL	13.9	-	B	15.2	-	B	15.1	-	B	18.0	-	B							15.1	-	B	18.0	-	B						
17: Church St. & Main St													Same as NO IMPROVEMENTS Conditions												Same as NO IMPROVEMENTS Conditions					
EB LT	-	-	-	-	-	-	45.9	0.46	D	47.7	0.45	D							45.9	0.46	D	47.7	0.45	D						
EB TH/RT	-	-	-	-	-	-	7.8	0.42	A	11.8	0.51	B							7.8	0.42	A	11.8	0.51	B						
WB LT	8.3	0.04	A	8.4	0.02	A	42.8	0.60	D	43.4	0.52	D							42.8	0.60	D	43.4	0.52	D						
WB TH/RT	-	-	-	-	-	-	7.9	0.49	A	11.5	0.52	B							7.9	0.49	A	11.5	0.52	B						
SB LT	20.0	0.11	C	23.2	0.30	C	-	-	-	-	-	-							-	-	-	-	-	-						
SB TH/RT	14.0	0.33	B	12.4	0.20	B	-	-	-	-	-	-							-	-	-	-	-	-						
SB LT/TH/RT	-	-	-	-	-	-	37.2	0.82	D	36.6	0.86	D							37.2	0.82	D	36.6	0.86	D						
OVERALL	3.2	-	-	3.2	-	-	14.5	-	B	18.9	-	B							14.5	-	B	18.9	-	B						

TABLE 4.2: LOS SUMMARY TABLE
EXISTING CONDITIONS AND BASE YEAR 2030 WITH AND WITHOUT IMI KALA BRIDGE EXTENSION (CONT.)

Intersection	Existing 2021 Conditions						Base Year 2030 NO Imi Kala St. Extension Conditions No Improvements						Base Year 2030 NO Imi Kala St. Extension Conditions With Improvements						Base Year 2030 WITH Imi Kala St. Extension Conditions No Improvements						Base Year 2030 WITH Imi Kala St. Extension Conditions With Improvements					
	AM			PM			AM			PM			AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
18: Market St & Main St																														
NB LT/TH	70.1	0.82	E	64.7	0.80	E	69.9	0.83	E	64.2	0.81	E							69.9	0.83	E	64.2	0.81	E						
NB RT	56.2	0.01	E	52.3	0.01	D	55.3	0.01	E	51.6	0.01	D							55.3	0.01	E	51.6	0.01	D						
EB LT	3.0	0.13	A	3.1	0.18	A	3.9	0.17	A	3.8	0.22	A							3.9	0.17	A	3.8	0.22	A						
EB TH	2.7	0.26	A	2.9	0.30	A	3.1	0.31	A	3.7	0.43	A							3.1	0.31	A	3.7	0.43	A						
WB TH	5.4	0.35	A	5.3	0.33	A	6.4	0.44	A	6.1	0.41	A							6.3	0.44	A	6.1	0.41	A						
WB RT	3.8	0.07	A	4.1	0.10	A	4.1	0.08	A	4.3	0.11	A							4.0	0.08	A	4.3	0.11	A						
OVERALL	11.3	-	B	10.2	-	B	11.3	-	B	9.9	-	A							11.3	-	B	9.9	-	A						
19: Main St & Central Ave																														
EB LT	12.6	0.13	B	11.1	0.17	B	16.8	0.19	B	14.9	0.32	B							25.7	0.27	C	15.6	0.34	B						
EB TH	12.0	0.30	B	10.8	0.43	B	14.6	0.37	B	14.4	0.61	B							22.7	0.43	C	15.2	0.62	B						
WB TH	18.3	0.46	B	19.2	0.64	B	23.9	0.61	C	29.1	0.84	C							37.3	0.74	D	31.6	0.86	C						
WB RT	14.1	0.17	B	12.5	0.17	B	16.2	0.20	B	13.8	0.18	B							24.3	0.24	C	14.5	0.19	B						
SB LT	65.2	0.92	E	40.9	0.90	D	64.6	0.92	E	43.8	0.92	D							64.9	0.95	E	46.2	0.94	D						
SB RT	39.0	0.04	D	18.5	0.07	B	36.6	0.07	D	17.5	0.08	B							27.7	0.07	C	16.9	0.08	B						
OVERALL	30.3	-	C	22.4	-	C	32.1	-	C	26.9	-	C							41.7	-	D	28.7	-	C						
20: Waiehu Beach Rd & Wailupe Dr/Lower Waiehu Beach Rd																														
NB LT	8.3	0.10	A	8.6	0.18	A	8.4	0.10	A	8.8	0.19	A							8.0	0.09	A	8.6	0.18	A						
EB LT/TH	23.1	0.20	C	37.9	0.16	E	26.4	0.23	D	45.1	0.19	E							20.4	0.18	C	39.4	0.17	E						
EB RT	12.5	0.32	B	11.3	0.21	B	13.3	0.35	B	11.7	0.23	B							11.2	0.29	B	11.2	0.21	B						
WB LT/TH	90.6	0.82	F	149.0	0.90	F	136.9	0.97	F	219.3	1.07	F*							58.9	0.68	F	160.3	0.93	F						
WB RT	9.8	0.02	A	10.8	0.01	B	9.9	0.02	A	11.2	0.01	B							9.9	0.02	A	11.1	0.01	B						
SB LT	7.9	0.00	A	8.4	0.02	A	7.9	0.00	A	8.6	0.02	A							7.9	0.00	A	8.5	0.02	A						
OVERALL	13.9	-	-	12.7	-	-	17.8	-	-	16.0	-	-							10.9	-	-	13.1	-	-						
21: Kahekili Hwy & Imi Kala St Ext																														
WB LT	-	-	-	-	-	-	-	-	-	-	-	-							0.0	-	A	0.0	-	A						
WB RT	-	-	-	-	-	-	-	-	-	-	-	-							10.0	0.16	B	13.9	0.43	B						
SB LT	-	-	-	-	-	-	-	-	-	-	-	-							8.6	0.29	A	8.3	0.12	A						
OVERALL	-	-	-	-	-	-	-	-	-	-	-	-							3.8	-	-	5.4	-	-						

Same as NO IMPROVEMENTS Conditions

Same as NO IMPROVEMENTS Conditions

Same as NO IMPROVEMENTS Conditions

Same as NO IMPROVEMENTS Conditions

* denotes overcapacity conditions

5. FUTURE YEAR 2030 WITH PROJECT CONDITIONS

5.1 Background

The Project proposes to construct a total of 752 dwelling units, 568 of which will be single-family units and 184 will be multi-family dwelling units, along with approximately 17,400 square feet of retail space, and three (3) parks totaling 6.3 acres. It was assumed that the single-family lots will not allow accessory (Ohana) dwelling units. The Project will be accessed via two driveways off of Kahekili Highway. The Project South Driveway will be a T-intersection approximately 1,100 feet north of the existing Kahekili Highway/Makaala Drive intersection. The Project's North Driveway is approximately 900 feet south of the Kahekili Highway/Waiehu Beach Road intersection and will line up with the proposed access to the planned Waiehu Affordable Housing project on the east side of Kahekili Highway, ultimately forming a 4-legged intersection.

5.1.1 Trip Generation

The Institute of Transportation Engineers (ITE) publishes a book based on empirical data compiled from a body of more than 4,250 trip generation studies submitted by public agencies, developers, consulting firms, and associations. This publication, titled Trip Generation Manual, 10th Edition, provides trip rates and/or formulae based on graphs that correlate vehicular trips with independent variables. The independent variables can range from Dwelling Units (DU) for single and multi-family attached homes to Square-foot Gross Leasable Area (SF GLA) for commercial development. These trip rates/formulae and their associated directional distributions were used to estimate the increase in vehicular trips generated by the proposed Project. The rates selected were based on the land use description. See Tables 5.1 and 5.2 for Trip Generation formulae and projections for the Project.

Based on the ITE Trip Generation Handbook, 3rd Edition, internal capture and pass-by trip reductions were applied to the vehicular trips generated by the Project and described further below:

5.1.1.1 Internal Capture Reduction

The ITE Handbook describes internal trips as the interaction of trips made between two or more land uses on-site. Based on ITE methodology, an approximately 1.9%(7.0%) vehicle reduction was applied to overall new regional Project trips based on the interactions between the retail and residential uses during the weekday AM(PM) peak hours of traffic, respectively.

5.1.1.2 Pass-by Trip Reduction

The ITE Handbook describes a pass-by trip as an existing trip that is currently traveling along the Project's adjacent roads and makes an intermediate stop to the Project site on the way from an origin to a primary destination. The ITE Handbook shows a 34% pass-by rate for Shopping Centers (ITE 820) during the PM peak hour. ITE does not provide a pass-by rate for the AM peak hour due to lack of data; however, it is anticipated that pass-by operations will be similar between the AM and PM peak hours. Therefore, to remain conservative, a lower 20% pass-by reduction was applied to retail/shopping center trips during the AM and PM peak hours. See Table 5.1 for Trip Generation formulae and projections for the Project.

Table 5.1: Project Trip Generation Rates

Land Use (ITE Code)	Independent Variable	AM Peak Hour		PM Peak Hour	
		% Enter	Trip Rate	% Enter	Trip Rate
Single-Family Detached Housing (210)	DU	25%	[a]	63%	[b]
Multifamily Housing Low-Rise (220)	DU	23%	[c]	63%	[d]
Shopping Center (820)	1000 SF GLA	62%	[e]	48%	[f]
Public Park (411)	Acres	59%	0.02	55%	[g]

Notes
DU = Dwelling Unit
[a] T = 0.71(X) + 4.80
[b] T = EXP(0.96Ln(X) + 0.20)
[c] T = EXP(0.95Ln(X) - 0.51)
[d] T = EXP(0.89Ln(X) - 0.02)
GLA = Gross Leasable Area
[e] T = 2.76(X) + 77.28
[f] T = EXP(0.72LN(X) + 3.02)
[g] T = 0.06(X) + 22.60

Table 5.2: Project Trip Generation

Land Use (ITE Code)	Quantity	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Single-Family Detached Housing (210)	568 DU	102	307	409	340	199	539
Multifamily Housing Low-Rise (220)	184 DU	20	66	86	64	38	102
Shopping Center (820)	17.4 kSF	68	58	126	81	81	161
Public Park (411)	6.3 Acres	-	-	-	13	10	23
SUBTOTAL		**190**	**431**	**621**	**497**	**328**	**825**
Internal Capture Reduction		*-6*	*-6*	*-12*	*-29*	*-29*	*-58*
Pass-By Trip Reduction		*-11*	*-11*	*-22*	*-12*	*-12*	*-24*
TOTAL NEW EXTERNAL TRIPS		**173**	**414**	**587**	**456**	**287**	**743**

5.1.2 Trip Distribution/Assignment

Traffic generated by the Project was added to the forecast Base Year 2030 traffic volumes within the vicinity of the Project to constitute the traffic volumes for the Future Year 2030 traffic conditions. Trips generated by the Project were assigned throughout the study area based upon regional origins and destinations as well as existing travel patterns within the vicinity of the Project. In general, Project traffic was distributed based on the patterns below:

- 45% to/from Kahului via Waiehu Beach Road-Kahului Beach Road route
- 25% to/from Wailuku Industrial Park area via Waiehu Beach Road-Eha Street route
- 20% to/from Happy Valley & Wailuku via Kahekili Highway-Market Street route
- 10% to/from Waihee via Kahekili Highway

A map of project-generated trips without the Imi Kala Street Ext. & Bridge Improvement can be found in Figure 5.1A, 5.1B, and 5.1C. A map of project-generated trips with the Imi Kala Street Ext. & Bridge Improvement can be found in Figure 5.2A, 5.2B, and 5.2C.

5.2 Future Year 2030 Without Imi Kala Street Ext. & Bridge Improvement Analysis

As shown in Table 5.2, the Project is anticipated to generate a total of 587(743) new trips during the AM(PM) peak hours.

Kahekili Highway/Waiehu Beach Road

Without improvements, the westbound approach at this intersection will operate at LOS F and overcapacity conditions during both the AM and PM peak hours. In Base Year conditions, the widening of the southbound approach to provide a left-turn lane and widening of the westbound approach to provide a left-turn and right-turn lane and widening of the southbound approach to provide a left-turn lane was recommended and will continue to be recommended for Future Year 2030 conditions. The Project is anticipated to add 276(349) trips at this intersection, with 54(150) entering Project trips turning left from Waiehu Beach Road onto Kahekili Highway at the intersection during the AM(PM) peak hours. The 59(168) entering westbound left-turn trips correspond to approximately 32% of total entering Project trips. Based on Future Year 2030 trips, a signal is anticipated to be warranted under 100% factor. The intersection should be monitored to determine if a signal or roundabout would be warranted based on actual volumes.

Operationally, if a signal is installed, all movements will operate at LOS C or better across both peak hours. If a roundabout is installed, all movements are anticipated to operate at LOS A across both peak hours.

Kahekili Highway/Makaala Drive

With Future Year conditions, the westbound left-turn movement is anticipated to operate at LOS F and overcapacity conditions during the AM peak hour. While the Project does not add any trips to this westbound left-turn movement, the increase in Project trips along Kahekili Highway leads to increased delay. All other movements operate at LOS D or better across both peak hours. Similar to Base Year conditions, a signal would only be warranted under the 70% factor.

In lieu of a signal, a median refuge lane could be provided to facilitate two-stage turns for left-turners from Makaala Drive turning onto Kahekili Highway as recommended for Base Year 2030 conditions WITH Imi Kala Street Ext. & Bridge Improvements scenario in Section 4.5. With a median refuge lane, the westbound left-turn movement will operate at LOS E and below capacity conditions during the AM peak hour.

Waiehu Beach Road/Makaala Drive

With Project traffic, it is anticipated that the eastbound right-turn movement will continue to operate at LOS F and overcapacity conditions during the AM peak hour, consistent with operations for Base Year conditions. During the PM peak hour, the eastbound left-turn movement is anticipated to lower from LOS E with Base Year conditions to LOS F, though the movement will continue to operate significantly under capacity.

Kahekili Highway/Kamaile Street and Kahekili Highway/Puuohala Road

The Project is anticipated to add approximately 82(106) vehicles along the mainline Kahekili Highway during the AM(PM) peak hours at these two intersections. All movements at both intersections are anticipated to continue to operate at LOS C or better across both peak hours.

Kahekili Highway/Market Street/Piihana Road/Mokuhau Road

With Future Year conditions, it is anticipated that all movements at this intersection operate at LOS D or better across both peak hours, with the exception of the westbound approach which is anticipated to operate at LOS F during both peak hours. The westbound approach is anticipated to serve approximately 50-70 vehicles during the AM and PM peak hours, or approximately 1 vehicle per minute on average, and will continue to operate significantly under capacity during both peak hours.

Waiehu Beach Road/Eha Street/Nukuwai Place

During the AM peak hour, it is anticipated that the turning movements will continue to operate at LOS F similar to Base Year conditions. The southbound through movement is anticipated to continue to operate at LOS F and overcapacity conditions due to reasons outlined in Section 3.3.2. The project is anticipated to add 97(63) new southbound right-turn and 171(120) new southbound through trips along Waiehu Beach Road during the AM(PM) peak hours.

During the PM peak hour, the northbound through movement is anticipated to operate at LOS F and overcapacity conditions due to the increased 59(199) Project vehicles during the AM(PM) peak hours. The eastbound shared left-turn movement is anticipated to operate at LOS E.

The Imi Kala Street Extension is anticipated to alleviate some of these capacity issues by shifting traffic away from Waiehu Beach Road to Imi Kala Extension.

Lower Main Street/Kahului Beach Road/Waiehu Beach Road

With Future Year conditions, during the PM peak hour, the eastbound left-turn and the westbound shared through/right-turn volume is anticipated to operate at LOS E, while southbound left-turn operates at LOS F.

Market Street/Mill Street

It is anticipated that westbound left-turn will continue to operate at LOS F and over capacity during the AM peak hour and LOS F and under capacity during the PM peak hour, similar to Base Year conditions. As observed during the AM peak hour, it is anticipated that lengthy southbound congestion will continue to occur along Market Street in part due to a significant volume of southbound left-turn volumes and a relatively short turn lane, resulting in southbound left-turn and through volumes in the same queue, causing spillback.

Mill Street/Central Avenue

During the PM peak hour, the northbound movement is anticipated to continue to operate at LOS F as it did with Base Year conditions.

Mill Street/Imi Kala Street

The Project is anticipated to add 19(29) vehicles to the intersection during the AM(PM) peak hours. A signal is warranted with Base Year 2030 conditions and will continue to be warranted with Future Year conditions. If a signal is installed, it is anticipated that all movements will operate at LOS B or better across both peak hours.

Market Street/Vineyard Street

During the AM peak hour, the southbound right-turn movement is anticipated to operate at LOS F and over capacity. During the PM peak hour, the northbound approach is anticipated to experience an increase of approximately 18 seconds of delay and will operate at LOS F and over capacity conditions compared to Base Year conditions, which is anticipated to operate at LOS F and near-capacity conditions. The eastbound left-turn movement is anticipated to experience an increase of approximately 7 seconds in delay and will continue to operate at LOS F as it did with Base Year conditions. A signal is warranted with Base and Future Year 2030 volumes, however based on discussions with Maui County, a signal may be infeasible give narrow roadway widths and limited right-of-way

Main Street/High Street and Main Street/Church Street

With the addition of Project trips, all movements at this intersection are anticipated to continue to operate at LOS D or better across both peak hours.

Main Street/Market Street & Main Street/Central Avenue

With Future Year Conditions, all movements are anticipated to operate similarly to Base Year conditions with some movements continuing to operate at LOS E conditions.

Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road

With Future Year conditions, it is anticipated that the shared eastbound left-turn/through movement will operate at LOS E(F) and under capacity during the AM(PM) peak hours and the westbound shared left-turn through movement is anticipated to operate at LOS F and overcapacity conditions during both peak hours.

Kahekili Highway/North Project Driveway

The Kahekili Highway/North Project Driveway is planned to be a 4-legged intersection located directly across of the central access of the proposed Waiehu Affordable Housing Project. As of the writing of this report, construction has not yet begun on the Waiehu Affordable Housing Project, but it anticipates construction of an entering northbound right-turn and entering southbound left-turn lane into its site.

The North Project Driveway is anticipated to serve a portion of the residential uses as well as its retail uses due to its proximity to the driveway. As an unsignalized intersection, the eastbound shared left-turn/through movement is anticipated to operate at LOS F(E) during the AM(PM) peak hours, though under capacity. All other movements are anticipated to operate at LOS D or better across both peak hours. With projected volumes, it is anticipated that a signal would be warranted with the 70% warrant. An exclusive northbound left-turn lane and southbound right-turn lane is recommended. The intersection should be monitored to determine if a signal or roundabout will be warranted.

Kahekili Highway/South Project Driveway

The Kahekili Highway/South Project Driveway is planned to be a T-intersection serving residential uses. An exclusive northbound left-turn lane, southbound right-turn lane, and median refuge lane for the eastbound left-turn movement is recommended. A traffic signal is not warranted at this intersection.

Figure 5.3A, 5.3B, and 5.3C shows conditions without the Imi Kala Street Ext. & Bridge Improvement, and Figure 5.4 shows conditions with the improvements mentioned in the above Section 5.3. A LOS Summary can be found in Table 5.3.

5.3 Future Year 2030 With Imi Kala Street Ext. & Bridge Improvement Analysis

With the Imi Kala Street Ext. & Bridge Improvement, it is anticipated that 59(24) southbound trips and 17(58) northbound Project trips during the AM(PM) peak hours will utilize the Imi Kala Street Extension.

Kahekili Highway/Waiehu Beach Road

Without improvements, the westbound approach at this intersection will operate at LOS F and overcapacity conditions during both the AM and PM peak hours. As recommended in Section 5.1, exclusive westbound left-turn and right-turn lanes and a southbound left-turn lane is recommended. Based on Future Year 2030 trips, a signal is anticipated to be warranted under 100% factor. The intersection should be monitored to determine if a signal or roundabout would be warranted based on actual volumes.

Operationally, if a signal is installed, all movements will operate at LOS C or better across both peak hours. If a roundabout is installed, all movements are anticipated to operate at LOS A across both peak hours.

Kahekili Highway/Makaala Drive

As recommended in Section 5.1, a median refuge lane is recommended, but with Imi Kala Extension the westbound left-turn movement will worsen to LOS F and over-capacity conditions. Similar to Base Year conditions, a signal would only be warranted under the 70% factor. The intersection should be monitored during occupancy of the Project to determine if a signal would be warranted by actual volumes.

Waiehu Beach Road/Makaala Drive

With Project traffic, it is anticipated that the eastbound right-turn movement will continue to operate at LOS F and overcapacity conditions during the AM peak hour. However, with the Imi Kala Extension, the capacity will reduce to levels similar to the Base Year 2030 without Imi Kala Ext. & Bridge Improvements scenario.

Waiehu Beach Road/Eha Street/Nukuwai Place

Project impacts are mitigated with the Imi Kala Street Extension, since the critical southbound through movement will operate with lower delay than Existing conditions.

Lower Main Street/Kahului Beach Road/Waiehu Beach Road

The Project will increase traffic through this intersection with or without the Imi Kala Street Extension. As a result, the southbound left-turn movement will worsen from LOS D to LOS F conditions however, all movements will operate below capacity.

Market Street/Mill Street

Project impacts are mitigated with the Imi Kala Extension since the critical southbound left-turn movement is significantly reduced. The Project adds about 58(39) southbound vehicles at this intersection, but is offset by the 126(69) southbound left-turn vehicles that are rerouted to the Imi Kala Street Extension.

Mill Street/Central Avenue

Traffic along Mill Street will reduce with Imi Kala Extension, thereby improving the northbound approach, which will operate adequately at LOS C or better across both peak hours.

Imi Kala Street/Eha Street

As an all-way stop controlled intersection, all movements will operate adequately at LOS D or better across both peak hours.

Mill Street/Imi Kala Street

The Project is anticipated to add 52(35) vehicles to the intersection during the AM and PM peak hours. A signal is warranted with Base Year 2030 conditions and will continue to be warranted with this scenario. If a signal is installed, it is anticipated that all movements will operate at LOS C or better across both peak hours.

Market Street/Vineyard Street

This intersection is anticipated to operate the same as Future Year Without Imi Kala Street Ext. & Bridge Improvement scenario with various LOS E/F and over-capacity conditions.

Main Street/Central Avenue

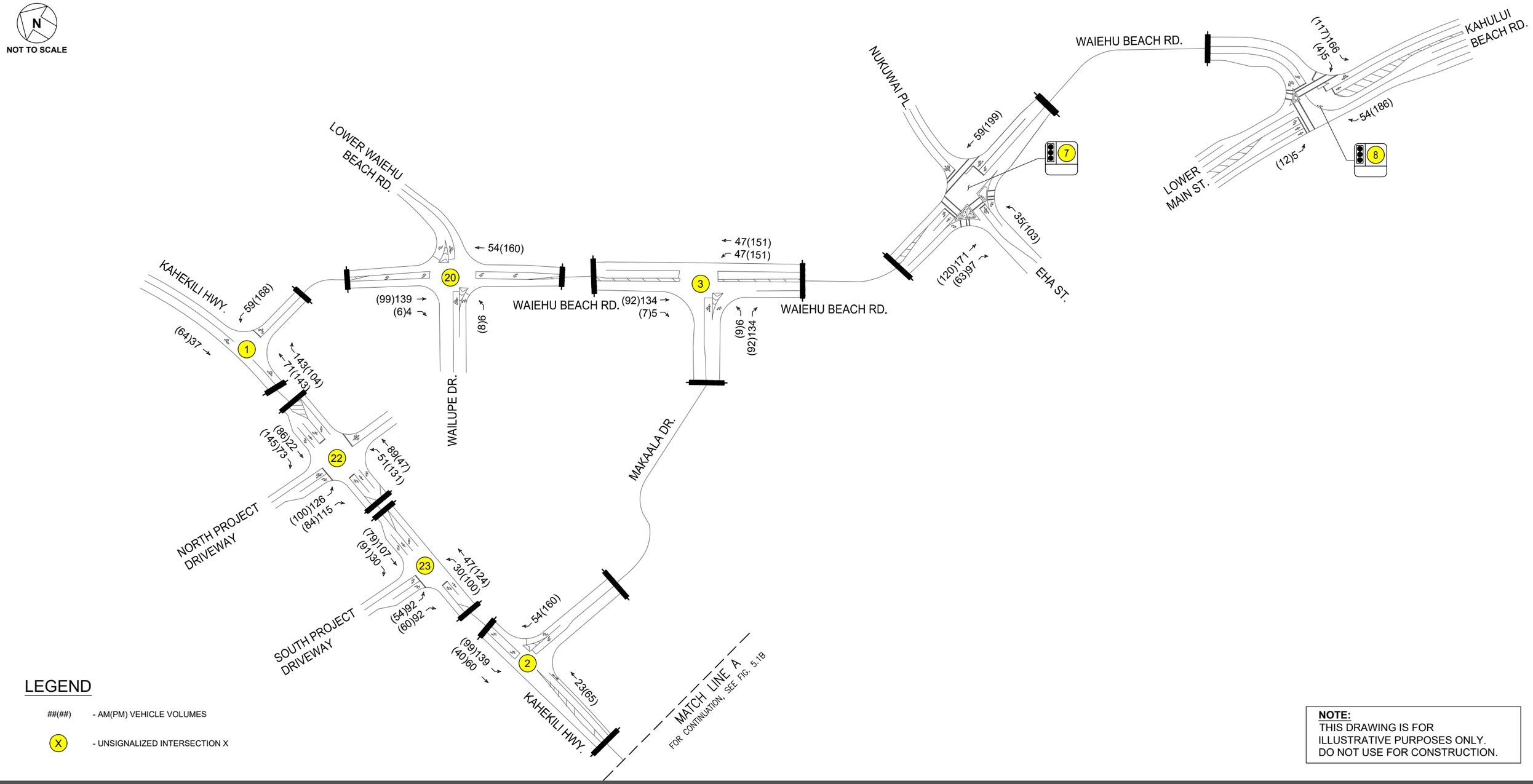
It is anticipated that southbound Project trips that are rerouted to the Imi Kala Street Extension will use Central Avenue to access Main Street for regional travel, adding approximately 43 vehicles to the southbound left-turn during the critical AM peak hour. With the added trips, all movements are anticipated to operate at LOS D or better across both peak hours with the exception of the southbound left-turn movement which operates at LOS E during the AM peak hour as it did with Existing and Base Year conditions.

Kahekili Highway/Imi Kala Street

This intersection is anticipated to be the northern terminus of the Imi Kala Street Extension. Dedicated turn lanes are recommended along Kahekili Highway for turns onto the Imi Kala Street Extension, and along the westbound Imi Kala Street Extension approach. All movements at this intersection are anticipated to operate at LOS C or better across both peak hours.

WAIEHU MASTER PLAN TIAR

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors



LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
X	- UNSIGNALIZED INTERSECTION X

NOTE:
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FIGURE 5.1A

PROJECT TRIPS WITHOUT IMI KALA STREET EXTENSION - 1

N

NOT TO SCALE

NOTE:
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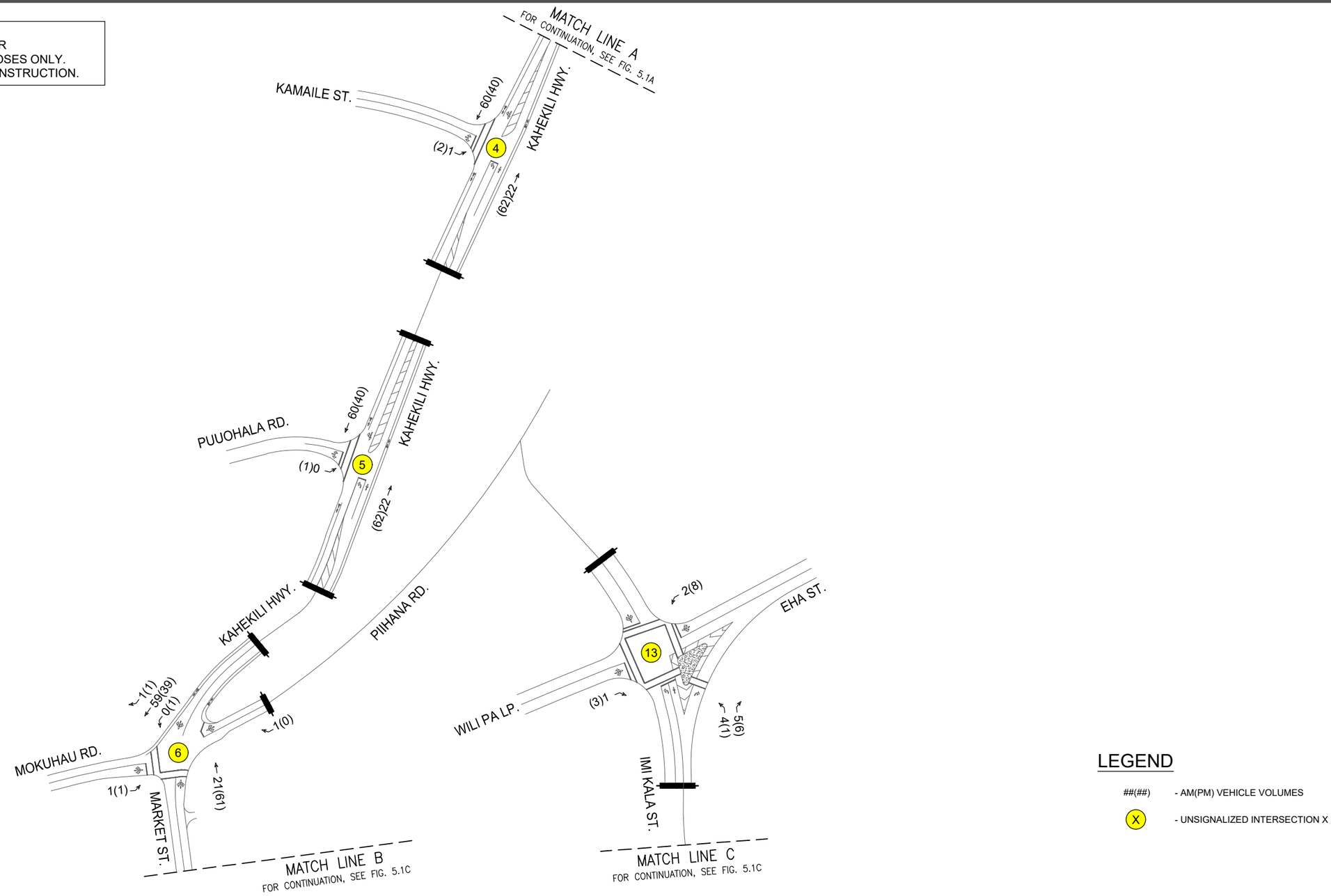

LEGEND

##(##) - AM(PM) VEHICLE VOLUMES

X - UNSIGNALIZED INTERSECTION X

FIGURE 5.1B

PROJECT TRIPS WITHOUT IMI KALA STREET EXTENSION - 2

WAIEHU MASTER PLAN TIAR

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

N
NOT TO SCALE

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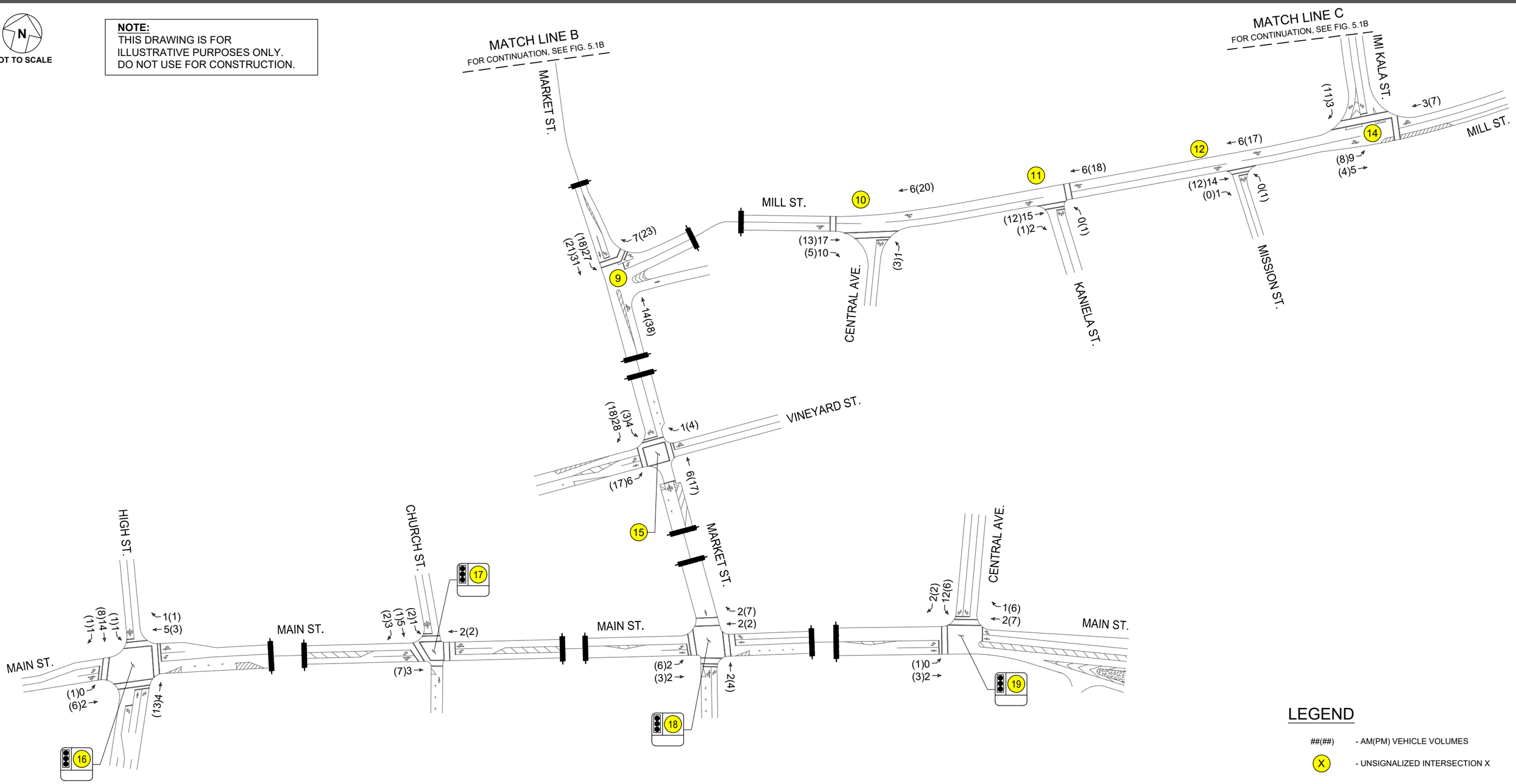


LEGEND

##(##) - AM(PM) VEHICLE VOLUMES

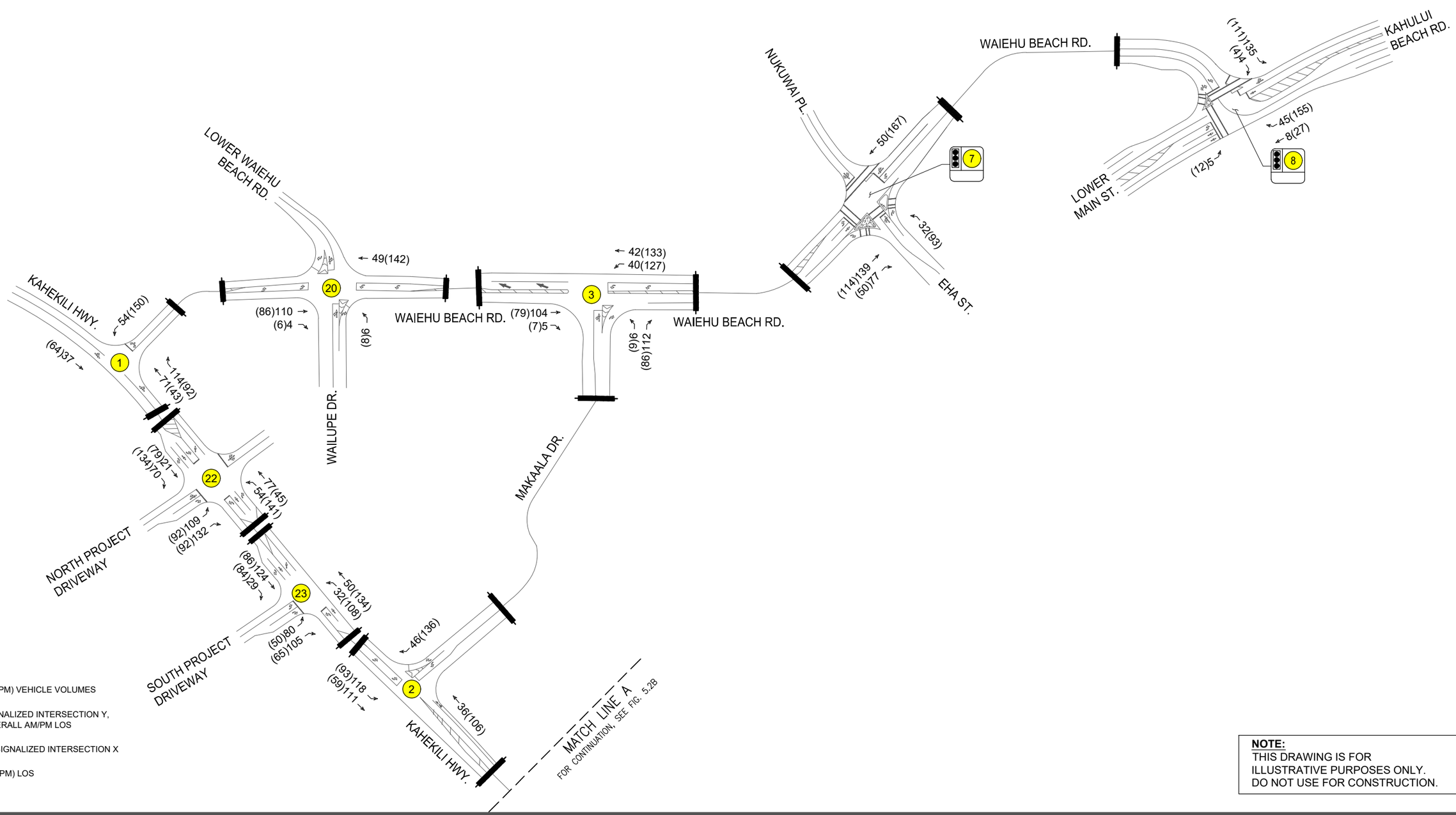
X - UNSIGNALIZED INTERSECTION X

FIGURE 5.1C

PROJECT TRIPS WITHOUT IMI KALA STREET EXTENSION - 3

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

N
NOT TO SCALE



LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

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

FIGURE 5.2A

PROJECT TRIPS WITH IMI KALA STREET EXTENSION - 1

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

N
NOT TO SCALE

NOTE:
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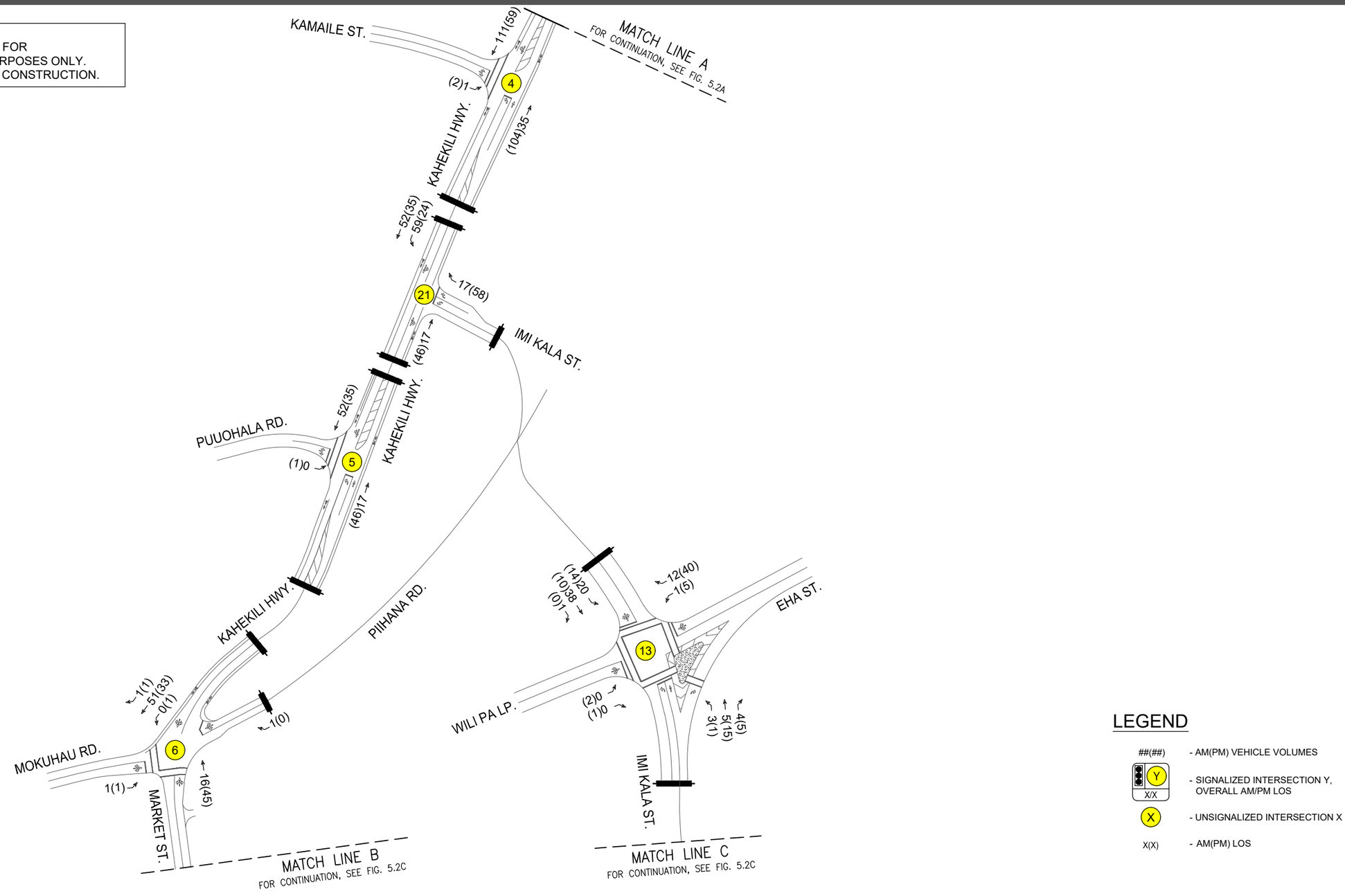

LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y, X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

FIGURE 5.2B

PROJECT TRIPS WITH IMI KALA STREET EXTENSION - 2

WAIEHU MASTER PLAN TIAR

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

N
NOT TO SCALE

NOTE:
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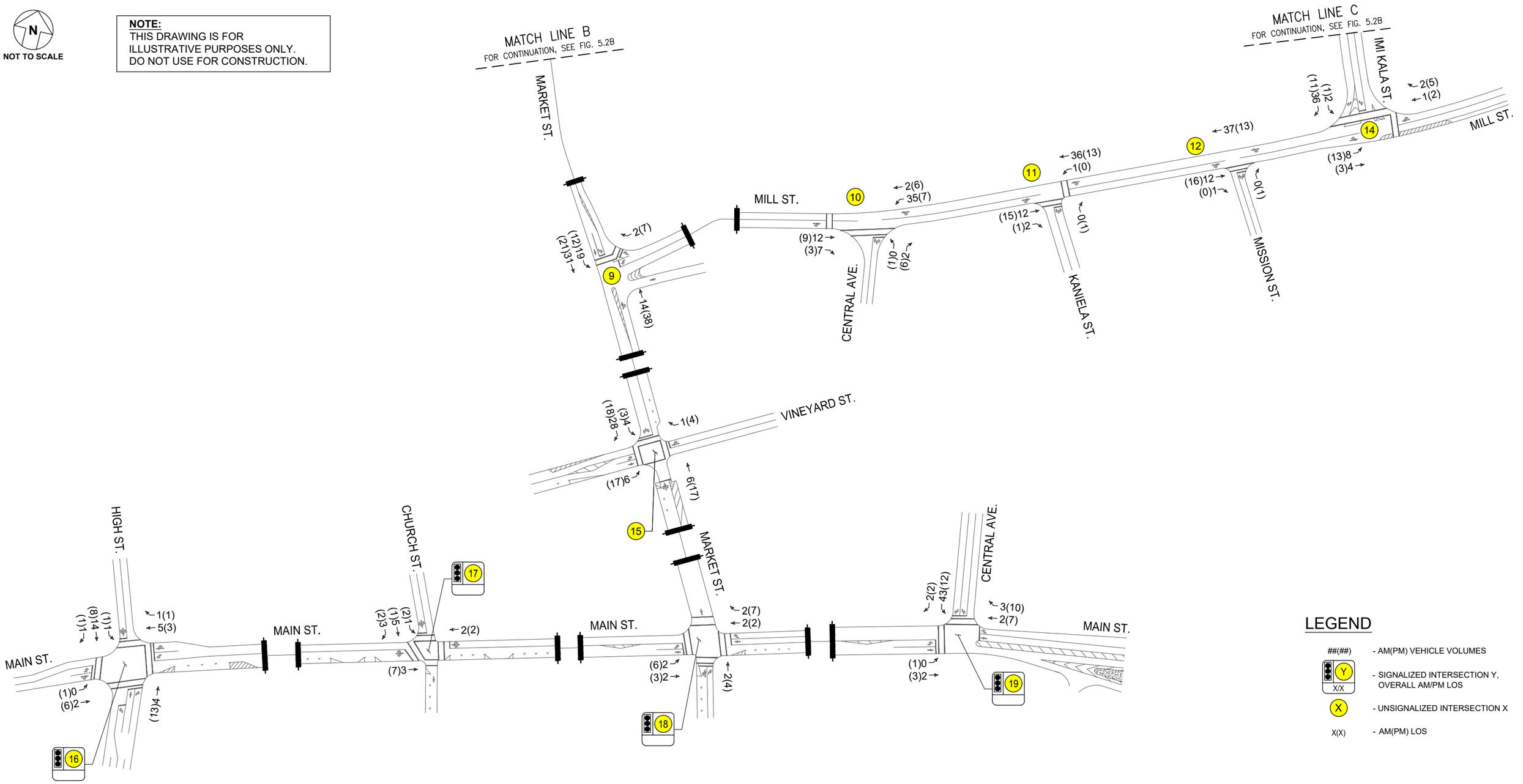
DO NOT USE FOR CONSTRUCTION.



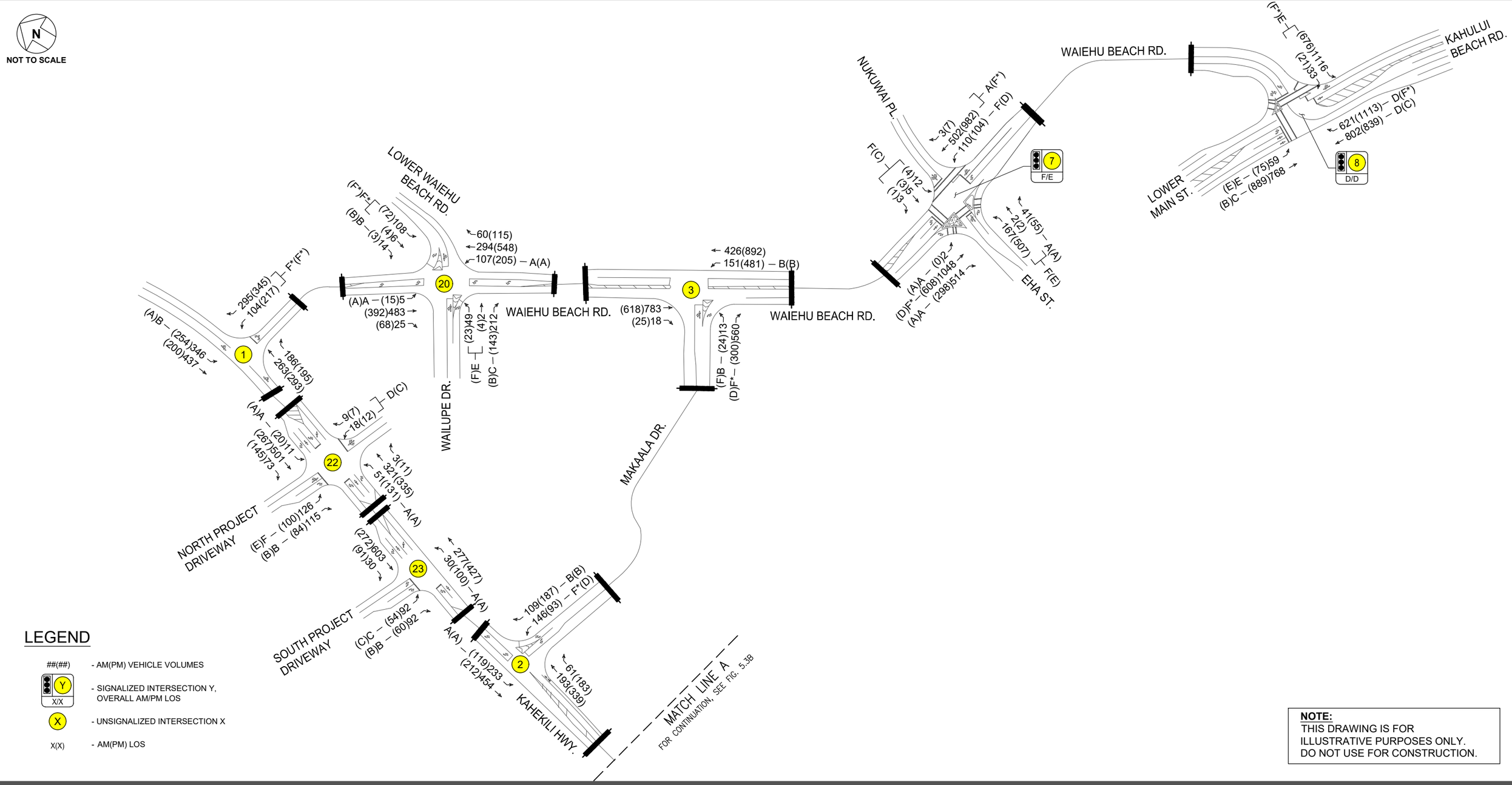
LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

FIGURE 5.2C

PROJECT TRIPS WITH IMI KALA STREET BRIDGE EXTENSION - 3

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors



LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

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

FIGURE 5.3A

FUTURE YEAR 2030 CONDITIONS WITHOUT IMI KALA STREET EXTENSION
NO IMPROVEMENTS - 1

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

N
NOT TO SCALE

NOTE:
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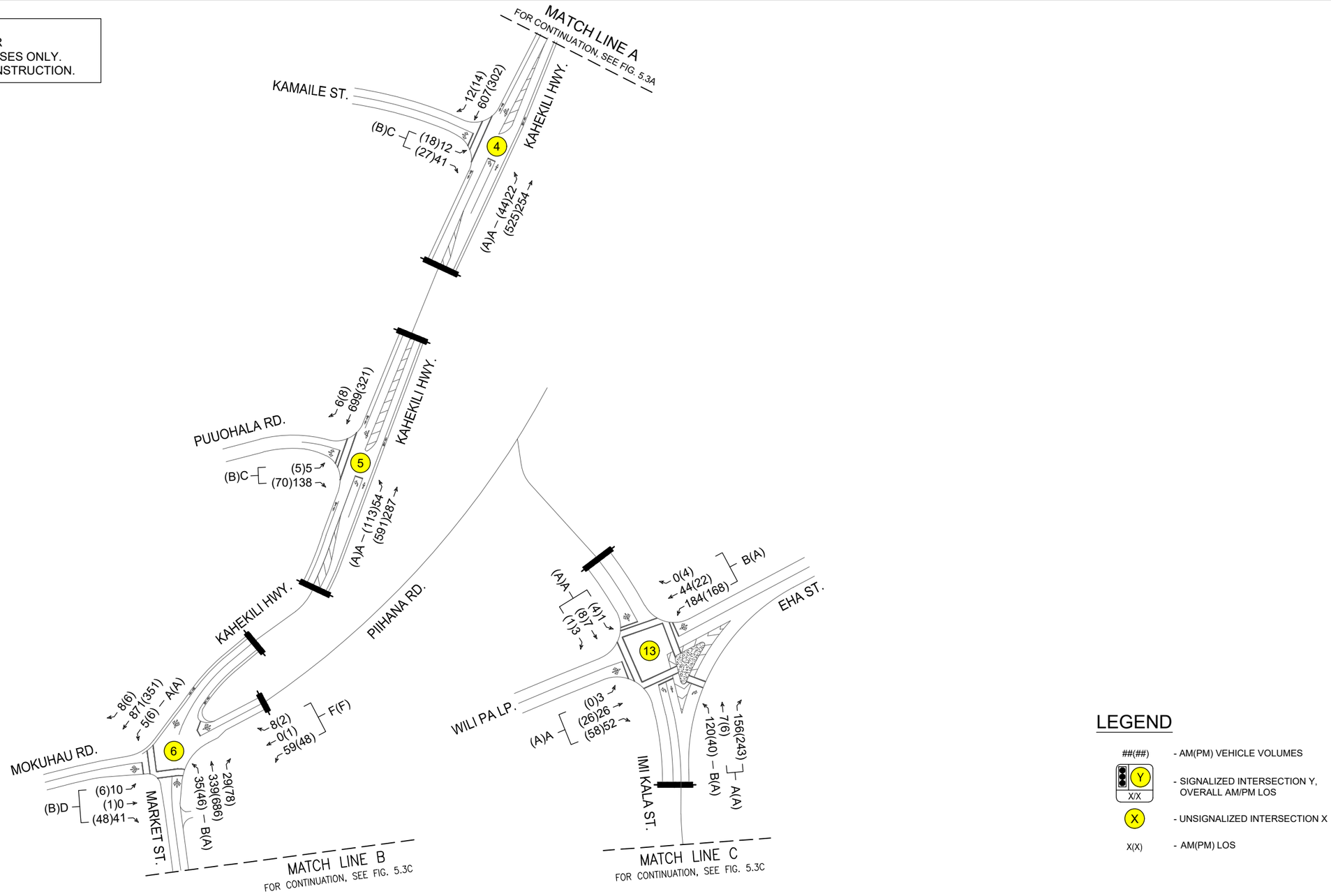
DO NOT USE FOR CONSTRUCTION.



LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

FIGURE 5.3B

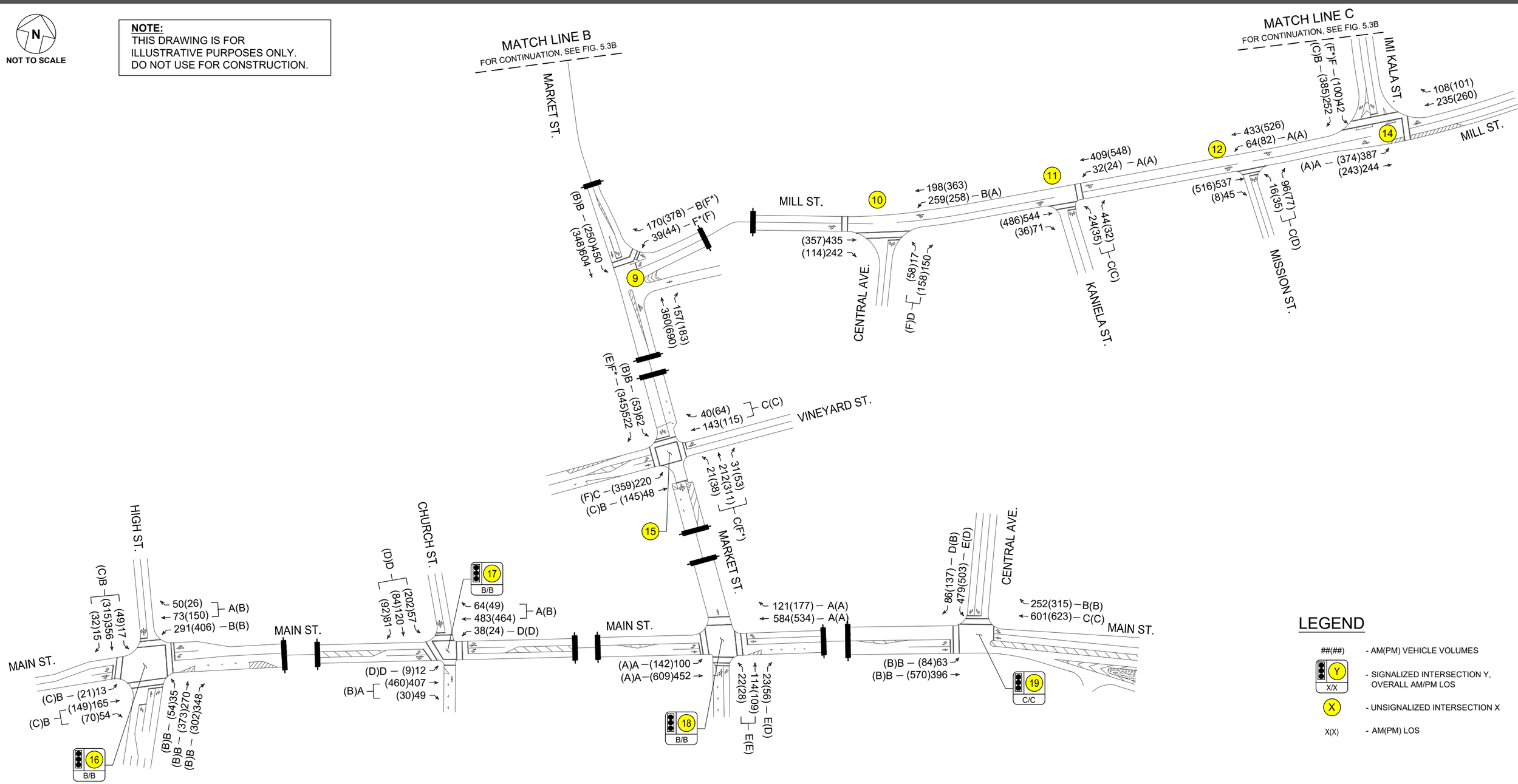
FUTURE YEAR 2030 CONDITIONS WITHOUT IMI KALA STREET EXTENSION
NO IMPROVEMENTS - 2

WAIEHU MASTER PLAN TIAR

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

N
NOT TO SCALE

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



LEGEND

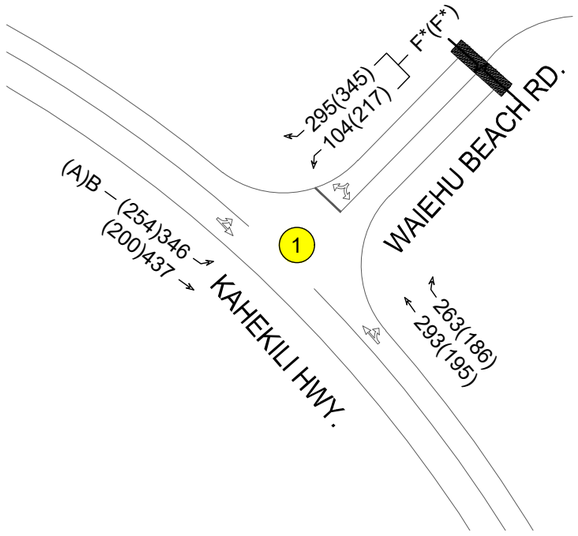
##(##)	- AM(PM) VEHICLE VOLUMES
Y (X/X)	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

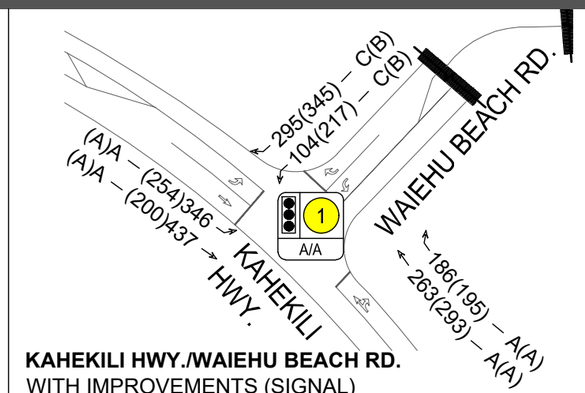
FIGURE 5.3C

FUTURE YEAR 2030 CONDITIONS WITHOUT IMI KALA STREET EXTENSION
NO IMPROVEMENTS - 3

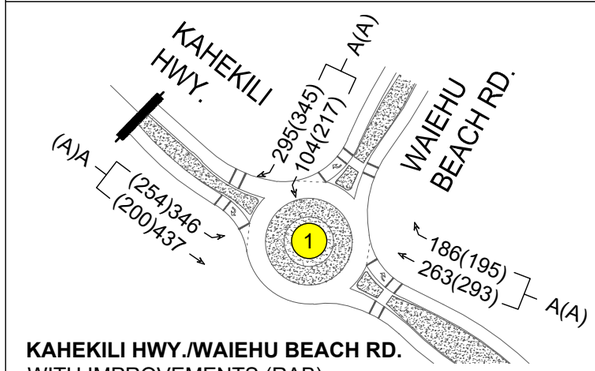
AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

KAHEKILI HWY./WAIEHU BEACH RD.
WITHOUT IMPROVEMENTS



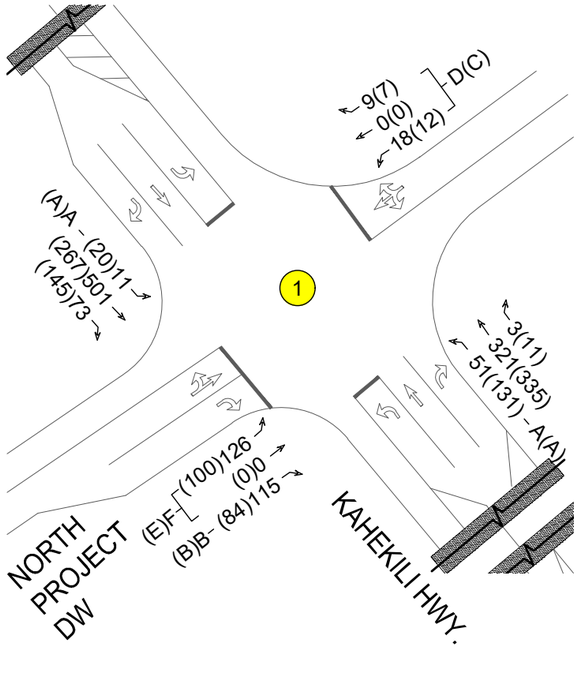


KAHEKILI HWY./WAIEHU BEACH RD.
WITH IMPROVEMENTS (SIGNAL)

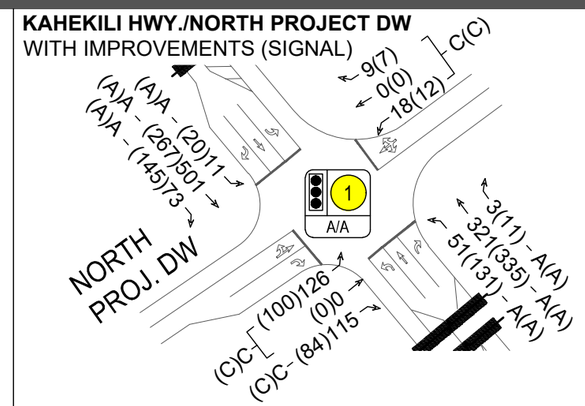


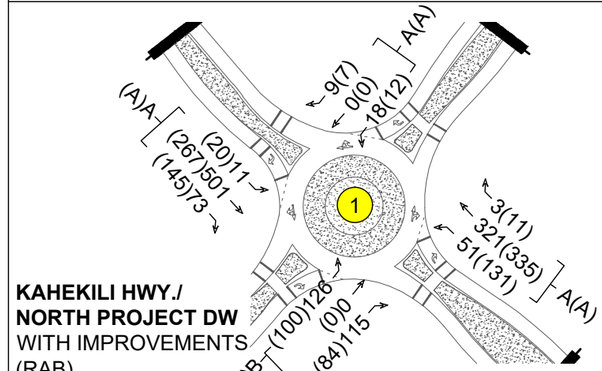
KAHEKILI HWY./WAIEHU BEACH RD.
WITH IMPROVEMENTS (RAB)

KAHEKILI HWY./NORTH PROJECT DW
WITHOUT IMPROVEMENTS



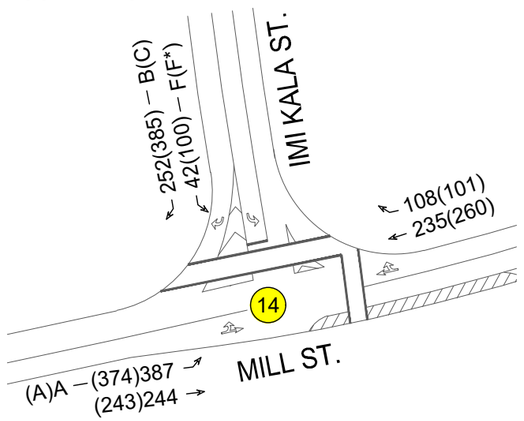
KAHEKILI HWY./NORTH PROJECT DW
WITH IMPROVEMENTS (SIGNAL)





KAHEKILI HWY./
NORTH PROJECT DW
WITH IMPROVEMENTS
(RAB)

MILL ST./IMI KALA ST.
WITHOUT IMPROVEMENTS



MILL ST./IMI KALA ST.
WITH IMPROVEMENTS

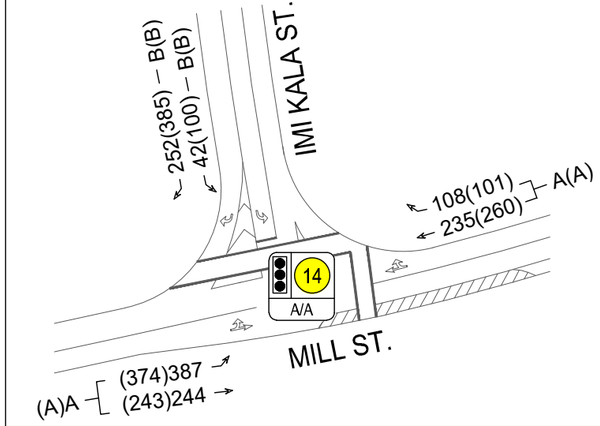


FIGURE 5.4

FUTURE YEAR 2030 CONDITIONS WITHOUT IMI KALA STREET EXTENSION
WITH IMPROVEMENTS

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS · SURVEYORS

TABLE 5.3: LOS SUMMARY TABLE
EXISTING CONDITIONS, BASE YEAR, AND FUTURE YEAR CONDITIONS WITHOUT IMI KALA STREET EXTENSION
WITH AND WITHOUT IMPROVEMENTS

Intersection	Existing 2021 Conditions						Base Year 2030 NO Imi Kala St. Ext. Conditions No Improvements						Base Year 2030 NO Imi Kala St. Ext. Conditions With Improvements						Future Year 2030 NO Imi Kala St. Ext. Conditions No Improvements						Future Year 2030 NO Imi Kala St. Ext. Conditions With Improvements					
	AM			PM			AM			PM			AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kahekili Hwy & Waiehu Beach Rd													**Mitigation: Widen to provide westbound right-turn and left-turn lanes, and southbound left-turn lane**												**Mitigation: Widen to provide westbound right-turn and left-turn lanes, southbound left-turn lane, AND monitor to determine if signal or roundabout warranted by future traffic growth**					
WB LT	-	-	-	-	-	-	-	-	-	-	-	-	63.4	0.45	F	29.4	0.27	D	-	-	-	-	-	-						
WB LT/RT	23.4	0.64	C	17.6	0.57	C	57.8	0.91	F	33.1	0.80	D	-	-	-	-	-	-	673.5	2.37	F*	594.3	2.23	F*						
WB RT	-	-	-	-	-	-	-	-	-	-	-	-	12.4	0.40	B	15.3	0.52	C	-	-	-	-	-	-						
SB LT	8.5	0.25	A	8.6	0.20	A	8.9	0.29	A	8.9	0.23	A	8.9	0.29	A	8.9	0.23	A	10.1	0.35	B	9.7	0.27	A	See Table 5.6					
OVERALL	8.6	-	-	8.4	-	-	17.2	-	-	13.6	-	-	7.2	-	-	8.0	-	-	166.9	-	-	223.7	-	-						
2: Kahekili Hwy & Makaala Dr																									**Mitigation: Provide median refuge lane for westbound left-turners**					
WB LT	21.6	0.41	C	13.5	0.18	B	28.9	0.52	D	15.7	0.23	C	Same as NO IMPROVEMENTS Conditions						137.2	1.02	F*	29.0	0.41	D	44.7	0.66	E	18.0	0.27	C
WB RT	9.5	0.06	A	10.2	0.01	B	9.7	0.07	A	10.8	0.05	B							10.3	0.15	B	14.2	0.34	B	10.3	0.15	B	14.2	0.34	B
SB LT	7.9	0.07	A	8.2	0.01	A	8.0	0.08	A	8.4	0.02	A							8.5	0.20	A	9.1	0.13	A	8.5	0.20	A	9.1	0.13	A
OVERALL	5.0	-	-	2.1	-	-	6.0	-	-	2.5	-	-							19.4	-	-	5.7	-	-	8.1	-	-	4.8	-	-
3: Waiehu Beach Rd & Makaala Dr																														
NB LT	9.3	0.11	A	10.0	0.32	B	9.7	0.13	A	10.7	0.37	B	Same as NO IMPROVEMENTS Conditions						10.9	0.21	B	14.4	0.58	B	Same as NO IMPROVEMENTS Conditions					
EB LT	16.7	0.02	C	30.4	0.10	D	18.2	0.03	C	36.3	0.12	E							23.4	0.07	B	82.6	0.37	F						
EB RT	55.5	0.94	F	15.1	0.38	C	95.7	1.07	F*	17.4	0.44	C							359.5	1.72	F*	31.9	0.73	D						
OVERALL	16.8	-	-	4.1	-	-	26.6	-	-	4.2	-	-							104.2	-	-	7.9	-	-						
4: Kahekili Hwy & Kamaile St.																														
NB LT	8.5	0.02	A	7.8	0.03	A	8.8	0.03	A	8.0	0.04	A	Same as NO IMPROVEMENTS Conditions						9.0	0.03	A	8.1	0.04	A	Same as NO IMPROVEMENTS Conditions					
EB LT/RT	13.1	0.11	B	12.1	0.08	B	14.4	0.13	B	13.2	0.09	B							15.7	0.15	C	14.8	0.12	B						
OVERALL	1.1	-	-	1.2	-	-	1.1	-	-	1.1	-	-							1.1	-	-	1.1	-	-						
5: Kahekili Hwy & Puuohala Rd																														
NB LT	8.9	0.06	A	8.0	0.09	A	9.3	0.07	A	8.2	0.10	A	Same as NO IMPROVEMENTS Conditions						9.6	0.07	A	8.3	0.10	A	Same as NO IMPROVEMENTS Conditions					
EB LT/RT	15.5	0.30	C	10.9	0.11	B	18.3	0.37	C	11.7	0.13	B							20.3	0.40	C	12.3	0.14	B						
OVERALL	2.7	-	-	1.9	-	-	2.8	-	-	1.8	-	-							2.9	-	-	1.7	-	-						
6: Market St/Kahekili Hwy & Piihana Rd/Mokuhau Rd																														
NB LT	9.4	0.04	A	7.9	0.04	A	10.0	0.05	A	8.1	0.04	A	Same as NO IMPROVEMENTS Conditions						10.3	0.05	B	8.2	0.04	A	Same as NO IMPROVEMENTS Conditions					
EB LT/TH/RT	18.7	0.17	C	11.9	0.09	B	22.6	0.21	C	13.0	0.12	B							26.0	0.25	D	14.6	0.14	B						
WB LT/TH/RT	44.6	0.44	E	29.4	0.26	D	79.3	0.63	F	45.3	0.39	E							106.7	0.74	F	59.2	0.47	F						
SB LT	7.9	0.00	A	8.9	0.01	A	8.1	0.01	A	9.3	0.01	A							8.1	0.01	A	9.5	0.01	A						
OVERALL	3.5	-	-	2.3	-	-	5.1	-	-	2.9	-	-							6.3	-	-	3.4	-	-						
7: Waiehu Beach Rd & Eha St/Nukuwai Pl.																														
NB LT	105.2	0.87	F	15.4	0.29	B	105.5	0.87	F	18.0	0.32	B	Same as NO IMPROVEMENTS Conditions						108.1	0.88	F	36.8	0.49	D	Same as NO IMPROVEMENTS Conditions					
NB TH/RT	5.8	0.29	A	19.6	0.78	B	6.1	0.33	A	25.3	0.87	C							8.7	0.38	A	109.1	1.11	F*						
EB LT/TH	106.4	0.71	F	30.0	0.70	C	106.5	0.71	F	35.7	0.74	D							106.9	0.76	F	58.6	0.85	E						
EB RT	85.6	0.02	F	18.8	0.05	B	85.3	0.02	F	21.8	0.05	C							0.0	0.00	A	0.0	0.00	A						
WB LT/TH/RT	86.3	0.08	F	18.4	0.01	B	86.1	0.08	F	21.4	0.01	C							83.4	0.07	F	30.2	0.01	C						
SB LT	5.1	0.00	A	0.0	0.00	A	5.4	0.00	A	0.0	0.00	A							7.2	0.00	A	0.0	0.00	A						
SB TH	79.7	1.07	F*	23.9	0.58	C	133.7	1.21	F*	27.6	0.64	C							264.3	1.50	F*	51.6	0.79	D						
SB RT	9.1	0.35	A	19.1	0.29	B	9.5	0.36	A	20.9	0.31	C							0.0	0.00	A	0.0	0.00	A						
OVERALL	52.2	-	D	22.5	-	C	76.1	-	E	27.1	-	C							169.2	-	F	78.0	-	E						
8: Lower Main St/Kahului Beach Rd & Waiehu Beach Rd																														
EB LT	16.0	0.24	B	16.9	0.29	B	28.9	0.42	C	30.6	0.46	C	Same as NO IMPROVEMENTS Conditions						63.6	0.62	E	71.8	0.83	E	Same as NO IMPROVEMENTS Conditions					
EB TH	11.2	0.39	B	6.7	0.37	A	17.0	0.41	B	8.5	0.38	A							24.7	0.42	C	10.1	0.37	B						
WB TH	24.8	0.80	C	19.3	0.80	B	29.2	0.79	C	20.0	0.76	B							42.3	0.83	D	25.6	0.77	C						
WB TH/RT	25.5	0.81	C	22.8	0.85	C	30.2	0.81	C	25.9	0.86	C							45.0	0.86	D	68.5	1.03	F*						
SB LT/RT	29.8	0.82	C	37.5	0.77	D	45.2	0.85	D	69.1	0.87	E							60.7	0.90	E	107.4	1.00	F*						
OVERALL	22.9	-	C	19.7	-	B	31.4	-	C	27.4	-	C							45.5	-	D	51.2	-	D						
9: Market St & Mill St.																														
WB LT	191.8	0.75	F	64.3	0.40	F	378.6	1.18	F*	129.7	0.68	F	Same as NO IMPROVEMENTS Conditions						537.1	1.46	F*	190.6	0.84	F	Same as NO IMPROVEMENTS Conditions					
WB RT	12.5	0.25	B	36.3	0.78	E	13.5	0.30	B	83.8	1.02	F*							13.9	0.31	B	125.2	1.14	F*						
SB LT	10.8	0.43	B	11.1	0.30	B	11.4	0.45	B	12.2	0.34	B							11.9	0.49	B	12.9	0.38	B						
OVERALL	8.3	-	-	10.6	-	-	12.8	-	-	21.4	-	-							16.1	-	-	31.1	-	-						

TABLE 5.3: LOS SUMMARY TABLE
EXISTING, BASE YEAR, AND FUTURE YEAR CONDITIONS WITHOUT IMI KALA STREET EXTENSION
WITH AND WITHOUT IMPROVEMENTS (CONT.)

Intersection	Existing 2021 Conditions						Base Year 2030 NO Imi Kala St. Ext. Conditions No Improvements						Base Year 2030 NO Imi Kala St. Ext. Conditions With Improvements						Future Year 2030 NO Imi Kala St. Ext. Conditions No Improvements						Future Year 2030 NO Imi Kala St. Ext. Conditions With Improvements					
	AM			PM			AM			PM			AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
10: Central Ave & Mill St.													Same as NO IMPROVEMENTS Conditions												Same as NO IMPROVEMENTS Conditions					
NB LT/RT	19.9	0.42	C	35.1	0.66	E	23.2	0.48	C	57.7	0.82	F							25.4	0.51	D	76.0	0.91	F						
WB LT	10.4	0.29	B	9.2	0.24	A	10.9	0.32	B	9.6	0.26	A							11.1	0.32	B	9.7	0.27	A						
OVERALL	4.9	-	-	7.8	-	-	5.3	-	-	11.6	-	-							5.5	-	-	14.4	-	-						
11: Kaniela St. & Mill St.													Same as NO IMPROVEMENTS Conditions												Same as NO IMPROVEMENTS Conditions					
NB LT/RT	16.6	0.19	C	17.9	0.20	C	18.5	0.22	C	20.9	0.24	C							19.0	0.22	C	22.1	0.26	C						
WB LT	8.8	0.04	A	8.4	0.02	A	9.0	0.04	A	8.6	0.03	A							9.1	0.04	A	8.7	0.03	A						
OVERALL	1.4	-	-	1.4	-	-	1.4	-	-	1.4	-	-							1.4	-	-	1.5	-	-						
12: Mission St. & Mill St.													Same as NO IMPROVEMENTS Conditions												Same as NO IMPROVEMENTS Conditions					
NB LT/RT	15.9	0.27	C	19.8	0.33	C	17.6	0.30	C	23.8	0.39	C							18.1	0.31	C	25.4	0.41	D						
WB LT	8.8	0.07	A	8.6	0.08	A	9.0	0.07	A	8.9	0.09	A							9.1	0.07	A	8.9	0.09	A						
OVERALL	2.2	-	-	2.6	-	-	2.2	-	-	2.8	-	-							2.2	-	-	2.9	-	-						
13: Imi Kala St. & Eha St.													Same as NO IMPROVEMENTS Conditions												Same as NO IMPROVEMENTS Conditions					
NB LT	10.1	0.20	B	8.9	0.06	A	10.1	0.21	B	8.9	0.07	A							10.2	0.21	B	9.0	0.07	A						
NB TH/RT	8.7	0.22	A	9.4	0.32	A	8.8	0.22	A	9.6	0.33	A							8.9	0.23	A	9.8	0.35	A						
EB LT/TH/RT	8.2	0.11	A	8.1	0.11	A	8.2	0.11	A	8.1	0.11	A							8.3	0.12	A	8.2	0.12	A						
WB LT	-	-	-	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-						
WB TH/RT	-	-	-	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-						
WB LT/TH/RT	10.4	0.33	B	9.8	0.27	A	10.5	0.34	B	9.9	0.28	A							10.6	0.34	B	10.0	0.29	A						
SB LT/TH/RT	8.2	0.02	A	8.3	0.02	A	8.2	0.02	A	8.3	0.02	A							8.3	0.02	A	8.3	0.02	A						
OVERALL	9.5	-	A	9.3	-	A	9.6	-	A	9.4	-	A							9.7	-	A	9.6	-	A						
14: Mill St. & Imi Kala St.													**Mitigation: Monitor and install signal if warranted by future traffic growth**												**Mitigation: Monitor and install signal if warranted by future traffic growth**					
EB LT	8.8	0.30	A	8.8	0.29	A	9.0	0.31	A	9.0	0.31	A	-	-	-	-	-	-	9.0	0.32	A	9.1	0.32	A	-	-	-	-	-	-
EB LT/TH	-	-	-	-	-	-	-	-	-	-	-	-	5.1	0.66	A	6.3	0.69	A	-	-	-	-	-	-	5.4	0.64	A	6.4	0.69	A
WB TH/RT	-	-	-	-	-	-	-	-	-	-	-	-	2.4	0.21	A	2.9	0.23	A	-	-	-	-	-	-	2.8	0.19	A	2.8	0.17	A
SB LT	59.2	0.42	F	129.0	0.91	F	69.3	0.46	F	194.7	1.09	F*	15.4	0.37	B	16.8	0.55	B	76.4	0.49	F	218.7	1.14	F*	14.0	0.39	B	18.1	0.63	B
SB RT	12.3	0.35	B	15.5	0.54	C	12.8	0.37	B	16.6	0.57	C	14.2	0.18	B	14.7	0.24	B	12.9	0.38	B	17.3	0.59	C	13.4	0.28	B	14.7	0.20	B
OVERALL	7.4	-	-	16.0	-	-	7.6	-	-	20.2	-	-	5.1	-	A	6.8	-	A	7.8	-	-	21.8	-	-	5.9	-	A	7.4	-	A
15: Market St & Vineyard St													Same as NO IMPROVEMENTS Conditions												Same as NO IMPROVEMENTS Conditions					
NB LT/TH/RT	18.8	0.55	C	43.1	0.86	E	22.8	0.61	C	74.4	0.99	F							23.4	0.63	C	92.2	1.04	F*						
EB LT	17.9	0.48	C	28.6	0.70	D	21.6	0.56	C	61.7	0.93	F							22.3	0.58	C	68.1	0.99	F						
EB TH	11.0	0.10	B	13.4	0.27	B	11.9	0.12	B	16.4	0.38	C							12.0	0.12	B	16.5	0.38	C						
WB TH/RT	15.5	0.39	C	17.5	0.42	C	18.4	0.46	C	22.5	0.51	C							18.6	0.47	C	23.0	0.54	C						
SB LT	11.1	0.12	B	12.4	0.12	B	11.7	0.14	B	13.6	0.14	B							11.9	0.15	B	13.8	0.15	B						
SB RT	25.0	0.75	C	19.4	0.58	C	59.8	0.97	F	35.9	0.79	E							72.9	1.02	F*	39.6	0.85	E						
OVERALL	19.7	-	C	27.5	-	D	35.6	-	E	48.0	-	E							41.5	-	E	55.6	-	F						
16: Main St & High St													Same as NO IMPROVEMENTS Conditions												Same as NO IMPROVEMENTS Conditions					
NB LT	12.7	0.09	B	14.2	0.14	B	14.0	0.10	B	16.5	0.19	B							13.4	0.10	B	17.5	0.20	B						
NB TH	14.0	0.37	B	16.4	0.55	B	16.2	0.50	B	18.8	0.60	B							15.5	0.49	B	19.9	0.60	B						
NB RT	12.9	0.18	B	13.7	0.16	B	14.4	0.24	B	15.4	0.20	B							13.6	0.21	B	16.3	0.21	B						
EB LT	15.0	0.02	B	17.3	0.04	B	15.7	0.03	B	21.1	0.06	C							15.4	0.03	B	22.5	0.06	C						
EB TH/RT	17.6	0.46	B	19.9	0.48	B	18.8	0.53	B	25.0	0.58	C							18.4	0.52	B	26.7	0.58	C						
WB LT	10.6	0.45	B	12.0	0.59	B	11.2	0.51	B	15.0	0.70	B							11.2	0.53	B	16.3	0.72	B						
WB TH/RT	7.1	0.11	A	8.0	0.17	A	7.2	0.13	A	9.4	0.20	A							7.5	0.14	A	10.4	0.21	B						
SB LT/TH/RT	16.3	0.61	B	18.1	0.66	B	17.9	0.64	B	21.4	0.72	C							17.3	0.64	B	23.0	0.74	C						
OVERALL	13.9	-	B	15.2	-	B	15.1	-	B	18.0	-	B							14.7	-	B	19.4	-	B						
17: Church St. & Main St													Same as NO IMPROVEMENTS Conditions												Same as NO IMPROVEMENTS Conditions					
EB LT	-	-	-	-	-	-	45.9	0.46	D	47.7	0.45	D							45.9	0.46	D	47.7	0.45	D						
EB TH/RT	-	-	-	-	-	-	7.8	0.42	A	11.8	0.51	B							8.1	0.43	A	12.0	0.52	B						
WB LT	8.3	0.04	A	8.4	0.02	A	42.8	0.60	D	43.4	0.52	D							42.8	0.60	D	43.4	0.52	D						
WB TH/RT	-	-	-	-	-	-	7.9	0.49	A	11.5	0.52	B							8.1	0.50	A	11.7	0.53	B						
SB LT/TH/RT	-	-	-	-	-	-	37.2	0.82	D	36.6	0.86	D							37.7	0.82	D	36.8	0.86	D						
OVERALL	3.2	-	-	3.2	-	-	14.5	-	B	18.9	-	B							14.9	-	B	19.1	-	B						

TABLE 5.3: LOS SUMMARY TABLE
EXISTING, BASE YEAR, AND FUTURE YEAR CONDITIONS WITHOUT IMI KALA STREET EXTENSION
WITH AND WITHOUT IMPROVEMENTS (CONT.)

Intersection	Existing 2021 Conditions						Base Year 2030 NO Imi Kala St. Ext. Conditions No Improvements						Base Year 2030 NO Imi Kala St. Ext. Conditions With Improvements						Future Year 2030 NO Imi Kala St. Ext. Conditions No Improvements						Future Year 2030 NO Imi Kala St. Ext. Conditions With Improvements					
	AM			PM			AM			PM			AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
18: Market St & Main St																														
NB LT/TH	70.1	0.82	E	64.7	0.80	E	69.9	0.83	E	64.2	0.81	E	Same as NO IMPROVEMENTS Conditions						70.2	0.83	E	64.0	0.81	E	Same as NO IMPROVEMENTS Conditions					
NB RT	56.2	0.01	E	52.3	0.01	D	55.3	0.01	E	51.6	0.01	D							55.2	0.01	E	51.3	0.01	D						
EB LT	3.0	0.13	A	3.1	0.18	A	3.9	0.17	A	3.8	0.22	A							4.0	0.19	A	4.0	0.26	A						
EB TH	2.7	0.26	A	2.9	0.30	A	3.1	0.31	A	3.7	0.43	A							3.1	0.32	A	3.8	0.43	A						
WB TH	5.4	0.35	A	5.3	0.33	A	6.4	0.44	A	6.1	0.41	A							6.5	0.44	A	6.2	0.41	A						
WB RT	3.8	0.07	A	4.1	0.10	A	4.1	0.08	A	4.3	0.11	A							4.1	0.08	A	4.4	0.11	A						
OVERALL	11.3	-	B	10.2	-	B	11.3	-	B	9.9	-	A							11.4	-	B	10.1	-	B						
19: Main St & Central Ave																														
EB LT	12.6	0.13	B	11.1	0.17	B	16.8	0.19	B	14.9	0.32	B	Same as NO IMPROVEMENTS Conditions						17.6	0.22	B	15.4	0.34	B	Same as NO IMPROVEMENTS Conditions					
EB TH	12.0	0.30	B	10.8	0.43	B	14.6	0.37	B	14.4	0.61	B							15.2	0.37	B	14.7	0.62	B						
WB TH	18.3	0.46	B	19.2	0.64	B	23.9	0.61	C	29.1	0.84	C							24.8	0.62	C	30.5	0.85	C						
WB RT	14.1	0.17	B	12.5	0.17	B	16.2	0.20	B	13.8	0.18	B							16.7	0.20	B	14.0	0.18	B						
SB LT	65.2	0.92	E	40.9	0.90	D	64.6	0.92	E	43.8	0.92	D							64.5	0.92	E	44.4	0.93	D						
SB RT	39.0	0.04	D	18.5	0.07	B	36.6	0.07	D	17.5	0.08	B							35.9	0.07	D	17.3	0.08	B						
OVERALL	30.3	-	C	22.4	-	C	32.1	-	C	26.9	-	C							32.8	-	C	27.6	-	C						
20: Waiehu Beach Rd & Wailupe Dr/Lower Waiehu Beach Rd																														
NB LT	8.3	0.10	A	8.6	0.18	A	8.4	0.10	A	8.8	0.19	A	Same as NO IMPROVEMENTS Conditions						9.0	0.11	A	9.3	0.21	A	Same as NO IMPROVEMENTS Conditions					
EB LT/TH	23.1	0.20	C	37.9	0.16	E	26.4	0.23	D	45.1	0.19	E							41.0	0.36	E	93.3	0.43	F						
EB RT	12.5	0.32	B	11.3	0.21	B	13.3	0.35	B	11.7	0.23	B							16.5	0.43	C	13.1	0.26	B						
WB LT/TH	90.6	0.82	F	149.0	0.90	F	136.9	0.97	F	219.3	1.07	F*							389.4	1.55	F*	591.6	1.84	F*						
WB RT	9.8	0.02	A	10.8	0.01	B	9.9	0.02	A	11.2	0.01	B							10.3	0.02	B	12.8	0.01	B						
SB LT	7.9	0.00	A	8.4	0.02	A	7.9	0.00	A	8.6	0.02	A							8.1	0.01	A	9.2	0.02	A						
OVERALL	13.9	-	-	12.7	-	-	17.8	-	-	16.0	-	-							37.5	-	-	32.3	-	-						
22: Kahekili Hwy & North Project DW																									**Mitigation: Monitor to determine if signal or roundabout warranted by future traffic growth**					
NB LT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.0	0.06	A	8.7	0.13	A						
EB LT/TH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	56.8	0.70	F	43.3	0.55	E						
EB RT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.7	0.23	B	10.5	0.12	B	See Table 5.6					
WB LT/TH/RT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28.7	0.16	D	24.3	0.10	C						
SB LT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.0	0.01	A	8.1	0.02	A						
OVERALL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.2	-	-	6.3	-	-						
23: Kahekili Hwy & South Project DW																														
NB LT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.1	0.04	A	8.4	0.09	A						
EB LT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.1	0.27	C	16.4	0.16	C	Same as NO IMPROVEMENTS Conditions					
EB RT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.8	0.22	B	10.3	0.09	B						
OVERALL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.9	-	-	2.3	-	-						

* denotes overcapacity conditions

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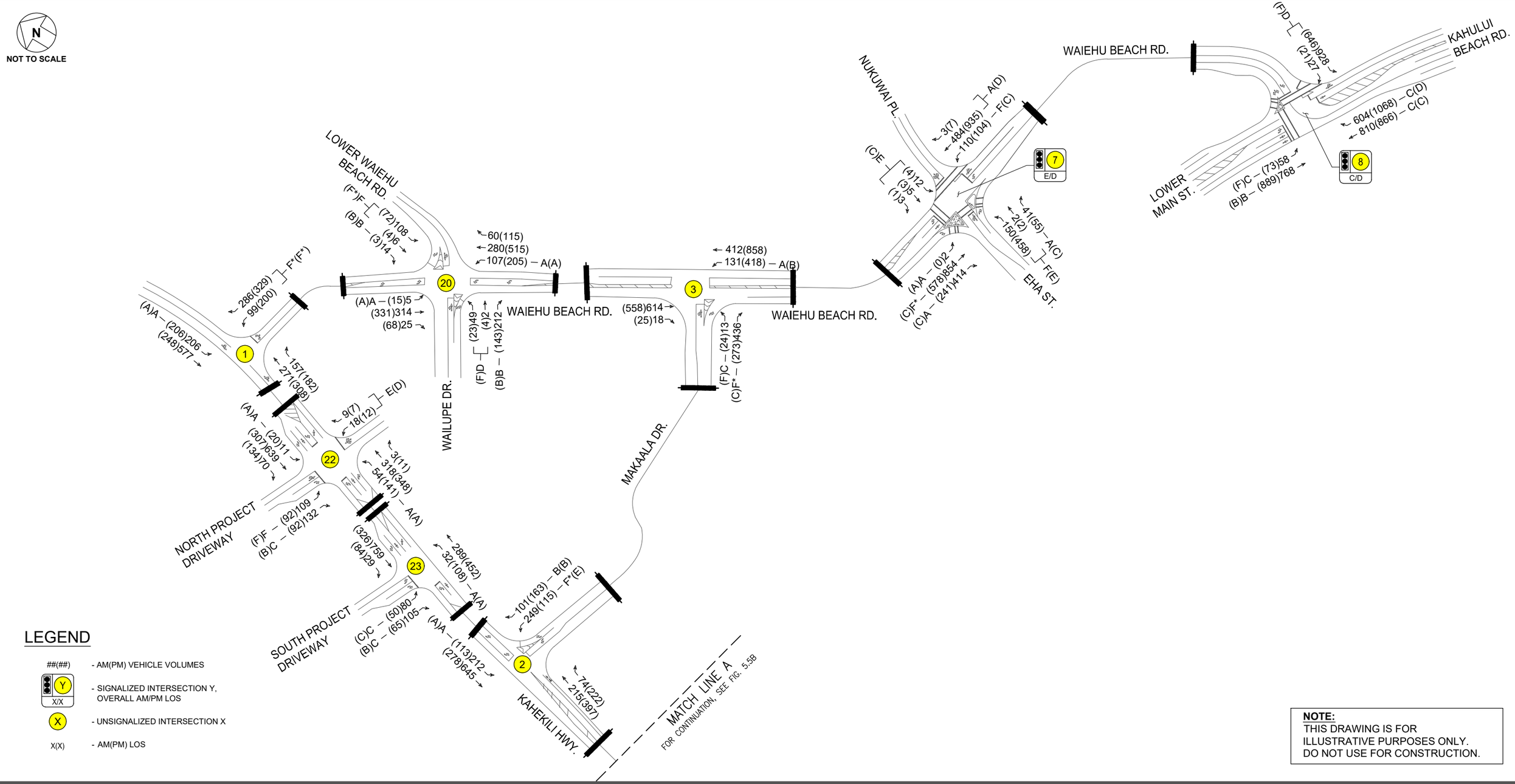

NOTE:
THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. DO NOT USE FOR CONSTRUCTION.

FIGURE 5.5A

FUTURE YEAR 2030 CONDITIONS WITH IMI KALA STREET EXTENSION
NO IMPROVEMENTS - 1

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N
NOT TO SCALE

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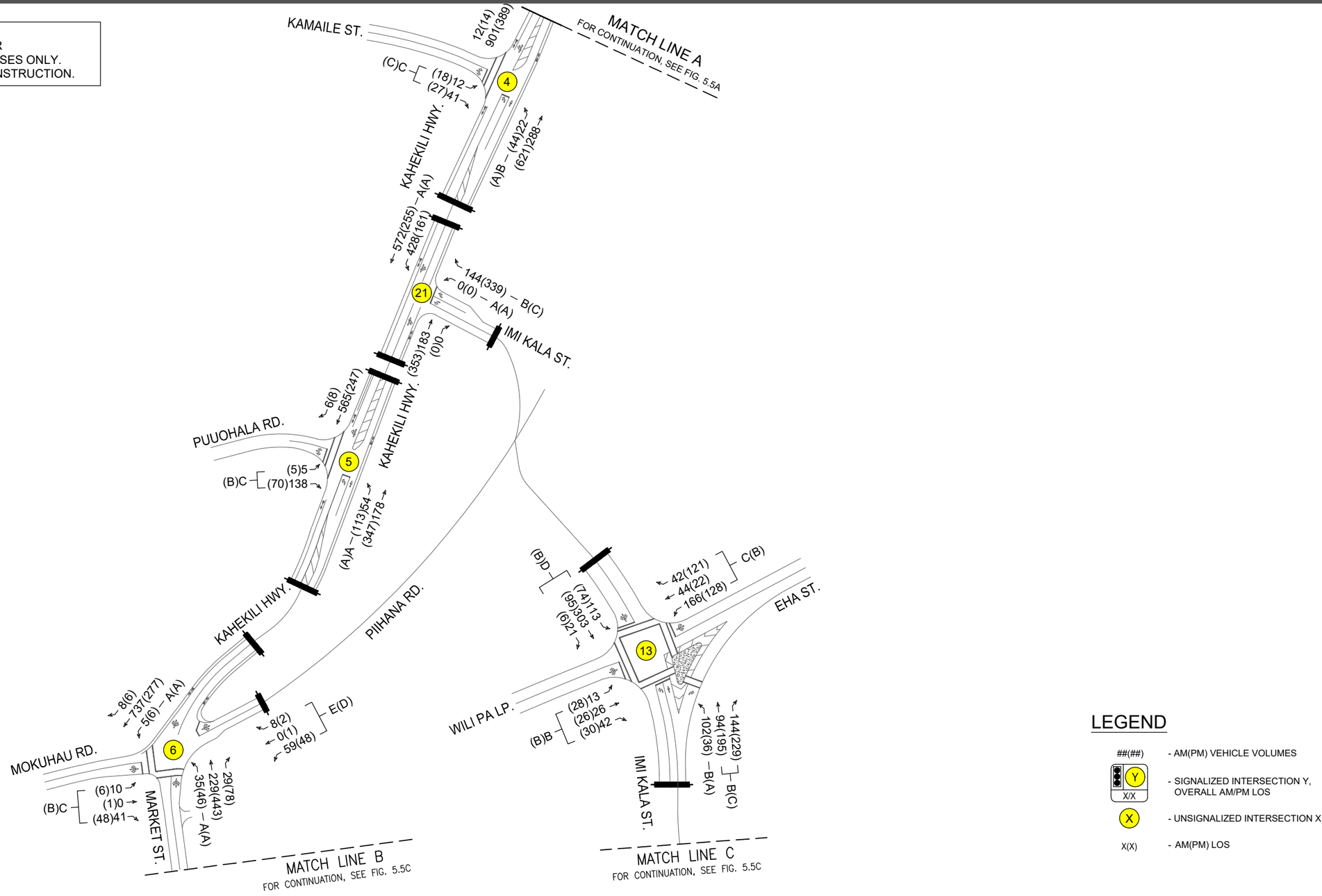

LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

FIGURE 5.5B

FUTURE YEAR 2030 CONDITIONS WITH IMI KALA STREET EXTENSION
NO IMPROVEMENTS - 2

WAIEHU MASTER PLAN TIAR

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N
NOT TO SCALE

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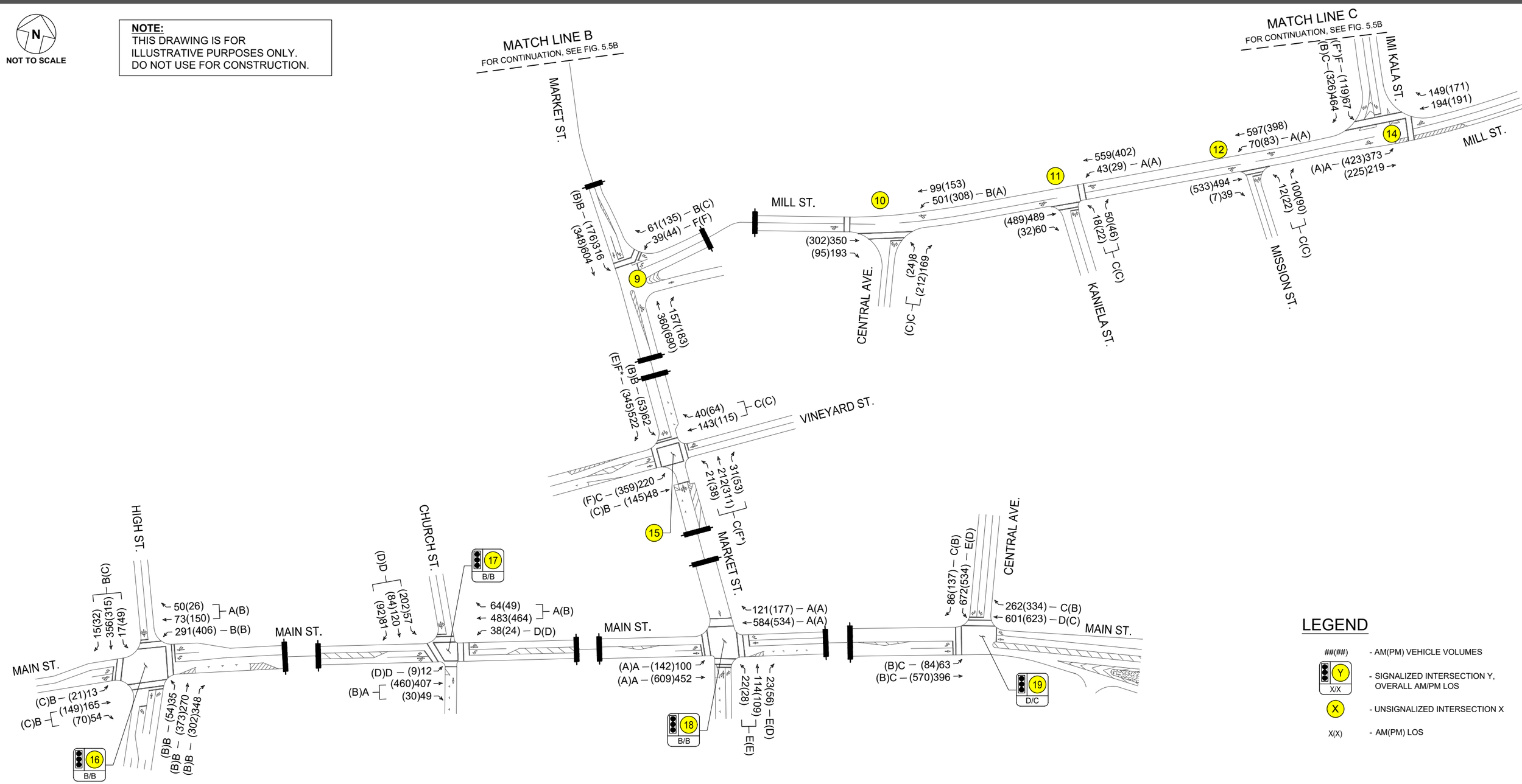

LEGEND

##(##)	- AM(PM) VEHICLE VOLUMES
Y / X/X	- SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS
X	- UNSIGNALIZED INTERSECTION X
X(X)	- AM(PM) LOS

FIGURE 5.5C

FUTURE YEAR 2030 CONDITIONS WITH IMI KALA STREET EXTENSION
NO IMPROVEMENTS - 3

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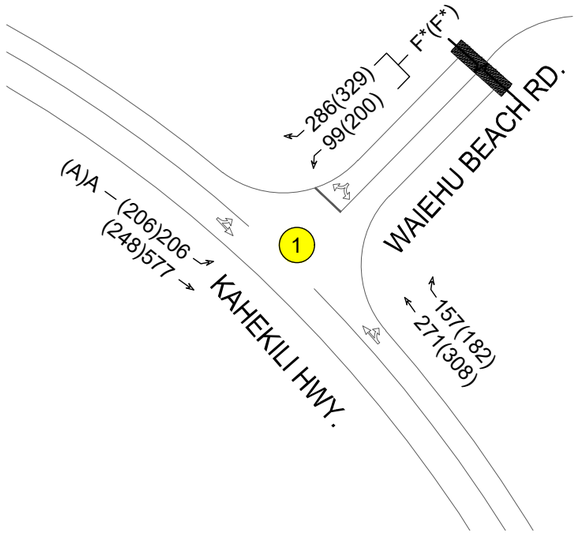
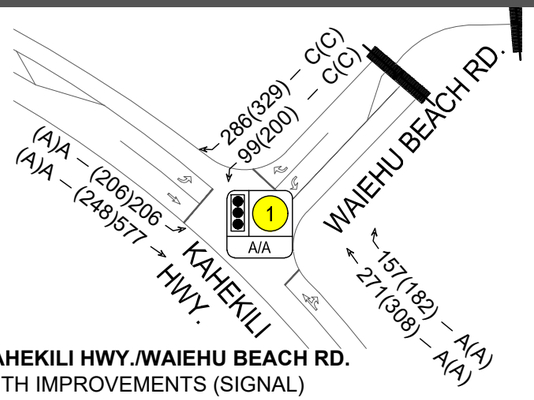
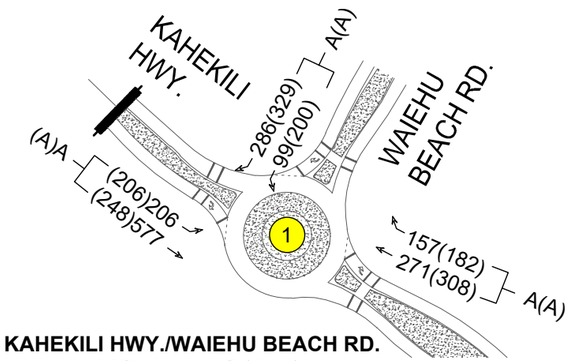
KAHEKILI HWY./WAIEHU BEACH RD.
WITHOUT IMPROVEMENTS



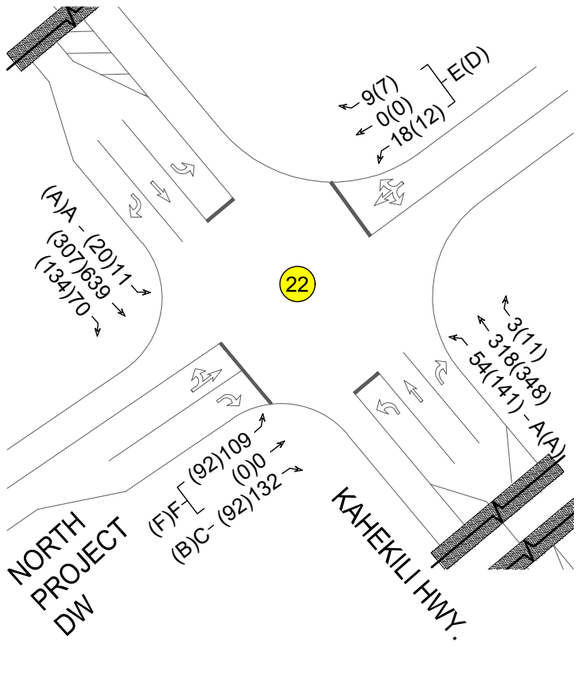


KAHEKILI HWY./WAIEHU BEACH RD.
WITH IMPROVEMENTS (SIGNAL)

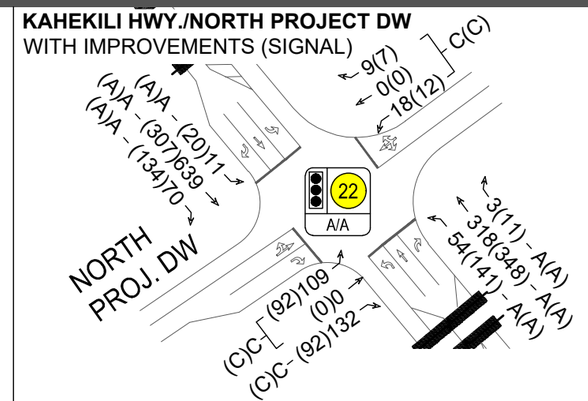


KAHEKILI HWY./WAIEHU BEACH RD.
WITH IMPROVEMENTS (RAB)

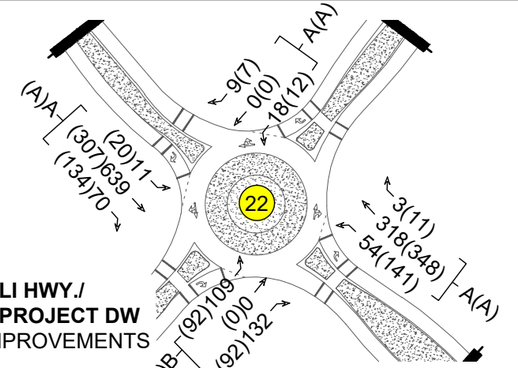
KAHEKILI HWY./NORTH PROJECT DW
WITHOUT IMPROVEMENTS



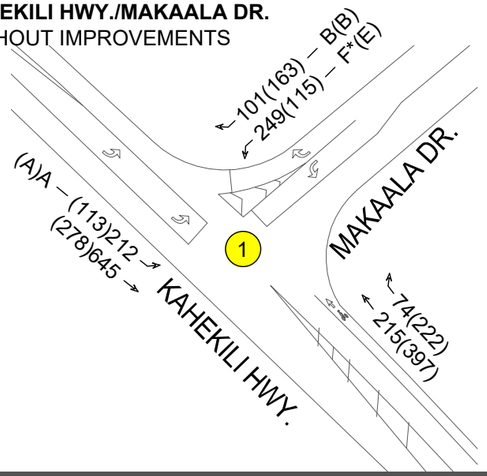
KAHEKILI HWY./NORTH PROJECT DW
WITH IMPROVEMENTS (SIGNAL)



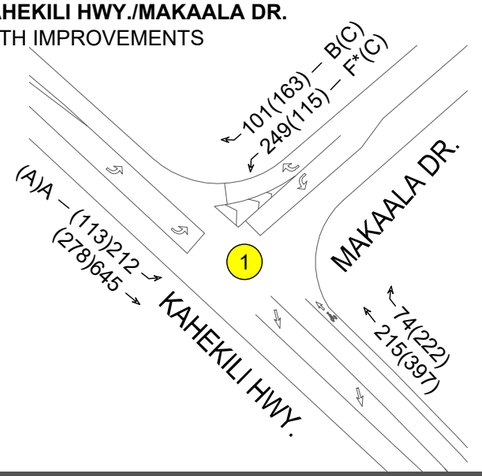
KAHEKILI HWY./ NORTH PROJECT DW
WITH IMPROVEMENTS (RAB)



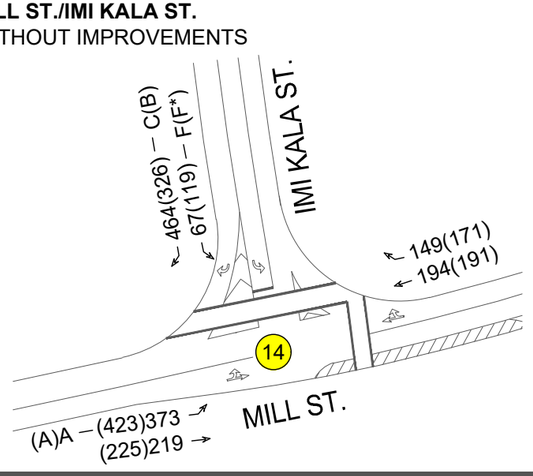
KAHEKILI HWY./MAKAALA DR.
WITHOUT IMPROVEMENTS



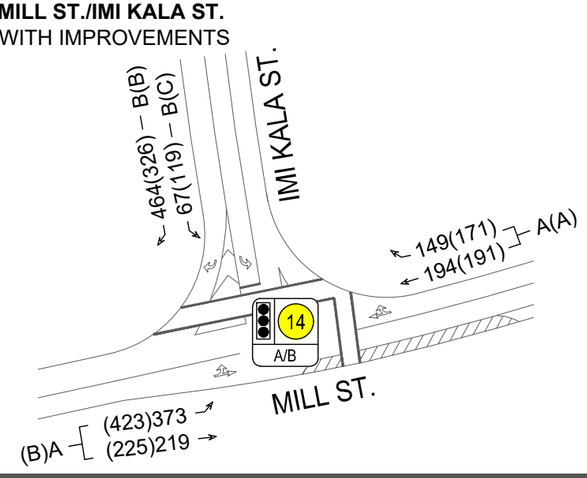
KAHEKILI HWY./MAKAALA DR.
WITH IMPROVEMENTS



MILL ST./IMI KALA ST.
WITHOUT IMPROVEMENTS



MILL ST./IMI KALA ST.
WITH IMPROVEMENTS



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CIVIL ENGINEERS · SURVEYORS

TABLE 5.4: LOS SUMMARY TABLE
EXISTING, BASE YEAR, AND FUTURE YEAR CONDITIONS WITH IMI KALA STREET EXTENSION
WITH AND WITHOUT IMPROVEMENTS

Intersection	Existing 2021 Conditions						Base Year 2030 WITH Imi Kala St. Ext. Conditions No Improvements						Base Year 2030 WITH Imi Kala St. Ext. Conditions With Improvements						Future Year 2030 WITH Imi Kala St. Ext. Conditions No Improvements						Future Year 2030 WITH Imi Kala St. Ext. Conditions With Improvements					
	AM			PM			AM			PM			AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kahekili Hwy & Waiehu Beach Rd													**Mitigation: Widen to provide westbound right-turn and left-turn lanes, and southbound left-turn lane**												**Mitigation: Widen to provide westbound right-turn and left-turn lanes, southbound left-turn lane, AND monitor to determine if signal or roundabout warranted by future traffic growth**					
WB LT	-	-	-	-	-	-	-	-	-	-	-	-	39.2	0.32	E	26.4	0.25	D	-	-	-	-	-	-						
WB LT/RT	23.4	0.64	C	17.6	0.57	C	30.5	0.74	D	29.7	0.76	D	-	-	-	-	-	-	306.8	1.57	F*	450.3	1.91	F*	See Table 5.6					
WB RT	-	-	-	-	-	-	-	-	-	-	-	-	12.4	0.39	B	15.3	0.51	C	-	-	-	-	-	-						
SB LT	8.5	0.25	A	8.6	0.20	A	8.3	0.17	A	8.8	0.19	A	8.3	0.17	A	8.8	0.19	A	9.1	0.20	A	9.4	0.22	A						
OVERALL	8.6	-	-	8.4	-	-	8.9	-	-	11.6	-	-	5.3	-	-	7.3	-	-	75.2	-	-	163.0	-	-						
2: Kahekili Hwy & Makaala Dr													**Mitigation: Provide median refuge lane for westbound left-turners**												**Mitigation: Monitor to determine if signal warranted by future traffic growth**					
WB LT	21.6	0.41	C	13.5	0.18	B	137.1	1.12	F*	18.7	0.32	C	46.1	0.79	E	14.8	0.25	B	591.1	2.13	F*	35.2	0.52	E	222.4	1.33	F*	21.8	0.37	C
WB RT	9.5	0.06	A	10.2	0.01	B	9.8	0.07	A	11.1	0.05	B	9.8	0.07	A	11.1	0.05	B	10.2	0.14	B	13.0	0.28	B	10.5	0.14	B	15.1	0.33	C
SB LT	7.9	0.07	A	8.2	0.01	A	8.0	0.08	A	8.6	0.02	A	8.0	0.08	A	8.6	0.02	A	8.5	0.19	A	9.5	0.13	A	8.5	0.19	A	9.5	0.13	A
OVERALL	5.0	-	-	2.1	-	-	29.9	-	-	2.9	-	-	10.8	-	-	2.4	-	-	100.3	-	-	5.6	-	-	38.9	-	-	4.7	-	-
3: Waiehu Beach Rd & Makaala Dr																														
NB LT	9.3	0.11	A	10.0	0.32	B	9.0	0.10	A	10.1	0.31	B	Same as NO IMPROVEMENTS Conditions						9.7	0.16	A	12.2	0.48	B	Same as NO IMPROVEMENTS Conditions					
EB LT	16.7	0.02	C	30.4	0.10	D	16.1	0.02	C	31.5	0.11	D							19.4	0.05	C	58.9	0.28	F						
EB RT	55.5	0.94	F	15.1	0.38	C	24.4	0.67	C	15.4	0.37	C							85.4	1.05	F*	23.3	0.61	C						
OVERALL	16.8	-	-	4.1	-	-	6.7	-	-	3.7	-	-							23.9	-	-	6.0	-	-						
4: Kahekili Hwy & Kamaile St.																														
NB LT	8.5	0.02	A	7.8	0.03	A	9.8	0.03	A	8.2	0.04	A	Same as NO IMPROVEMENTS Conditions						10.3	0.03	B	8.4	0.04	A	Same as NO IMPROVEMENTS Conditions					
EB LT/RT	13.1	0.11	B	12.1	0.08	B	19.5	0.19	C	14.6	0.11	B							23.6	0.23	C	17.7	0.15	C						
OVERALL	1.1	-	-	1.2	-	-	1.1	-	-	1.0	-	-							1.2	-	-	1.1	-	-						
5: Kahekili Hwy & Puuohala Rd																														
NB LT	8.9	0.06	A	8.0	0.09	A	8.8	0.06	A	8.0	0.09	A	Same as NO IMPROVEMENTS Conditions						9.0	0.06	A	8.1	0.10	A	Same as NO IMPROVEMENTS Conditions					
EB LT/RT	15.5	0.30	C	10.9	0.11	B	15.0	0.30	C	10.6	0.11	B							16.2	0.33	C	10.9	0.12	B						
OVERALL	2.7	-	-	1.9	-	-	3.0	-	-	2.4	-	-							3.0	-	-	2.2	-	-						
6: Market St/Kahekili Hwy & Piihana Rd/Mokuhau Rd																														
NB LT	9.4	0.04	A	7.9	0.04	A	9.4	0.04	A	7.9	0.04	A	Same as NO IMPROVEMENTS Conditions						9.6	0.05	A	8.0	0.04	A	Same as NO IMPROVEMENTS Conditions					
EB LT/TH/RT	18.7	0.17	C	11.9	0.09	B	17.8	0.16	C	11.2	0.09	B							19.6	0.18	C	12.0	0.10	B						
WB LT/TH/RT	44.6	0.44	E	29.4	0.26	D	39.5	0.41	E	24.1	0.23	C							46.8	0.47	E	28.0	0.26	D						
SB LT	7.9	0.00	A	8.9	0.01	A	7.8	0.00	A	8.5	0.01	A							7.8	0.00	A	8.6	0.01	A						
OVERALL	3.5	-	-	2.3	-	-	3.6	-	-	2.6	-	-							3.9	-	-	2.6	-	-						
7: Waiehu Beach Rd & Eha St/Nukuwai Pl.																														
NB LT	105.2	0.87	F	15.4	0.29	B	49.5	0.62	D	14.5	0.29	B	Same as NO IMPROVEMENTS Conditions						131.7	0.93	F	24.5	0.35	C	Same as NO IMPROVEMENTS Conditions					
NB TH/RT	5.8	0.29	A	19.6	0.78	B	5.3	0.32	A	19.6	0.82	B							5.4	0.36	A	52.1	0.96	D						
EB LT/TH	106.4	0.71	F	30.0	0.70	C	89.7	0.69	F	32.7	0.70	C							123.4	0.90	F	66.4	0.88	E						
EB RT	85.6	0.02	F	18.8	0.05	B	68.7	0.01	E	20.7	0.05	C							0.0	0.00	A	33.4	0.05	C						
WB LT/TH/RT	86.3	0.08	F	18.4	0.01	B	69.5	0.09	E	20.4	0.01	C							73.8	0.08	E	32.7	0.01	C						
SB LT	5.1	0.00	A	0.0	0.00	A	3.3	0.00	A	0.0	0.00	A							3.9	0.00	A	0.0	0.00	A						
SB TH	79.7	1.07	F*	23.9	0.58	C	38.0	0.96	D	22.5	0.59	C							107.3	1.16	F*	34.3	0.67	C						
SB RT	9.1	0.35	A	19.1	0.29	B	5.2	0.24	A	16.2	0.20	B							6.9	0.32	A	24.0	0.25	C						
OVERALL	52.2	-	D	22.5	-	C	28.9	-	C	22.4	-	C							66.3	-	E	46.7	-	D						
8: Lower Main St/Kahului Beach Rd & Waiehu Beach Rd																														
EB LT	16.0	0.24	B	16.9	0.29	B	20.4	0.30	C	30.2	0.42	C	Same as NO IMPROVEMENTS Conditions						28.9	0.41	C	140.2	0.92	F	Same as NO IMPROVEMENTS Conditions					
EB TH	11.2	0.39	B	6.7	0.37	A	12.4	0.38	B	8.4	0.37	A							16.9	0.40	B	11.2	0.37	B						
WB TH	24.8	0.80	C	19.3	0.80	B	24.2	0.77	C	19.3	0.75	B							31.4	0.80	C	25.9	0.76	C						
WB TH/RT	25.5	0.81	C	22.8	0.85	C	25.0	0.79	C	24.0	0.84	C							33.0	0.83	C	50.7	0.96	D						
SB LT/RT	29.8	0.82	C	37.5	0.77	D	42.7	0.83	D	73.5	0.86	E							50.8	0.86	D	116.8	0.96	F						
OVERALL	22.9	-	C	19.7	-	B	26.3	-	C	27.1	-	C							34.0	-	C	48.9	-	D						
9: Market St & Mill St.																														
WB LT	191.8	0.75	F	64.3	0.40	F	128.2	0.64	F	70.3	0.48	F	Same as NO IMPROVEMENTS Conditions						172.4	0.76	F	91.8	0.56	F	Same as NO IMPROVEMENTS Conditions					
WB RT	12.5	0.25	B	36.3	0.78	E	11.7	0.11	B	19.8	0.37	C							11.9	0.11	B	21.7	0.41	C						
SB LT	10.8	0.43	B	11.1	0.30	B	10.1	0.32	B	11.3	0.24	B							10.4	0.34	B	11.7	0.26	B						
OVERALL	8.3	-	-	10.6	-	-	5.9	-	-	5.0	-	-							7.0	-	-	5.7	-	-						

TABLE 5.4: LOS SUMMARY TABLE
EXISTING, BASE YEAR, AND FUTURE YEAR CONDITIONS WITH IMI KALA STREET EXTENSION
WITH AND WITHOUT IMPROVEMENTS (CONT.)

Intersection	Existing 2021 Conditions						Base Year 2030 WITH Imi Kala St. Ext. Conditions No Improvements						Base Year 2030 WITH Imi Kala St. Ext. Conditions With Improvements						Future Year 2030 WITH Imi Kala St. Ext. Conditions No Improvements						Future Year 2030 WITH Imi Kala St. Ext. Conditions With Improvements					
	AM			PM			AM			PM			AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
10: Central Ave & Mill St.																														
NB LT/RT	19.9	0.42	C	35.1	0.66	E	21.1	0.46	C	19.5	0.50	C	Same as NO IMPROVEMENTS Conditions						24.6	0.52	C	21.1	0.54	C	Same as NO IMPROVEMENTS Conditions					
WB LT	10.4	0.29	B	9.2	0.24	A	12.2	0.51	B	9.4	0.29	A							13.1	0.55	B	9.5	0.30	A						
OVERALL	4.9	-	-	7.8	-	-	7.4	-	-	6.9	-	-							8.3	-	-	7.2	-	-						
11: Kaniela St. & Mill St.																														
NB LT/RT	16.6	0.19	C	17.9	0.20	C	17.6	0.20	C	16.0	0.18	C	Same as NO IMPROVEMENTS Conditions						18.5	0.22	C	16.6	0.19	C	Same as NO IMPROVEMENTS Conditions					
WB LT	8.8	0.04	A	8.4	0.02	A	8.8	0.05	A	8.6	0.03	A							8.9	0.05	A	8.7	0.03	A						
OVERALL	1.4	-	-	1.4	-	-	1.3	-	-	1.3	-	-							1.3	-	-	1.4	-	-						
12: Mission St. & Mill St.																														
NB LT/RT	15.9	0.27	C	19.8	0.33	C	16.8	0.29	C	18.4	0.31	C	Same as NO IMPROVEMENTS Conditions						17.4	0.30	C	19.0	0.32	C	Same as NO IMPROVEMENTS Conditions					
WB LT	8.8	0.07	A	8.6	0.08	A	8.9	0.08	A	8.9	0.09	A							8.9	0.08	A	9.0	0.09	A						
OVERALL	2.2	-	-	2.6	-	-	2.0	-	-	2.5	-	-							1.9	-	-	2.6	-	-						
13: Imi Kala St. & Eha St.																														
NB LT	10.1	0.20	B	8.9	0.06	A	11.3	0.21	B	9.4	0.07	A	Same as NO IMPROVEMENTS Conditions						11.8	0.22	B	9.8	0.07	A	Same as NO IMPROVEMENTS Conditions					
NB TH/RT	8.7	0.22	A	9.4	0.32	A	12.5	0.41	B	17.7	0.65	C							13.7	0.44	B	21.6	0.72	C						
EB LT/TH/RT	8.2	0.11	A	8.1	0.11	A	10.7	0.16	B	10.1	0.15	B							11.3	0.17	B	10.6	0.16	B						
WB LT/TH/RT	10.4	0.33	B	9.8	0.27	A	14.4	0.45	B	12.3	0.39	B							16.0	0.50	C	14.2	0.48	B						
SB LT/TH/RT	8.2	0.02	A	8.3	0.02	A	19.1	0.66	C	10.9	0.26	B							27.9	0.78	D	12.1	0.32	B						
OVERALL	9.5	-	A	9.3	-	A	15.1	-	C	14.2	-	B							19.5	-	C	16.5	-	C						
14: Mill St. & Imi Kala St.													**Mitigation: Monitor and install signal if warranted by future traffic growth**												**Mitigation: Monitor and install signal if warranted by future traffic growth**					
EB LT	8.8	0.30	A	8.8	0.29	A	8.7	0.29	A	8.9	0.33	A	-	-	-	-	-	-	8.8	0.30	A	9.0	0.34	A	-	-	-	-	-	-
EB LT/TH	-	-	-	-	-	-	-	-	-	-	-	-	5.4	0.64	A	6.4	0.69	A	-	-	-	-	-	-	6.7	0.70	A	11.4	0.79	B
WB TH/RT	-	-	-	-	-	-	-	-	-	-	-	-	2.8	0.19	A	2.8	0.17	A	-	-	-	-	-	-	2.9	0.29	A	2.8	0.29	A
SB LT	59.2	0.42	F	129.0	0.91	F	78.0	0.62	F	301.5	1.37	F*	14.0	0.39	B	18.1	0.63	B	86.3	0.66	F	363.2	1.50	F*	16.6	0.41	B	22.8	0.67	C
SB RT	12.3	0.35	B	15.5	0.54	C	17.3	0.62	C	13.9	0.46	B	13.4	0.28	B	14.7	0.20	B	19.2	0.68	C	14.3	0.48	B	16.2	0.33	B	18.4	0.22	B
OVERALL	7.4	-	-	16.0	-	-	11.1	-	-	30.5	-	-	5.9	-	A	7.4	-	A	12.3	-	-	35.5	-	-	6.6	-	A	10.4	-	B
15: Market St & Vineyard St																														
NB LT/TH/RT	18.8	0.55	C	43.1	0.86	E	22.8	0.61	C	74.4	0.99	F	Same as NO IMPROVEMENTS Conditions						23.4	0.63	C	92.2	1.04	F*	Same as NO IMPROVEMENTS Conditions					
EB LT	17.9	0.48	C	28.6	0.70	D	21.6	0.56	C	61.7	0.93	F							22.3	0.58	C	68.1	0.99	F						
EB TH	11.0	0.10	B	13.4	0.27	B	11.9	0.12	B	16.4	0.38	C							12.0	0.12	B	16.5	0.38	C						
WB TH/RT	15.5	0.39	C	17.5	0.42	C	18.4	0.46	C	22.5	0.51	C							18.6	0.47	C	23.0	0.54	C						
SB LT	11.1	0.12	B	12.4	0.12	B	11.7	0.14	B	13.6	0.14	B							11.9	0.15	B	13.8	0.15	B						
SB RT	25.0	0.75	C	19.4	0.58	C	59.8	0.97	F	35.9	0.79	E							72.9	1.02	F*	39.6	0.85	E						
OVERALL	19.7	-	C	27.5	-	D	35.6	-	E	48.0	-	E							41.5	-	E	55.6	-	F						
16: Main St & High St																														
NB LT	12.7	0.09	B	14.2	0.14	B	14.0	0.10	B	16.5	0.19	B	Same as NO IMPROVEMENTS Conditions						13.4	0.10	B	17.5	0.20	B	Same as NO IMPROVEMENTS Conditions					
NB TH	14.0	0.37	B	16.4	0.55	B	16.2	0.50	B	18.8	0.60	B							15.5	0.49	B	19.8	0.60	B						
NB RT	12.9	0.18	B	13.7	0.16	B	14.2	0.21	B	15.4	0.20	B							13.6	0.21	B	16.5	0.24	B						
EB LT	15.0	0.02	B	17.3	0.04	B	15.7	0.03	B	21.1	0.06	C							15.3	0.03	B	22.2	0.06	C						
EB TH/RT	17.6	0.46	B	19.9	0.48	B	18.8	0.53	B	25.0	0.58	C							18.4	0.52	B	26.2	0.58	C						
WB LT	10.6	0.45	B	12.0	0.59	B	11.2	0.51	B	15.0	0.70	B							11.2	0.53	B	16.0	0.71	B						
WB TH/RT	7.1	0.11	A	8.0	0.17	A	7.2	0.13	A	9.4	0.20	A							7.5	0.14	A	10.1	0.21	B						
SB LT/TH/RT	16.3	0.61	B	18.1	0.66	B	17.9	0.64	B	21.4	0.72	C							17.3	0.64	B	22.9	0.74	C						
OVERALL	13.9	-	B	15.2	-	B	15.1	-	B	18.0	-	B							14.7	-	B	19.2	-	B						
17: Church St. & Main St																														
EB LT	-	-	-	-	-	-	45.9	0.46	D	47.7	0.45	D	Same as NO IMPROVEMENTS Conditions						45.9	0.46	D	47.7	0.45	D	Same as NO IMPROVEMENTS Conditions					
EB TH/RT	-	-	-	-	-	-	7.8	0.42	A	11.8	0.51	B							8.1	0.43	A	12.0	0.52	B						
WB LT	8.3	0.04	A	8.4	0.02	A	42.8	0.60	D	43.4	0.52	D							42.8	0.60	D	43.4	0.52	D						
WB TH/RT	-	-	-	-	-	-	7.9	0.49	A	11.5	0.52	B							8.1	0.50	A	11.7	0.53	B						
SB LT	20.0	0.11	C	23.2	0.30	C	-	-	-	-	-	-							-	-	-	-	-	-						
SB TH/RT	14.0	0.33	B	12.4	0.20	B	-	-	-	-	-	-							-	-	-	-	-	-						
SB LT/TH/RT	-	-	-	-	-	-	37.2	0.82	D	36.6	0.86	D							37.7	0.82	D	36.8	0.86	D						
OVERALL	3.2	-	-	3.2	-	-	14.5	-	B	18.9	-	B							14.9	-	B	19.1	-	B						

TABLE 5.4: LOS SUMMARY TABLE
EXISTING, BASE YEAR, AND FUTURE YEAR CONDITIONS WITH IMI KALA STREET EXTENSION
WITH AND WITHOUT IMPROVEMENTS (CONT.)

Intersection	Existing 2021 Conditions						Base Year 2030 WITH Imi Kala St. Ext. Conditions No Improvements						Base Year 2030 WITH Imi Kala St. Ext. Conditions With Improvements						Future Year 2030 WITH Imi Kala St. Ext. Conditions No Improvements						Future Year 2030 WITH Imi Kala St. Ext. Conditions With Improvements					
	AM			PM			AM			PM			AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
18: Market St & Main St																														
NB LT/TH	70.1	0.82	E	64.7	0.80	E	69.9	0.83	E	64.2	0.81	E	Same as NO IMPROVEMENTS Conditions						70.2	0.83	E	64.0	0.81	E	Same as NO IMPROVEMENTS Conditions					
NB RT	56.2	0.01	E	52.3	0.01	D	55.3	0.01	E	51.6	0.01	D							55.2	0.01	E	51.3	0.01	D						
EB LT	3.0	0.13	A	3.1	0.18	A	3.9	0.17	A	3.8	0.22	A							4.0	0.17	A	3.9	0.23	A						
EB TH	2.7	0.26	A	2.9	0.30	A	3.1	0.31	A	3.7	0.43	A							3.1	0.32	A	3.8	0.43	A						
WB TH	5.4	0.35	A	5.3	0.33	A	6.3	0.44	A	6.1	0.41	A							6.3	0.44	A	6.2	0.41	A						
WB RT	3.8	0.07	A	4.1	0.10	A	4.0	0.08	A	4.3	0.11	A							4.1	0.08	A	4.4	0.11	A						
OVERALL	11.3	-	B	10.2	-	B	11.3	-	B	9.9	-	A							11.4	-	B	10.1	-	B						
19: Main St & Central Ave																														
EB LT	12.6	0.13	B	11.1	0.17	B	25.7	0.27	C	15.6	0.34	B	Same as NO IMPROVEMENTS Conditions						28.0	0.30	C	16.1	0.35	B	Same as NO IMPROVEMENTS Conditions					
EB TH	12.0	0.30	B	10.8	0.43	B	22.7	0.43	C	15.2	0.62	B							24.8	0.45	C	15.7	0.63	B						
WB TH	18.3	0.46	B	19.2	0.64	B	37.3	0.74	D	31.6	0.86	C							41.4	0.77	D	33.8	0.88	C						
WB RT	14.1	0.17	B	12.5	0.17	B	24.3	0.24	C	14.5	0.19	B							26.0	0.24	C	14.8	0.20	B						
SB LT	65.2	0.92	E	40.9	0.90	D	64.9	0.95	E	46.2	0.94	D							67.1	0.97	E	47.5	0.95	D						
SB RT	39.0	0.04	D	18.5	0.07	B	27.7	0.07	C	16.9	0.08	B							26.0	0.09	C	16.6	0.08	B						
OVERALL	30.3	-	C	22.4	-	C	41.7	-	D	28.7	-	C							44.8	-	D	30.0	-	C						
20: Waiehu Beach Rd & Wailupe Dr/Lower Waiehu Beach Rd																														
NB LT	8.3	0.10	A	8.6	0.18	A	8.0	0.09	A	8.6	0.18	A	Same as NO IMPROVEMENTS Conditions						8.3	0.10	A	9.0	0.20	A	Same as NO IMPROVEMENTS Conditions					
EB LT/TH	23.1	0.20	C	37.9	0.16	E	20.4	0.18	C	39.4	0.17	E							27.5	0.26	D	72.8	0.36	F						
EB RT	12.5	0.32	B	11.3	0.21	B	11.2	0.29	B	11.2	0.21	B							12.8	0.33	B	12.2	0.24	B						
WB LT/TH	90.6	0.82	F	149.0	0.90	F	58.9	0.68	F	160.3	0.93	F							136.9	0.97	F	408.8	1.48	F*						
WB RT	9.8	0.02	A	10.8	0.01	B	9.9	0.02	A	11.1	0.01	B							10.2	0.02	B	12.5	0.01	B						
SB LT	7.9	0.00	A	8.4	0.02	A	7.9	0.00	A	8.5	0.02	A							8.0	0.01	A	9.0	0.02	A						
OVERALL	13.9	-	-	12.7	-	-	10.9	-	-	13.1	-	-							17.6	-	-	24.6	-	-						
21: Kahekili Hwy & Imi Kala St Ext																														
WB LT	-	-	-	-	-	-	0.0	-	A	0.0	-	A	Same as NO IMPROVEMENTS Conditions						0.0	-	A	0.0	-	A	Same as NO IMPROVEMENTS Conditions					
WB RT	-	-	-	-	-	-	10.0	0.16	B	13.9	0.43	B							10.2	0.19	B	17.0	0.56	C						
SB LT	-	-	-	-	-	-	8.6	0.29	A	8.3	0.12	A							9.0	0.34	A	8.6	0.15	A						
OVERALL	-	-	-	-	-	-	3.8	-	-	5.4	-	-							4.0	-	-	6.4	-	-						
22: Kahekili Hwy & North Project DW																									**Mitigation: Monitor to determine if signal or roundabout warranted by future traffic growth**					
NB LT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.6	0.07	A	8.9	0.14	A						
EB LT/TH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	81.6	0.77	F	51.5	0.58	F						
EB RT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.0	0.33	C	10.9	0.14	B	See Table 5.6					
WB LT/TH/RT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42.4	0.24	E	27.9	0.12	D						
SB LT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.0	0.01	A	8.1	0.02	A						
OVERALL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.4	-	-	6.6	-	-						
23: Kahekili Hwy & South Project DW																														
NB LT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.8	0.04	A	8.6	0.11	A	Same as NO IMPROVEMENTS Conditions					
EB LT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.8	0.28	C	17.4	0.16	C						
EB RT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.9	0.31	C	10.8	0.10	B						
OVERALL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.1	-	-	2.3	-	-						

* denotes overcapacity conditions

TABLE 5.5: LOS SUMMARY TABLE
BASE YEAR AND FUTURE YEAR CONDITIONS WITH AND WITHOUT IMI KALA STREET EXTENSION
WITH IMPROVEMENTS

Intersection	Base Year 2030 NO Imi Kala St. Ext. Conditions With Improvements						Base Year 2030 WITH Imi Kala St. Ext. Conditions With Improvements						Future Year 2030 NO Imi Kala St. Ext. Conditions With Improvements						Future Year 2030 WITH Imi Kala St. Ext. Conditions With Improvements					
	AM			PM			AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kahekili Hwy & Waiehu Beach Rd	**Mitigation: Widen to provide westbound right-turn and left-turn lanes, and southbound left-turn lane**												**Mitigation: Widen to provide westbound right-turn and left-turn lanes AND Monitor to determine if signal or roundabout warranted by future traffic growth**											
WB LT	63.4	0.45	F	29.4	0.27	D	39.2	0.32	E	26.4	0.25	D	See Table 5.6						See Table 5.6					
WB RT	12.4	0.40	B	15.3	0.52	C	12.4	0.39	B	15.3	0.51	C												
SB LT	8.9	0.29	A	8.9	0.23	A	8.3	0.17	A	8.8	0.19	A												
OVERALL	7.2	-	-	8.0	-	-	5.3	-	-	7.3	-	-												
2: Kahekili Hwy & Makaala Dr							**Mitigation: Provide median refuge lane for westbound left-turners**												**Mitigation: Monitor to determine if signal warranted by future traffic growth**					
WB LT	28.9	0.52	D	15.7	0.23	C	46.1	0.79	E	14.8	0.25	B	44.7	0.66	E	18.0	0.27	C	222.4	1.33	F*	21.8	0.37	C
WB RT	9.7	0.07	A	10.8	0.05	B	9.8	0.07	A	11.1	0.05	B	10.3	0.15	B	14.2	0.34	B	10.5	0.14	B	15.1	0.33	C
SB LT	8.0	0.08	A	8.4	0.02	A	8.0	0.08	A	8.6	0.02	A	8.5	0.20	A	9.1	0.13	A	8.5	0.19	A	9.5	0.13	A
OVERALL	6.0	-	-	2.5	-	-	10.8	-	-	2.4	-	-	8.1	-	-	4.8	-	-	38.9	-	-	4.7	-	-
3: Waiehu Beach Rd & Makaala Dr																								
NB LT	9.7	0.13	A	10.7	0.37	B	9.0	0.10	A	10.1	0.31	B	10.9	0.21	B	14.4	0.58	B	9.7	0.16	A	12.2	0.48	B
EB LT	18.2	0.03	C	36.3	0.12	E	16.1	0.02	C	31.5	0.11	D	23.4	0.07	B	82.6	0.37	F	19.4	0.05	C	58.9	0.28	F
EB RT	95.7	1.07	F*	17.4	0.44	C	24.4	0.67	C	15.4	0.37	C	359.5	1.72	F*	31.9	0.73	D	85.4	1.05	F*	23.3	0.61	C
OVERALL	26.6	-	-	4.2	-	-	6.7	-	-	3.7	-	-	104.2	-	-	7.9	-	-	23.9	-	-	6.0	-	-
4: Kahekili Hwy & Kamaile St.																								
NB LT	8.8	0.03	A	8.0	0.04	A	9.8	0.03	A	8.2	0.04	A	9.0	0.03	A	8.1	0.04	A	10.3	0.03	B	8.4	0.04	A
EB LT/RT	14.4	0.13	B	13.2	0.09	B	19.5	0.19	C	14.6	0.11	B	15.7	0.15	C	14.8	0.12	B	23.6	0.23	C	17.7	0.15	C
OVERALL	1.1	-	-	1.1	-	-	1.1	-	-	1.0	-	-	1.1	-	-	1.1	-	-	1.2	-	-	1.1	-	-
5: Kahekili Hwy & Puuohala Rd																								
NB LT	9.3	0.07	A	8.2	0.10	A	8.8	0.06	A	8.0	0.09	A	9.6	0.07	A	8.3	0.10	A	9.0	0.06	A	8.1	0.10	A
EB LT/RT	18.3	0.37	C	11.7	0.13	B	15.0	0.30	C	10.6	0.11	B	20.3	0.40	C	12.3	0.14	B	16.2	0.33	C	10.9	0.12	B
OVERALL	2.8	-	-	1.8	-	-	3.0	-	-	2.4	-	-	2.9	-	-	1.7	-	-	3.0	-	-	2.2	-	-
6: Market St/Kahekili Hwy & Piihana Rd/Mokuhau Rd																								
NB LT	10.0	0.05	A	8.1	0.04	A	9.4	0.04	A	7.9	0.04	A	10.3	0.05	B	8.2	0.04	A	9.6	0.05	A	8.0	0.04	A
EB LT/TH/RT	22.6	0.21	C	13.0	0.12	B	17.8	0.16	C	11.2	0.09	B	26.0	0.25	D	14.6	0.14	B	19.6	0.18	C	12.0	0.10	B
WB LT/TH/RT	79.3	0.63	F	45.3	0.39	E	39.5	0.41	E	24.1	0.23	C	106.7	0.74	F	59.2	0.47	F	46.8	0.47	E	28.0	0.26	D
SB LT	8.1	0.01	A	9.3	0.01	A	7.8	0.00	A	8.5	0.01	A	8.1	0.01	A	9.5	0.01	A	7.8	0.00	A	8.6	0.01	A
OVERALL	5.1	-	-	2.9	-	-	3.6	-	-	2.6	-	-	6.3	-	-	3.4	-	-	3.9	-	-	2.6	-	-
7: Waiehu Beach Rd & Eha St/Nukuwai Pl.																								
NB LT	105.5	0.87	F	18.0	0.32	B	49.5	0.62	D	14.5	0.29	B	108.1	0.88	F	36.8	0.49	D	131.7	0.93	F	24.5	0.35	C
NB TH/RT	6.1	0.33	A	25.3	0.87	C	5.3	0.32	A	19.6	0.82	B	8.7	0.38	A	109.1	1.11	F*	5.4	0.36	A	52.1	0.96	D
EB LT/TH	106.5	0.71	F	35.7	0.74	D	89.7	0.69	F	32.7	0.70	C	106.9	0.76	F	58.6	0.85	E	123.4	0.90	F	66.4	0.88	E
EB RT	85.3	0.02	F	21.8	0.05	C	68.7	0.01	E	20.7	0.05	C	0.0	0.00	A	0.0	0.00	A	0.0	0.00	A	33.4	0.05	C
WB LT/TH/RT	86.1	0.08	F	21.4	0.01	C	69.5	0.09	E	20.4	0.01	C	83.4	0.07	F	30.2	0.01	C	73.8	0.08	E	32.7	0.01	C
SB LT	5.4	0.00	A	0.0	0.00	A	3.3	0.00	A	0.0	0.00	A	7.2	0.00	A	0.0	0.00	A	3.9	0.00	A	0.0	0.00	A
SB TH	133.7	1.21	F*	27.6	0.64	C	38.0	0.96	D	22.5	0.59	C	264.3	1.50	F*	51.6	0.79	D	107.3	1.16	F*	34.3	0.67	C
SB RT	9.5	0.36	A	20.9	0.31	C	5.2	0.24	A	16.2	0.20	B	0.0	0.00	A	0.0	0.00	A	6.9	0.32	A	24.0	0.25	C
OVERALL	76.1	-	E	27.1	-	C	28.9	-	C	22.4	-	C	169.2	-	F	78.0	-	E	66.3	-	E	46.7	-	D
8: Lower Main St/Kahului Beach Rd & Waiehu Beach Rd																								
EB LT	28.9	0.42	C	30.6	0.46	C	20.4	0.30	C	30.2	0.42	C	63.6	0.62	E	71.8	0.83	E	28.9	0.41	C	140.2	0.92	F
EB TH	17.0	0.41	B	8.5	0.38	A	12.4	0.38	B	8.4	0.37	A	24.7	0.42	C	10.1	0.37	B	16.9	0.40	B	11.2	0.37	B
WB TH	29.2	0.79	C	20.0	0.76	B	24.2	0.77	C	19.3	0.75	B	42.3	0.83	D	25.6	0.77	C	31.4	0.80	C	25.9	0.76	C
WB TH/RT	30.2	0.81	C	25.9	0.86	C	25.0	0.79	C	24.0	0.84	C	45.0	0.86	D	68.5	1.03	F*	33.0	0.83	C	50.7	0.96	D
SB LT/RT	45.2	0.85	D	69.1	0.87	E	42.7	0.83	D	73.5	0.86	E	60.7	0.90	E	107.4	1.00	F*	50.8	0.86	D	116.8	0.96	F
OVERALL	31.4	-	C	27.4	-	C	26.3	-	C	27.1	-	C	45.5	-	D	51.2	-	D	34.0	-	C	48.9	-	D

TABLE 5.5: LOS SUMMARY TABLE
BASE YEAR AND FUTURE YEAR CONDITIONS WITH AND WITHOUT IMI KALA STREET EXTENSION
WITH IMPROVEMENTS (CONT)

Intersection	Base Year 2030 NO Imi Kala St. Ext. Conditions With Improvements						Base Year 2030 WITH Imi Kala St. Ext. Conditions With Improvements						Future Year 2030 NO Imi Kala St. Ext. Conditions With Improvements						Future Year 2030 WITH Imi Kala St. Ext. Conditions With Improvements					
	AM			PM			AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
9: Market St & Mill St.																								
WB LT	378.6	1.18	F*	129.7	0.68	F	128.2	0.64	F	70.3	0.48	F	537.1	1.46	F*	190.6	0.84	F	172.4	0.76	F	91.8	0.56	F
WB RT	13.5	0.30	B	83.8	1.02	F*	11.7	0.11	B	19.8	0.37	C	13.9	0.31	B	125.2	1.14	F*	11.9	0.11	B	21.7	0.41	C
SB LT	11.4	0.45	B	12.2	0.34	B	10.1	0.32	B	11.3	0.24	B	11.9	0.49	B	12.9	0.38	B	10.4	0.34	B	11.7	0.26	B
OVERALL	12.8	-	-	21.4	-	-	5.9	-	-	5.0	-	-	16.1	-	-	31.1	-	-	7.0	-	-	5.7	-	-
10: Central Ave & Mill St.																								
NB LT/RT	23.2	0.48	C	57.7	0.82	F	21.1	0.46	C	19.5	0.50	C	25.4	0.51	D	76.0	0.91	F	24.6	0.52	C	21.1	0.54	C
WB LT	10.9	0.32	B	9.6	0.26	A	12.2	0.51	B	9.4	0.29	A	11.1	0.32	B	9.7	0.27	A	13.1	0.55	B	9.5	0.30	A
OVERALL	5.3	-	-	11.6	-	-	7.4	-	-	6.9	-	-	5.5	-	-	14.4	-	-	8.3	-	-	7.2	-	-
11: Kaniela St. & Mill St.																								
NB LT/RT	18.5	0.22	C	20.9	0.24	C	17.6	0.20	C	16.0	0.18	C	19.0	0.22	C	22.1	0.26	C	18.5	0.22	C	16.6	0.19	C
WB LT	9.0	0.04	A	8.6	0.03	A	8.8	0.05	A	8.6	0.03	A	9.1	0.04	A	8.7	0.03	A	8.9	0.05	A	8.7	0.03	A
OVERALL	1.4	-	-	1.4	-	-	1.3	-	-	1.3	-	-	1.4	-	-	1.5	-	-	1.3	-	-	1.4	-	-
12: Mission St. & Mill St.																								
NB LT/RT	17.6	0.30	C	23.8	0.39	C	16.8	0.29	C	18.4	0.31	C	18.1	0.31	C	25.4	0.41	D	17.4	0.30	C	19.0	0.32	C
WB LT	9.0	0.07	A	8.9	0.09	A	8.9	0.08	A	8.9	0.09	A	9.1	0.07	A	8.9	0.09	A	8.9	0.08	A	9.0	0.09	A
OVERALL	2.2	-	-	2.8	-	-	2.0	-	-	2.5	-	-	2.2	-	-	2.9	-	-	1.9	-	-	2.6	-	-
13: Imi Kala St. & Eha St.	**Mitigation: Monitor and install signal if warranted by future traffic growth**																							
NB LT	10.1	0.21	B	8.9	0.07	A	11.3	0.21	B	9.4	0.07	A	10.2	0.21	B	9.0	0.07	A	11.8	0.22	B	9.8	0.07	A
NB TH/RT	8.8	0.22	A	9.6	0.33	A	12.5	0.41	B	17.7	0.65	C	8.9	0.23	A	9.8	0.35	A	13.7	0.44	B	21.6	0.72	C
EB LT/TH/RT	8.2	0.11	A	8.1	0.11	A	10.7	0.16	B	10.1	0.15	B	8.3	0.12	A	8.2	0.12	A	11.3	0.17	B	10.6	0.16	B
WB LT/TH/RT	10.5	0.34	B	9.9	0.28	A	14.4	0.45	B	12.3	0.39	B	10.6	0.34	B	10.0	0.29	A	16.0	0.50	C	14.2	0.48	B
SB LT/TH/RT	8.2	0.02	A	8.3	0.02	A	19.1	0.66	C	10.9	0.26	B	8.3	0.02	A	8.3	0.02	A	27.9	0.78	D	12.1	0.32	B
OVERALL	9.6	-	A	9.4	-	A	15.1	-	C	14.2	-	B	9.7	-	A	9.6	-	A	19.5	-	C	16.5	-	C
14: Mill St. & Imi Kala St.																								
EB LT/TH	5.1	0.66	A	6.3	0.69	A	5.4	0.64	A	6.4	0.69	A	4.8	0.66	A	6.0	0.69	A	6.7	0.70	A	11.4	0.79	B
WB TH/RT	2.4	0.21	A	2.9	0.23	A	2.8	0.19	A	2.8	0.17	A	2.2	0.21	A	2.7	0.24	A	2.9	0.29	A	2.8	0.29	A
SB LT	15.4	0.37	B	16.8	0.55	B	14.0	0.39	B	18.1	0.63	B	17.8	0.49	B	18.9	0.65	B	16.6	0.41	B	22.8	0.67	C
SB RT	14.2	0.18	B	14.7	0.24	B	13.4	0.28	B	14.7	0.20	B	0.0	0.00	A	0.0	0.00	A	16.2	0.33	B	18.4	0.22	B
OVERALL	5.1	-	A	6.8	-	A	5.9	-	A	7.4	-	A	4.7	-	A	6.4	-	A	6.6	-	A	10.4	-	B
15: Market St & Vineyard St																								
NB LT/TH/RT	22.8	0.61	C	74.4	0.99	F	22.8	0.61	C	74.4	0.99	F	23.4	0.63	C	92.2	1.04	F*	23.4	0.63	C	92.2	1.04	F*
EB LT	21.6	0.56	C	61.7	0.93	F	21.6	0.56	C	61.7	0.93	F	22.3	0.58	C	68.1	0.99	F	22.3	0.58	C	68.1	0.99	F
EB TH	11.9	0.12	B	16.4	0.38	C	11.9	0.12	B	16.4	0.38	C	12.0	0.12	B	16.5	0.38	C	12.0	0.12	B	16.5	0.38	C
WB TH/RT	18.4	0.46	C	22.5	0.51	C	18.4	0.46	C	22.5	0.51	C	18.6	0.47	C	23.0	0.54	C	18.6	0.47	C	23.0	0.54	C
SB LT	11.7	0.14	B	13.6	0.14	B	11.7	0.14	B	13.6	0.14	B	11.9	0.15	B	13.8	0.15	B	11.9	0.15	B	13.8	0.15	B
SB RT	59.8	0.97	F	35.9	0.79	E	59.8	0.97	F	35.9	0.79	E	72.9	1.02	F*	39.6	0.85	E	72.9	1.02	F*	39.6	0.85	E
OVERALL	35.6	-	E	48.0	-	E	35.6	-	E	48.0	-	E	41.5	-	E	55.6	-	F	41.5	-	E	55.6	-	F
16: Main St & High St																								
NB LT	14.0	0.10	B	16.5	0.19	B	14.0	0.10	B	16.5	0.19	B	13.4	0.10	B	17.5	0.20	B	13.4	0.10	B	17.5	0.20	B
NB TH	16.2	0.50	B	18.8	0.60	B	16.2	0.50	B	18.8	0.60	B	15.5	0.49	B	19.9	0.60	B	15.5	0.49	B	19.8	0.60	B
NB RT	14.4	0.24	B	15.4	0.20	B	14.2	0.21	B	15.4	0.20	B	13.6	0.21	B	16.3	0.21	B	13.6	0.21	B	16.5	0.24	B
EB LT	15.7	0.03	B	21.1	0.06	C	15.7	0.03	B	21.1	0.06	C	15.4	0.03	B	22.5	0.06	C	15.3	0.03	B	22.2	0.06	C
EB TH/RT	18.8	0.53	B	25.0	0.58	C	18.8	0.53	B	25.0	0.58	C	18.4	0.52	B	26.7	0.58	C	18.4	0.52	B	26.2	0.58	C
WB LT	11.2	0.51	B	15.0	0.70	B	11.2	0.51	B	15.0	0.70	B	11.2	0.53	B	16.3	0.72	B	11.2	0.53	B	16.0	0.71	B
WB TH/RT	7.2	0.13	A	9.4	0.20	A	7.2	0.13	A	9.4	0.20	A	7.5	0.14	A	10.4	0.21	B	7.5	0.14	A	10.1	0.21	B
SB LT/TH/RT	17.9	0.64	B	21.4	0.72	C	17.9	0.64	B	21.4	0.72	C	17.3	0.64	B	23.0	0.74	C	17.3	0.64	B	22.9	0.74	C
OVERALL	15.1	-	B	18.0	-	B	15.1	-	B	18.0	-	B	14.7	-	B	19.4	-	B	14.7	-	B	19.2	-	B

TABLE 5.5: LOS SUMMARY TABLE
BASE YEAR AND FUTURE YEAR CONDITIONS WITH AND WITHOUT IMI KALA STREET EXTENSION
WITH IMPROVEMENTS (CONT)

Intersection	Base Year 2030 NO Imi Kala St. Ext. Conditions With Improvements						Base Year 2030 WITH Imi Kala St. Ext. Conditions With Improvements						Future Year 2030 NO Imi Kala St. Ext. Conditions With Improvements						Future Year 2030 WITH Imi Kala St. Ext. Conditions With Improvements					
	AM			PM			AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
17: Church St. & Main St																								
EB LT	45.9	0.46	D	47.7	0.45	D	45.9	0.46	D	47.7	0.45	D	45.9	0.46	D	47.7	0.45	D	45.9	0.46	D	47.7	0.45	D
EB TH/RT	7.8	0.42	A	11.8	0.51	B	7.8	0.42	A	11.8	0.51	B	8.1	0.43	A	12.0	0.52	B	8.1	0.43	A	12.0	0.52	B
WB LT	42.8	0.60	D	43.4	0.52	D	42.8	0.60	D	43.4	0.52	D	42.8	0.60	D	43.4	0.52	D	42.8	0.60	D	43.4	0.52	D
WB TH/RT	7.9	0.49	A	11.5	0.52	B	7.9	0.49	A	11.5	0.52	B	8.1	0.50	A	11.7	0.53	B	8.1	0.50	A	11.7	0.53	B
SB LT/TH/RT	37.2	0.82	D	36.6	0.86	D	37.2	0.82	D	36.6	0.86	D	37.7	0.82	D	36.8	0.86	D	37.7	0.82	D	36.8	0.86	D
OVERALL	14.5	-	B	18.9	-	B	14.5	-	B	18.9	-	B	14.9	-	B	19.1	-	B	14.9	-	B	19.1	-	B
18: Market St & Main St																								
NB LT/TH	69.9	0.83	E	64.2	0.81	E	69.9	0.83	E	64.2	0.81	E	70.2	0.83	E	64.0	0.81	E	70.2	0.83	E	64.0	0.81	E
NB RT	55.3	0.01	E	51.6	0.01	D	55.3	0.01	E	51.6	0.01	D	55.2	0.01	E	51.3	0.01	D	55.2	0.01	E	51.3	0.01	D
EB LT	3.9	0.17	A	3.8	0.22	A	3.9	0.17	A	3.8	0.22	A	4.0	0.19	A	4.0	0.26	A	4.0	0.17	A	3.9	0.23	A
EB TH	3.1	0.31	A	3.7	0.43	A	3.1	0.31	A	3.7	0.43	A	3.1	0.32	A	3.8	0.43	A	3.1	0.32	A	3.8	0.43	A
WB TH	6.4	0.44	A	6.1	0.41	A	6.3	0.44	A	6.1	0.41	A	6.5	0.44	A	6.2	0.41	A	6.3	0.44	A	6.2	0.41	A
WB RT	4.1	0.08	A	4.3	0.11	A	4.0	0.08	A	4.3	0.11	A	4.1	0.08	A	4.4	0.11	A	4.1	0.08	A	4.4	0.11	A
OVERALL	11.3	-	B	9.9	-	A	11.3	-	B	9.9	-	A	11.4	-	B	10.1	-	B	11.4	-	B	10.1	-	B
19: Main St & Central Ave																								
EB LT	16.8	0.19	B	14.9	0.32	B	25.7	0.27	C	15.6	0.34	B	17.6	0.22	B	15.4	0.34	B	28.0	0.30	C	16.1	0.35	B
EB TH	14.6	0.37	B	14.4	0.61	B	22.7	0.43	C	15.2	0.62	B	15.2	0.37	B	14.7	0.62	B	24.8	0.45	C	15.7	0.63	B
WB TH	23.9	0.61	C	29.1	0.84	C	37.3	0.74	D	31.6	0.86	C	24.8	0.62	C	30.5	0.85	C	41.4	0.77	D	33.8	0.88	C
WB RT	16.2	0.20	B	13.8	0.18	B	24.3	0.24	C	14.5	0.19	B	16.7	0.20	B	14.0	0.18	B	26.0	0.24	C	14.8	0.20	B
SB LT	64.6	0.92	E	43.8	0.92	D	64.9	0.95	E	46.2	0.94	D	64.5	0.92	E	44.4	0.93	D	67.1	0.97	E	47.5	0.95	D
SB RT	36.6	0.07	D	17.5	0.08	B	27.7	0.07	C	16.9	0.08	B	35.9	0.07	D	17.3	0.08	B	26.0	0.09	C	16.6	0.08	B
OVERALL	32.1	-	C	26.9	-	C	41.7	-	D	28.7	-	C	32.8	-	C	27.6	-	C	44.8	-	D	30.0	-	C
20: Waiehu Beach Rd & Wailupe Dr/Lower Waiehu Beach Rd																								
NB LT	8.4	0.10	A	8.8	0.19	A	8.0	0.09	A	8.6	0.18	A	9.0	0.11	A	9.3	0.21	A	8.3	0.10	A	9.0	0.20	A
EB LT/TH	26.4	0.23	D	45.1	0.19	E	20.4	0.18	C	39.4	0.17	E	41.0	0.36	E	93.3	0.43	F	27.5	0.26	D	72.8	0.36	F
EB RT	13.3	0.35	B	11.7	0.23	B	11.2	0.29	B	11.2	0.21	B	16.5	0.43	C	13.1	0.26	B	12.8	0.33	B	12.2	0.24	B
WB LT/TH	136.9	0.97	F	219.3	1.07	F*	58.9	0.68	F	160.3	0.93	F	389.4	1.55	F*	591.6	1.84	F*	136.9	0.97	F	408.8	1.48	F*
WB RT	9.9	0.02	A	11.2	0.01	B	9.9	0.02	A	11.1	0.01	B	10.3	0.02	B	12.8	0.01	B	10.2	0.02	B	12.5	0.01	B
SB LT	7.9	0.00	A	8.6	0.02	A	7.9	0.00	A	8.5	0.02	A	8.1	0.01	A	9.2	0.02	A	8.0	0.01	A	9.0	0.02	A
OVERALL	17.8	-	-	16.0	-	-	10.9	-	-	13.1	-	-	37.5	-	-	32.3	-	-	17.6	-	-	24.6	-	-
21: Kahekili Hwy & Imi Kala St Ext																								
WB LT	-	-	-	-	-	-	0.0	-	A	0.0	-	A	-	-	-	-	-	-	0.0	-	A	0.0	-	A
WB RT	-	-	-	-	-	-	10.0	0.16	B	13.9	0.43	B	-	-	-	-	-	-	10.2	0.19	B	17.0	0.56	C
SB LT	-	-	-	-	-	-	8.6	0.29	A	8.3	0.12	A	-	-	-	-	-	-	9.0	0.34	A	8.6	0.15	A
OVERALL	-	-	-	-	-	-	3.8	-	-	5.4	-	-	8.2	-	-	6.3	-	-	4.0	-	-	6.4	-	-
22: Kahekili Hwy & North Project DW													**Mitigation: Monitor to determine if signal or roundabout warranted by future traffic growth**											
OVERALL	-	-	-	-	-	-	-	-	-	-	-	-	See Table 5.6						See Table 5.6					
23: Kahekili Hwy & South Project DW																								
NB LT	-	-	-	-	-	-	-	-	-	-	-	-	9.1	0.04	A	8.4	0.09	A	9.8	0.04	A	8.6	0.11	A
EB LT	-	-	-	-	-	-	-	-	-	-	-	-	18.1	0.27	C	16.4	0.16	C	20.8	0.28	C	17.4	0.16	C
EB RT	-	-	-	-	-	-	-	-	-	-	-	-	14.8	0.22	B	10.3	0.09	B	18.9	0.31	C	10.8	0.10	B
OVERALL	-	-	-	-	-	-	-	-	-	-	-	-	2.9	-	-	2.3	-	-	3.1	-	-	2.3	-	-

TABLE 5.6: LOS SUMMARY TABLE
FUTURE YEAR INTERSECTION OPERATION WITH SIGNAL VS. ROUNDABOUT

	CONDITIONS WITH SIGNAL												CONDITIONS WITH ROUNDABOUT											
	Future Year 2030 NO Imi Kala St. Ext. Conditions						Future Year 2030 WITH Imi Kala St. Ext. Conditions						Future Year 2030 NO Imi Kala St. Ext. Conditions						Future Year 2030 WITH Imi Kala St. Ext. Conditions					
	AM			PM			AM			PM			AM			PM			AM			PM		
Intersection	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kahekili Hwy & Waiehu Beach Rd																								
NB TH													-	-	-	-	-	-	-	-	-	-	-	-
NB TH/RT	-	-	-	-	-	-	-	-	-	-	-	-	2.4	0.46	A	1.8	0.46	A	1.3	0.39	A	1.4	0.45	A
NB RT													-	-	-	-	-	-	-	-	-	-	-	-
WB LT	32.0	0.70	C	16.1	0.69	B	32.2	0.70	C	28.3	0.76	C	-	-	-	-	-	-	-	-	-	-	-	-
WB LT/RT	-	-	-	-	-	-	-	-	-	-	-	-	2.4	0.39	A	3.4	0.55	A	2.4	0.37	A	3.3	0.53	A
WB RT	25.9	0.20	C	12.8	0.24	B	26.0	0.18	C	22.3	0.21	C	-	-	-	-	-	-	-	-	-	-	-	-
SB LT	4.7	0.45	A	10.4	0.50	B	8.2	0.33	A	4.8	0.29	A	-	-	-	-	-	-	-	-	-	-	-	-
SB TH	3.0	0.33	A	4.1	0.21	A	3.5	0.44	A	3.7	0.21	A	-	-	-	-	-	-	-	-	-	-	-	-
SB LT/TH	-	-	-	-	-	-	-	-	-	-	-	-	2.3	0.65	A	3.0	0.42	A	1.8	0.65	A	2.6	0.42	A
OVERALL	5.4	-	A	8.6	-	A	8.8	-	A	8.0	-	A	2.3	0.65	A	2.8	0.55	A	1.8	0.65	A	2.5	0.53	A
22: Kahekili Hwy & North Project DW																								
NB LT	2.6	0.07	A				2.4	0.09	A	2.5	0.17	A	-	-	-	-	-	-	-	-	-	-	-	-
NB TH	3.2	0.26	A				2.9	0.25	A	2.7	0.27	A	-	-	-	-	-	-	-	-	-	-	-	-
NB LT/TH/RT	-	-	-	-	-	-	-	-	-	-	-	-	2.2	0.33	A	3.6	0.41	A	2.2	0.32	A	3.7	0.43	A
NB RT	2.3	0.00	A				2.0	0.00	A	1.8	0.01	A	-	-	-	-	-	-	-	-	-	-	-	-
EB LT/TH	26.4	0.46	C				26.9	0.43	C	27.5	0.39	C	-	-	-	-	-	-	-	-	-	-	-	-
EB LT/TH/RT	-	-	-	-	-	-	-	-	-	-	-	-	10.8	0.32	B	8.9	0.20	A	11.9	0.37	B	9.0	0.21	A
EB RT	23.3	0.06	C				24.2	0.06	C	24.9	0.05	C	-	-	-	-	-	-	-	-	-	-	-	-
WB LT/TH/RT	23.3	0.06	C				24.2	0.07	C	25.0	0.05	C	4.4	0.03	A	4.7	0.02	A	4.2	0.03	A	4.8	0.03	A
SB LT	0.2	0.01	A				0.2	0.01	A	0.2	0.03	A	-	-	-	-	-	-	-	-	-	-	-	-
SB TH	0.8	0.40	A				1.1	0.50	A	0.4	0.24	A	-	-	-	-	-	-	-	-	-	-	-	-
SB LT/TH/RT	-	-	-	-	-	-	-	-	-	-	-	-	1.1	0.47	A	2.4	0.38	A	1.1	0.59	A	2.3	0.41	A
SB RT	0.1	0.05	A				0.1	0.04	A	0.1	0.08	A	-	-	-	-	-	-	-	-	-	-	-	-
OVERALL	5.2	-	A	5.7	-	A	4.5	-	A	4.3	-	A	2.3	0.65	A	4.1	0.41	A	3.4	0.59	A	4.0	0.43	A

6. CONCLUSIONS

The Project proposes to construct a total of 752 dwelling units, 568 of which will be single-family units and 184 will be multi-family dwelling units, along with approximately 17,400 square feet of retail space, and three (3) parks totaling 6.3 acres. It was assumed that the single-family lots will not allow accessory (Ohana) dwelling units. The Project will be accessed via two driveways off of Kahekili Highway. The Project South Driveway will be a T-intersection approximately 1,100 feet north of the existing Kahekili Highway/Makaala Drive intersection. The Project's North Driveway is approximately 900 feet south of the Kahekili Highway/Waiehu Beach Road intersection and will line up with the proposed access to the planned Waiehu Affordable Housing project on the east side of Kahekili Highway, ultimately forming a 4-legged intersection.

6.1 Existing Conditions

Due to COVID-19, traffic volumes throughout the state were significantly lower than normal levels. For this reason, turning movement counts that were collected from 2016-2019, before impacts of COVID-19, were utilized for this study. Based on early consultation with State DOT and County Department of Public Works, the use of historic counts were acceptable as a basis for existing conditions. A growth rate of 1.0% per year along Kahekili Highway, Waiehu Beach Road, Main Street and High Street was applied to increase regional traffic counts from 2016-2019 to constitute "Existing 2021" volumes analyzed in this study.

The Waiehu area in the immediate vicinity of the Project is largely comprised of single-family homes, with a few community parks. This area is served by Waiehu Beach Road and Kahekili Highway – the two regional roadways that provide access to schools and commercial areas in Kahului and Wailuku.

During the AM peak hour as residents leave for work and school, southbound Waiehu Beach Road experiences extensive queueing which stems from the Waiehu Beach Road/Eha Street intersection and at its maximum queue, extends over 1 mile near to the Kahekili Highway/Waiehu Beach Road intersection. This is primarily because the right-turn lane at the Waiehu Beach Road/Eha Street intersection serves a relatively high volume and the right-turn lane is relatively short, which results in right-turn vehicles decelerating in the through lane in anticipation of the turn which reduces flow in the southbound through lane. Also due to the short right-turn lane, southbound right-turn vehicles are not able to bypass queued southbound through vehicles. Lengthening of the right-turn pocket is difficult and costly due to the existing bridge over the Wailuku River which currently abuts the end of the right-turn lane. The length of time in queue can vary between 6-15 minutes from the back of the maximum queue to clear the Waiehu Beach Road/Eha Street intersection. As a result of the queue spillback along Waiehu Beach Road, right-turning movements from side streets turning onto southbound Waiehu Beach Road can experience slower progression or blockages, resulting in varying lengths of side street queues. However, these right-turn vehicles were also observed to slowly but consistently filter into the Waiehu Beach Road queue, which helped to process lengthy side street queues. The congestion along Waiehu Beach Road generally lasted for about an hour and dissipated completely by 8:00 AM.

Also during the AM peak period (roughly 7:15-7:45 am), lengthy southbound queues occur along Market Street, primarily stemming from the Market Street/Mill Street intersection. Turning movements suggest that a significantly high volume – about half of the total southbound Market

Street approach volume in the AM peak hour – turns left onto Mill Street. An existing left-turn storage lane is provided, but is relatively short (100' long). This short left-turn lane along Market Street locks up southbound left-turn vehicles in the same queue as through vehicles, lengthening the queues beyond Happy Valley. The duration of time in queue can vary between 4-8 minutes. No persistent queueing was observed along Kahekili Highway or Waiehu Beach Road during the PM peak hour.

At the Kahekili Highway/Waiehu Beach Road intersection, signal warrant analysis indicated a signal would be warranted assuming the full westbound left-turn/right-turn lane volume is included in the warrant due to the shared lane approach. If the approach was widened to include separate westbound left-turn and right-turn movements, a signal would not be warranted. Therefore, in lieu of a signal, consideration should be made to first widen the westbound Waiehu Beach Road approach to provide separate left-turn and right-turn lanes.

Main Street experiences relatively slow-moving stop-and-go traffic conditions due to on-street parking stalls, pedestrian crossing and numerous businesses and driveways throughout the stretch in the study area.

6.2 Base Year 2030

Based on historical counts collected by ATA in 2016, 2018, and 2019 and traffic counts recorded in May 2003 for the Hale Mua TIAR completed by Julian Ng, little to no growth has occurred along Kahekili Highway and Waiehu Beach Road. To remain conservative, an annual growth rate of 1.0% was applied to regional flows along Waiehu Beach Road and Kahekili Highway to accommodate for any infill development. A growth rate of 1.0% was also applied to Main Street. Several developments are anticipated to be completed in the Project area by 2030, including the Boys & Girls Clubhouse, Wailuku Civic Complex, Waiehu Affordable Housing, and Wailuku Hotel.

The Imi Kala Street Extension & Bridge Improvements, were previously identified as a long range capacity improvement that would provide a new paved roadway between Kahekili Highway to the north and the existing Imi Kala Street/Wili Pa Loop/Eha Street intersection to the south and improve the existing Imi Kala Bridge. This TIAR analyzes the WITH and WITHOUT Imi Kala Street Extension & Bridge Improvements for both Base and Future Year conditions.

The next phase of the improvement, Imi Kala Street Extension (Phase II), would provide a new paved road from the existing Imi Kala Street/Mill Street intersection and terminate to the south at Lower Main Street. Based on discussion with County DPW, there is currently no timeframe for completion of this improvement and therefore not included in this TIAR.

Base Year 2030 Without Imi Kala Street Ext. & Bridge Improvements

The ambient traffic growth and trips generated by background developments are anticipated to increase traffic by approximately 110 vehicles along Kahekili Highway and approximately 150-200 vehicles along Waiehu Beach Road during each of the AM and PM peak hours in the vicinity of the Project site. Based on these increases, AM queueing along both Kahekili Highway and Waiehu Beach Road is expected to persist through the Base Year Condition.

At the Kahekili Highway/Waiehu Beach Road intersection, the westbound movement is anticipated to worsen from LOS C(C) to LOS F(D) in the AM peak hour, though the movement will continue to operate under capacity. If separate right and left-turn lanes were installed, the

critical westbound left-turn movement is anticipated to continue operating at LOS F(D), but will remove left-turn vehicles from the heavier right-turn flows and provide more capacity along the westbound approach. In addition a southbound left-turn lane is warranted based on volumes and is recommended.

At the Waiehu Beach Road intersections with Wailupe Drive/Lower Waiehu Beach Road, Makaala Drive and Eha Street and at the Market Street/Mill Street intersection, the critical movements will continue to operate at LOS F at near-to or overcapacity conditions during the congested AM peak period, similar to existing conditions. The Imi Kala Street Extension is planned to alleviate some of the congestion along the Kahekili Highway and Waiehu Beach Road corridors, thereby mitigating some of the capacity issues.

At the Mill Street/Imi Kala Street, with the increased volumes with Base Year conditions, the southbound left-turn is anticipated to lower to LOS F and overcapacity conditions over Existing conditions during the PM peak hour. A signal is warranted with Base Year 2030 volumes. If a signal is installed, it is anticipated that all movements will operate at LOS B or better across both peak hours.

At the Market Street/Vineyard Street all-way stop controlled (AWSC) intersection, various movements will worsen to LOS E/F conditions. A signal is warranted with Base Year 2030 volumes, however based on discussions with Maui County, a signal may be infeasible give narrow roadway widths and limited right-of-way.

Base Year 2030 WITH Imi Kala Street Ext. & Bridge Improvements

The Imi Kala Street Ext. & Bridge Improvement will provide a third connection between Waiehu and Wailuku/Kahului and alleviate some existing congestion along Kahekili Highway and Waiehu Beach Road. It is anticipated that a portion of regional vehicles (to/from Wailuku and Kahului) which currently use the Kahekili Highway/Market Street and Waiehu Beach Road/Kahului Beach Road routes will reroute to the Imi Kala Street Extension. In total, it is anticipated that approximately 369(173) southbound vehicles and 126(282) northbound vehicles will be rerouted to the Imi Kala Street Extension.

In general, conditions along the Waiehu Beach Road corridor and Kahekili Hwy/Market Street corridor between Puuohala Road and Mill Street improved as a result of the Imi Kala Street Extension. However, traffic will likely increase along roadways and intersections along Imi Kala Street and Eha Street in addition to heavier westbound left-turn volume at the Kahekili Highway/Makaala Drive intersection, as more Wailuku/Kahului bound vehicles may opt to use Kahekili Highway-Imi Kala Extension route instead of Waiehu Beach Road.

At the Kahekili Highway/Waiehu Beach Road intersection, a portion of regional southbound left-turn trips from Waihee turning left onto Waiehu Beach Road will instead reroute and continue through on Kahekili Highway to use the Imi Kala Street Extension. It is anticipated that 40%(19%) of the southbound left-turn volume would reroute to the Imi Kala Street Extension during the AM(PM) peak hours of traffic. As a result, the LOS of the westbound approach improved from LOS F during the AM peak hour without the Imi Kala Street Ext. & Bridge Improvement to acceptable LOS D with the Imi Kala Street Ext. & Bridge Improvement. Since all movement LOS improves to LOS D or better, mitigation is not required, but widening of the westbound approach to provide exclusive left-turn and right-turn lanes and widening of southbound approach to provide an exclusive left-turn lane may still be considered.

At the Kahekili Highway/Makaala Drive intersection, a number of vehicles bound for Wailuku/Kahului will be rerouted from Waiehu Beach Road to Makaala Drive to access the Imi Kala Street Extension. In addition to the 140(47) rerouted southbound regional trips along Kahekili Highway, 103(21) vehicles were rerouted to the Makaala Drive westbound left-turn movement. As a result, the westbound left-turn movement is anticipated to operate at LOS F and overcapacity conditions during the AM peak hour. A median refuge lane could be provided to facilitate two-stage turns for left-turners from Makaala Drive turning onto Kahekili Highway, which will improve the westbound left-turn movement to LOS E and below capacity conditions.

Due to capacity balancing as previously explained, it is anticipated that Waiehu Beach Road will experience a decrease in volumes as trips are rerouted to the Imi Kala Street Extension. At the Waiehu Beach Road/Eha Street/Nukuwai Place intersection, the critical southbound approach during the AM peak hour, approximately 162 southbound through vehicles and 81 southbound right-turn vehicles are anticipated to be rerouted to the Imi Kala Street Extension. The reduction in vehicles is anticipated to help reduce the queue lengths and duration of queues along Waiehu Beach Road and improve operations at the Waiehu Beach Road/Eha Street/Nukuwai Place intersection.

At the Mill Street/Imi Kala Street intersection, a signal will continue to be warranted for Base Year conditions with Imi Kala Street Extension.

6.3 Future Year 2030

In total, it is anticipated that the Project will generate a total of 587(743) trips during the AM(PM) peak hours. This trip generation includes internal capture trip and pass-by trip reductions, which represent trips that will be between residential and retail uses within the site and trips that already exist on adjacent streets that will be redirected to visit the site. Both types of trips will not generate new trips at Study Intersections. Trips generated by the Project were assigned throughout the study area based upon regional origins as well as existing travel patterns within the vicinity of the Project.

Future Year 2030 With and Without Imi Kala Street Extension & Bridge Improvement

At the Kahekili Highway/Waiehu Beach Road intersection without improvements, the westbound approach at this intersection will operate at LOS F and overcapacity conditions during both the AM and PM peak hours. In the Base Year conditions, the widening of the southbound approach to provide a left-turn lane and widening of the westbound approach to provide a left-turn and right-turn lane was recommended and will continue to be recommended for Future Year 2030 conditions. In addition, Project traffic may increase traffic to warrant a signal under the 100% factor with or without the Imi Kala Extension. The intersection should be monitored to determine if a signal or roundabout would be warranted based on actual volumes

Project traffic increases at the Kahekii Highway/Makaala Drive intersection will result in the westbound left-turn movement operating at LOS F and overcapacity conditions during the AM peak hour even with a median refuge lane. Similar to base year condition, a signal would only be warranted under the 70% factor with or without Imi Kala Extension. A median refuge lane will improve westbound left-turn operations to improve to LOS E and below capacity without Imi Kala Extension, but will worsen back to LOS F with Imi Kala Extension. With Imi Kala Extension, the intersection should be monitored to determine if a signal would be warranted based on actual volumes.

At the Waiehu Beach Road intersections with Wailupe Drive/Lower Waiehu Beach Road, Makaala Drive and Eha Street, the critical movements will continue to operate at LOS F conditions during the heavy AM peak hour, but with delays similar to the Base Year 2030 condition without Imi Kala Street Extension. Some side street movements may experience lengthier delays and LOS F conditions during the PM peak hour, but increased PM trips rerouted to Imi Kala Extension could reduce these movement delays. At the Market Street/Mill Street intersection, all overcapacity movements will be mitigated with the Imi Kala Extension. Overall, the LOS comparison between Base Year 2030 condition without Imi Kala Street Extension vs. Future Year 2030 condition with Imi Kala Street Extension indicate that the regional Imi Kala Street Extension generally mitigates Project traffic increases/impacts to operate similar to Base Year conditions. The Project will contribute its fair share towards the regional Imi Kala Street Extension Improvement to satisfy its regional impacts in the study area.

At the Mill Street/Imi Kala Street intersection, a signal will continue to be warranted similar to Base Year 2030 conditions.

The Kahekili Highway/North Project Driveway is planned to be a 4-legged intersection located directly across of the central access of the proposed Waiehu Affordable Housing Project. The North Project Driveway is anticipated to serve a portion of the residential uses as well as its retail uses due to its proximity to the driveway. As an unsignalized intersection, the eastbound shared left-turn/through movement will operate at LOS F(E) during the AM(PM) peak hours, though under capacity. All other movements are anticipated to operate at LOS D or better across both peak hours. With projected volumes, it is anticipated that a signal would only be warranted with the 70% warrant. Turn lanes are recommended on all approaches.

The Kahekili Highway/South Project Driveway is planned to be a T-intersection serving residential uses. An exclusive northbound left-turn lane, southbound right-turn lane, and median refuge lane is recommended. A traffic signal is not anticipated to be warranted at this intersection.

7. RECOMMENDATIONS

7.1 Base Year 2030 Without Project

- Kahekili Highway/Waiehu Beach Road (**Without Imi Kala Extension**) – Below mitigation may still be considered With Imi Kala Extension
    - Widen westbound Waiehu Beach Road approach to provide exclusive westbound left-turn and right turn lanes.
    - Widen southbound Kahekili Highway approach to provide exclusive southbound left-turn lane.

- Kahekili Highway/Makaala Drive (**With Imi Kala Extension Only**)
    - Provide median refuge lane along Kahekili Highway to assist westbound left-turn vehicles.

- Mill Street/Imi Kala Street (**With or Without Imi Kala Extension**)
    - Monitor and install a traffic signal if warranted by future traffic growth.
        - TIAR forecasts signal may be warranted with 100% factor.

7.2 Future Year 2030 With Project

The Project will contribute its fair share towards the regional Imi Kala Street Extension Improvement. The Imi Kala Extension will alleviate some congestion along both Kahekili Highway and Waiehu Beach Road, with numerous intersections forecast to improve or operate with similar levels of service to Base Year 2030 conditions WITHOUT the Project. The following are additional mitigations that should be considered with the Project.

- Kahekili Highway/Waiehu Beach Road (**With or Without Imi Kala Extension**)
    - Monitor and install a traffic signal or roundabout if warranted by future Project traffic growth.
        - TIAR forecasts signal may be warranted with 100% factor.

- Kahekili Highway/Makaala Drive (**With Imi Kala Extension Only**)
    - Monitor and install a traffic signal if warranted or needed to accommodate future traffic growth.
        - TIAR forecasts signal would be warranted with 70% factor.

- Kahekili Highway/North Project Driveway (**With or Without Imi Kala Extension)**
    - Provide an unsignalized four-legged intersection with turn lanes along all approaches.
    - Monitor and install a traffic signal or roundabout if warranted to accommodate future traffic growth.
        - TIAR forecasts signal would be warranted with 70% factor.

- Kahekili Highway/South Project Driveway (**With or Without Imi Kala Extension**)
    - Provide an unsignalized T-intersection with stop control on the South Project Driveway approach.
    - Provide an exclusive southbound right-turn lane and northbound left-turn lane for entering Project traffic.
    - Provide a median refuge lane along Kahekili Highway to assist exiting eastbound left-turn vehicles.

8. REFERENCES

1. County of Maui, Maui Bus Public Transit System, mauicounty.gov.

2. Federal Highway Administration, Manual on Uniform Traffic Control Devices, 2009.

3. Institute of Transportation Engineers, Trip Generation, 10th Edition, 2017.

4. Maui Metropolitan Organization, Hele Mai Maui Long Range Transportation Plan 2040, 2019.

5. State of Hawaii Department of Transportation, Bike Plan Hawaii Master Plan, 2003.

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

APPENDICES

APPENDIX A

TRAFFIC COUNT DATA

Austin Tsutsumi & Associates

501 Sumner Street, Suite 521
Honolulu, HI 96817-5031
Phone: (808) 533-3646 Fax: (808) 526-1267

File Name : Kahekili Hwy - Waiehu Beach Rd
Site Code : 18-503 Waiehu Golf Course
Start Date : 5/1/2018
Page No : 1

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

	KAHEKILI HWY Southbound				WAIEHU BEACH RD Westbound				KAHEKILI HWY Northbound				Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:00 AM	44	39	0	0	1	0	15	0	0	11	5	0	0	0	0	0	115
06:15 AM	66	34	0	0	7	0	15	0	0	12	8	0	0	0	0	0	142
06:30 AM	107	51	0	0	4	0	34	0	0	25	3	0	0	0	0	0	224
06:45 AM	109	60	0	0	5	0	69	0	0	37	2	0	0	0	0	0	282
Total	326	184	0	0	17	0	133	0	0	85	18	0	0	0	0	0	763
07:00 AM	130	97	0	0	10	0	74	0	0	43	5	0	0	0	0	0	359
07:15 AM	53	100	0	0	9	0	74	0	0	57	5	0	0	0	0	0	298
07:30 AM	61	91	0	0	10	0	69	0	0	32	4	0	0	0	0	0	267
07:45 AM	63	41	0	0	6	0	45	0	0	26	4	0	0	0	0	0	185
Total	307	329	0	0	35	0	262	0	0	158	18	0	0	0	0	0	1109
08:00 AM	50	29	0	0	4	0	50	0	0	27	7	0	0	0	0	0	167
08:15 AM	43	32	0	0	19	0	29	0	0	21	8	0	0	0	0	0	152
08:30 AM	58	21	0	0	8	0	25	0	0	32	11	2	0	0	0	0	157
08:45 AM	50	20	0	0	7	0	37	0	0	13	6	0	0	0	0	0	133
Total	201	102	0	0	38	0	141	0	0	93	32	2	0	0	0	0	609
Grand Total	834	615	0	0	90	0	536	0	0	336	68	2	0	0	0	0	2481
Apprch %	57.6	42.4	0	0	14.4	0	85.6	0	0	82.8	16.7	0.5	0	0	0	0	
Total %	33.6	24.8	0	0	3.6	0	21.6	0	0	13.5	2.7	0.1	0	0	0	0	
Motorcycles	3	5	0	0	2	0	3	0	0	1	0	0	0	0	0	0	14
% Motorcycles	0.4	0.8	0	0	2.2	0	0.6	0	0	0.3	0	0	0	0	0	0	0.6
Cars & Light Goods	813	600	0	0	86	0	517	0	0	325	67	0	0	0	0	0	2408
% Cars & Light Goods	97.5	97.6	0	0	95.6	0	96.5	0	0	96.7	98.5	0	0	0	0	0	97.1
Buses	14	6	0	0	0	0	13	0	0	7	1	0	0	0	0	0	41
% Buses	1.7	1	0	0	0	0	2.4	0	0	2.1	1.5	0	0	0	0	0	1.7
Single-Unit Trucks	3	2	0	0	2	0	1	0	0	2	0	0	0	0	0	0	10
% Single-Unit Trucks	0.4	0.3	0	0	2.2	0	0.2	0	0	0.6	0	0	0	0	0	0	0.4
Articulated Trucks	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
% Articulated Trucks	0.1	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Road	0	2	0	0	0	0	1	0	0	1	0	0	0	0	0	0	4
% Bicycles on Road	0	0.3	0	0	0	0	0.2	0	0	0.3	0	0	0	0	0	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0

Austin Tsutsumi & Associates

501 Sumner Street, Suite 521
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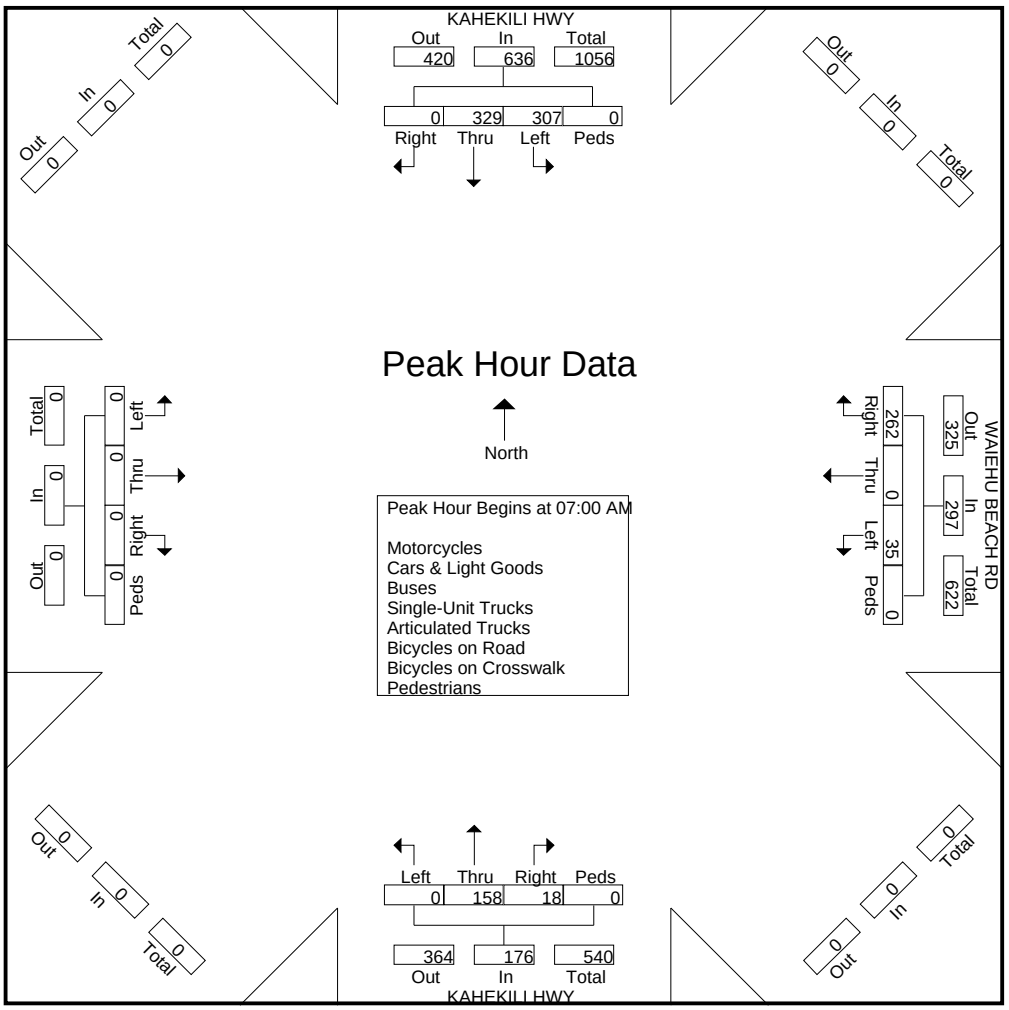
Phone: (808) 533-3646 Fax: (808) 526-1267

File Name : Kahekili Hwy - Waiehu Beach Rd
Site Code : 18-503 Waiehu Golf Course
Start Date : 5/1/2018
Page No : 2

	KAHEKILI HWY Southbound					WAIEHU BEACH RD Westbound					KAHEKILI HWY Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	**130**	97	0	0	**227**	**10**	0	**74**	0	**84**	0	43	**5**	0	48	0	0	0	0	0	**359**
07:15 AM	53	**100**	0	0	153	9	0	74	0	83	0	**57**	5	0	**62**	0	0	0	0	0	298
07:30 AM	61	91	0	0	152	10	0	69	0	79	0	32	4	0	36	0	0	0	0	0	267
07:45 AM	63	41	0	0	104	6	0	45	0	51	0	26	4	0	30	0	0	0	0	0	185
Total Volume	307	329	0	0	636	35	0	262	0	297	0	158	18	0	176	0	0	0	0	0	1109
% App. Total	48.3	51.7	0	0		11.8	0	88.2	0		0	89.8	10.2	0		0	0	0	0		
PHF	.590	.823	.000	.000	.700	.875	.000	.885	.000	.884	.000	.693	.900	.000	.710	.000	.000	.000	.000	.000	.772



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Phone: (808) 533-3646 Fax: (808) 526-1267

File Name : Kahekili Hwy - Waiehu Beach Rd
Site Code : 18-503 Waiehu Golf Course
Start Date : 5/1/2018
Page No : 1

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

	KAHEKILI HWY Southbound				WAIEHU BEACH RD Westbound				KAHEKILI HWY Northbound				Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:00 PM	60	44	0	0	11	0	67	0	0	47	11	0	0	0	0	0	240
03:15 PM	56	27	0	0	7	0	64	0	0	30	9	0	0	0	0	0	193
03:30 PM	62	27	0	0	7	0	88	0	0	27	21	0	0	0	0	0	232
03:45 PM	63	35	0	0	5	0	64	0	0	37	17	0	0	0	0	0	221
Total	241	133	0	0	30	0	283	0	0	141	58	0	0	0	0	0	886
04:00 PM	55	26	0	0	9	0	67	0	0	50	13	0	0	0	0	0	220
04:15 PM	62	37	0	0	8	0	77	0	0	57	26	0	0	0	0	0	267
04:30 PM	49	31	0	0	10	0	84	0	0	44	10	0	0	0	0	0	228
04:45 PM	59	11	0	0	3	0	78	0	0	47	17	0	0	0	0	0	215
Total	225	105	0	0	30	0	306	0	0	198	66	0	0	0	0	0	930
05:00 PM	65	32	0	0	8	0	88	0	0	39	25	0	0	0	0	0	257
05:15 PM	61	26	0	0	4	0	72	0	0	30	19	0	0	0	0	0	212
05:30 PM	52	27	0	0	4	0	64	0	0	31	17	0	0	0	0	0	195
05:45 PM	36	31	0	0	13	0	62	0	0	42	11	0	0	0	0	0	195
Total	214	116	0	0	29	0	286	0	0	142	72	0	0	0	0	0	859
Grand Total	680	354	0	0	89	0	875	0	0	481	196	0	0	0	0	0	2675
Apprch %	65.8	34.2	0	0	9.2	0	90.8	0	0	71	29	0	0	0	0	0	
Total %	25.4	13.2	0	0	3.3	0	32.7	0	0	18	7.3	0	0	0	0	0	
Motorcycles	1	3	0	0	1	0	4	0	0	5	0	0	0	0	0	0	14
% Motorcycles	0.1	0.8	0	0	1.1	0	0.5	0	0	1	0	0	0	0	0	0	0.5
Cars & Light Goods	667	343	0	0	88	0	863	0	0	467	192	0	0	0	0	0	2620
% Cars & Light Goods	98.1	96.9	0	0	98.9	0	98.6	0	0	97.1	98	0	0	0	0	0	97.9
Buses	5	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	9
% Buses	0.7	0	0	0	0	0	0.2	0	0	0.4	0	0	0	0	0	0	0.3
Single-Unit Trucks	7	0	0	0	0	0	3	0	0	4	2	0	0	0	0	0	16
% Single-Unit Trucks	1	0	0	0	0	0	0.3	0	0	0.8	1	0	0	0	0	0	0.6
Articulated Trucks	0	1	0	0	0	0	2	0	0	0	1	0	0	0	0	0	4
% Articulated Trucks	0	0.3	0	0	0	0	0.2	0	0	0	0.5	0	0	0	0	0	0.1
Bicycles on Road	0	7	0	0	0	0	1	0	0	3	1	0	0	0	0	0	12
% Bicycles on Road	0	2	0	0	0	0	0.1	0	0	0.6	0.5	0	0	0	0	0	0.4
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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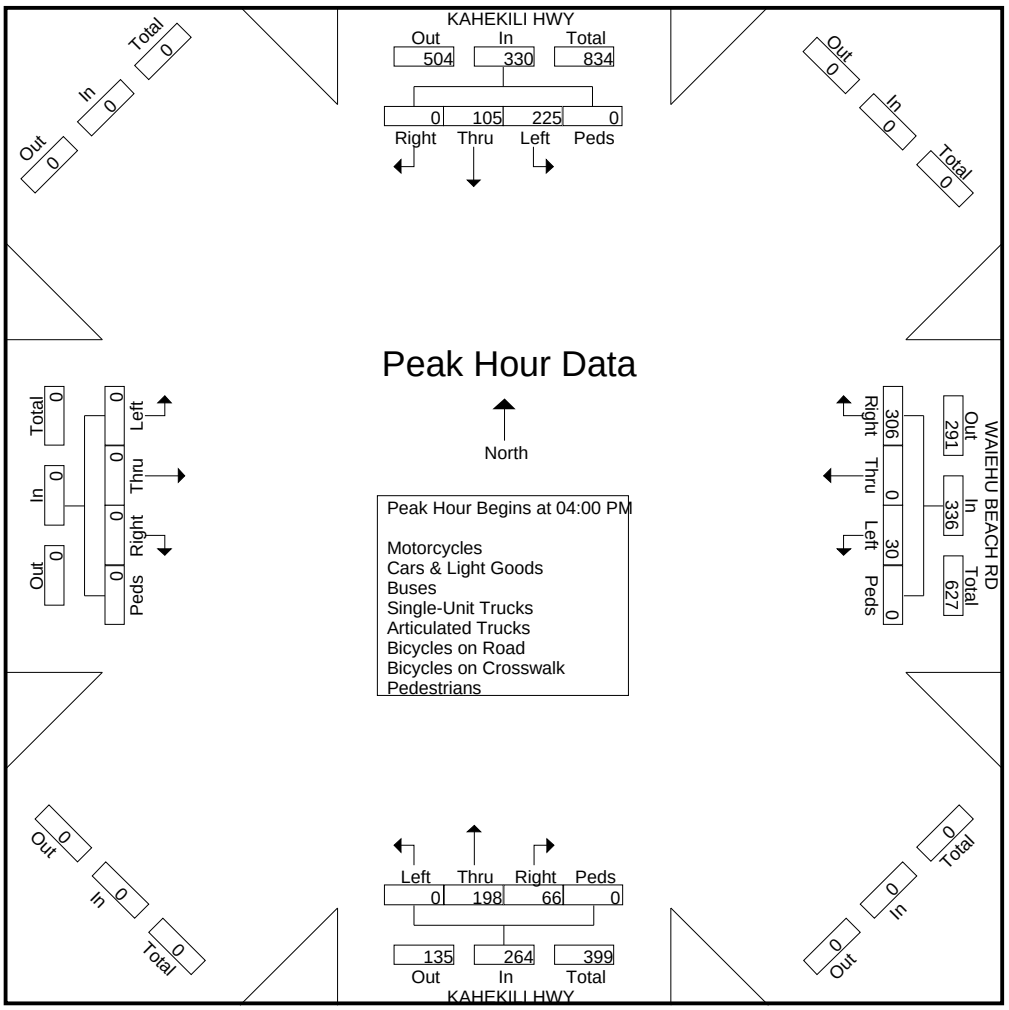
Phone: (808) 533-3646 Fax: (808) 526-1267

File Name : Kahekili Hwy - Waiehu Beach Rd
Site Code : 18-503 Waiehu Golf Course
Start Date : 5/1/2018
Page No : 2

	KAHEKILI HWY Southbound					WAIEHU BEACH RD Westbound					KAHEKILI HWY Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	55	26	0	0	81	9	0	67	0	76	0	50	13	0	63	0	0	0	0	0	220
04:15 PM	**62**	**37**	0	0	**99**	8	0	77	0	85	0	**57**	**26**	0	**83**	0	0	0	0	0	**267**
04:30 PM	49	31	0	0	80	**10**	0	**84**	0	**94**	0	44	10	0	54	0	0	0	0	0	228
04:45 PM	59	11	0	0	70	3	0	78	0	81	0	47	17	0	64	0	0	0	0	0	215
Total Volume	225	105	0	0	330	30	0	306	0	336	0	198	66	0	264	0	0	0	0	0	930
% App. Total	68.2	31.8	0	0		8.9	0	91.1	0		0	75	25	0		0	0	0	0		
PHF	.907	.709	.000	.000	.833	.750	.000	.911	.000	.894	.000	.868	.635	.000	.795	.000	.000	.000	.000	.000	.871



Austin Tsutsumi & Associates

1871 Wili Pa Loop, Suite A
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Phone: (808) 224-8044 Fax: (808) 242-9163

File Name : Kehekili Hwy - Makaala Dr
Site Code : 19-509 Boys & Girls Club
Start Date : 4/11/2019
Page No : 1

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

	KAHEKILI HWY SOUTHBOUND				MAKAALA DR WESTBOUND				KAHEKILI HWY NORTHBOUND				EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30	2	64	0	0	53	0	11	0	0	18	6	0	0	0	0	0	154
06:45	7	100	0	0	45	0	15	0	0	45	18	0	0	0	0	0	230
Total	9	164	0	0	98	0	26	0	0	63	24	0	0	0	0	0	384
07:00	20	107	0	0	37	0	23	0	0	45	6	0	0	0	0	0	238
07:15	36	67	0	0	25	0	11	0	0	38	20	0	0	0	0	0	197
07:30	20	52	0	0	29	0	0	0	0	15	15	0	0	0	0	0	131
07:45	2	44	0	0	29	0	1	0	0	32	24	0	0	0	0	0	132
Total	78	270	0	0	120	0	35	0	0	130	65	0	0	0	0	0	698
08:00	3	25	0	0	25	0	2	0	0	37	23	0	0	0	0	0	115
08:15	1	38	0	0	21	0	2	0	0	24	17	0	0	0	0	0	103
Grand Total	91	497	0	0	264	0	65	0	0	254	129	0	0	0	0	0	1300
Apprch %	15.5	84.5	0	0	80.2	0	19.8	0	0	66.3	33.7	0	0	0	0	0	
Total %	7	38.2	0	0	20.3	0	5	0	0	19.5	9.9	0	0	0	0	0	
Motorcycles	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
% Motorcycles	1.1	0	0	0	0.4	0	0	0	0	0	0	0	0	0	0	0	0.2
Cars & Light Goods	86	488	0	0	255	0	64	0	0	249	124	0	0	0	0	0	1266
% Cars & Light Goods	94.5	98.2	0	0	96.6	0	98.5	0	0	98	96.1	0	0	0	0	0	97.4
Buses	3	7	0	0	5	0	1	0	0	2	5	0	0	0	0	0	23
% Buses	3.3	1.4	0	0	1.9	0	1.5	0	0	0.8	3.9	0	0	0	0	0	1.8
Single-Unit Trucks	1	1	0	0	3	0	0	0	0	2	0	0	0	0	0	0	7
% Single-Unit Trucks	1.1	0.2	0	0	1.1	0	0	0	0	0.8	0	0	0	0	0	0	0.5
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
% Bicycles on Road	0	0.2	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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1871 Wili Pa Loop, Suite A
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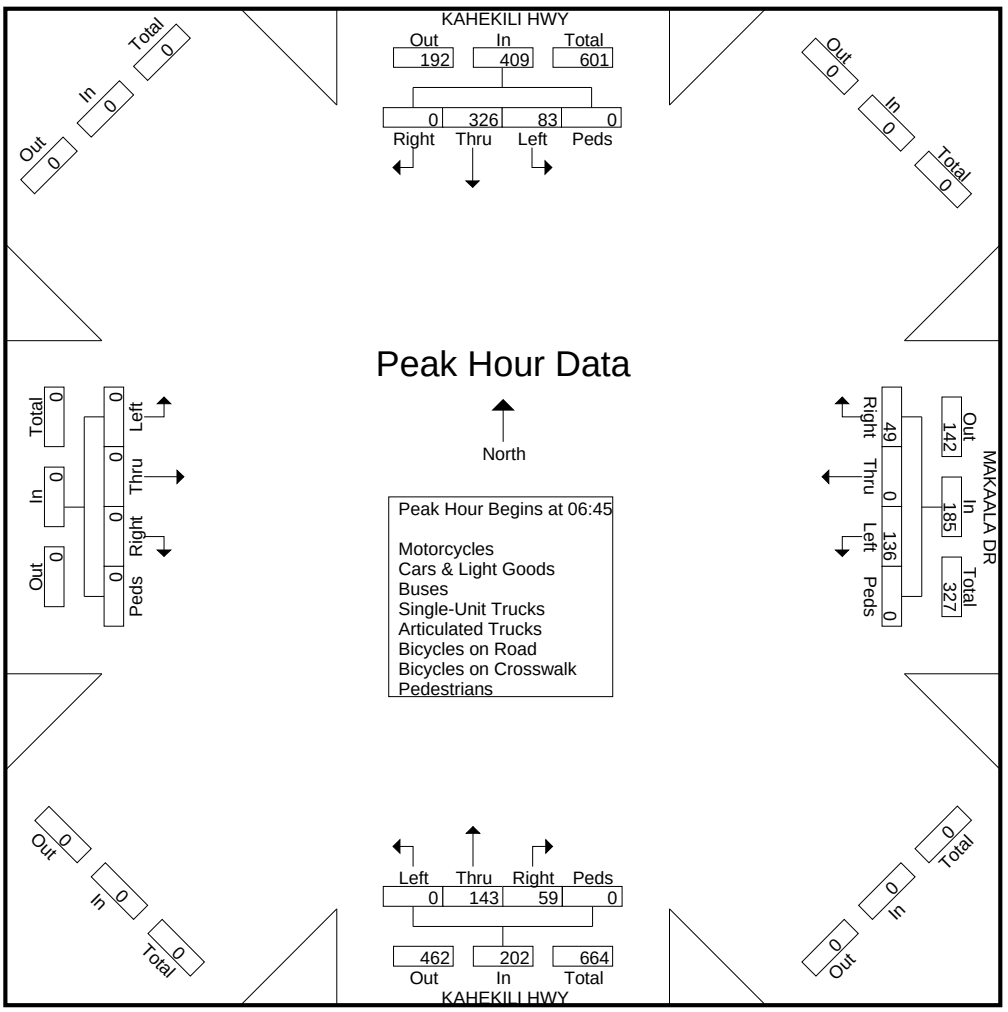
File Name : Kehekili Hwy - Makaala Dr
Site Code : 19-509 Boys & Girls Club
Start Date : 4/11/2019
Page No : 2

	KAHEKILI HWY SOUTHBOUND					MAKAALA DR WESTBOUND					KAHEKILI HWY NORTHBOUND					EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 to 07:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45																					
06:45	7	100	0	0	107	**45**	0	15	0	**60**	0	**45**	18	0	**63**	0	0	0	0	0	230
07:00	20	**107**	0	0	**127**	37	0	**23**	0	60	0	45	6	0	51	0	0	0	0	0	**238**
07:15	**36**	67	0	0	103	25	0	11	0	36	0	38	**20**	0	58	0	0	0	0	0	197
07:30	20	52	0	0	72	29	0	0	0	29	0	15	15	0	30	0	0	0	0	0	131
Total Volume	83	326	0	0	409	136	0	49	0	185	0	143	59	0	202	0	0	0	0	0	796
% App. Total	20.3	79.7	0	0		73.5	0	26.5	0		0	70.8	29.2	0		0	0	0	0		
PHF	.576	.762	.000	.000	.805	.756	.000	.533	.000	.771	.000	.794	.738	.000	.802	.000	.000	.000	.000	.000	.836



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File Name : Kehekili Hwy - Makaala Dr
Site Code : 19-509 Boys & Girls Club
Start Date : 4/11/2019

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

	KAHEKILI HWY SOUTHBOUND				MAKAALA DR WESTBOUND				KAHEKILI HWY NORTHBOUND				EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:00	8	57	0	0	14	0	2	0	0	38	24	0	0	0	0	0	143
15:15	5	38	0	0	29	0	2	0	0	46	30	0	0	0	0	0	150
15:30	3	36	0	0	25	0	2	0	0	43	35	0	0	0	0	0	144
15:45	4	27	0	0	21	0	4	0	0	54	33	0	0	0	0	0	143
Total	20	158	0	0	89	0	10	0	0	181	122	0	0	0	0	0	580
16:00	2	43	0	0	26	0	1	0	0	47	48	0	0	0	0	0	167
16:15	4	36	0	0	12	0	1	0	0	52	47	0	0	0	0	0	152
16:30	1	33	0	0	26	0	3	0	0	65	42	0	0	0	0	0	170
16:45	4	40	0	0	24	0	0	0	0	50	55	0	0	0	0	0	173
Total	11	152	0	0	88	0	5	0	0	214	192	0	0	0	0	0	662
17:00	0	32	0	0	16	0	2	0	0	69	36	0	0	0	0	0	155
17:15	0	30	0	0	21	0	3	0	0	50	30	0	0	0	0	0	134
Grand Total	31	372	0	0	214	0	20	0	0	514	380	0	0	0	0	0	1531
Apprch %	7.7	92.3	0	0	91.5	0	8.5	0	0	57.5	42.5	0	0	0	0	0	
Total %	2	24.3	0	0	14	0	1.3	0	0	33.6	24.8	0	0	0	0	0	
Motorcycles	0	3	0	0	2	0	0	0	0	2	3	0	0	0	0	0	10
% Motorcycles	0	0.8	0	0	0.9	0	0	0	0	0.4	0.8	0	0	0	0	0	0.7
Cars & Light Goods	31	367	0	0	205	0	20	0	0	509	371	0	0	0	0	0	1503
% Cars & Light Goods	100	98.7	0	0	95.8	0	100	0	0	99	97.6	0	0	0	0	0	98.2
Buses	0	1	0	0	6	0	0	0	0	1	4	0	0	0	0	0	12
% Buses	0	0.3	0	0	2.8	0	0	0	0	0.2	1.1	0	0	0	0	0	0.8
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0.1
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	1	0	0	1	0	0	0	0	1	2	0	0	0	0	0	5
% Bicycles on Road	0	0.3	0	0	0.5	0	0	0	0	0.2	0.5	0	0	0	0	0	0.3
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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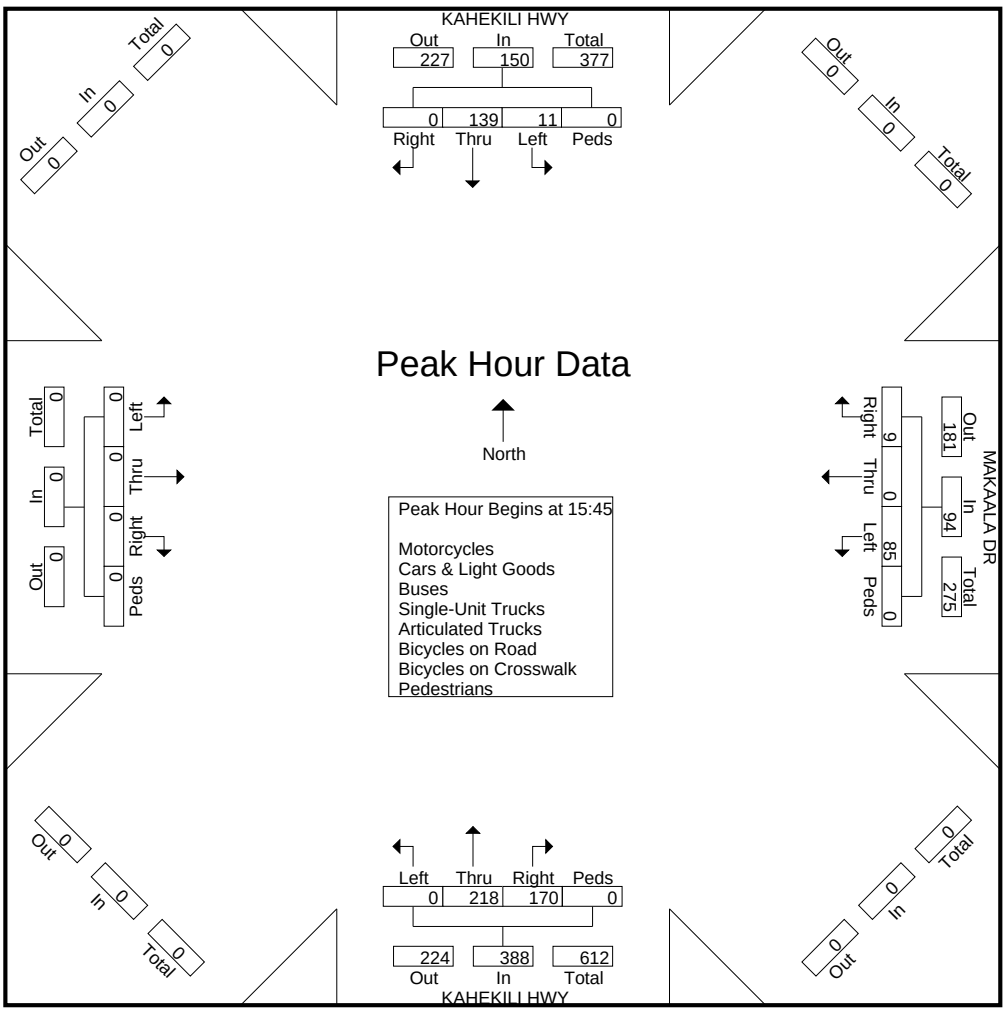
File Name : Kehekili Hwy - Makaala Dr
Site Code : 19-509 Boys & Girls Club
Start Date : 4/11/2019
Page No : 2

	KAHEKILI HWY SOUTHBOUND					MAKAALA DR WESTBOUND					KAHEKILI HWY NORTHBOUND					EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 15:45 to 16:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 15:45																					
15:45	**4**	27	0	0	31	21	0	**4**	0	25	0	54	33	0	87	0	0	0	0	0	143
16:00	2	**43**	0	0	**45**	**26**	0	1	0	27	0	47	**48**	0	95	0	0	0	0	0	167
16:15	4	36	0	0	40	12	0	1	0	13	0	52	47	0	99	0	0	0	0	0	152
16:30	1	33	0	0	34	26	0	3	0	**29**	0	**65**	42	0	**107**	0	0	0	0	0	**170**
Total Volume	11	139	0	0	150	85	0	9	0	94	0	218	170	0	388	0	0	0	0	0	632
% App. Total	7.3	92.7	0	0		90.4	0	9.6	0		0	56.2	43.8	0		0	0	0	0		
PHF	.688	.808	.000	.000	.833	.817	.000	.563	.000	.810	.000	.838	.885	.000	.907	.000	.000	.000	.000	.000	.929



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File Name : Kahekili Hwy - Kamaile St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/18/2021
Page No : 1

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

	KAHEKILI HWY SOUTHBOUND				WESTBOUND				KAHEKILI HWY NORTHBOUND				KAMAILE ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	0	57	0	0	0	0	0	0	3	15	0	0	3	0	3	0	81
06:45 AM	0	86	1	0	0	0	0	0	2	22	0	0	2	0	5	0	118
Total	0	143	1	0	0	0	0	0	5	37	0	0	5	0	8	0	199
07:00 AM	0	77	1	0	0	0	0	0	2	26	0	0	5	0	5	0	116
07:15 AM	0	82	4	0	0	0	0	0	3	37	0	0	1	0	8	0	135
07:30 AM	0	90	0	0	0	0	0	0	1	38	0	0	2	0	6	0	137
07:45 AM	0	81	1	0	0	0	0	0	6	44	0	0	1	0	3	0	136
Total	0	330	6	0	0	0	0	0	12	145	0	0	9	0	22	0	524
08:00 AM	0	54	3	0	0	0	0	0	4	37	0	0	3	0	8	0	109
08:15 AM	0	50	1	0	0	0	0	0	1	42	0	0	2	0	4	0	100
Grand Total	0	577	11	0	0	0	0	0	22	261	0	0	19	0	42	0	932
Apprch %	0	98.1	1.9	0	0	0	0	0	7.8	92.2	0	0	31.1	0	68.9	0	
Total %	0	61.9	1.2	0	0	0	0	0	2.4	28	0	0	2	0	4.5	0	
Motorcycles	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Motorcycles	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Cars & Light Goods	0	565	9	0	0	0	0	0	22	253	0	0	18	0	40	0	907
% Cars & Light Goods	0	97.9	81.8	0	0	0	0	0	100	96.9	0	0	94.7	0	95.2	0	97.3
Buses	0	6	0	0	0	0	0	0	0	5	0	0	0	0	0	0	11
% Buses	0	1	0	0	0	0	0	0	0	1.9	0	0	0	0	0	0	1.2
Single-Unit Trucks	0	5	1	0	0	0	0	0	0	2	0	0	1	0	2	0	11
% Single-Unit Trucks	0	0.9	9.1	0	0	0	0	0	0	0.8	0	0	5.3	0	4.8	0	1.2
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2
% Bicycles on Road	0	0	9.1	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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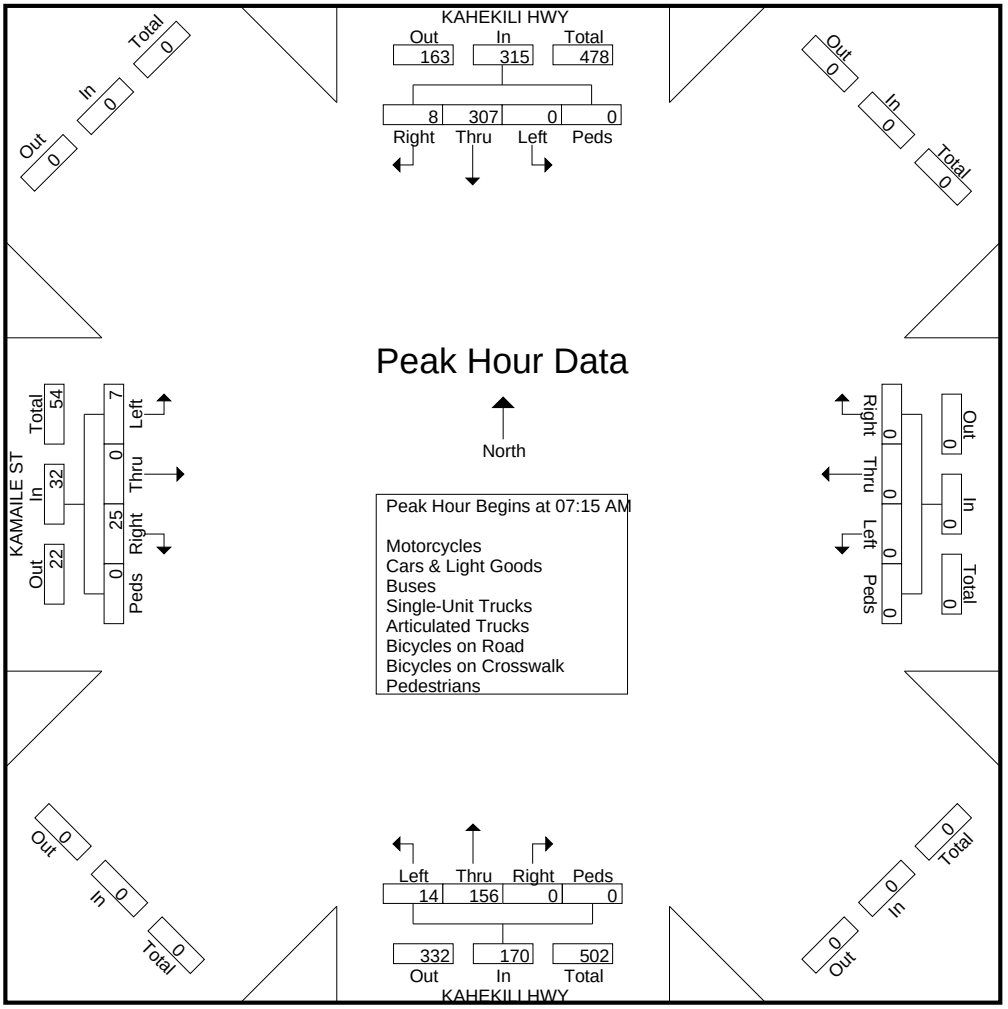
File Name : Kahekili Hwy - Kamaile St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/18/2021
Page No : 2

	KAHEKILI HWY SOUTHBOUND					WESTBOUND					KAHEKILI HWY NORTHBOUND					KAMAILE ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	82	**4**	0	86	0	0	0	0	0	3	37	0	0	40	1	0	**8**	0	9	135
07:30 AM	0	**90**	0	0	**90**	0	0	0	0	0	1	38	0	0	39	2	0	6	0	8	**137**
07:45 AM	0	81	1	0	82	0	0	0	0	0	**6**	**44**	0	0	**50**	1	0	3	0	4	136
08:00 AM	0	54	3	0	57	0	0	0	0	0	4	37	0	0	41	**3**	0	8	0	**11**	109
Total Volume	0	307	8	0	315	0	0	0	0	0	14	156	0	0	170	7	0	25	0	32	517
% App. Total	0	97.5	2.5	0		0	0	0	0		8.2	91.8	0	0		21.9	0	78.1	0		
PHF	.000	.853	.500	.000	.875	.000	.000	.000	.000	.000	.583	.886	.000	.000	.850	.583	.000	.781	.000	.727	.943



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File Name : Kahekili Hwy - Kamaile St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/17/2021
Page No : 1

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

	KAHEKILI HWY SOUTHBOUND				WESTBOUND				KAHEKILI HWY NORTHBOUND				KAMAILE ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	0	49	3	0	0	0	0	0	6	75	0	0	2	0	3	0	138
03:45 PM	0	45	4	0	0	0	0	0	6	80	0	0	4	0	4	0	143
Total	0	94	7	0	0	0	0	0	12	155	0	0	6	0	7	0	281
04:00 PM	0	49	1	0	0	0	0	0	4	76	0	0	2	0	5	0	137
04:15 PM	0	45	2	0	0	0	0	0	8	91	0	0	2	0	5	0	153
04:30 PM	0	50	2	0	0	0	0	0	9	98	0	0	2	0	2	0	163
04:45 PM	0	34	4	0	0	0	0	0	4	85	0	0	2	0	9	0	138
Total	0	178	9	0	0	0	0	0	25	350	0	0	8	0	21	0	591
05:00 PM	0	38	1	0	0	0	0	0	4	79	0	0	1	0	3	0	126
05:15 PM	0	34	4	0	0	0	0	0	5	72	0	0	3	0	6	0	124
Grand Total	0	344	21	0	0	0	0	0	46	656	0	0	18	0	37	0	1122
Apprch %	0	94.2	5.8	0	0	0	0	0	6.6	93.4	0	0	32.7	0	67.3	0	
Total %	0	30.7	1.9	0	0	0	0	0	4.1	58.5	0	0	1.6	0	3.3	0	
Motorcycles	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Motorcycles	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0.1
Cars & Light Goods	0	341	19	0	0	0	0	0	46	651	0	0	18	0	36	0	1111
% Cars & Light Goods	0	99.1	90.5	0	0	0	0	0	100	99.2	0	0	100	0	97.3	0	99
Buses	0	3	1	0	0	0	0	0	0	3	0	0	0	0	1	0	8
% Buses	0	0.9	4.8	0	0	0	0	0	0	0.5	0	0	0	0	2.7	0	0.7
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0.1
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Bicycles on Road	0	0	4.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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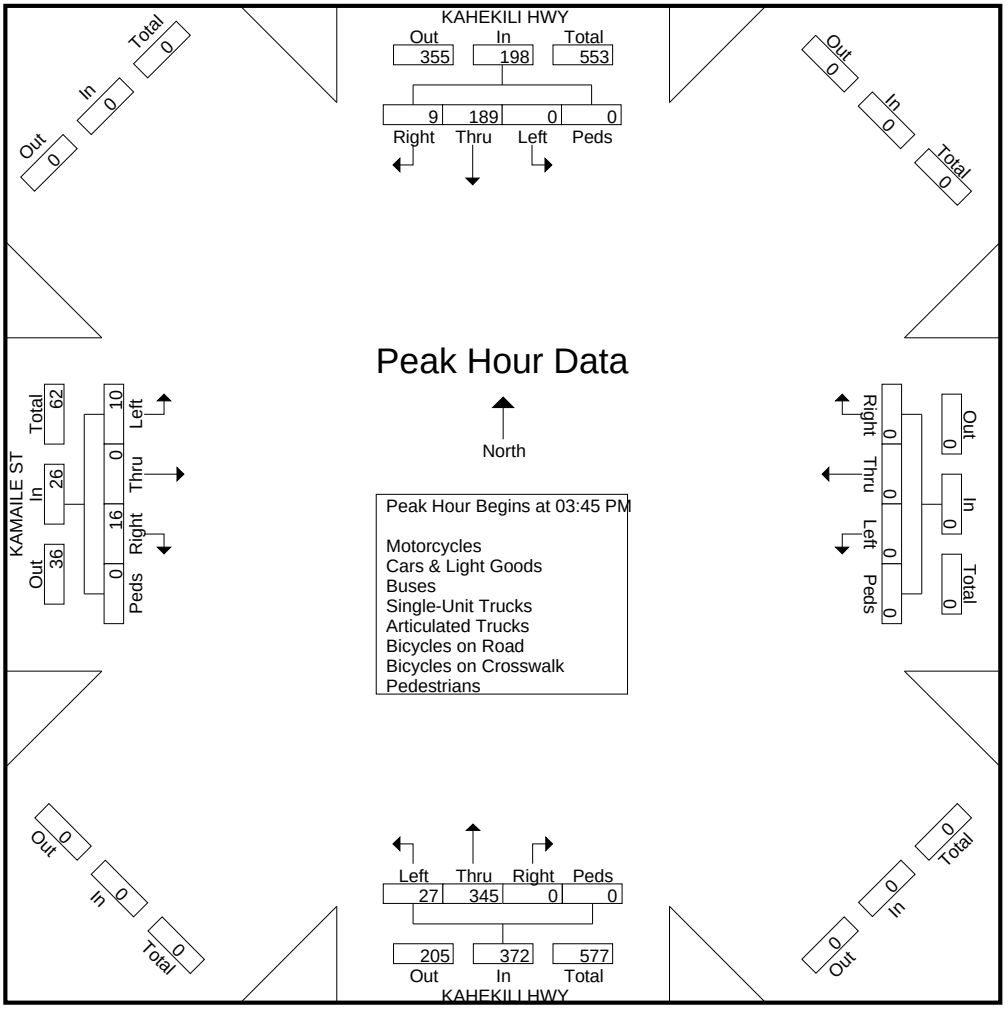
File Name : Kahekili Hwy - Kamaile St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/17/2021
Page No : 2

	KAHEKILI HWY SOUTHBOUND					WESTBOUND					KAHEKILI HWY NORTHBOUND					KAMAILE ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	45	**4**	0	49	0	0	0	0	0	6	80	0	0	86	**4**	0	4	0	**8**	143
04:00 PM	0	49	1	0	50	0	0	0	0	0	4	76	0	0	80	2	0	**5**	0	7	137
04:15 PM	0	45	2	0	47	0	0	0	0	0	8	91	0	0	99	2	0	5	0	7	153
04:30 PM	0	**50**	2	0	**52**	0	0	0	0	0	**9**	**98**	0	0	**107**	2	0	2	0	4	**163**
Total Volume	0	189	9	0	198	0	0	0	0	0	27	345	0	0	372	10	0	16	0	26	596
% App. Total	0	95.5	4.5	0		0	0	0	0		7.3	92.7	0	0		38.5	0	61.5	0		
PHF	.000	.945	.563	.000	.952	.000	.000	.000	.000	.000	.750	.880	.000	.000	.869	.625	.000	.800	.000	.813	.914



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File Name : Kahekili Hwy - Puuohala Rd
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/18/2021
Page No : 1

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

	KAHEKILI HWY SOUTHBOUND				WESTBOUND				KAHEKILI HWY NORTHBOUND				PUUOHALA RD EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	0	63	0	0	0	0	0	0	4	17	0	0	2	0	8	4	98
06:45 AM	0	89	0	0	0	0	0	0	3	23	0	0	1	0	10	0	126
Total	0	152	0	0	0	0	0	0	7	40	0	0	3	0	18	4	224
07:00 AM	0	83	3	0	0	0	0	0	5	27	0	0	1	0	19	0	138
07:15 AM	0	88	2	0	0	0	0	0	4	41	0	0	1	0	18	0	154
07:30 AM	0	96	2	0	0	0	0	0	11	36	0	0	1	0	28	4	178
07:45 AM	0	83	0	0	0	0	0	0	11	50	0	0	1	0	20	0	165
Total	0	350	7	0	0	0	0	0	31	154	0	0	4	0	85	4	635
08:00 AM	0	62	0	0	0	0	0	0	9	43	0	0	0	0	20	0	134
08:15 AM	0	54	0	0	0	0	0	0	6	41	0	0	1	0	13	0	115
Grand Total	0	618	7	0	0	0	0	0	53	278	0	0	8	0	136	8	1108
Apprch %	0	98.9	1.1	0	0	0	0	0	16	84	0	0	5.3	0	89.5	5.3	
Total %	0	55.8	0.6	0	0	0	0	0	4.8	25.1	0	0	0.7	0	12.3	0.7	
Motorcycles	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Motorcycles	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Cars & Light Goods	0	607	6	0	0	0	0	0	52	269	0	0	8	0	133	0	1075
% Cars & Light Goods	0	98.2	85.7	0	0	0	0	0	98.1	96.8	0	0	100	0	97.8	0	97
Buses	0	5	1	0	0	0	0	0	0	5	0	0	0	0	1	0	12
% Buses	0	0.8	14.3	0	0	0	0	0	0	1.8	0	0	0	0	0.7	0	1.1
Single-Unit Trucks	0	4	0	0	0	0	0	0	1	3	0	0	0	0	2	0	10
% Single-Unit Trucks	0	0.6	0	0	0	0	0	0	1.9	1.1	0	0	0	0	1.5	0	0.9
Articulated Trucks	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Articulated Trucks	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Road	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0.7

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1871 Wili Pa Loop STE.A
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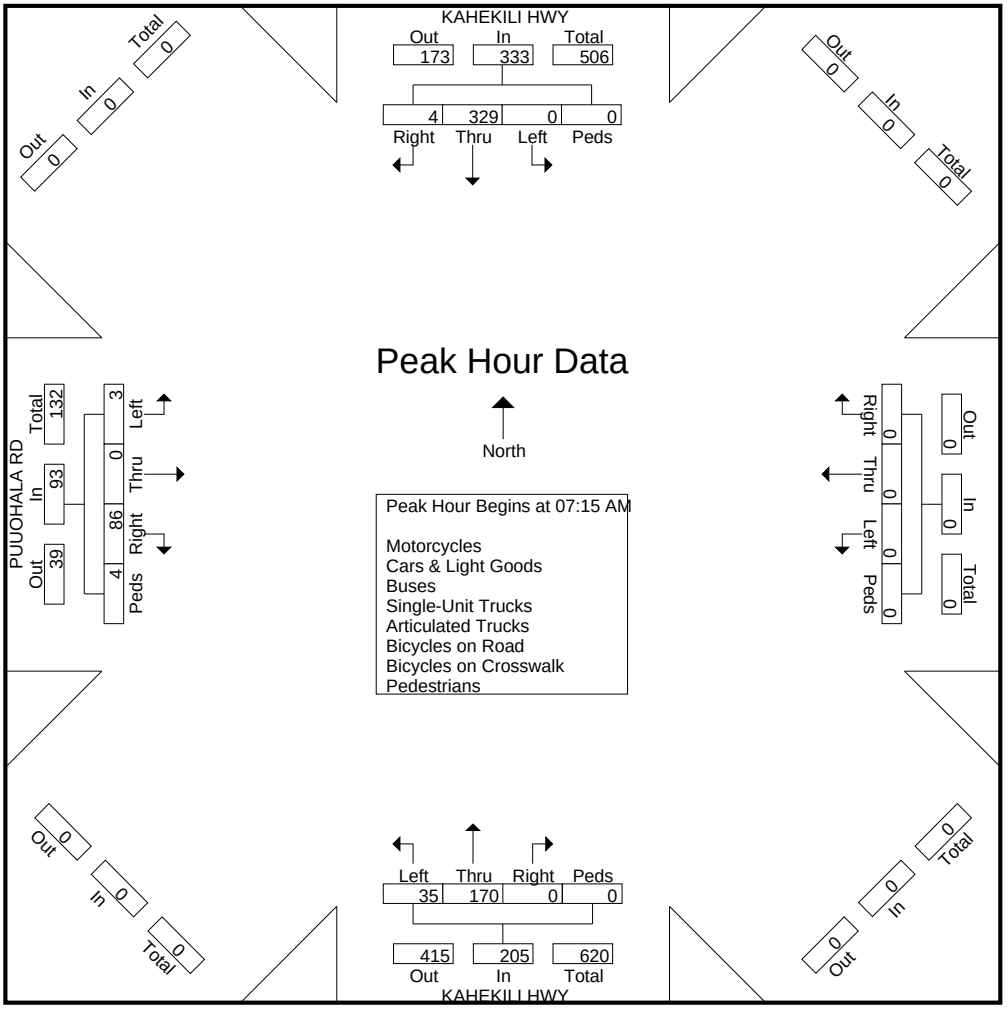
File Name : Kahekili Hwy - Puuohala Rd
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/18/2021
Page No : 2

	KAHEKILI HWY SOUTHBOUND					WESTBOUND					KAHEKILI HWY NORTHBOUND					PUUOHALA RD EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	88	**2**	0	90	0	0	0	0	0	4	41	0	0	45	**1**	0	18	0	19	154
07:30 AM	0	**96**	2	0	**98**	0	0	0	0	0	**11**	36	0	0	47	1	0	**28**	**4**	**33**	**178**
07:45 AM	0	83	0	0	83	0	0	0	0	0	11	**50**	0	0	**61**	1	0	20	0	21	165
08:00 AM	0	62	0	0	62	0	0	0	0	0	9	43	0	0	52	0	0	20	0	20	134
Total Volume	0	329	4	0	333	0	0	0	0	0	35	170	0	0	205	3	0	86	4	93	631
% App. Total	0	98.8	1.2	0		0	0	0	0		17.1	82.9	0	0		3.2	0	92.5	4.3		
PHF	.000	.857	.500	.000	.849	.000	.000	.000	.000	.000	.795	.850	.000	.000	.840	.750	.000	.768	.250	.705	.886



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File Name : Kahekili Hwy - Puuohala Rd
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/17/2021
Page No : 1

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

	KAHEKILI HWY SOUTHBOUND				WESTBOUND				KAHEKILI HWY NORTHBOUND				PUUOHALA RD EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	0	52	1	0	0	0	0	0	16	84	0	0	1	0	13	0	167
03:45 PM	0	48	1	0	0	0	0	0	13	80	0	0	0	0	8	0	150
Total	0	100	2	0	0	0	0	0	29	164	0	0	1	0	21	0	317
04:00 PM	0	53	1	0	0	0	0	0	16	81	0	0	1	0	9	0	161
04:15 PM	0	48	2	0	0	0	0	0	24	99	0	0	1	0	15	0	189
04:30 PM	0	53	1	0	0	0	0	0	17	103	0	0	1	0	11	0	186
04:45 PM	0	44	0	0	0	0	0	0	24	90	0	0	1	0	14	0	173
Total	0	198	4	0	0	0	0	0	81	373	0	0	4	0	49	0	709
05:00 PM	0	37	3	0	0	0	0	0	19	84	0	0	0	0	6	0	149
05:15 PM	0	42	0	0	0	0	0	0	12	74	0	0	2	0	7	0	137
Grand Total	0	377	9	0	0	0	0	0	141	695	0	0	7	0	83	0	1312
Apprch %	0	97.7	2.3	0	0	0	0	0	16.9	83.1	0	0	7.8	0	92.2	0	
Total %	0	28.7	0.7	0	0	0	0	0	10.7	53	0	0	0.5	0	6.3	0	
Motorcycles	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
% Motorcycles	0	0	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0.2
Cars & Light Goods	0	373	9	0	0	0	0	0	141	690	0	0	7	0	82	0	1302
% Cars & Light Goods	0	98.9	100	0	0	0	0	0	100	99.3	0	0	100	0	98.8	0	99.2
Buses	0	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	6
% Buses	0	1.1	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0.5
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2
% Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	1.2	0	0.2
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Austin Tsutsumi & Associates

1871 Wili Pa Loop STE.A
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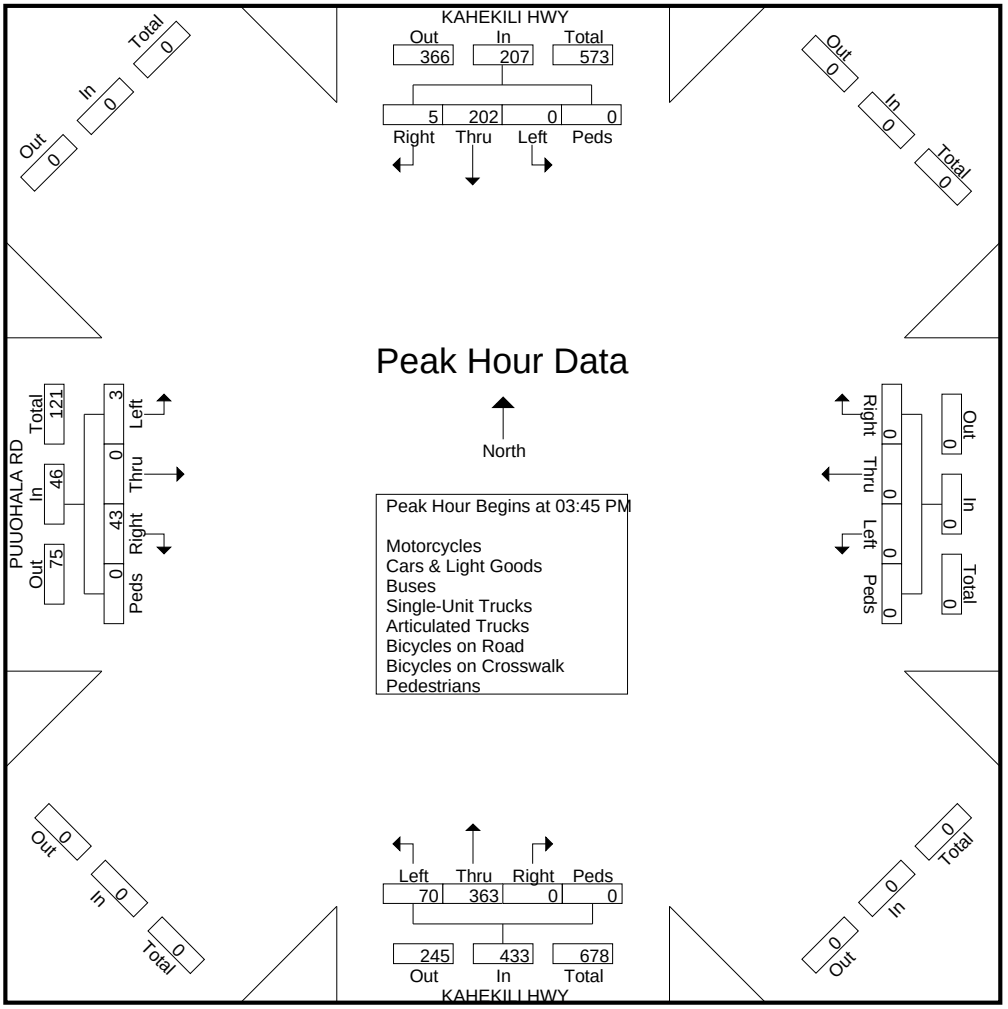
File Name : Kahekili Hwy - Puuohala Rd
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/17/2021
Page No : 2

	KAHEKILI HWY SOUTHBOUND					WESTBOUND					KAHEKILI HWY NORTHBOUND					PUUOHALA RD EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	48	1	0	49	0	0	0	0	0	13	80	0	0	93	0	0	8	0	8	150
04:00 PM	0	**53**	1	0	**54**	0	0	0	0	0	16	81	0	0	97	**1**	0	9	0	10	161
04:15 PM	0	48	**2**	0	50	0	0	0	0	0	**24**	99	0	0	**123**	1	0	**15**	0	**16**	**189**
04:30 PM	0	53	1	0	54	0	0	0	0	0	17	**103**	0	0	120	1	0	11	0	12	186
Total Volume	0	202	5	0	207	0	0	0	0	0	70	363	0	0	433	3	0	43	0	46	686
% App. Total	0	97.6	2.4	0		0	0	0	0		16.2	83.8	0	0		6.5	0	93.5	0		
PHF	.000	.953	.625	.000	.958	.000	.000	.000	.000	.000	.729	.881	.000	.000	.880	.750	.000	.717	.000	.719	.907



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File Name : AM_Kahekili Hwy - Piihana Rd
Site Code : 00000000
Start Date : 9/20/2016
Page No : 1

Groups Printed- Unshifted - Bank 1

	KAHEKILI HWY Southbound				PIIHANA RD Westbound				KAHEKILI HWY Northbound				PIIHANA RD Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:00 AM	0	58	0	0	6	0	0	0	3	13	6	0	1	0	3	0	90
06:15 AM	0	87	1	0	10	0	1	0	1	22	6	0	2	0	11	0	141
06:30 AM	2	104	1	0	12	0	1	0	3	32	3	1	0	0	9	0	168
06:45 AM	1	150	0	0	8	0	1	0	6	46	4	0	2	0	6	1	225
Total	3	399	2	0	36	0	3	0	13	113	19	1	5	0	29	1	624
07:00 AM	1	157	1	0	16	0	1	0	8	70	5	3	1	0	13	2	278
07:15 AM	0	140	3	0	19	0	2	1	6	58	7	0	4	0	12	8	260
07:30 AM	0	194	1	0	10	0	4	0	9	64	6	0	1	0	4	2	295
07:45 AM	4	171	2	0	11	0	0	0	11	72	10	4	3	0	10	0	298
Total	5	662	7	0	56	0	7	1	34	264	28	7	9	0	39	12	1131
08:00 AM	1	85	4	0	11	0	1	0	8	68	8	4	3	0	4	1	198
08:15 AM	0	74	3	0	6	0	0	0	11	52	3	3	2	0	5	2	161
Grand Total	9	1220	16	0	109	0	11	1	66	497	58	15	19	0	77	16	2114
Apprch %	0.7	98	1.3	0	90.1	0	9.1	0.8	10.4	78.1	9.1	2.4	17	0	68.8	14.3	
Total %	0.4	57.7	0.8	0	5.2	0	0.5	0	3.1	23.5	2.7	0.7	0.9	0	3.6	0.8	
Unshifted	9	1220	16	0	109	0	11	1	66	497	58	15	19	0	77	16	2114
% Unshifted	100	100	100	0	100	0	100	100	100	100	100	100	100	0	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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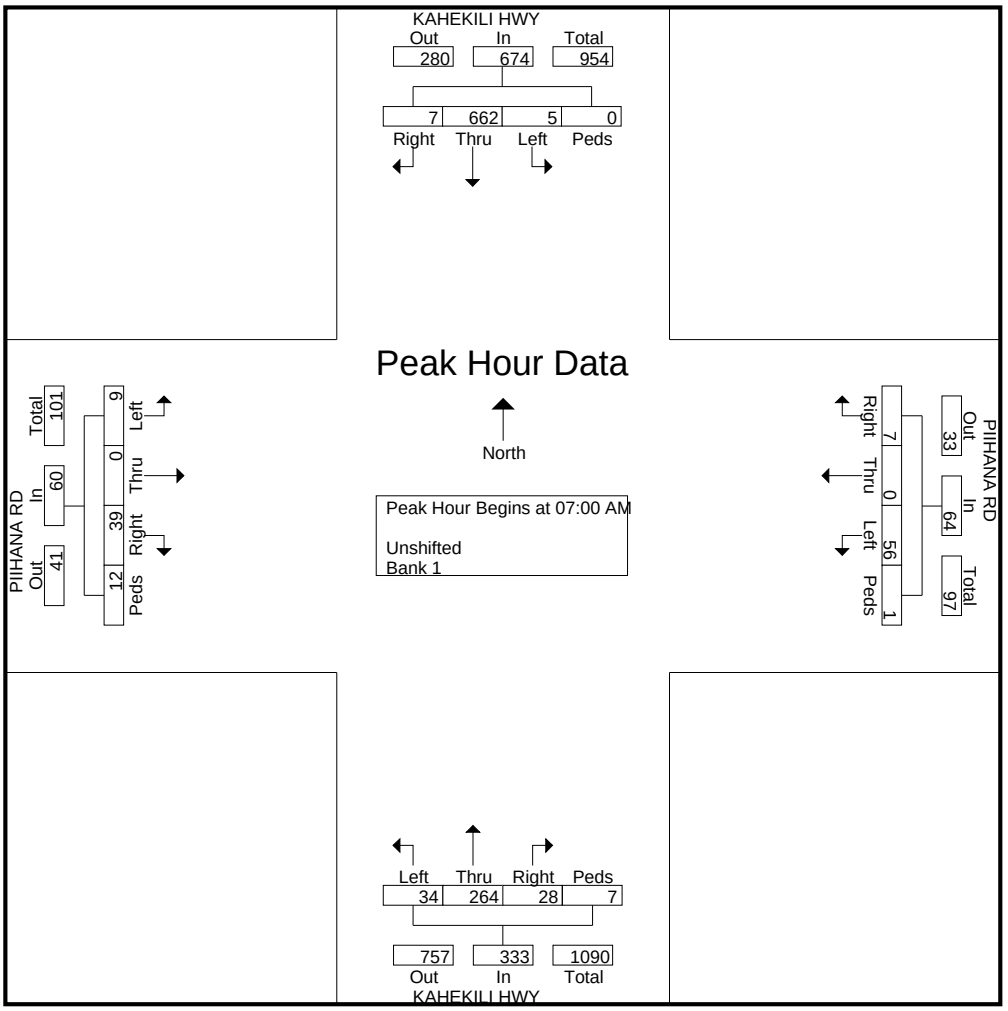
File Name : AM_Kahekili Hwy - Piihana Rd
Site Code : 00000000
Start Date : 9/20/2016
Page No : 2

	KAHEKILI HWY Southbound					PIIHANA RD Westbound					KAHEKILI HWY Northbound					PIIHANA RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	1	157	1	0	159	16	0	1	0	17	8	70	5	3	86	1	0	**13**	2	16	278
07:15 AM	0	140	**3**	0	143	**19**	0	2	**1**	**22**	6	58	7	0	71	**4**	0	12	**8**	**24**	260
07:30 AM	0	**194**	1	0	**195**	10	0	**4**	0	14	9	64	6	0	79	1	0	4	2	7	295
07:45 AM	**4**	171	2	0	177	11	0	0	0	11	**11**	**72**	**10**	**4**	**97**	3	0	10	0	13	**298**
Total Volume	5	662	7	0	674	56	0	7	1	64	34	264	28	7	333	9	0	39	12	60	1131
% App. Total	0.7	98.2	1	0		87.5	0	10.9	1.6		10.2	79.3	8.4	2.1		15	0	65	20		
PHF	.313	.853	.583	.000	.864	.737	.000	.438	.250	.727	.773	.917	.700	.438	.858	.563	.000	.750	.375	.625	.949



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File Name : PM_Kahekili Hwy - Piihana Rd
Site Code : 00000000
Start Date : 9/20/2016
Page No : 1

Groups Printed- Unshifted - Bank 1

	KAHEKILI HWY Southbound				PIIHANA RD Westbound				KAHEKILI HWY Northbound				PIIHANA RD Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:00 PM	2	57	1	0	6	0	0	0	7	74	8	0	2	0	6	0	163
03:15 PM	0	58	0	0	5	0	1	0	4	79	12	0	1	0	8	1	169
03:30 PM	3	62	4	0	10	0	1	0	12	87	10	1	2	0	10	3	205
03:45 PM	4	85	0	0	6	0	4	0	12	102	17	2	3	1	8	3	247
Total	9	262	5	0	27	0	6	0	35	342	47	3	8	1	32	7	784
04:00 PM	0	72	0	0	4	1	0	0	5	106	13	5	3	2	10	2	223
04:15 PM	5	63	1	0	10	0	2	0	5	99	10	3	3	0	9	3	213
04:30 PM	2	70	2	0	7	1	0	0	9	129	21	3	0	1	9	0	254
04:45 PM	1	64	1	0	12	0	1	0	21	140	18	0	3	0	10	0	271
Total	8	269	4	0	33	2	3	0	40	474	62	11	9	3	38	5	961
05:00 PM	1	52	1	0	14	0	1	0	4	115	20	6	2	0	10	3	229
05:15 PM	1	58	1	0	11	0	0	0	9	113	14	9	0	0	15	8	239
Grand Total	19	641	11	0	85	2	10	0	88	1044	143	29	19	4	95	23	2213
Apprch %	2.8	95.5	1.6	0	87.6	2.1	10.3	0	6.7	80.1	11	2.2	13.5	2.8	67.4	16.3	
Total %	0.9	29	0.5	0	3.8	0.1	0.5	0	4	47.2	6.5	1.3	0.9	0.2	4.3	1	
Unshifted	19	641	11	0	85	2	10	0	88	1044	143	29	19	4	95	23	2213
% Unshifted	100	100	100	0	100	100	100	0	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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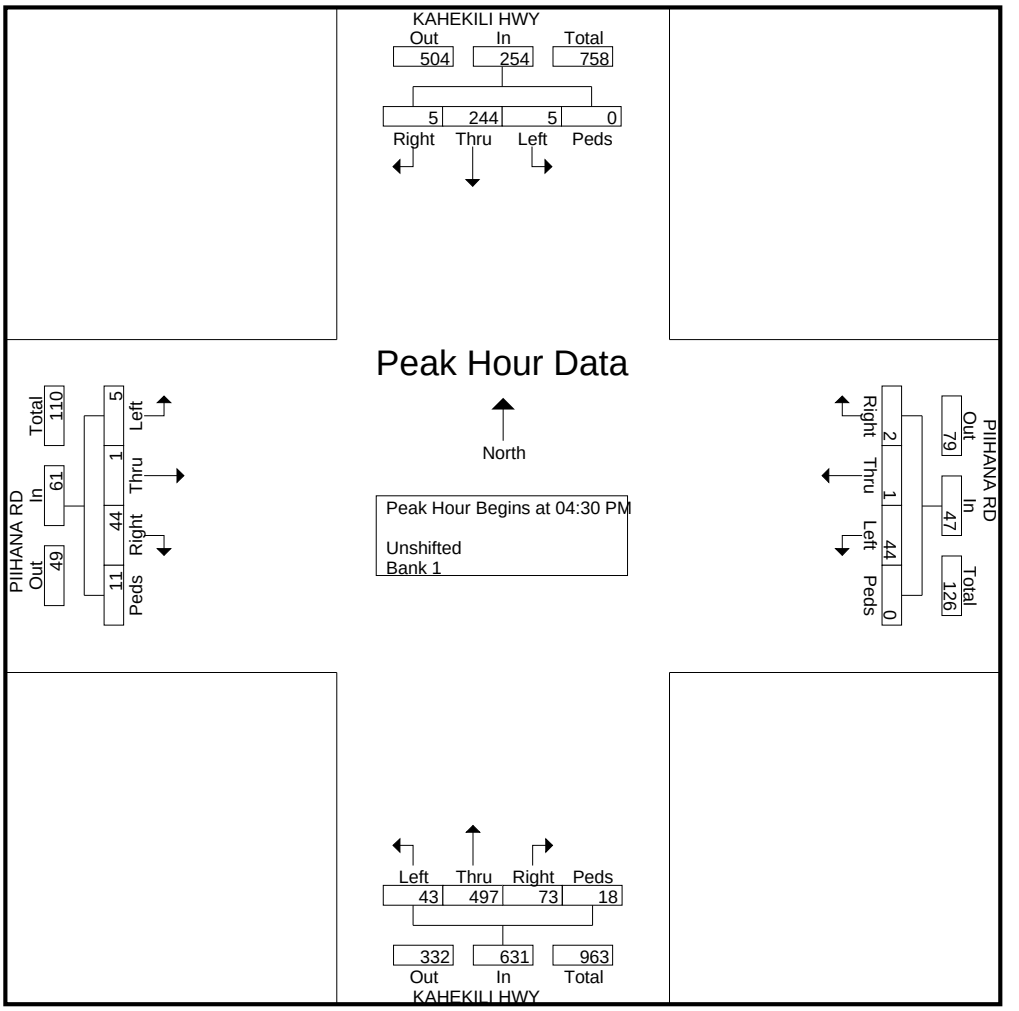
File Name : PM_Kahekili Hwy - Piihana Rd
Site Code : 00000000
Start Date : 9/20/2016
Page No : 2

	KAHEKILI HWY Southbound					PIIHANA RD Westbound					KAHEKILI HWY Northbound					PIIHANA RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	**2**	**70**	**2**	0	**74**	7	**1**	0	0	8	9	129	**21**	3	162	0	**1**	9	0	10	254
04:45 PM	1	64	1	0	66	12	0	**1**	0	13	**21**	**140**	18	0	**179**	**3**	0	10	0	13	**271**
05:00 PM	1	52	1	0	54	**14**	0	1	0	**15**	4	115	20	6	145	2	0	10	3	15	229
05:15 PM	1	58	1	0	60	11	0	0	0	11	9	113	14	**9**	145	0	0	**15**	**8**	**23**	239
Total Volume	5	244	5	0	254	44	1	2	0	47	43	497	73	18	631	5	1	44	11	61	993
% App. Total	2	96.1	2	0		93.6	2.1	4.3	0		6.8	78.8	11.6	2.9		8.2	1.6	72.1	18		
PHF	.625	.871	.625	.000	.858	.786	.250	.500	.000	.783	.512	.888	.869	.500	.881	.417	.250	.733	.344	.663	.916



Austin Tsutsumi & Associates

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File Name : Waiehu Beach Rd - Wailupe Dr
Site Code : 20-521 Waiehu Affordable Housing Project TIAR
Start Date : 2/18/2021
Page No : 1

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

	WAIEHU BEACH RD SOUTHBOUND				WAILUPE DR WESTBOUND				WAIEHU BEACH RD NORTHBOUND				WAILUPE DR EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	0	59	4	0	19	0	2	0	5	12	6	0	5	0	34	0	146
06:45 AM	0	63	1	0	13	0	3	0	11	27	5	0	2	1	49	0	175
Total	0	122	5	0	32	0	5	0	16	39	11	0	7	1	83	0	321
07:00 AM	0	68	1	0	16	1	1	0	16	35	9	0	5	0	39	0	191
07:15 AM	0	72	2	0	22	1	3	0	17	34	9	0	6	1	49	0	216
07:30 AM	2	80	3	0	17	2	4	0	20	43	4	0	10	0	44	0	229
07:45 AM	1	60	7	0	14	0	1	0	15	42	16	0	7	0	45	0	208
Total	3	280	13	0	69	4	9	0	68	154	38	0	28	1	177	0	844
08:00 AM	1	60	2	1	16	0	2	0	16	39	8	0	3	0	35	0	183
08:15 AM	1	38	5	1	17	0	1	0	13	32	15	0	4	0	38	0	165
Grand Total	5	500	25	2	134	4	17	0	113	264	72	0	42	2	333	0	1513
Apprch %	0.9	94	4.7	0.4	86.5	2.6	11	0	25.2	58.8	16	0	11.1	0.5	88.3	0	
Total %	0.3	33	1.7	0.1	8.9	0.3	1.1	0	7.5	17.4	4.8	0	2.8	0.1	22	0	
Motorcycles	0	1	0	0	1	0	0	0	0	1	0	0	0	0	1	0	4
% Motorcycles	0	0.2	0	0	0.7	0	0	0	0	0.4	0	0	0	0	0.3	0	0.3
Cars & Light Goods	5	483	20	0	133	4	16	0	108	257	68	0	40	2	324	0	1460
% Cars & Light Goods	100	96.6	80	0	99.3	100	94.1	0	95.6	97.3	94.4	0	95.2	100	97.3	0	96.5
Buses	0	7	5	0	0	0	1	0	4	2	4	0	2	0	7	0	32
% Buses	0	1.4	20	0	0	0	5.9	0	3.5	0.8	5.6	0	4.8	0	2.1	0	2.1
Single-Unit Trucks	0	8	0	0	0	0	0	0	1	4	0	0	0	0	1	0	14
% Single-Unit Trucks	0	1.6	0	0	0	0	0	0	0.9	1.5	0	0	0	0	0.3	0	0.9
Articulated Trucks	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Articulated Trucks	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0.1

Austin Tsutsumi & Associates

1871 Wili Pa Loop STE.A
Wailuku, HI 96793
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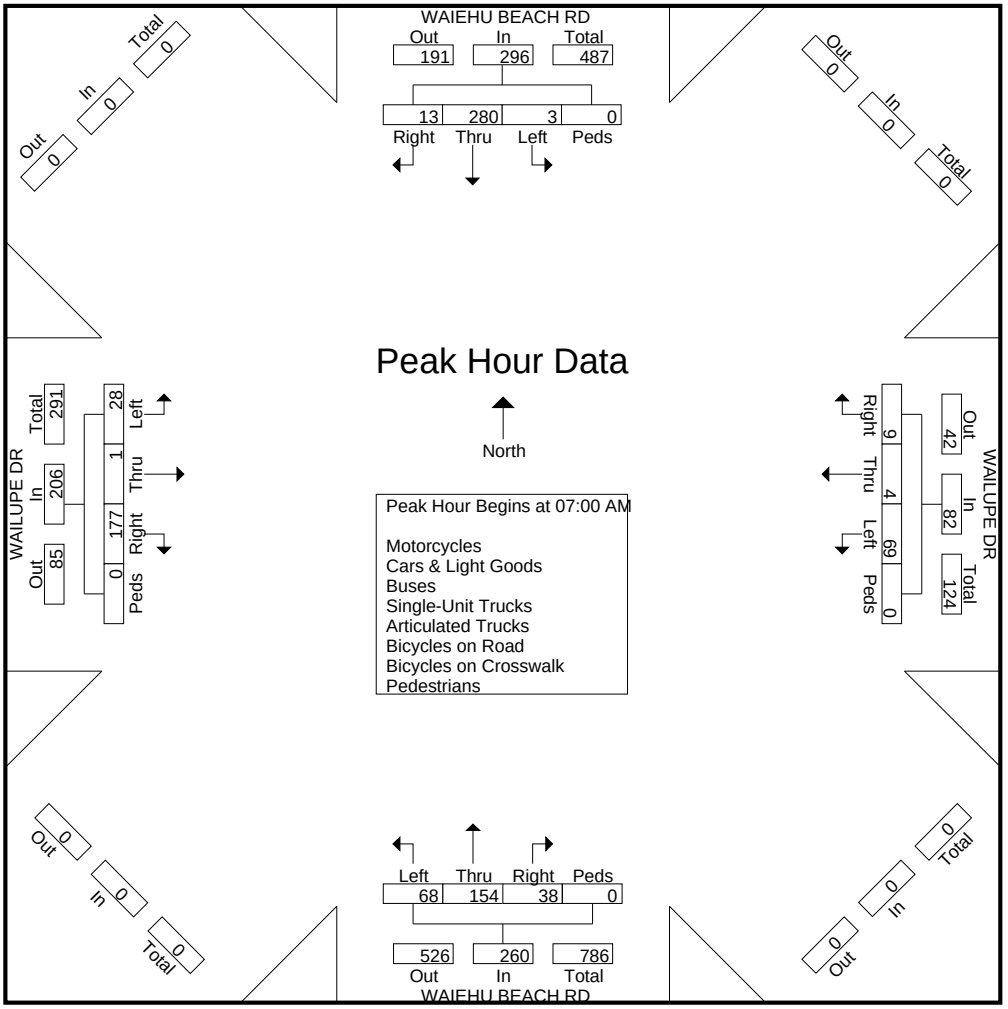
File Name : Waiehu Beach Rd - Wailupe Dr
Site Code : 20-521 Waiehu Affordable Housing Project TIAR
Start Date : 2/18/2021
Page No : 2

	WAIEHU BEACH RD SOUTHBOUND					WAILUPE DR WESTBOUND					WAIEHU BEACH RD NORTHBOUND					WAILUPE DR EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	68	1	0	69	16	1	1	0	18	16	35	9	0	60	5	0	39	0	44	191
07:15 AM	0	72	2	0	74	**22**	1	3	0	**26**	17	34	9	0	60	6	**1**	**49**	0	**56**	216
07:30 AM	**2**	**80**	3	0	**85**	17	**2**	**4**	0	23	**20**	**43**	4	0	67	**10**	0	44	0	54	**229**
07:45 AM	1	60	**7**	0	68	14	0	1	0	15	15	42	**16**	0	**73**	7	0	45	0	52	208
Total Volume	3	280	13	0	296	69	4	9	0	82	68	154	38	0	260	28	1	177	0	206	844
% App. Total	1	94.6	4.4	0		84.1	4.9	11	0		26.2	59.2	14.6	0		13.6	0.5	85.9	0		
PHF	.375	.875	.464	.000	.871	.784	.500	.563	.000	.788	.850	.895	.594	.000	.890	.700	.250	.903	.000	.920	.921



Austin Tsutsumi & Associates

1871 Wili Pa Loop STE.A
Wailuku, HI 96793
Phone: (808) 244-8044 Fax: (808) 242-9163

File Name : Waiehu Beach Rd - Wailupe Dr
Site Code : 20-521 Waiehu Affordable Housing Project TIAR
Start Date : 2/17/2021
Page No : 1

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

	WAIEHU BEACH RD SOUTHBOUND				WAILUPE DR WESTBOUND				WAIEHU BEACH RD NORTHBOUND				WAILUPE DR EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	3	62	5	0	24	0	3	0	36	53	24	0	2	0	20	0	232
03:45 PM	4	43	8	0	9	0	3	0	39	50	26	0	2	0	26	0	210
Total	7	105	13	0	33	0	6	0	75	103	50	0	4	0	46	0	442
04:00 PM	2	50	7	0	14	0	3	0	55	75	16	0	2	0	25	0	249
04:15 PM	3	61	12	0	13	0	1	0	29	83	25	0	2	0	32	0	261
04:30 PM	2	49	13	0	19	0	1	0	44	72	22	0	2	0	15	0	239
04:45 PM	2	36	12	0	7	3	0	0	35	72	23	0	3	1	30	0	224
Total	9	196	44	0	53	3	5	0	163	302	86	0	9	1	102	0	973
05:00 PM	4	41	8	0	13	0	0	0	40	57	13	0	4	2	26	0	208
05:15 PM	3	41	12	0	10	0	5	0	48	81	33	0	4	1	38	0	276
Grand Total	23	383	77	0	109	3	16	0	326	543	182	0	21	4	212	0	1899
Apprch %	4.8	79.3	15.9	0	85.2	2.3	12.5	0	31	51.7	17.3	0	8.9	1.7	89.5	0	
Total %	1.2	20.2	4.1	0	5.7	0.2	0.8	0	17.2	28.6	9.6	0	1.1	0.2	11.2	0	
Motorcycles	0	0	0	0	0	0	0	0	2	1	1	0	0	0	1	0	5
% Motorcycles	0	0	0	0	0	0	0	0	0.6	0.2	0.5	0	0	0	0.5	0	0.3
Cars & Light Goods	23	378	76	0	109	3	16	0	324	537	179	0	21	4	209	0	1879
% Cars & Light Goods	100	98.7	98.7	0	100	100	100	0	99.4	98.9	98.4	0	100	100	98.6	0	98.9
Buses	0	1	1	0	0	0	0	0	0	1	2	0	0	0	1	0	6
% Buses	0	0.3	1.3	0	0	0	0	0	0	0.2	1.1	0	0	0	0.5	0	0.3
Single-Unit Trucks	0	2	0	0	0	0	0	0	0	3	0	0	0	0	1	0	6
% Single-Unit Trucks	0	0.5	0	0	0	0	0	0	0	0.6	0	0	0	0	0.5	0	0.3
Articulated Trucks	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0.1
Bicycles on Road	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Bicycles on Road	0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Austin Tsutsumi & Associates

1871 Wili Pa Loop STE.A
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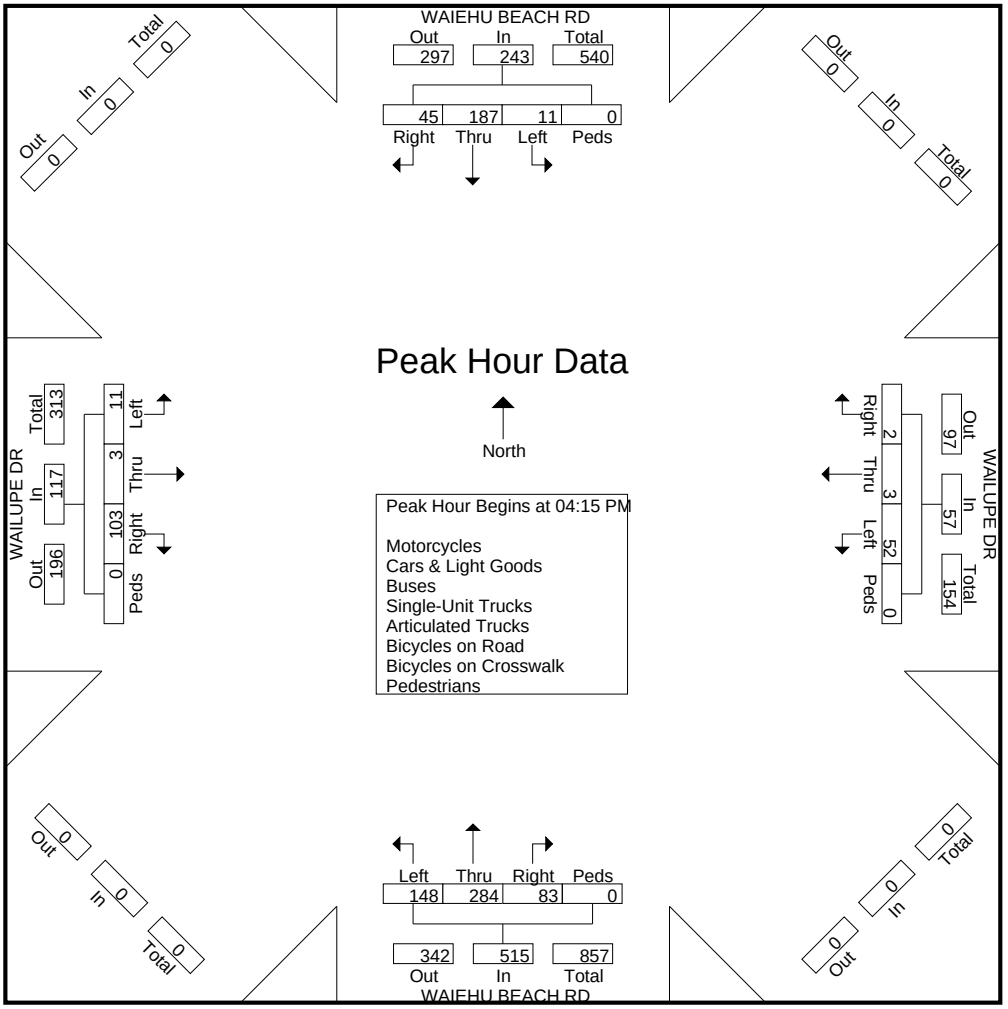
File Name : Waiehu Beach Rd - Wailupe Dr
Site Code : 20-521 Waiehu Affordable Housing Project TIAR
Start Date : 2/17/2021
Page No : 2

	WAIEHU BEACH RD SOUTHBOUND					WAILUPE DR WESTBOUND					WAIEHU BEACH RD NORTHBOUND					WAILUPE DR EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:15 PM to 05:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	3	**61**	12	0	**76**	13	0	**1**	0	14	29	**83**	**25**	0	137	2	0	**32**	0	**34**	**261**
04:30 PM	2	49	**13**	0	64	**19**	0	1	0	**20**	**44**	72	22	0	**138**	2	0	15	0	17	239
04:45 PM	2	36	12	0	50	7	**3**	0	0	10	35	72	23	0	130	3	1	30	0	34	224
05:00 PM	**4**	41	8	0	53	13	0	0	0	13	40	57	13	0	110	**4**	**2**	26	0	32	208
Total Volume	11	187	45	0	243	52	3	2	0	57	148	284	83	0	515	11	3	103	0	117	932
% App. Total	4.5	77	18.5	0		91.2	5.3	3.5	0		28.7	55.1	16.1	0		9.4	2.6	88	0		
PHF	.688	.766	.865	.000	.799	.684	.250	.500	.000	.713	.841	.855	.830	.000	.933	.688	.375	.805	.000	.860	.893



Austin Tsutsumi & Associates

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Honolulu, HI 96817-5031
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File Name : AM_Waiehu Beach Rd – Makaala Dr
Site Code : 00000000
Start Date : 9/20/2016
Page No : 1

Groups Printed- Unshifted

	MAKAALA DR Eastbound				MAKAALA DR Westbound				WAIEHU BEACH RD Northbound				WAIEHU BEACH RD Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:00 AM	1	0	56	0	0	0	0	0	10	32	0	0	0	64	3	0	166
06:15 AM	1	0	64	0	0	0	0	0	24	37	0	0	0	122	1	0	249
06:30 AM	2	0	86	1	0	0	0	0	14	45	0	0	0	164	3	0	315
06:45 AM	2	0	74	0	0	0	0	0	27	84	0	0	0	159	1	0	347
Total	6	0	280	1	0	0	0	0	75	198	0	0	0	509	8	0	1077
07:00 AM	3	0	81	0	0	0	0	0	26	86	0	0	0	144	5	0	345
07:15 AM	3	0	121	0	0	0	0	0	22	88	0	0	0	122	3	0	359
07:30 AM	1	0	117	0	0	0	0	0	29	72	0	0	0	116	0	0	335
07:45 AM	0	0	98	0	0	0	0	0	22	71	0	0	0	158	5	0	354
Total	7	0	417	0	0	0	0	0	99	317	0	0	0	540	13	0	1393
08:00 AM	4	0	37	1	0	0	0	0	26	79	0	0	0	97	3	0	247
08:15 AM	3	0	41	0	0	0	0	0	18	84	0	0	0	113	2	0	261
Grand Total	20	0	775	2	0	0	0	0	218	678	0	0	0	1259	26	0	2978
Apprch %	2.5	0	97.2	0.3	0	0	0	0	24.3	75.7	0	0	0	98	2	0	
Total %	0.7	0	26	0.1	0	0	0	0	7.3	22.8	0	0	0	42.3	0.9	0	

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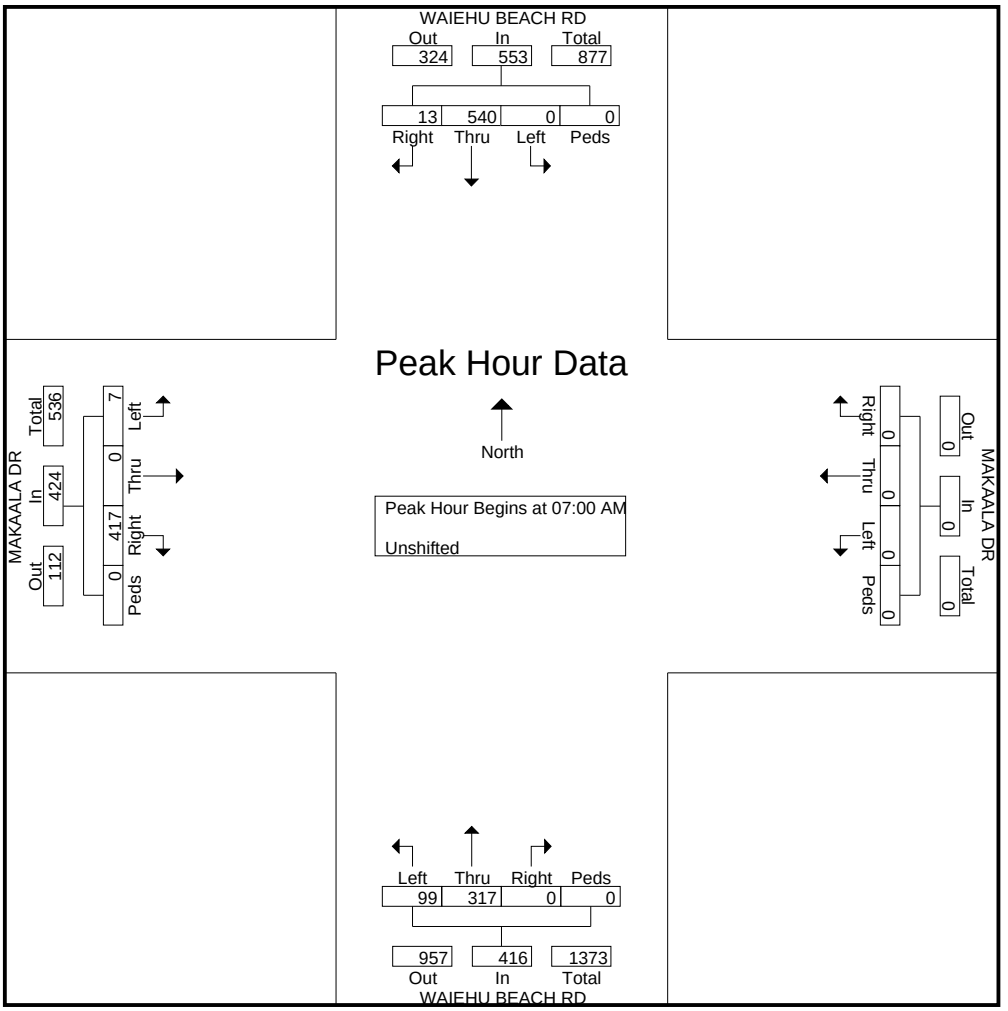
File Name : AM_Waiehu Beach Rd – Makaala Dr
Site Code : 00000000
Start Date : 9/20/2016
Page No : 2

	MAKAALA DR Eastbound					MAKAALA DR Westbound					WAIEHU BEACH RD Northbound					WAIEHU BEACH RD Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	**3**	0	81	0	84	0	0	0	0	0	26	86	0	0	**112**	0	144	**5**	0	149	345
07:15 AM	3	0	**121**	0	**124**	0	0	0	0	0	22	**88**	0	0	110	0	122	3	0	125	**359**
07:30 AM	1	0	117	0	118	0	0	0	0	0	**29**	72	0	0	101	0	116	0	0	116	335
07:45 AM	0	0	98	0	98	0	0	0	0	0	22	71	0	0	93	0	**158**	5	0	**163**	354
Total Volume	7	0	417	0	424	0	0	0	0	0	99	317	0	0	416	0	540	13	0	553	1393
% App. Total	1.7	0	98.3	0		0	0	0	0		23.8	76.2	0	0		0	97.6	2.4	0		
PHF	.583	.000	.862	.000	.855	.000	.000	.000	.000	.000	.853	.901	.000	.000	.929	.000	.854	.650	.000	.848	.970



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File Name : PM_Waiehu Beach Rd – Makaala Dr
Site Code : 00000000
Start Date : 9/20/2016
Page No : 1

Groups Printed- Unshifted

	MAKAALA DR Eastbound				MAKAALA DR Westbound				WAIEHU BEACH RD Northbound				WAIEHU BEACH RD Southbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:00 PM	3	0	27	1	0	0	0	0	46	118	0	0	0	90	3	0	288
03:15 PM	3	0	47	1	0	0	0	0	46	107	0	0	0	111	5	0	320
03:30 PM	0	0	59	1	0	0	0	0	63	127	0	0	0	90	6	0	346
03:45 PM	3	0	45	0	0	0	0	0	68	129	0	0	0	100	6	0	351
Total	9	0	178	3	0	0	0	0	223	481	0	0	0	391	20	0	1305
04:00 PM	7	0	47	0	0	0	0	0	63	148	0	0	0	111	4	0	380
04:15 PM	1	0	50	0	0	0	0	0	81	137	0	0	0	111	4	0	384
04:30 PM	2	0	57	0	0	0	0	0	91	168	0	0	0	104	3	0	425
04:45 PM	5	0	47	0	0	0	0	0	79	162	0	0	0	100	7	0	400
Total	15	0	201	0	0	0	0	0	314	615	0	0	0	426	18	0	1589
05:00 PM	3	0	44	1	0	0	0	0	81	138	0	0	0	94	6	0	367
05:15 PM	1	0	64	0	0	0	0	0	79	151	0	0	0	68	8	0	371
Grand Total	28	0	487	4	0	0	0	0	697	1385	0	0	0	979	52	0	3632
Apprch %	5.4	0	93.8	0.8	0	0	0	0	33.5	66.5	0	0	0	95	5	0	
Total %	0.8	0	13.4	0.1	0	0	0	0	19.2	38.1	0	0	0	27	1.4	0	

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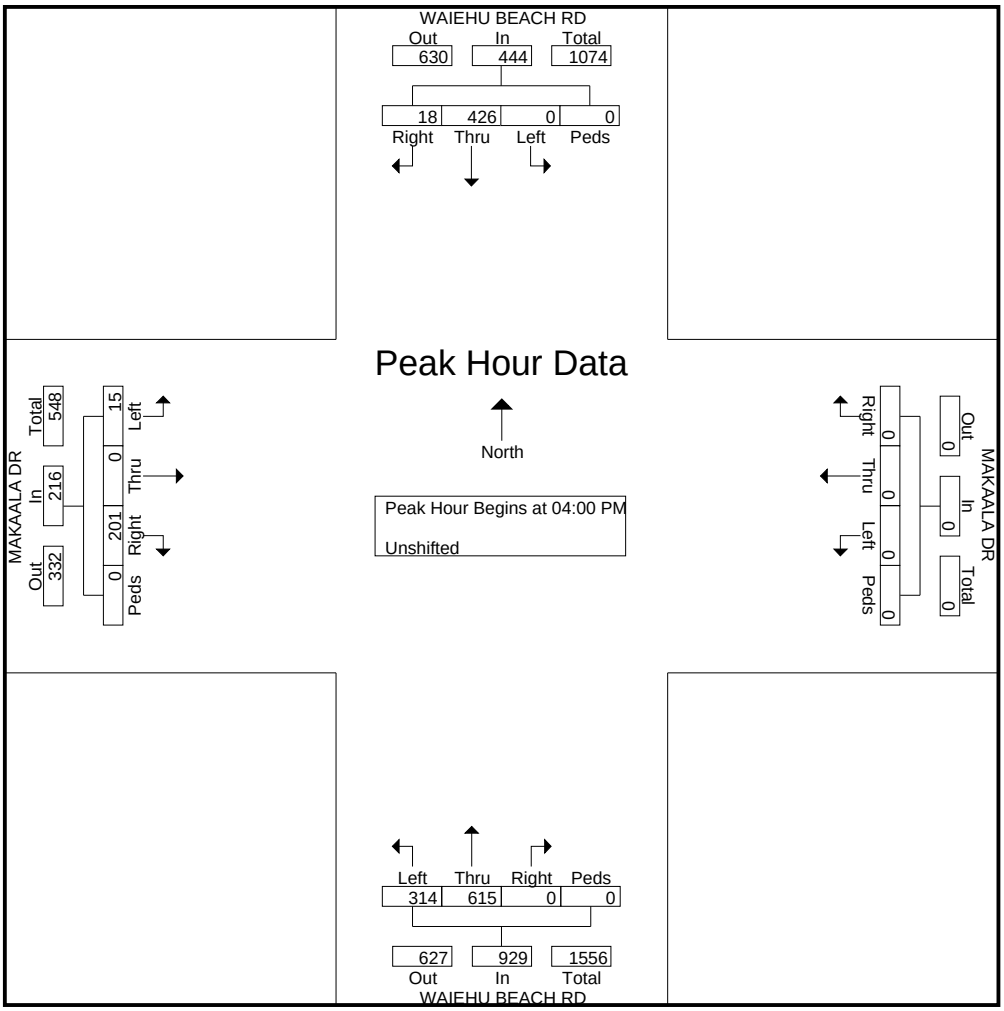
File Name : PM_Waiehu Beach Rd – Makaala Dr
Site Code : 00000000
Start Date : 9/20/2016
Page No : 2

	MAKAALA DR Eastbound					MAKAALA DR Westbound					WAIEHU BEACH RD Northbound					WAIEHU BEACH RD Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	**7**	0	47	0	54	0	0	0	0	0	63	148	0	0	211	0	**111**	4	0	**115**	380
04:15 PM	1	0	50	0	51	0	0	0	0	0	81	137	0	0	218	0	111	4	0	115	384
04:30 PM	2	0	**57**	0	**59**	0	0	0	0	0	**91**	**168**	0	0	**259**	0	104	3	0	107	**425**
04:45 PM	5	0	47	0	52	0	0	0	0	0	79	162	0	0	241	0	100	**7**	0	107	400
Total Volume	15	0	201	0	216	0	0	0	0	0	314	615	0	0	929	0	426	18	0	444	1589
% App. Total	6.9	0	93.1	0		0	0	0	0		33.8	66.2	0	0		0	95.9	4.1	0		
PHF	.536	.000	.882	.000	.915	.000	.000	.000	.000	.000	.863	.915	.000	.000	.897	.000	.959	.643	.000	.965	.935



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File Name : Waiehu Beach Rd - Eha St
Site Code : 16-014.07 Maui Signal Opt
Start Date : 5/3/2018
Page No : 1

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

	WAIEHU BEACH RD SOUTHBOUND				EHA ST WESTBOUND				WAIEHU BEACH RD NORTHBOUND				EHA ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:00 AM	0	117	35	0	2	5	2	0	17	50	0	0	9	1	7	0	245
06:15 AM	1	149	51	3	3	0	1	0	16	31	0	0	14	0	6	2	277
06:30 AM	0	207	84	0	3	1	0	0	22	60	1	0	15	0	3	0	396
06:45 AM	0	211	94	0	1	0	0	0	24	92	1	0	30	1	10	0	464
Total	1	684	264	3	9	6	3	0	79	233	2	0	68	2	26	2	1382
07:00 AM	0	178	99	1	3	1	2	0	24	107	0	0	30	1	6	0	452
07:15 AM	1	182	121	0	6	2	0	0	23	94	1	0	35	0	11	0	476
07:30 AM	1	185	90	0	2	2	1	0	39	87	1	0	32	0	14	0	454
07:45 AM	0	181	97	3	3	0	1	1	24	105	1	0	39	0	15	1	471
Total	2	726	407	4	14	5	4	1	110	393	3	0	136	1	46	1	1853
Grand Total	3	1410	671	7	23	11	7	1	189	626	5	0	204	3	72	3	3235
Apprch %	0.1	67.4	32.1	0.3	54.8	26.2	16.7	2.4	23	76.3	0.6	0	72.3	1.1	25.5	1.1	
Total %	0.1	43.6	20.7	0.2	0.7	0.3	0.2	0	5.8	19.4	0.2	0	6.3	0.1	2.2	0.1	
Motorcycles	0	9	4	0	0	0	0	0	0	2	0	0	1	0	1	0	17
% Motorcycles	0	0.6	0.6	0	0	0	0	0	0	0.3	0	0	0.5	0	1.4	0	0.5
Cars	2	919	422	0	18	7	5	0	132	416	3	0	149	2	51	0	2126
% Cars	66.7	65.2	62.9	0	78.3	63.6	71.4	0	69.8	66.5	60	0	73	66.7	70.8	0	65.7
Light Goods Vehicles	1	460	236	0	5	4	2	0	52	181	2	0	50	1	14	0	1008
% Light Goods Vehicles	33.3	32.6	35.2	0	21.7	36.4	28.6	0	27.5	28.9	40	0	24.5	33.3	19.4	0	31.2
Buses	0	14	5	0	0	0	0	0	2	20	0	0	2	0	0	0	43
% Buses	0	1	0.7	0	0	0	0	0	1.1	3.2	0	0	1	0	0	0	1.3
Single-Unit Trucks	0	4	2	0	0	0	0	0	2	6	0	0	2	0	5	0	21
% Single-Unit Trucks	0	0.3	0.3	0	0	0	0	0	1.1	1	0	0	1	0	6.9	0	0.6
Articulated Trucks	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3
% Articulated Trucks	0	0.1	0	0	0	0	0	0	0.5	0	0	0	0	0	0	0	0.1
Bicycles on Road	0	2	2	0	0	0	0	0	0	1	0	0	0	0	1	0	6
% Bicycles on Road	0	0.1	0.3	0	0	0	0	0	0	0.2	0	0	0	0	1.4	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	7	0	0	0	1	0	0	0	0	0	0	0	3	11
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	0	0	0	0	100	0.3

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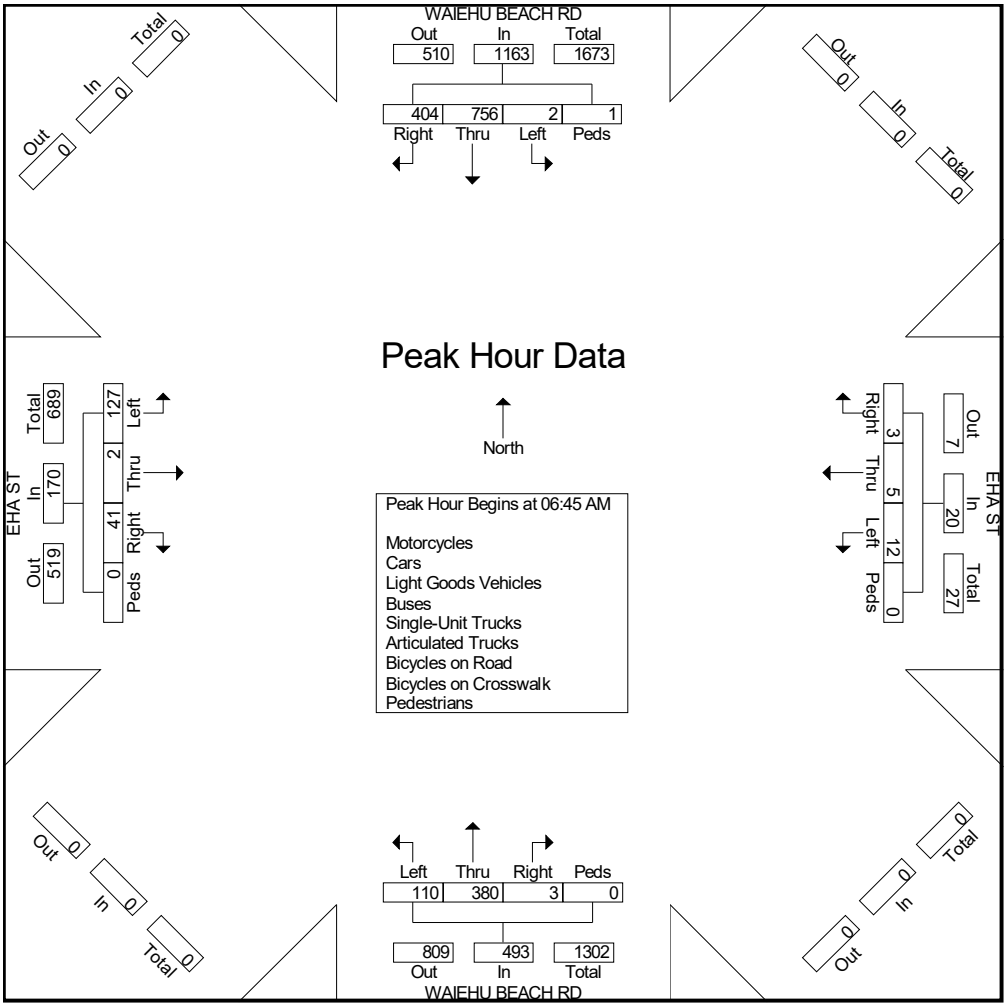
	WAIEHU BEACH RD SOUTHBOUND					EHA ST WESTBOUND					WAIEHU BEACH RD NORTHBOUND					EHA ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	**211**	94	0	**305**	1	0	0	0	1	24	92	**1**	0	117	30	**1**	10	0	41	464
07:00 AM	0	178	99	**1**	278	3	1	**2**	0	6	24	**107**	0	0	**131**	30	1	6	0	37	452
07:15 AM	**1**	182	**121**	0	304	**6**	**2**	0	0	**8**	23	94	1	0	118	**35**	0	11	0	**46**	**476**
07:30 AM	1	185	90	0	276	2	2	1	0	5	**39**	87	1	0	127	32	0	**14**	0	46	454
Total Volume	2	756	404	1	1163	12	5	3	0	20	110	380	3	0	493	127	2	41	0	170	1846
% App. Total	0.2	65	34.7	0.1		60	25	15	0		22.3	77.1	0.6	0		74.7	1.2	24.1	0		
PHF	.500	.896	.835	.250	.953	.500	.625	.375	.000	.625	.705	.888	.750	.000	.941	.907	.500	.732	.000	.924	.970



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File Name : Waiehu Beach Rd - Eha St
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Groups Printed- Motorcycles - Cars - Light Goods Vehicles - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIEHU BEACH RD From North				EHA ST From East				WAIEHU BEACH RD From South				EHA ST From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	62	89	0	0	0	1	1	0	0	150	24	0	18	0	100	0	445
04:15 PM	54	111	0	0	0	0	0	0	3	180	21	0	2	0	93	0	464
04:30 PM	53	112	0	0	0	0	2	0	2	177	24	0	8	0	94	0	472
04:45 PM	51	96	0	0	1	2	1	0	2	160	35	0	27	2	100	0	477
Total	220	408	0	0	1	3	4	0	7	667	104	0	55	2	387	0	1858
Grand Total	220	408	0	0	1	3	4	0	7	667	104	0	55	2	387	0	1858
Apprch %	35	65	0	0	12.5	37.5	50	0	0.9	85.7	13.4	0	12.4	0.5	87.2	0	
Total %	11.8	22	0	0	0.1	0.2	0.2	0	0.4	35.9	5.6	0	3	0.1	20.8	0	
Motorcycles	0	0	0	0	0	0	0	0	0	2	2	0	0	0	4	0	8
% Motorcycles	0	0	0	0	0	0	0	0	0	0.3	1.9	0	0	0	1	0	0.4
Cars	151	281	0	0	0	2	2	0	6	429	72	0	44	2	242	0	1231
% Cars	68.6	68.9	0	0	0	66.7	50	0	85.7	64.3	69.2	0	80	100	62.5	0	66.3
Light Goods Vehicles	68	122	0	0	1	1	2	0	1	231	29	0	11	0	138	0	604
% Light Goods Vehicles	30.9	29.9	0	0	100	33.3	50	0	14.3	34.6	27.9	0	20	0	35.7	0	32.5
Buses	1	4	0	0	0	0	0	0	0	2	0	0	0	0	3	0	10
% Buses	0.5	1	0	0	0	0	0	0	0	0.3	0	0	0	0	0.8	0	0.5
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
% Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0.3	1	0	0	0	0	0	0.2
Articulated Trucks	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1
Bicycles on Road	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Bicycles on Road	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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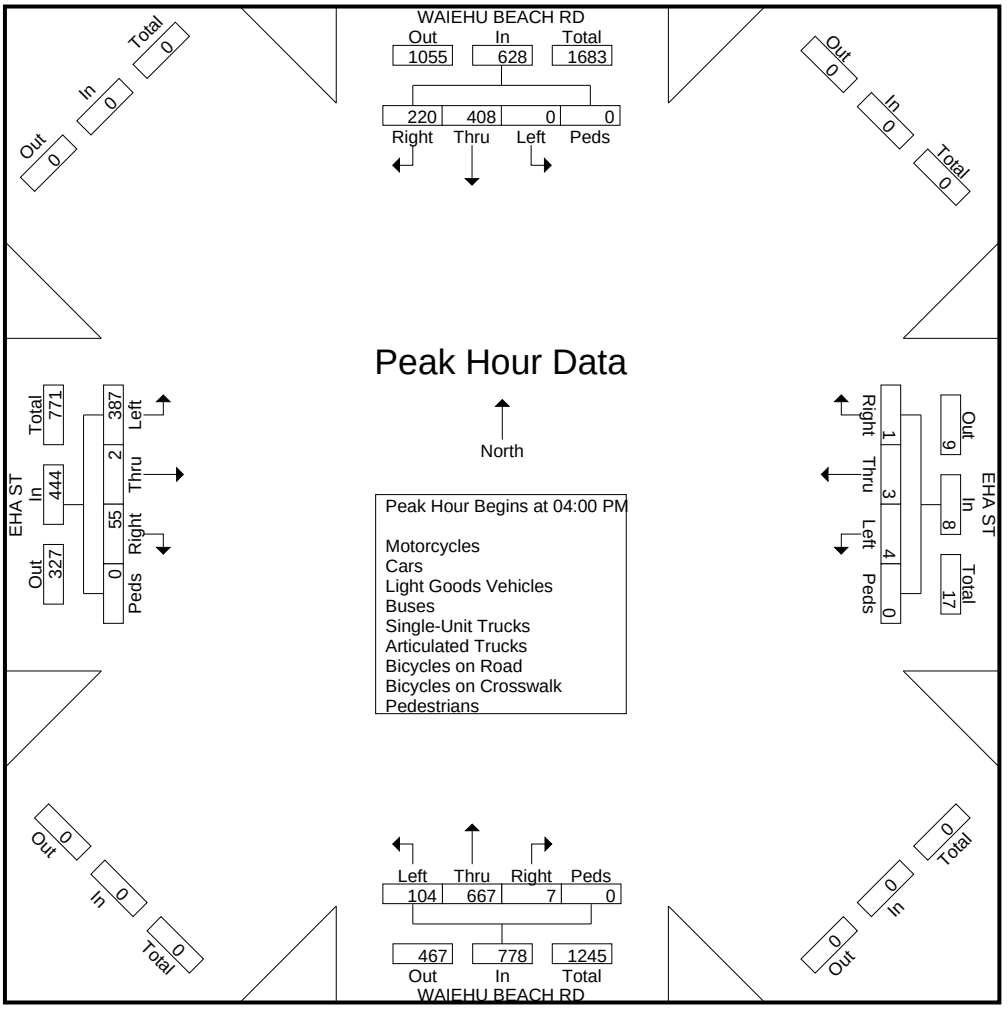
	WAIEHU BEACH RD From North					EHA ST From East					WAIEHU BEACH RD From South					EHA ST From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	**62**	89	0	0	151	0	1	1	0	2	0	150	24	0	174	18	0	**100**	0	118	445
04:15 PM	54	111	0	0	**165**	0	0	0	0	0	**3**	**180**	21	0	**204**	2	0	93	0	95	464
04:30 PM	53	**112**	0	0	165	0	0	**2**	0	2	2	177	24	0	203	8	0	94	0	102	472
04:45 PM	51	96	0	0	147	**1**	**2**	1	0	**4**	2	160	**35**	0	197	**27**	**2**	100	0	**129**	**477**
Total Volume	220	408	0	0	628	1	3	4	0	8	7	667	104	0	778	55	2	387	0	444	1858
% App. Total	35	65	0	0		12.5	37.5	50	0		0.9	85.7	13.4	0		12.4	0.5	87.2	0		
PHF	.887	.911	.000	.000	.952	.250	.375	.500	.000	.500	.583	.926	.743	.000	.953	.509	.250	.968	.000	.860	.974



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File Name : Kahului Beach Rd_Lower Main St - Waiehu Beach Rd
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Groups Printed- Motorcycles - Cars - Light Goods Vehicles - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	LOWER MAIN ST From North				WAIEHU BEACH RD From East				KAHULUI BEACH RD From South				From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
06:00 AM	0	50	3	0	4	0	137	1	62	58	0	0	0	0	0	0	315
06:15 AM	0	102	9	0	4	0	178	0	51	74	0	0	0	0	0	0	418
06:30 AM	0	128	4	0	1	0	215	2	88	84	0	0	0	0	0	0	522
06:45 AM	0	141	14	0	3	0	221	0	126	136	0	0	0	0	0	0	641
Total	0	421	30	0	12	0	751	3	327	352	0	0	0	0	0	0	1896
07:00 AM	0	143	14	1	6	0	206	0	124	146	0	0	0	0	0	0	640
07:15 AM	0	197	5	0	9	0	212	0	126	197	0	0	0	0	0	0	746
07:30 AM	0	234	17	0	5	0	205	0	127	206	0	0	0	0	0	0	794
07:45 AM	0	128	12	0	4	0	199	0	129	184	0	0	0	0	0	0	656
Total	0	702	48	1	24	0	822	0	506	733	0	0	0	0	0	0	2836
08:00 AM	0	148	14	0	0	0	140	0	103	145	0	0	0	0	0	0	550
Grand Total	0	1271	92	1	36	0	1713	3	936	1230	0	0	0	0	0	0	5282
Apprch %	0	93.2	6.7	0.1	2.1	0	97.8	0.2	43.2	56.8	0	0	0	0	0	0	
Total %	0	24.1	1.7	0	0.7	0	32.4	0.1	17.7	23.3	0	0	0	0	0	0	
Motorcycles	0	5	1	0	0	0	12	0	4	2	0	0	0	0	0	0	24
% Motorcycles	0	0.4	1.1	0	0	0	0.7	0	0.4	0.2	0	0	0	0	0	0	0.5
Cars	0	829	63	0	25	0	1113	0	654	915	0	0	0	0	0	0	3599
% Cars	0	65.2	68.5	0	69.4	0	65	0	69.9	74.4	0	0	0	0	0	0	68.1
Light Goods Vehicles	0	389	24	0	10	0	555	0	238	292	0	0	0	0	0	0	1508
% Light Goods Vehicles	0	30.6	26.1	0	27.8	0	32.4	0	25.4	23.7	0	0	0	0	0	0	28.5
Buses	0	7	0	0	0	0	16	0	26	4	0	0	0	0	0	0	53
% Buses	0	0.6	0	0	0	0	0.9	0	2.8	0.3	0	0	0	0	0	0	1
Single-Unit Trucks	0	36	4	0	1	0	11	0	10	14	0	0	0	0	0	0	76
% Single-Unit Trucks	0	2.8	4.3	0	2.8	0	0.6	0	1.1	1.1	0	0	0	0	0	0	1.4
Articulated Trucks	0	4	0	0	0	0	1	0	2	3	0	0	0	0	0	0	10
% Articulated Trucks	0	0.3	0	0	0	0	0.1	0	0.2	0.2	0	0	0	0	0	0	0.2
Bicycles on Road	0	1	0	0	0	0	5	0	2	0	0	0	0	0	0	0	8
% Bicycles on Road	0	0.1	0	0	0	0	0.3	0	0.2	0	0	0	0	0	0	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	4
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	0	0	0	0	0	0.1

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Site Code : 16-014.07 Maui Signal Opt
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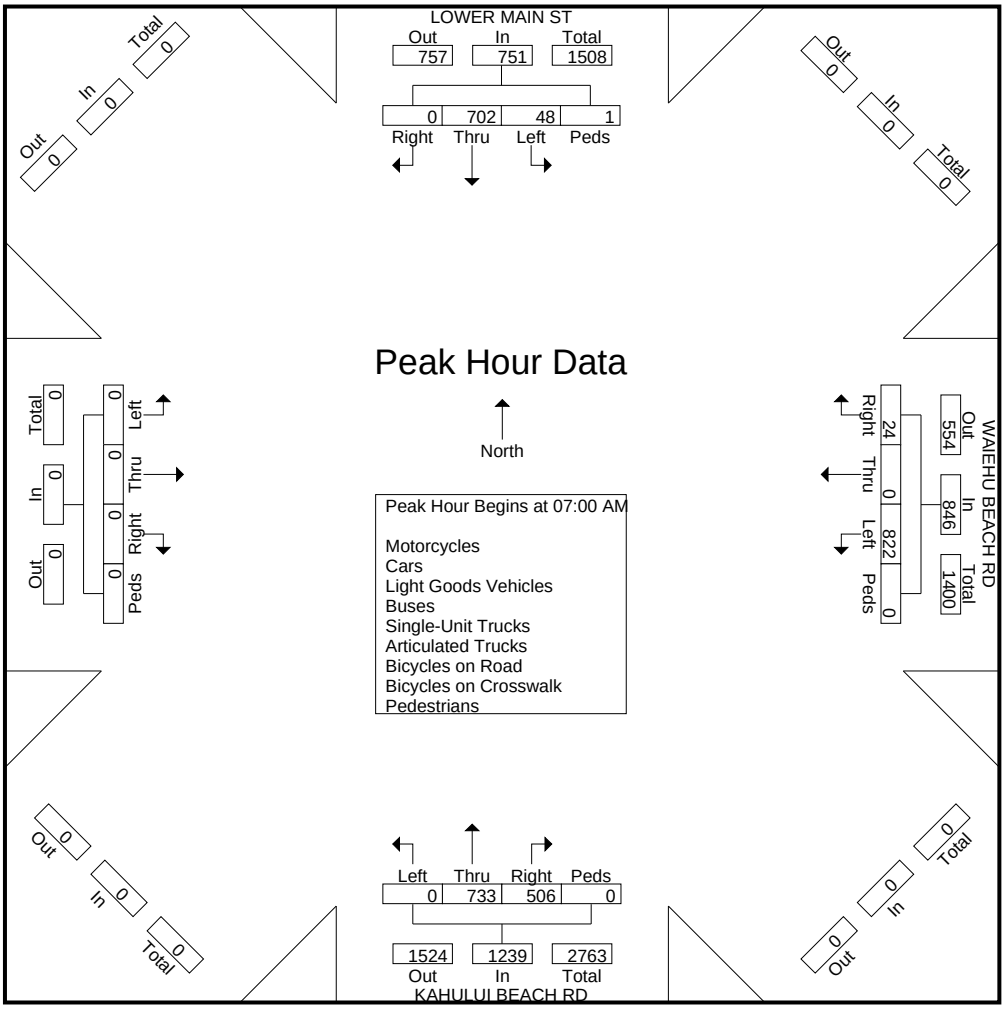
	LOWER MAIN ST From North					WAIEHU BEACH RD From East					KAHULUI BEACH RD From South					From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	143	14	**1**	158	6	0	206	0	212	124	146	0	0	270	0	0	0	0	0	640
07:15 AM	0	197	5	0	202	**9**	0	**212**	0	**221**	126	197	0	0	323	0	0	0	0	0	746
07:30 AM	0	**234**	**17**	0	**251**	5	0	205	0	210	127	**206**	0	0	**333**	0	0	0	0	0	**794**
07:45 AM	0	128	12	0	140	4	0	199	0	203	**129**	184	0	0	313	0	0	0	0	0	656
Total Volume	0	702	48	1	751	24	0	822	0	846	506	733	0	0	1239	0	0	0	0	0	2836
% App. Total	0	93.5	6.4	0.1		2.8	0	97.2	0		40.8	59.2	0	0		0	0	0	0		
PHF	.000	.750	.706	.250	.748	.667	.000	.969	.000	.957	.981	.890	.000	.000	.930	.000	.000	.000	.000	.000	.893



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

	LOWER MAIN ST From North				WAIEHU BEACH RD From East				KAHULUI BEACH RD From South				From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
03:30 PM	0	208	13	0	10	0	121	0	215	214	0	0	0	0	0	0	781
03:45 PM	0	175	3	0	10	0	115	0	157	189	0	0	0	0	0	0	649
Total	0	383	16	0	20	0	236	0	372	403	0	0	0	0	0	0	1430
04:00 PM	0	213	11	0	7	0	101	0	207	198	0	0	0	0	0	0	737
04:15 PM	0	197	14	0	4	0	111	0	208	183	0	0	0	0	0	0	717
04:30 PM	0	212	15	0	0	0	152	0	211	192	0	0	0	0	0	0	782
04:45 PM	0	191	15	0	4	0	108	0	195	194	0	0	0	0	0	0	707
Total	0	813	55	0	15	0	472	0	821	767	0	0	0	0	0	0	2943
05:00 PM	0	211	15	0	4	0	135	0	181	152	0	0	0	0	0	0	698
05:15 PM	0	174	12	0	1	0	132	1	174	141	0	0	0	0	0	0	635
Grand Total	0	1581	98	0	40	0	975	1	1548	1463	0	0	0	0	0	0	5706
Apprch %	0	94.2	5.8	0	3.9	0	96	0.1	51.4	48.6	0	0	0	0	0	0	
Total %	0	27.7	1.7	0	0.7	0	17.1	0	27.1	25.6	0	0	0	0	0	0	
Motorcycles	0	2	1	0	0	0	1	0	5	4	0	0	0	0	0	0	13
% Motorcycles	0	0.1	1	0	0	0	0.1	0	0.3	0.3	0	0	0	0	0	0	0.2
Cars	0	1175	70	0	32	0	698	0	1079	1047	0	0	0	0	0	0	4101
% Cars	0	74.3	71.4	0	80	0	71.6	0	69.7	71.6	0	0	0	0	0	0	71.9
Light Goods Vehicles	0	389	25	0	8	0	269	0	445	378	0	0	0	0	0	0	1514
% Light Goods Vehicles	0	24.6	25.5	0	20	0	27.6	0	28.7	25.8	0	0	0	0	0	0	26.5
Buses	0	6	0	0	0	0	6	0	5	7	0	0	0	0	0	0	24
% Buses	0	0.4	0	0	0	0	0.6	0	0.3	0.5	0	0	0	0	0	0	0.4
Single-Unit Trucks	0	7	2	0	0	0	1	0	8	23	0	0	0	0	0	0	41
% Single-Unit Trucks	0	0.4	2	0	0	0	0.1	0	0.5	1.6	0	0	0	0	0	0	0.7
Articulated Trucks	0	1	0	0	0	0	0	0	5	4	0	0	0	0	0	0	10
% Articulated Trucks	0	0.1	0	0	0	0	0	0	0.3	0.3	0	0	0	0	0	0	0.2
Bicycles on Road	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
% Bicycles on Road	0	0.1	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
% Pedestrians	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0

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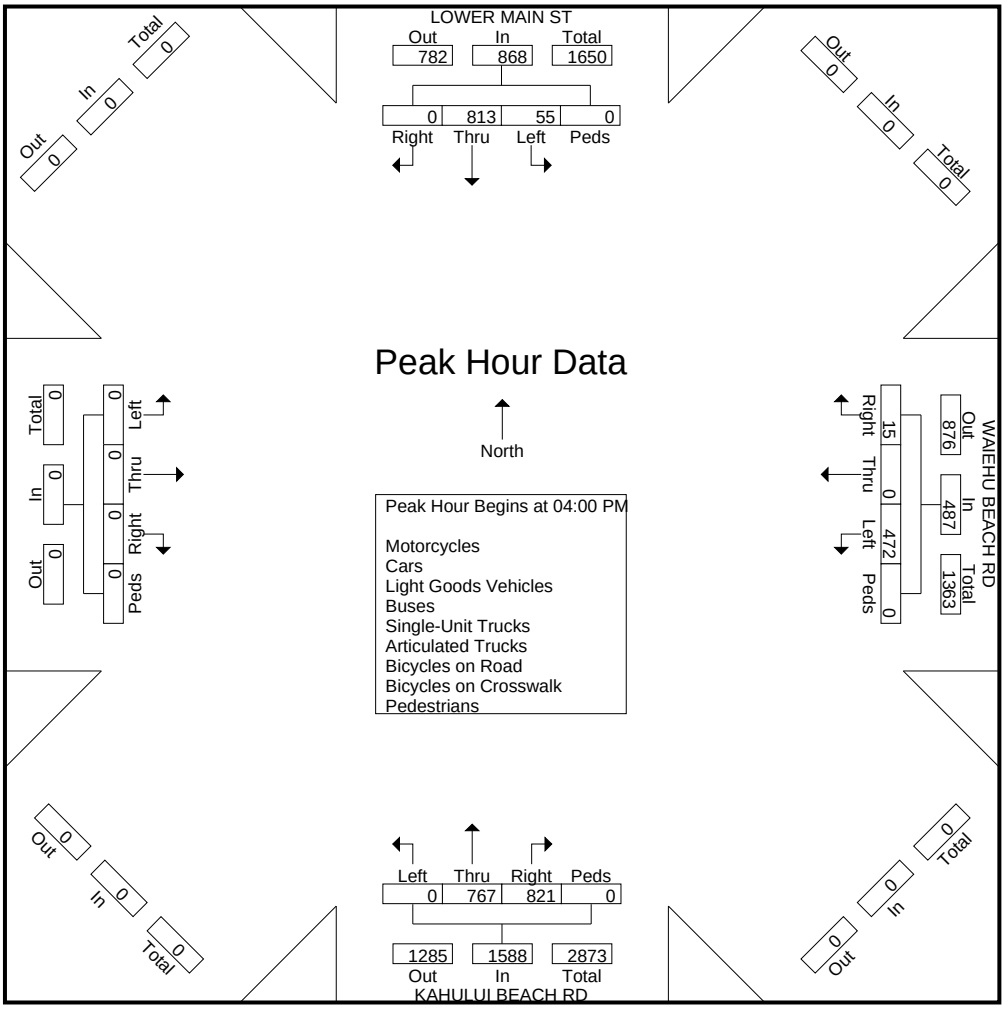
	LOWER MAIN ST From North					WAIEHU BEACH RD From East					KAHULUI BEACH RD From South					From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	**213**	11	0	224	**7**	0	101	0	108	207	**198**	0	0	**405**	0	0	0	0	0	737
04:15 PM	0	197	14	0	211	4	0	111	0	115	208	183	0	0	391	0	0	0	0	0	717
04:30 PM	0	212	**15**	0	**227**	0	0	**152**	0	**152**	**211**	192	0	0	403	0	0	0	0	0	**782**
04:45 PM	0	191	15	0	206	4	0	108	0	112	195	194	0	0	389	0	0	0	0	0	707
Total Volume	0	813	55	0	868	15	0	472	0	487	821	767	0	0	1588	0	0	0	0	0	2943
% App. Total	0	93.7	6.3	0		3.1	0	96.9	0		51.7	48.3	0	0		0	0	0	0		
PHF	.000	.954	.917	.000	.956	.536	.000	.776	.000	.801	.973	.968	.000	.000	.980	.000	.000	.000	.000	.000	.941



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File Name : Market St - Mill St
Site Code : 18-519 Main Street Business Hotel
Start Date : 5/1/2018
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	MARKET ST SOUTHBOUND				MILL ST WESTBOUND				MARKET ST NORTHBOUND				PRIVATE DWY EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30	84	97	0	0	2	0	17	1	0	40	13	0	0	0	0	6	260
06:45	90	130	0	2	5	0	21	1	0	57	18	0	0	0	0	15	339
Total	174	227	0	2	7	0	38	2	0	97	31	0	0	0	0	21	599
07:00	103	137	0	0	8	0	39	0	1	64	22	0	0	0	1	5	380
07:15	117	133	0	2	4	0	22	0	0	79	38	0	0	0	0	18	413
07:30	122	119	0	0	7	0	37	1	0	62	51	0	0	0	0	7	406
07:45	77	75	0	0	13	0	47	0	1	89	42	0	0	0	0	2	346
Total	419	464	0	2	32	0	145	1	2	294	153	0	0	0	1	32	1545
08:00	79	76	0	2	10	0	42	0	0	72	26	0	0	0	0	2	309
08:15	46	74	0	0	10	1	34	1	1	49	31	0	0	0	1	9	257
Grand Total	718	841	0	6	59	1	259	4	3	512	241	0	0	0	2	64	2710
Apprch %	45.9	53.7	0	0.4	18.3	0.3	80.2	1.2	0.4	67.7	31.9	0	0	0	3	97	
Total %	26.5	31	0	0.2	2.2	0	9.6	0.1	0.1	18.9	8.9	0	0	0	0.1	2.4	
Motorcycles	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
% Motorcycles	0.4	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
Cars & Light Goods	703	827	0	0	58	1	252	0	3	503	235	0	0	0	2	0	2584
% Cars & Light Goods	97.9	98.3	0	0	98.3	100	97.3	0	100	98.2	97.5	0	0	0	100	0	95.4
Buses	9	4	0	0	1	0	6	0	0	5	1	0	0	0	0	0	26
% Buses	1.3	0.5	0	0	1.7	0	2.3	0	0	1	0.4	0	0	0	0	0	1
Single-Unit Trucks	2	4	0	0	0	0	1	0	0	3	5	0	0	0	0	0	15
% Single-Unit Trucks	0.3	0.5	0	0	0	0	0.4	0	0	0.6	2.1	0	0	0	0	0	0.6
Articulated Trucks	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Articulated Trucks	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2
% Bicycles on Crosswalk	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	1.6	0.1
Pedestrians	0	0	0	6	0	0	0	3	0	0	0	0	0	0	0	63	72
% Pedestrians	0	0	0	100	0	0	0	75	0	0	0	0	0	0	0	98.4	2.7

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Start Date : 5/1/2018
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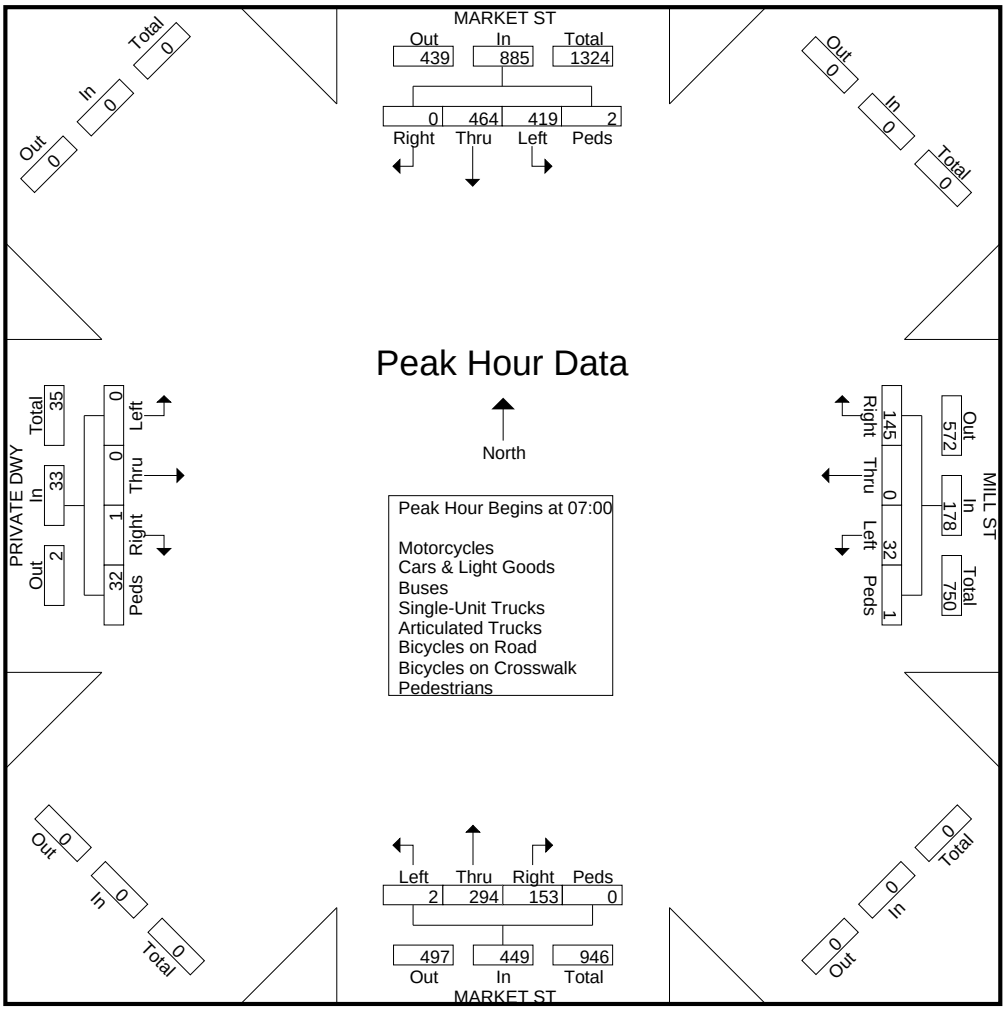
	MARKET ST SOUTHBOUND					MILL ST WESTBOUND					MARKET ST NORTHBOUND					PRIVATE DWY EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 08:15 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	103	**137**	0	0	240	8	0	39	0	47	**1**	64	22	0	87	0	0	**1**	5	6	380
07:15	117	133	0	**2**	**252**	4	0	22	0	26	0	79	38	0	117	0	0	0	**18**	**18**	**413**
07:30	**122**	119	0	0	241	7	0	37	**1**	45	0	62	**51**	0	113	0	0	0	7	7	406
07:45	77	75	0	0	152	**13**	0	**47**	0	**60**	1	**89**	42	0	**132**	0	0	0	2	2	346
Total Volume	419	464	0	2	885	32	0	145	1	178	2	294	153	0	449	0	0	1	32	33	1545
% App. Total	47.3	52.4	0	0.2		18	0	81.5	0.6		0.4	65.5	34.1	0		0	0	3	97		
PHF	.859	.847	.000	.250	.878	.615	.000	.771	.250	.742	.500	.826	.750	.000	.850	.000	.000	.250	.444	.458	.935



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

	MARKET ST SOUTHBOUND				MILL ST WESTBOUND				MARKET ST NORTHBOUND				PRIVATE DWY EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:15	51	67	0	4	4	0	46	1	0	95	41	0	0	0	0	9	318
15:30	38	55	0	0	10	0	59	0	1	113	43	0	0	0	1	12	332
15:45	52	62	0	5	12	0	74	2	1	118	50	0	0	1	1	9	387
Total	141	184	0	9	26	0	179	3	2	326	134	0	0	1	2	30	1037
16:00	58	66	0	0	7	0	89	0	0	135	37	0	0	0	1	5	398
16:15	63	71	1	0	9	0	79	0	1	129	36	0	1	0	0	4	394
16:30	57	61	0	2	7	0	73	0	0	143	46	0	0	0	1	3	393
16:45	50	64	1	0	11	0	66	0	3	127	38	0	0	2	0	3	365
Total	228	262	2	2	34	0	307	0	4	534	157	0	1	2	2	15	1550
17:00	51	67	1	0	10	1	61	0	0	115	28	0	0	0	1	3	338
Grand Total	420	513	3	11	70	1	547	3	6	975	319	0	1	3	5	48	2925
Apprch %	44.4	54.2	0.3	1.2	11.3	0.2	88.1	0.5	0.5	75	24.5	0	1.8	5.3	8.8	84.2	
Total %	14.4	17.5	0.1	0.4	2.4	0	18.7	0.1	0.2	33.3	10.9	0	0	0.1	0.2	1.6	
Motorcycles	4	1	0	0	0	0	5	0	0	5	0	0	0	0	0	0	15
% Motorcycles	1	0.2	0	0	0	0	0.9	0	0	0.5	0	0	0	0	0	0	0.5
Cars & Light Goods	406	505	3	0	70	1	535	0	6	956	315	0	1	3	5	0	2806
% Cars & Light Goods	96.7	98.4	100	0	100	100	97.8	0	100	98.1	98.7	0	100	100	100	0	95.9
Buses	5	0	0	0	0	0	2	0	0	3	0	0	0	0	0	0	10
% Buses	1.2	0	0	0	0	0	0.4	0	0	0.3	0	0	0	0	0	0	0.3
Single-Unit Trucks	3	2	0	0	0	0	4	0	0	8	4	0	0	0	0	0	21
% Single-Unit Trucks	0.7	0.4	0	0	0	0	0.7	0	0	0.8	1.3	0	0	0	0	0	0.7
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	2	5	0	0	0	0	1	0	0	3	0	0	0	0	0	0	11
% Bicycles on Road	0.5	1	0	0	0	0	0.2	0	0	0.3	0	0	0	0	0	0	0.4
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	11	0	0	0	3	0	0	0	0	0	0	0	48	62
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	0	0	0	0	100	2.1

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Start Date : 5/1/2018
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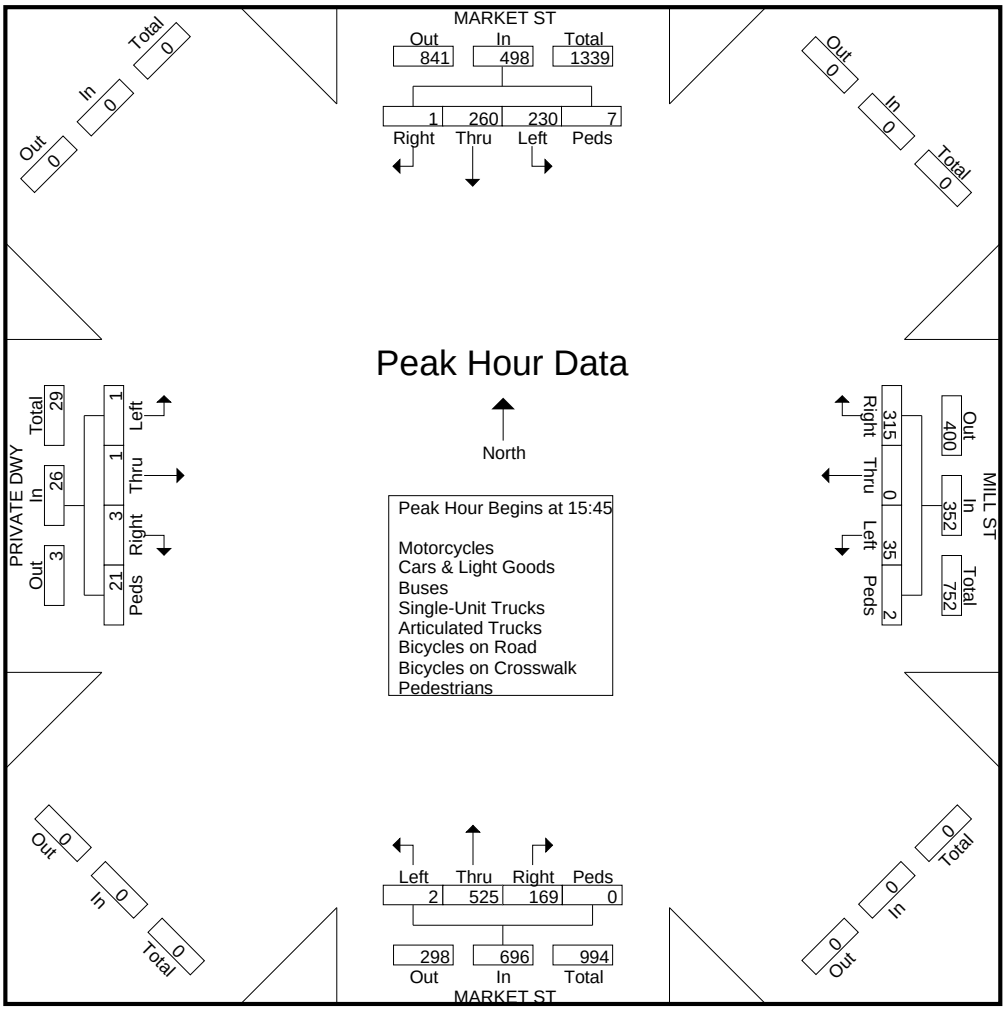
	MARKET ST SOUTHBOUND					MILL ST WESTBOUND					MARKET ST NORTHBOUND					PRIVATE DWY EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 15:15 to 17:00 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 15:45																					
15:45	52	62	0	**5**	119	**12**	0	74	**2**	88	**1**	118	**50**	0	169	0	**1**	**1**	**9**	**11**	387
16:00	58	66	0	0	124	7	0	**89**	0	**96**	0	135	37	0	172	0	0	1	5	6	**398**
16:15	**63**	**71**	**1**	0	**135**	9	0	79	0	88	1	129	36	0	166	**1**	0	0	4	5	394
16:30	57	61	0	2	120	7	0	73	0	80	0	**143**	46	0	**189**	0	0	1	3	4	393
Total Volume	230	260	1	7	498	35	0	315	2	352	2	525	169	0	696	1	1	3	21	26	1572
% App. Total	46.2	52.2	0.2	1.4		9.9	0	89.5	0.6		0.3	75.4	24.3	0		3.8	3.8	11.5	80.8		
PHF	.913	.915	.250	.350	.922	.729	.000	.885	.250	.917	.500	.918	.845	.000	.921	.250	.250	.750	.583	.591	.987



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File Name : Central Ave - Mill St
Site Code : 18-519 Main Street Business Hotel
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	PRIVATE DWY SOUTHBOUND				MILL ST WESTBOUND				CENTRAL AVE NORTHBOUND				MILL ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30	0	2	1	3	33	14	0	0	3	0	10	0	0	51	49	2	168
06:45	0	1	0	0	30	26	0	0	4	0	22	0	0	65	45	0	193
Total	0	3	1	3	63	40	0	0	7	0	32	0	0	116	94	2	361
07:00	1	1	1	0	54	42	0	0	5	0	30	0	0	61	66	0	261
07:15	0	0	0	0	62	27	0	0	0	0	40	1	0	98	61	0	289
07:30	0	0	1	0	66	44	0	0	6	0	27	0	0	126	52	0	322
07:45	1	0	0	1	65	55	0	0	5	0	48	0	0	84	42	0	301
Total	2	1	2	1	247	168	0	0	16	0	145	1	0	369	221	0	1173
08:00	0	0	1	1	48	45	0	0	8	0	25	1	0	72	29	0	230
08:15	0	0	1	2	39	37	0	0	4	0	29	0	0	56	23	1	192
Grand Total	2	4	5	7	397	290	0	0	35	0	231	2	0	613	367	3	1956
Apprch %	11.1	22.2	27.8	38.9	57.8	42.2	0	0	13.1	0	86.2	0.7	0	62.4	37.3	0.3	
Total %	0.1	0.2	0.3	0.4	20.3	14.8	0	0	1.8	0	11.8	0.1	0	31.3	18.8	0.2	
Motorcycles	0	0	0	0	3	1	0	0	0	0	0	0	0	1	2	0	7
% Motorcycles	0	0	0	0	0.8	0.3	0	0	0	0	0	0	0	0.2	0.5	0	0.4
Cars & Light Goods	2	4	5	0	384	283	0	0	34	0	228	0	0	597	362	0	1899
% Cars & Light Goods	100	100	100	0	96.7	97.6	0	0	97.1	0	98.7	0	0	97.4	98.6	0	97.1
Buses	0	0	0	0	4	6	0	0	1	0	1	0	0	7	3	0	22
% Buses	0	0	0	0	1	2.1	0	0	2.9	0	0.4	0	0	1.1	0.8	0	1.1
Single-Unit Trucks	0	0	0	0	6	0	0	0	0	0	2	0	0	7	0	0	15
% Single-Unit Trucks	0	0	0	0	1.5	0	0	0	0	0	0.9	0	0	1.1	0	0	0.8
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0.1
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% Bicycles on Crosswalk	0	0	0	14.3	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Pedestrians	0	0	0	6	0	0	0	0	0	0	0	2	0	0	0	3	11
% Pedestrians	0	0	0	85.7	0	0	0	0	0	0	0	100	0	0	0	100	0.6

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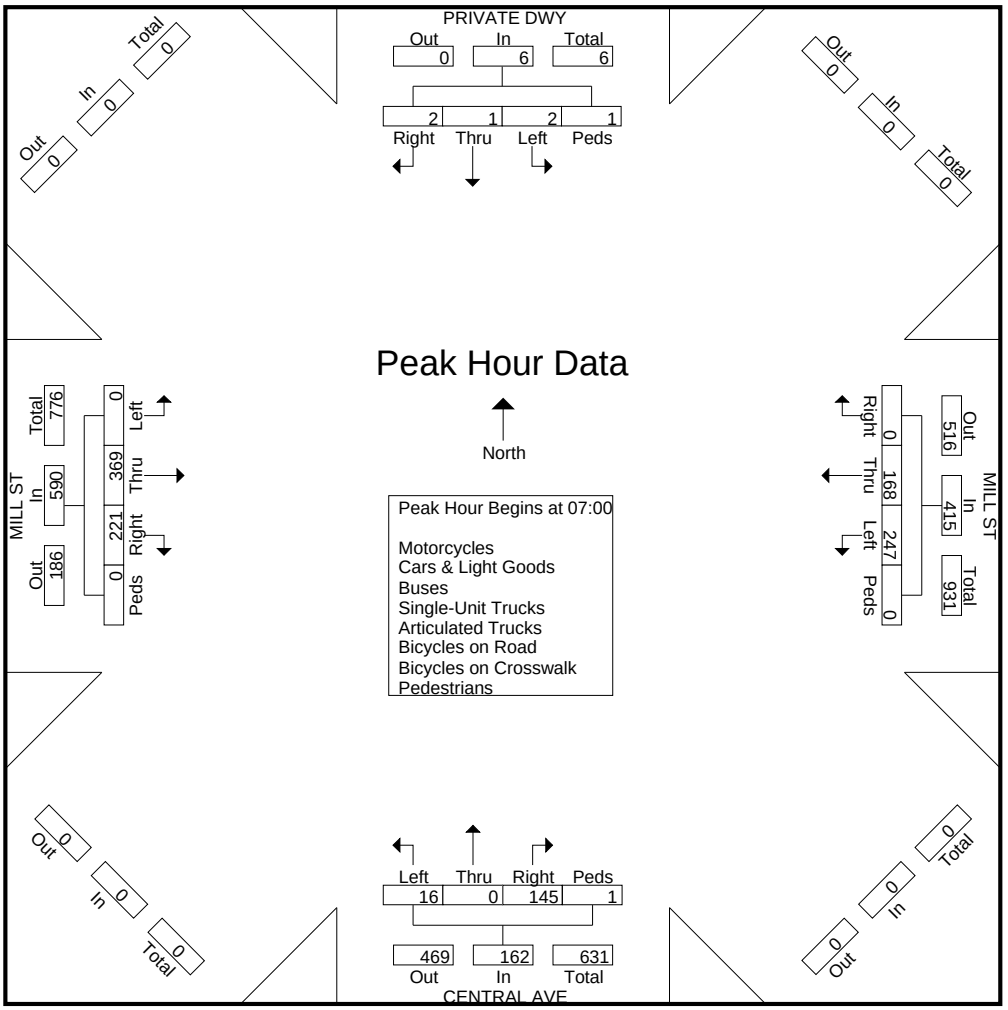
	PRIVATE DWY SOUTHBOUND					MILL ST WESTBOUND					CENTRAL AVE NORTHBOUND					MILL ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 08:15 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	**1**	**1**	**1**	0	**3**	54	42	0	0	96	5	0	30	0	35	0	61	**66**	0	127	261
07:15	0	0	0	0	0	62	27	0	0	89	0	0	40	**1**	41	0	98	61	0	159	289
07:30	0	0	1	0	1	**66**	44	0	0	110	**6**	0	27	0	33	0	**126**	52	0	**178**	**322**
07:45	1	0	0	**1**	2	65	**55**	0	0	**120**	5	0	**48**	0	**53**	0	84	42	0	126	301
Total Volume	2	1	2	1	6	247	168	0	0	415	16	0	145	1	162	0	369	221	0	590	1173
% App. Total	33.3	16.7	33.3	16.7		59.5	40.5	0	0		9.9	0	89.5	0.6		0	62.5	37.5	0		
PHF	.500	.250	.500	.250	.500	.936	.764	.000	.000	.865	.667	.000	.755	.250	.764	.000	.732	.837	.000	.829	.911



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

	PRIVATE DWY SOUTHBOUND				MILL ST WESTBOUND				CENTRAL AVE NORTHBOUND				MILL ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:15	0	0	0	0	57	43	1	0	11	0	37	0	0	69	24	0	242
15:30	0	0	0	0	51	60	0	0	9	1	43	0	0	61	18	0	243
15:45	0	0	0	1	60	74	0	0	14	0	46	2	0	79	20	0	296
Total	0	0	0	1	168	177	1	0	34	1	126	2	0	209	62	0	781
16:00	0	0	0	1	67	80	0	0	14	0	31	0	0	67	27	0	287
16:15	0	0	0	0	64	82	0	0	11	0	27	0	0	68	33	0	285
16:30	0	2	0	0	55	68	0	0	12	0	39	1	0	82	24	0	283
16:45	0	1	0	1	57	60	0	0	17	0	33	0	0	71	25	0	265
Total	0	3	0	2	243	290	0	0	54	0	130	1	0	288	109	0	1120
17:00	2	3	1	0	48	64	0	0	9	0	27	0	0	62	16	0	232
Grand Total	2	6	1	3	459	531	1	0	97	1	283	3	0	559	187	0	2133
Apprch %	16.7	50	8.3	25	46.3	53.6	0.1	0	25.3	0.3	73.7	0.8	0	74.9	25.1	0	
Total %	0.1	0.3	0	0.1	21.5	24.9	0	0	4.5	0	13.3	0.1	0	26.2	8.8	0	
Motorcycles	0	0	0	0	3	2	0	0	1	0	0	0	0	4	1	0	11
% Motorcycles	0	0	0	0	0.7	0.4	0	0	1	0	0	0	0	0.7	0.5	0	0.5
Cars & Light Goods	2	6	1	0	452	523	1	0	96	0	282	0	0	548	184	0	2095
% Cars & Light Goods	100	100	100	0	98.5	98.5	100	0	99	0	99.6	0	0	98	98.4	0	98.2
Buses	0	0	0	0	3	2	0	0	0	0	0	0	0	4	1	0	10
% Buses	0	0	0	0	0.7	0.4	0	0	0	0	0	0	0	0.7	0.5	0	0.5
Single-Unit Trucks	0	0	0	0	1	3	0	0	0	0	1	0	0	3	1	0	9
% Single-Unit Trucks	0	0	0	0	0.2	0.6	0	0	0	0	0.4	0	0	0.5	0.5	0	0.4
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2
% Bicycles on Road	0	0	0	0	0	0.2	0	0	0	100	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0	6
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0.3

Austin Tsutsumi & Associates

501 Sumner Street, Suite 521
Honolulu, HI 96817-5031
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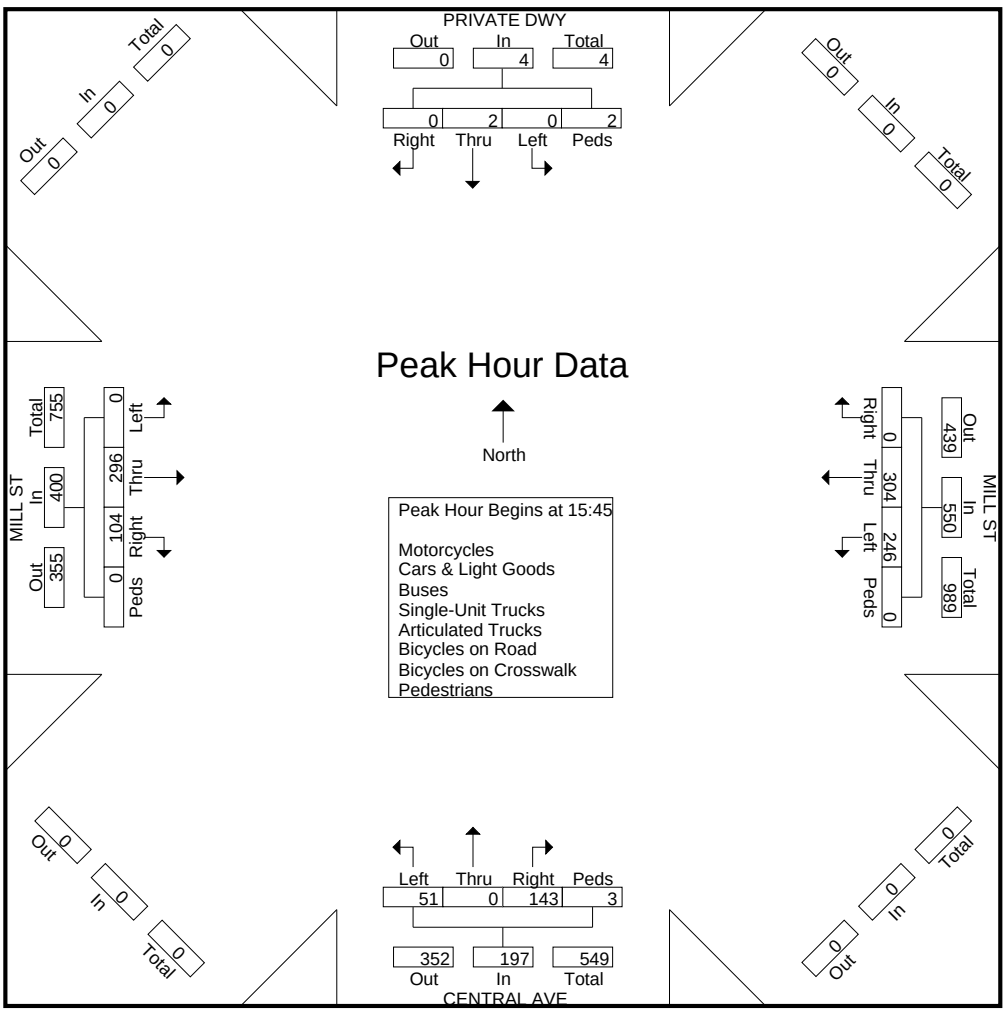
File Name : Central Ave - Mill St
Site Code : 18-519 Main Street Business Hotel
Start Date : 5/1/2018
Page No : 2

	PRIVATE DWY SOUTHBOUND					MILL ST WESTBOUND					CENTRAL AVE NORTHBOUND					MILL ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 15:15 to 17:00 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 15:45																					
15:45	0	0	0	**1**	1	60	74	0	0	134	**14**	0	**46**	**2**	**62**	0	79	20	0	99	**296**
16:00	0	0	0	1	1	**67**	80	0	0	**147**	14	0	31	0	45	0	67	27	0	94	287
16:15	0	0	0	0	0	64	**82**	0	0	146	11	0	27	0	38	0	68	**33**	0	101	285
16:30	0	**2**	0	0	**2**	55	68	0	0	123	12	0	39	1	52	0	**82**	24	0	**106**	283
Total Volume	0	2	0	2	4	246	304	0	0	550	51	0	143	3	197	0	296	104	0	400	1151
% App. Total	0	50	0	50		44.7	55.3	0	0		25.9	0	72.6	1.5		0	74	26	0		
PHF	.000	.250	.000	.500	.500	.918	.927	.000	.000	.935	.911	.000	.777	.375	.794	.000	.902	.788	.000	.943	.972



Austin Tsutsumi & Associates

1871 Wili Pa Loop STE.A
Wailuku, HI 96793
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File Name : Kaniela St - Mill St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/18/2021
Page No : 1

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

	SOUTHBOUND				MILL ST WESTBOUND				KANIELA ST NORTHBOUND				MILL ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	0	0	0	0	1	28	0	0	0	0	2	0	0	47	5	0	83
06:45 AM	0	0	0	0	1	30	0	0	0	0	4	0	0	68	7	0	110
Total	0	0	0	0	2	58	0	0	0	0	6	0	0	115	12	0	193
07:00 AM	0	0	0	0	0	37	0	0	0	0	4	0	0	60	10	0	111
07:15 AM	0	0	0	0	3	64	0	0	6	0	7	0	0	91	13	0	184
07:30 AM	0	0	0	0	7	78	0	0	9	0	8	0	0	95	10	0	207
07:45 AM	0	0	0	0	8	71	0	0	2	0	9	0	0	109	18	0	217
Total	0	0	0	0	18	250	0	0	17	0	28	0	0	355	51	0	719
08:00 AM	0	0	0	0	7	65	0	0	1	0	10	0	0	78	12	0	173
08:15 AM	0	0	0	0	2	59	0	0	2	0	1	0	0	79	4	0	147
Grand Total	0	0	0	0	29	432	0	0	20	0	45	0	0	627	79	0	1232
Apprch %	0	0	0	0	6.3	93.7	0	0	30.8	0	69.2	0	0	88.8	11.2	0	
Total %	0	0	0	0	2.4	35.1	0	0	1.6	0	3.7	0	0	50.9	6.4	0	
Motorcycles	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	5
% Motorcycles	0	0	0	0	0	0.5	0	0	0	0	0	0	0	0.5	0	0	0.4
Cars & Light Goods	0	0	0	0	29	413	0	0	17	0	42	0	0	607	77	0	1185
% Cars & Light Goods	0	0	0	0	100	95.6	0	0	85	0	93.3	0	0	96.8	97.5	0	96.2
Buses	0	0	0	0	0	8	0	0	0	0	3	0	0	4	1	0	16
% Buses	0	0	0	0	0	1.9	0	0	0	0	6.7	0	0	0.6	1.3	0	1.3
Single-Unit Trucks	0	0	0	0	0	9	0	0	3	0	0	0	0	11	1	0	24
% Single-Unit Trucks	0	0	0	0	0	2.1	0	0	15	0	0	0	0	1.8	1.3	0	1.9
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Austin Tsutsumi & Associates

1871 Wili Pa Loop STE.A
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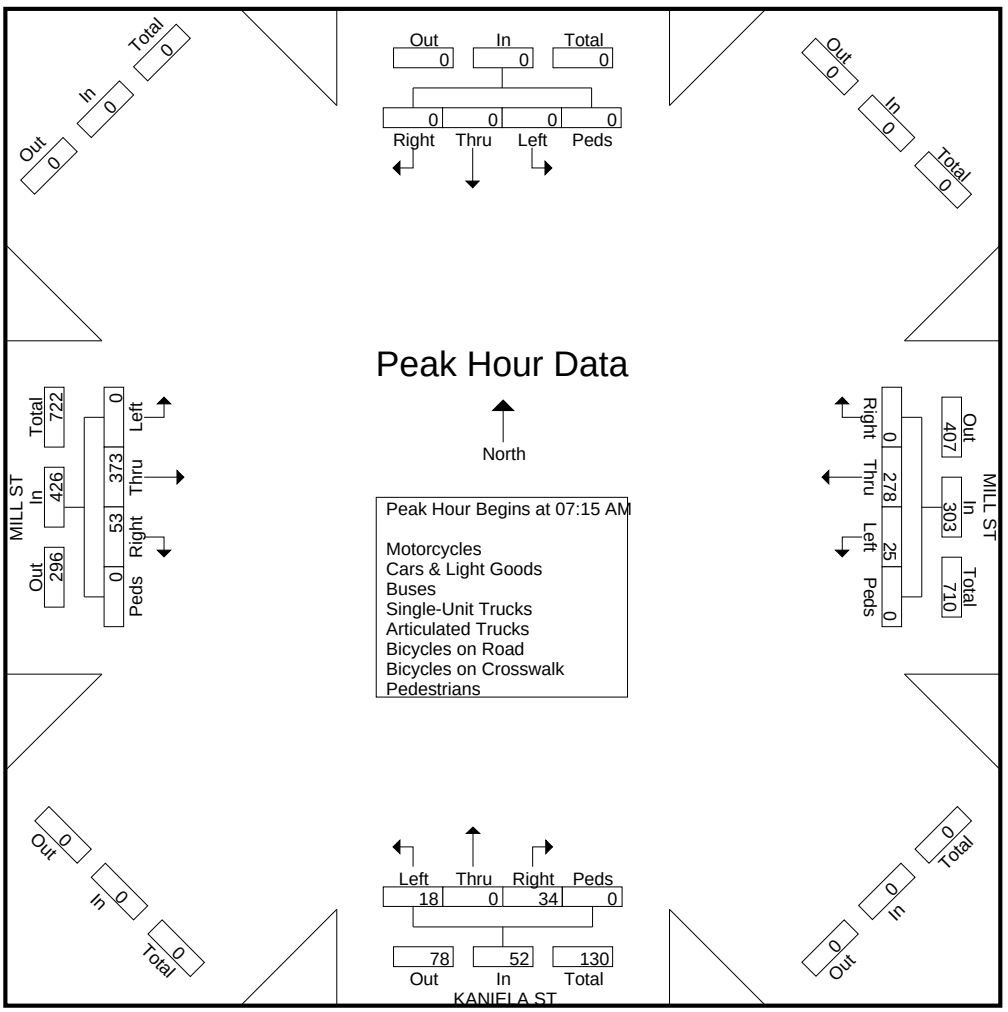
File Name : Kaniela St - Mill St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/18/2021
Page No : 2

	SOUTHBOUND					MILL ST WESTBOUND					KANIELA ST NORTHBOUND					MILL ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	0	0	0	3	64	0	0	67	6	0	7	0	13	0	91	13	0	104	184
07:30 AM	0	0	0	0	0	7	**78**	0	0	**85**	**9**	0	8	0	**17**	0	95	10	0	105	207
07:45 AM	0	0	0	0	0	**8**	71	0	0	79	2	0	9	0	11	0	**109**	**18**	0	**127**	**217**
08:00 AM	0	0	0	0	0	7	65	0	0	72	1	0	**10**	0	11	0	78	12	0	90	173
Total Volume	0	0	0	0	0	25	278	0	0	303	18	0	34	0	52	0	373	53	0	426	781
% App. Total	0	0	0	0		8.3	91.7	0	0		34.6	0	65.4	0		0	87.6	12.4	0		
PHF	.000	.000	.000	.000	.000	.781	.891	.000	.000	.891	.500	.000	.850	.000	.765	.000	.856	.736	.000	.839	.900



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File Name : Kaniela St - Mill St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/17/2021
Page No : 1

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

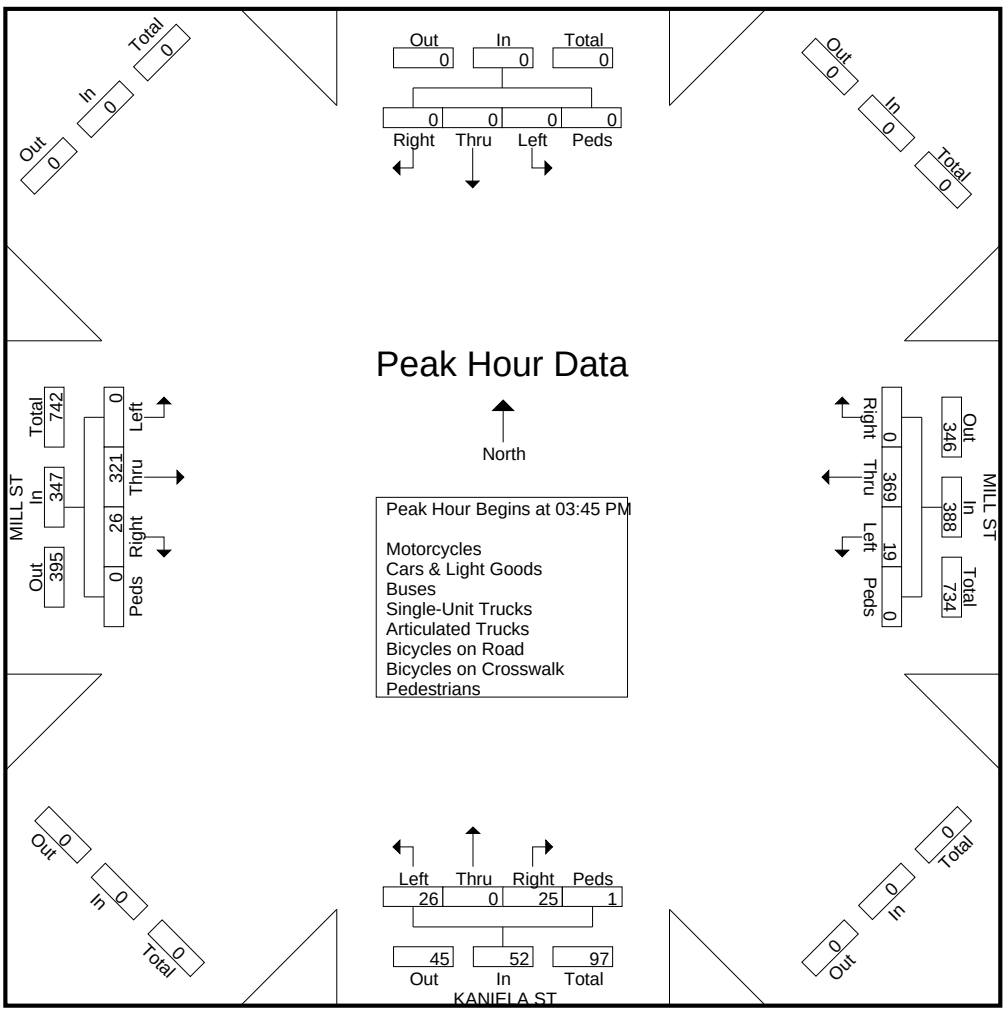
	SOUTHBOUND				MILL ST WESTBOUND				KANIELA ST NORTHBOUND				MILL ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	0	0	0	0	4	103	0	0	6	0	7	0	0	80	2	0	202
03:45 PM	0	0	0	0	9	90	0	0	4	0	9	1	0	77	11	0	201
Total	0	0	0	0	13	193	0	0	10	0	16	1	0	157	13	0	403
04:00 PM	0	0	0	0	4	85	0	0	7	0	6	0	0	72	7	0	181
04:15 PM	0	0	0	0	5	104	0	0	7	0	5	0	0	89	2	0	212
04:30 PM	0	0	0	0	1	90	0	0	8	0	5	0	0	83	6	0	193
04:45 PM	0	0	0	0	7	83	0	0	1	0	5	1	0	93	6	0	196
Total	0	0	0	0	17	362	0	0	23	0	21	1	0	337	21	0	782
05:00 PM	0	0	0	0	4	100	0	0	5	0	4	0	0	74	2	0	189
05:15 PM	0	0	0	0	4	76	0	0	2	0	7	0	0	62	3	0	154
Grand Total	0	0	0	0	38	731	0	0	40	0	48	2	0	630	39	0	1528
Apprch %	0	0	0	0	4.9	95.1	0	0	44.4	0	53.3	2.2	0	94.2	5.8	0	
Total %	0	0	0	0	2.5	47.8	0	0	2.6	0	3.1	0.1	0	41.2	2.6	0	
Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars & Light Goods	0	0	0	0	38	724	0	0	40	0	46	0	0	626	39	0	1513
% Cars & Light Goods	0	0	0	0	100	99	0	0	100	0	95.8	0	0	99.4	100	0	99
Buses	0	0	0	0	0	4	0	0	0	0	2	0	0	2	0	0	8
% Buses	0	0	0	0	0	0.5	0	0	0	0	4.2	0	0	0.3	0	0	0.5
Single-Unit Trucks	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	5
% Single-Unit Trucks	0	0	0	0	0	0.4	0	0	0	0	0	0	0	0.3	0	0	0.3
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0.1

Austin Tsutsumi & Associates

1871 Wili Pa Loop STE.A
Wailuku, HI 96793
Phone: (808) 244-8044 Fax: (808) 242-9163

File Name : Kaniela St - Mill St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/17/2021
Page No : 2

	SOUTHBOUND					MILL ST WESTBOUND					KANIELA ST NORTHBOUND					MILL ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	0	0	0	0	**9**	90	0	0	99	4	0	**9**	**1**	**14**	0	77	**11**	0	88	201
04:00 PM	0	0	0	0	0	4	85	0	0	89	7	0	6	0	13	0	72	7	0	79	181
04:15 PM	0	0	0	0	0	5	**104**	0	0	**109**	7	0	5	0	12	0	**89**	2	0	**91**	**212**
04:30 PM	0	0	0	0	0	1	90	0	0	91	**8**	0	5	0	13	0	83	6	0	89	193
Total Volume	0	0	0	0	0	19	369	0	0	388	26	0	25	1	52	0	321	26	0	347	787
% App. Total	0	0	0	0		4.9	95.1	0	0		50	0	48.1	1.9		0	92.5	7.5	0		
PHF	.000	.000	.000	.000	.000	.528	.887	.000	.000	.890	.813	.000	.694	.250	.929	.000	.902	.591	.000	.953	.928



Austin Tsutsumi & Associates

1871 Wili Pa Loop STE.A
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File Name : Mission St - Mill St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/18/2021
Page No : 1

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

	PRIVATE DWY SOUTHBOUND				MILL ST WESTBOUND				MISSION ST NORTHBOUND				MILL ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	0	0	0	0	13	28	0	0	1	0	6	1	0	43	4	0	96
06:45 AM	0	0	0	0	9	30	0	0	1	0	8	0	0	66	6	0	120
Total	0	0	0	0	22	58	0	0	2	0	14	1	0	109	10	0	216
07:00 AM	0	0	0	0	15	38	0	0	1	0	14	1	0	59	5	0	133
07:15 AM	0	0	0	0	12	66	0	0	3	0	12	0	0	87	9	0	189
07:30 AM	0	0	0	1	21	82	0	0	4	0	17	0	1	94	10	0	230
07:45 AM	0	0	0	0	6	74	0	0	2	0	25	0	0	102	14	0	223
Total	0	0	0	1	54	260	0	0	10	0	68	1	1	342	38	0	775
08:00 AM	0	0	0	1	11	73	0	0	3	0	21	0	0	86	1	0	196
08:15 AM	0	0	0	1	8	61	0	0	2	0	14	0	0	72	5	0	163
Grand Total	0	0	0	3	95	452	0	0	17	0	117	2	1	609	54	0	1350
Apprch %	0	0	0	100	17.4	82.6	0	0	12.5	0	86	1.5	0.2	91.7	8.1	0	
Total %	0	0	0	0.2	7	33.5	0	0	1.3	0	8.7	0.1	0.1	45.1	4	0	
Motorcycles	0	0	0	0	0	2	0	0	0	0	0	0	0	2	1	0	5
% Motorcycles	0	0	0	0	0	0.4	0	0	0	0	0	0	0	0.3	1.9	0	0.4
Cars & Light Goods	0	0	0	0	94	433	0	0	16	0	115	0	1	587	53	0	1299
% Cars & Light Goods	0	0	0	0	98.9	95.8	0	0	94.1	0	98.3	0	100	96.4	98.1	0	96.2
Buses	0	0	0	0	1	8	0	0	0	0	0	0	0	7	0	0	16
% Buses	0	0	0	0	1.1	1.8	0	0	0	0	0	0	0	1.1	0	0	1.2
Single-Unit Trucks	0	0	0	0	0	9	0	0	1	0	2	0	0	11	0	0	23
% Single-Unit Trucks	0	0	0	0	0	2	0	0	5.9	0	1.7	0	0	1.8	0	0	1.7
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	0	5
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0.4

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1871 Wili Pa Loop STE.A
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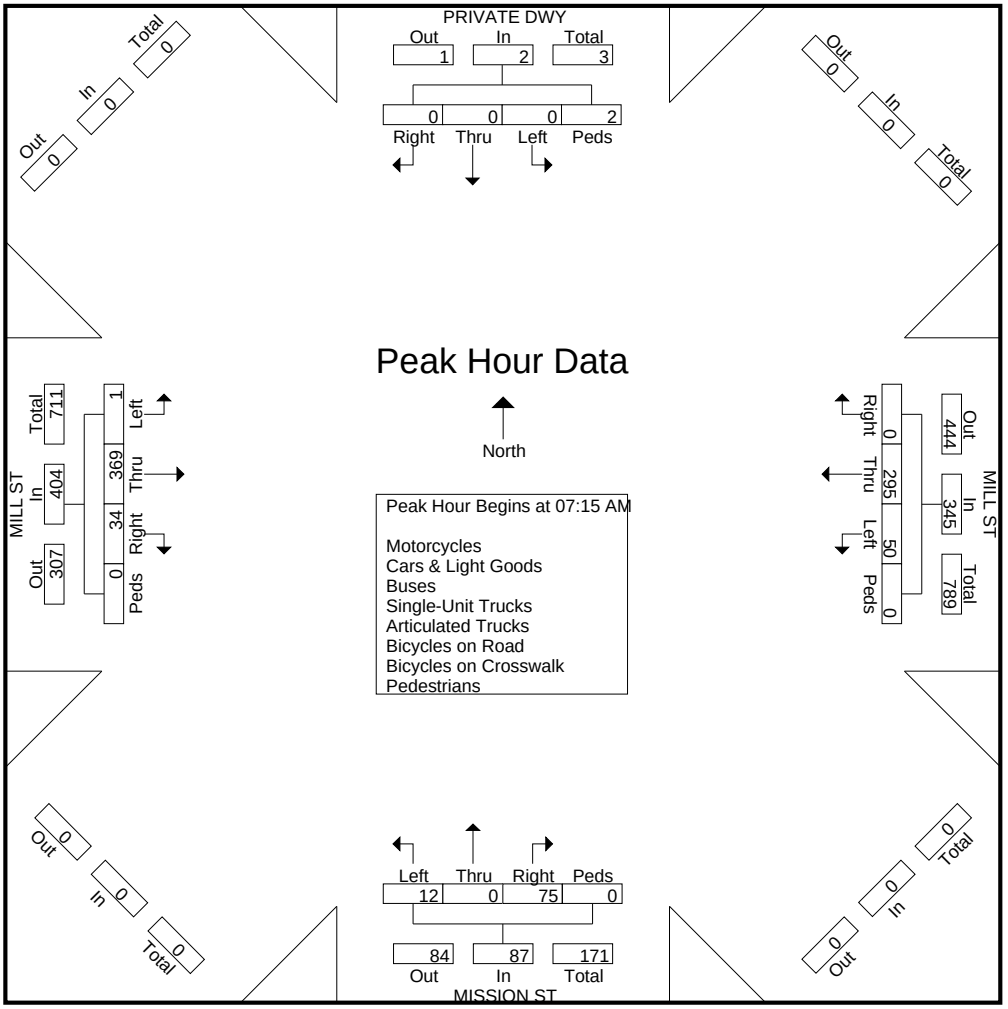
File Name : Mission St - Mill St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/18/2021
Page No : 2

	PRIVATE DWY SOUTHBOUND					MILL ST WESTBOUND					MISSION ST NORTHBOUND					MILL ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	0	0	0	12	66	0	0	78	3	0	12	0	15	0	87	9	0	96	189
07:30 AM	0	0	0	**1**	**1**	**21**	**82**	0	0	**103**	**4**	0	17	0	21	**1**	94	10	0	105	**230**
07:45 AM	0	0	0	0	0	6	74	0	0	80	2	0	**25**	0	**27**	0	**102**	**14**	0	**116**	223
08:00 AM	0	0	0	1	1	11	73	0	0	84	3	0	21	0	24	0	86	1	0	87	196
Total Volume	0	0	0	2	2	50	295	0	0	345	12	0	75	0	87	1	369	34	0	404	838
% App. Total	0	0	0	100		14.5	85.5	0	0		13.8	0	86.2	0		0.2	91.3	8.4	0		
PHF	.000	.000	.000	.500	.500	.595	.899	.000	.000	.837	.750	.000	.750	.000	.806	.250	.904	.607	.000	.871	.911



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File Name : Mission St - Mill St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/17/2021
Page No : 1

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

	PRIVATE DWY SOUTHBOUND				MILL ST WESTBOUND				MISSION ST NORTHBOUND				MILL ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	0	0	0	1	13	105	0	0	3	0	15	0	0	75	10	0	222
03:45 PM	0	0	0	1	13	89	0	0	7	0	15	0	0	83	2	0	210
Total	0	0	0	2	26	194	0	0	10	0	30	0	0	158	12	0	432
04:00 PM	0	0	0	0	24	86	0	0	6	0	13	0	0	77	2	0	208
04:15 PM	0	0	0	0	8	98	0	0	10	0	21	0	0	92	0	0	229
04:30 PM	0	0	0	3	19	82	0	0	3	0	11	1	0	91	2	0	212
04:45 PM	0	0	0	1	21	81	0	0	5	0	14	0	0	96	2	0	220
Total	0	0	0	4	72	347	0	0	24	0	59	1	0	356	6	0	869
05:00 PM	0	0	0	0	11	102	0	0	4	0	12	1	0	76	1	0	207
05:15 PM	1	0	0	0	8	75	1	0	4	0	9	0	0	65	6	0	169
Grand Total	1	0	0	6	117	718	1	0	42	0	110	2	0	655	25	0	1677
Apprch %	14.3	0	0	85.7	14	85.9	0.1	0	27.3	0	71.4	1.3	0	96.3	3.7	0	
Total %	0.1	0	0	0.4	7	42.8	0.1	0	2.5	0	6.6	0.1	0	39.1	1.5	0	
Motorcycles	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
% Motorcycles	0	0	0	0	0.9	0	0	0	0	0	0	0	0	0	0	0	0.1
Cars & Light Goods	1	0	0	0	116	713	1	0	41	0	110	0	0	648	25	0	1655
% Cars & Light Goods	100	0	0	0	99.1	99.3	100	0	97.6	0	100	0	0	98.9	100	0	98.7
Buses	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	8
% Buses	0	0	0	0	0	0.6	0	0	0	0	0	0	0	0.6	0	0	0.5
Single-Unit Trucks	0	0	0	0	0	1	0	0	1	0	0	0	0	2	0	0	4
% Single-Unit Trucks	0	0	0	0	0	0.1	0	0	2.4	0	0	0	0	0.3	0	0	0.2
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0.1
Bicycles on Crosswalk	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% Bicycles on Crosswalk	0	0	0	16.7	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Pedestrians	0	0	0	5	0	0	0	0	0	0	0	2	0	0	0	0	7
% Pedestrians	0	0	0	83.3	0	0	0	0	0	0	0	100	0	0	0	0	0.4

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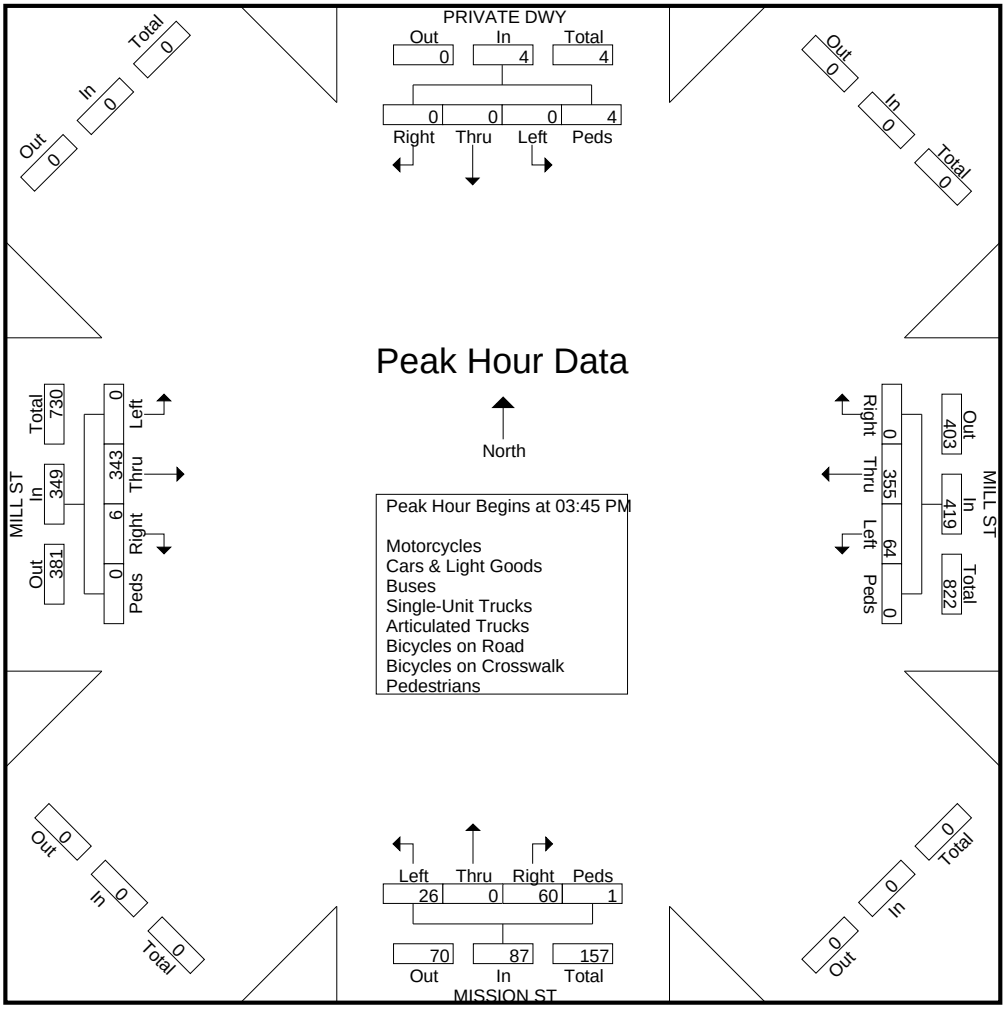
File Name : Mission St - Mill St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/17/2021
Page No : 2

	PRIVATE DWY SOUTHBOUND					MILL ST WESTBOUND					MISSION ST NORTHBOUND					MILL ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	0	0	1	1	13	89	0	0	102	7	0	15	0	22	0	83	**2**	0	85	210
04:00 PM	0	0	0	0	0	**24**	86	0	0	**110**	6	0	13	0	19	0	77	2	0	79	208
04:15 PM	0	0	0	0	0	8	**98**	0	0	106	**10**	0	**21**	0	**31**	0	**92**	0	0	92	**229**
04:30 PM	0	0	0	**3**	**3**	19	82	0	0	101	3	0	11	**1**	15	0	91	2	0	**93**	212
Total Volume	0	0	0	4	4	64	355	0	0	419	26	0	60	1	87	0	343	6	0	349	859
% App. Total	0	0	0	100		15.3	84.7	0	0		29.9	0	69	1.1		0	98.3	1.7	0		
PHF	.000	.000	.000	.333	.333	.667	.906	.000	.000	.952	.650	.000	.714	.250	.702	.000	.932	.750	.000	.938	.938



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File Name : Imi Kala St - Mill St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/18/2021
Page No : 1

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

	IMI KALA ST SOUTHBOUND				MILL ST WESTBOUND				PRIVATE DWY NORTHBOUND				MILL ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	5	0	29	0	0	12	8	0	0	0	0	0	23	27	0	0	104
06:45 AM	2	0	22	0	0	16	16	0	0	0	0	0	35	36	0	0	127
Total	7	0	51	0	0	28	24	0	0	0	0	0	58	63	0	0	231
07:00 AM	7	0	41	0	0	13	15	0	0	0	0	1	43	32	0	0	152
07:15 AM	8	0	43	0	0	35	17	0	0	0	0	0	61	37	0	0	201
07:30 AM	6	0	52	0	0	51	20	0	0	0	0	0	71	47	0	0	247
07:45 AM	9	0	40	0	0	43	25	0	0	0	0	0	80	47	0	0	244
Total	30	0	176	0	0	142	77	0	0	0	0	1	255	163	0	0	844
08:00 AM	10	0	54	0	0	32	22	0	0	0	0	0	71	37	0	0	226
08:15 AM	13	0	41	1	0	28	18	0	0	0	0	0	46	38	0	0	185
Grand Total	60	0	322	1	0	230	141	0	0	0	0	1	430	301	0	0	1486
Apprch %	15.7	0	84.1	0.3	0	62	38	0	0	0	0	100	58.8	41.2	0	0	
Total %	4	0	21.7	0.1	0	15.5	9.5	0	0	0	0	0.1	28.9	20.3	0	0	
Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
% Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0	0.1
Cars & Light Goods	54	0	311	0	0	226	138	0	0	0	0	0	412	295	0	0	1436
% Cars & Light Goods	90	0	96.6	0	0	98.3	97.9	0	0	0	0	0	95.8	98	0	0	96.6
Buses	2	0	7	0	0	2	2	0	0	0	0	0	5	2	0	0	20
% Buses	3.3	0	2.2	0	0	0.9	1.4	0	0	0	0	0	1.2	0.7	0	0	1.3
Single-Unit Trucks	4	0	4	0	0	2	1	0	0	0	0	0	10	4	0	0	25
% Single-Unit Trucks	6.7	0	1.2	0	0	0.9	0.7	0	0	0	0	0	2.3	1.3	0	0	1.7
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0.1

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File Name : Imi Kala St - Mill St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/18/2021
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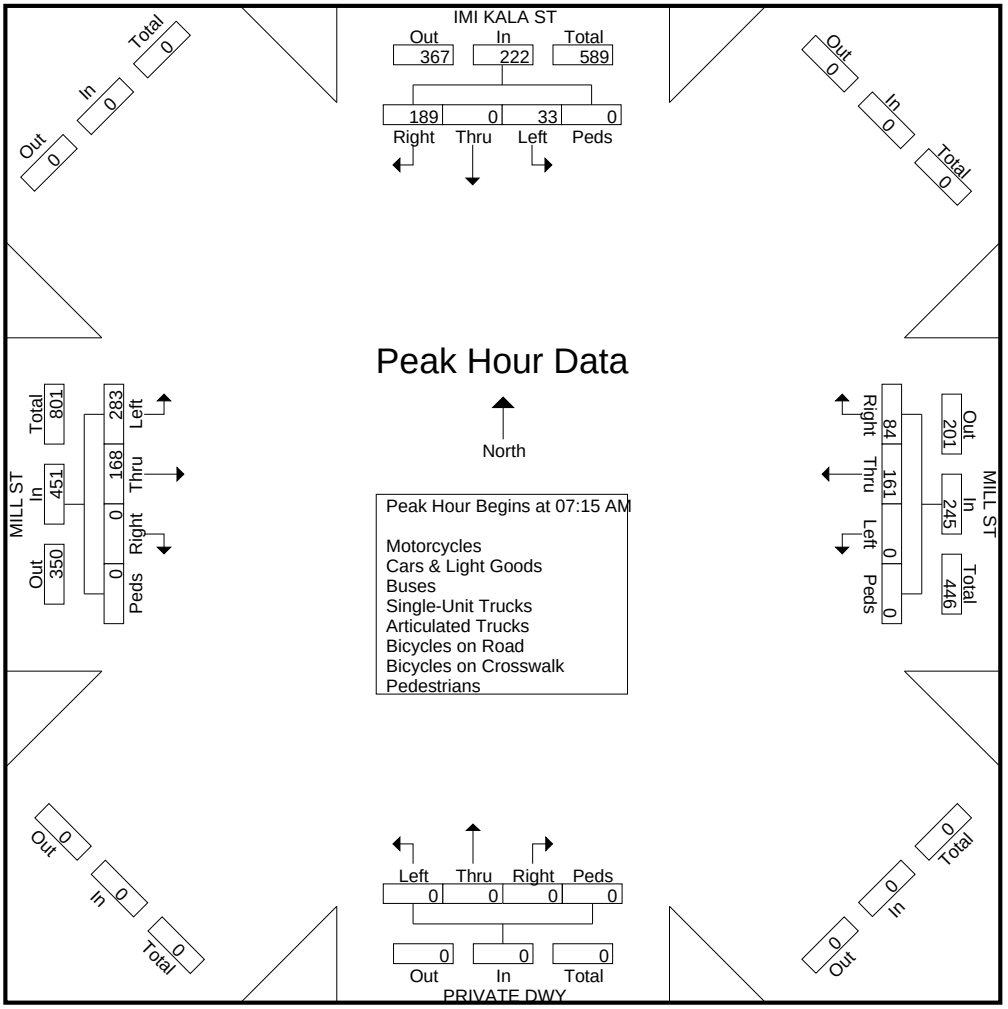
	IMI KALA ST SOUTHBOUND					MILL ST WESTBOUND					PRIVATE DWY NORTHBOUND					MILL ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	8	0	43	0	51	0	35	17	0	52	0	0	0	0	0	61	37	0	0	98	201
07:30 AM	6	0	52	0	58	0	**51**	20	0	**71**	0	0	0	0	0	71	**47**	0	0	118	**247**
07:45 AM	9	0	40	0	49	0	43	**25**	0	68	0	0	0	0	0	**80**	47	0	0	**127**	244
08:00 AM	**10**	0	**54**	0	**64**	0	32	22	0	54	0	0	0	0	0	71	37	0	0	108	226
Total Volume	33	0	189	0	222	0	161	84	0	245	0	0	0	0	0	283	168	0	0	451	918
% App. Total	14.9	0	85.1	0		0	65.7	34.3	0		0	0	0	0		62.7	37.3	0	0		
PHF	.825	.000	.875	.000	.867	.000	.789	.840	.000	.863	.000	.000	.000	.000	.000	.884	.894	.000	.000	.888	.929



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File Name : Imi Kala St - Mill St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/18/2021
Page No : 1

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

	IMI KALA ST SOUTHBOUND				MILL ST WESTBOUND				PRIVATE DWY NORTHBOUND				MILL ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	27	0	65	0	0	43	20	0	0	0	0	0	80	35	0	0	270
03:45 PM	22	0	66	0	0	51	18	4	0	0	0	4	66	44	0	0	275
Total	49	0	131	0	0	94	38	4	0	0	0	4	146	79	0	0	545
04:00 PM	24	0	73	0	1	40	21	1	0	0	0	0	65	39	0	0	264
04:15 PM	16	0	69	0	0	48	19	1	0	0	0	3	56	44	0	0	256
04:30 PM	16	0	79	0	0	38	21	0	0	0	0	0	89	36	0	0	279
04:45 PM	15	0	71	0	0	47	18	1	0	0	0	1	77	45	0	0	275
Total	71	0	292	0	1	173	79	3	0	0	0	4	287	164	0	0	1074
05:00 PM	15	0	59	0	0	49	12	1	0	0	0	1	58	29	0	0	224
05:15 PM	14	0	69	0	0	38	20	2	0	0	0	3	63	26	0	0	235
Grand Total	149	0	551	0	1	354	149	10	0	0	0	12	554	298	0	0	2078
Apprch %	21.3	0	78.7	0	0.2	68.9	29	1.9	0	0	0	100	65	35	0	0	
Total %	7.2	0	26.5	0	0	17	7.2	0.5	0	0	0	0.6	26.7	14.3	0	0	
Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
% Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0
Cars & Light Goods	149	0	546	0	1	350	148	0	0	0	0	0	546	297	0	0	2037
% Cars & Light Goods	100	0	99.1	0	100	98.9	99.3	0	0	0	0	0	98.6	99.7	0	0	98
Buses	0	0	4	0	0	0	0	0	0	0	0	0	4	0	0	0	8
% Buses	0	0	0.7	0	0	0	0	0	0	0	0	0	0.7	0	0	0	0.4
Single-Unit Trucks	0	0	1	0	0	3	1	0	0	0	0	0	2	0	0	0	7
% Single-Unit Trucks	0	0	0.2	0	0	0.8	0.7	0	0	0	0	0	0.4	0	0	0	0.3
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	3
% Bicycles on Road	0	0	0	0	0	0.3	0	0	0	0	0	0	0.2	0.3	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	10	0	0	0	12	0	0	0	0	22
% Pedestrians	0	0	0	0	0	0	0	100	0	0	0	100	0	0	0	0	1.1

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File Name : Imi Kala St - Mill St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/18/2021
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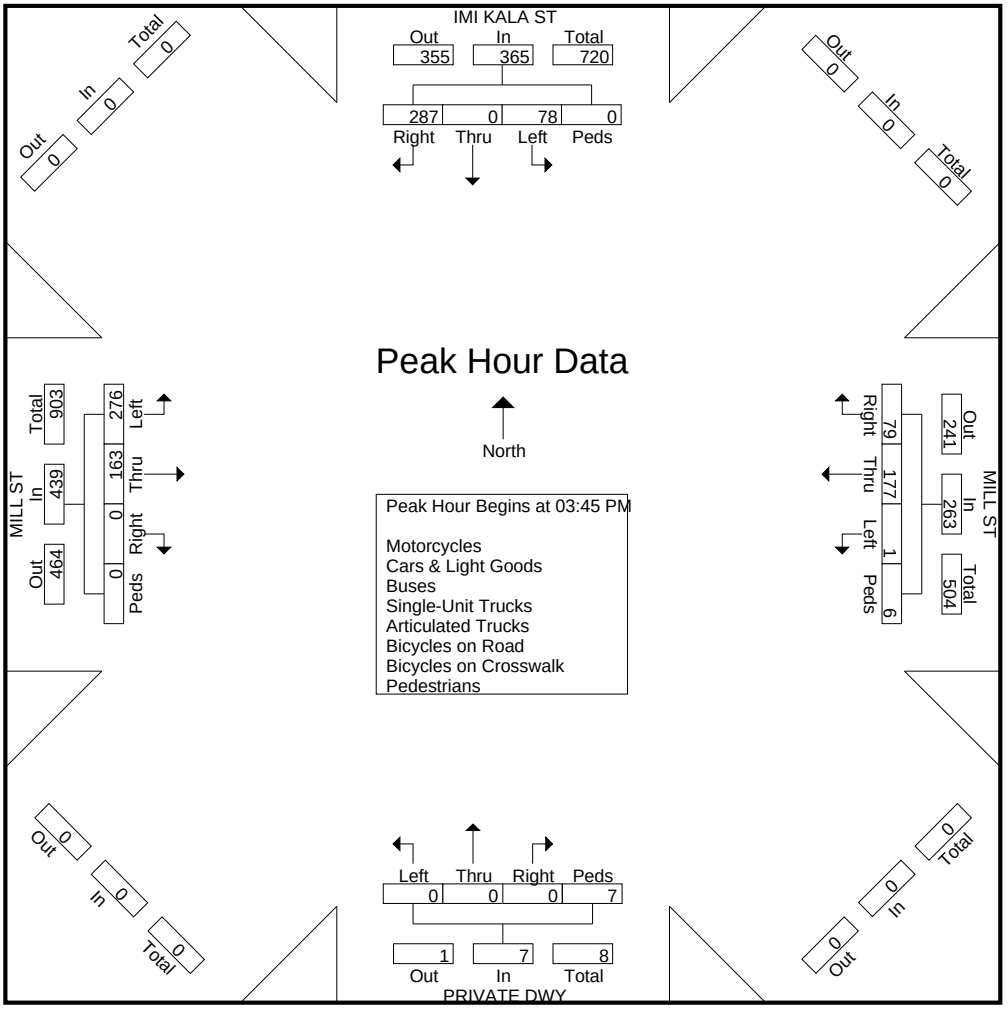
	IMI KALA ST SOUTHBOUND					MILL ST WESTBOUND					PRIVATE DWY NORTHBOUND					MILL ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	22	0	66	0	88	0	**51**	18	**4**	**73**	0	0	0	**4**	**4**	66	**44**	0	0	110	275
04:00 PM	**24**	0	73	0	**97**	**1**	40	**21**	1	63	0	0	0	0	0	65	39	0	0	104	264
04:15 PM	16	0	69	0	85	0	48	19	1	68	0	0	0	3	3	56	44	0	0	100	256
04:30 PM	16	0	**79**	0	95	0	38	21	0	59	0	0	0	0	0	**89**	36	0	0	**125**	**279**
Total Volume	78	0	287	0	365	1	177	79	6	263	0	0	0	7	7	276	163	0	0	439	1074
% App. Total	21.4	0	78.6	0		0.4	67.3	30	2.3		0	0	0	100		62.9	37.1	0	0		
PHF	.813	.000	.908	.000	.941	.250	.868	.940	.375	.901	.000	.000	.000	.438	.438	.775	.926	.000	.000	.878	.962



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File Name : Imi Kala St - WiliPa Lp_Eha St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/18/2021

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

	IMI KALA ST SOUTHBOUND				EHA ST WESTBOUND				IMI KALA ST NORTHBOUND				WILI PA LP EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	1	0	0	1	21	5	0	0	10	0	10	0	0	3	11	0	62
06:45 AM	0	0	0	0	15	2	0	0	14	0	19	0	0	0	1	0	51
Total	1	0	0	1	36	7	0	0	24	0	29	0	0	3	12	0	113
07:00 AM	0	0	1	1	31	6	0	1	18	1	16	1	0	2	10	0	88
07:15 AM	0	0	2	0	31	5	0	0	22	1	24	1	1	4	8	0	99
07:30 AM	0	3	0	0	43	19	0	0	24	2	21	0	0	8	8	0	128
07:45 AM	1	0	0	0	36	5	0	0	26	2	37	0	0	2	10	0	119
Total	1	3	3	1	141	35	0	1	90	6	98	2	1	16	36	0	434
08:00 AM	0	2	0	0	28	5	0	0	18	0	35	1	1	6	13	0	109
08:15 AM	0	4	0	0	24	7	2	0	18	0	24	0	1	3	8	0	91
Grand Total	2	9	3	2	229	54	2	1	150	6	186	3	3	28	69	0	747
Apprch %	12.5	56.2	18.8	12.5	80.1	18.9	0.7	0.3	43.5	1.7	53.9	0.9	3	28	69	0	
Total %	0.3	1.2	0.4	0.3	30.7	7.2	0.3	0.1	20.1	0.8	24.9	0.4	0.4	3.7	9.2	0	
Motorcycles	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Motorcycles	0	11.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Cars & Light Goods	1	5	2	0	224	52	1	0	143	5	182	0	1	27	66	0	709
% Cars & Light Goods	50	55.6	66.7	0	97.8	96.3	50	0	95.3	83.3	97.8	0	33.3	96.4	95.7	0	94.9
Buses	0	1	0	0	2	0	0	0	7	0	0	0	0	1	0	0	11
% Buses	0	11.1	0	0	0.9	0	0	0	4.7	0	0	0	0	3.6	0	0	1.5
Single-Unit Trucks	1	2	0	0	3	2	1	0	0	1	4	0	1	0	3	0	18
% Single-Unit Trucks	50	22.2	0	0	1.3	3.7	50	0	0	16.7	2.2	0	33.3	0	4.3	0	2.4
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2
% Bicycles on Road	0	0	33.3	0	0	0	0	0	0	0	0	0	33.3	0	0	0	0.3
Bicycles on Crosswalk	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2
% Bicycles on Crosswalk	0	0	0	50	0	0	0	100	0	0	0	0	0	0	0	0	0.3
Pedestrians	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	0	4
% Pedestrians	0	0	0	50	0	0	0	0	0	0	0	100	0	0	0	0	0.5

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Wailuku, HI 96793
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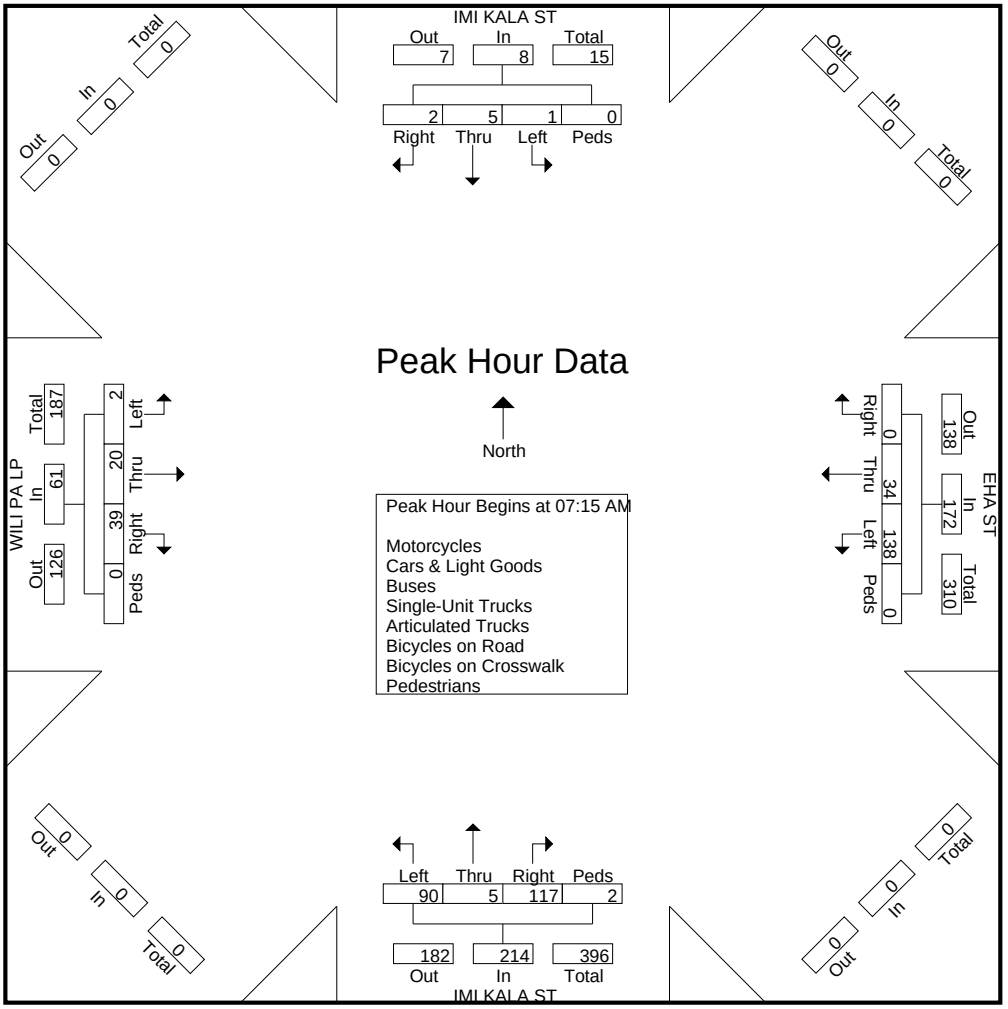
File Name : Imi Kala St - WiliPa Lp_Eha St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/18/2021
Page No : 2

	IMI KALA ST SOUTHBOUND					EHA ST WESTBOUND					IMI KALA ST NORTHBOUND					WILI PA LP EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	**2**	0	2	31	5	0	0	36	22	1	24	**1**	48	**1**	4	8	0	13	99
07:30 AM	0	**3**	0	0	**3**	**43**	**19**	0	0	**62**	24	**2**	21	0	47	0	**8**	8	0	16	**128**
07:45 AM	**1**	0	0	0	1	36	5	0	0	41	**26**	2	**37**	0	**65**	0	2	10	0	12	119
08:00 AM	0	2	0	0	2	28	5	0	0	33	18	0	35	1	54	1	6	**13**	0	**20**	109
Total Volume	1	5	2	0	8	138	34	0	0	172	90	5	117	2	214	2	20	39	0	61	455
% App. Total	12.5	62.5	25	0		80.2	19.8	0	0		42.1	2.3	54.7	0.9		3.3	32.8	63.9	0		
PHF	.250	.417	.250	.000	.667	.802	.447	.000	.000	.694	.865	.625	.791	.500	.823	.500	.625	.750	.000	.763	.889



Austin Tsutsumi & Associates

1871 Wili Pa Loop STE.A
Wailuku, HI 96793
Phone: (808) 244-8044 Fax: (808) 242-9163

File Name : Imi Kala St - Wili Pa Lp_Eha St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/17/2021

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

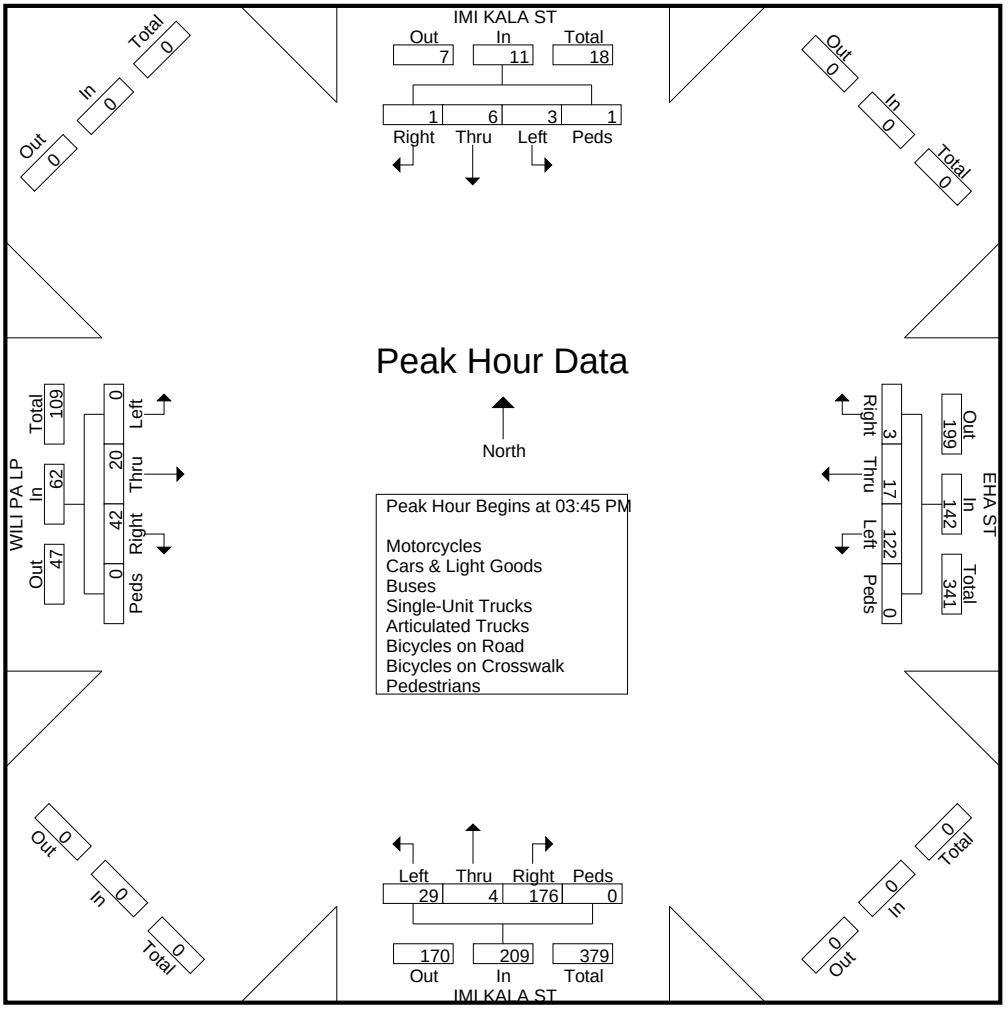
	IMI KALA ST SOUTHBOUND				EHA ST WESTBOUND				IMI KALA ST NORTHBOUND				WILI PA LP EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	0	0	0	0	42	2	0	0	12	0	52	0	0	9	15	0	132
03:45 PM	0	2	0	0	30	7	0	0	8	0	45	0	0	5	9	0	106
Total	0	2	0	0	72	9	0	0	20	0	97	0	0	14	24	0	238
04:00 PM	1	0	1	1	35	2	1	0	9	1	39	0	0	9	15	0	114
04:15 PM	1	3	0	0	29	1	0	0	10	2	43	0	0	3	8	0	100
04:30 PM	1	1	0	0	28	7	2	0	2	1	49	0	0	3	10	0	104
04:45 PM	0	0	0	0	15	2	0	0	10	2	52	0	0	3	9	0	93
Total	3	4	1	1	107	12	3	0	31	6	183	0	0	18	42	0	411
05:00 PM	1	3	0	0	34	4	0	0	4	0	55	0	0	7	5	0	113
05:15 PM	1	1	0	0	24	2	4	0	8	1	34	0	0	1	5	0	81
Grand Total	5	10	1	1	237	27	7	0	63	7	369	0	0	40	76	0	843
Apprch %	29.4	58.8	5.9	5.9	87.5	10	2.6	0	14.4	1.6	84.1	0	0	34.5	65.5	0	
Total %	0.6	1.2	0.1	0.1	28.1	3.2	0.8	0	7.5	0.8	43.8	0	0	4.7	9	0	
Motorcycles	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2
% Motorcycles	0	0	0	0	0.4	0	0	0	0	0	0.3	0	0	0	0	0	0.2
Cars & Light Goods	5	10	1	0	236	27	7	0	59	7	368	0	0	40	75	0	835
% Cars & Light Goods	100	100	100	0	99.6	100	100	0	93.7	100	99.7	0	0	100	98.7	0	99.1
Buses	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4
% Buses	0	0	0	0	0	0	0	0	6.3	0	0	0	0	0	0	0	0.5
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0.1

Austin Tsutsumi & Associates

1871 Wili Pa Loop STE.A
Wailuku, HI 96793
Phone: (808) 244-8044 Fax: (808) 242-9163

File Name : Imi Kala St - Wili Pa Lp_Eha St
Site Code : 20-556 Proposed Waiehu Master Plan TES
Start Date : 2/17/2021
Page No : 2

	IMI KALA ST SOUTHBOUND					EHA ST WESTBOUND					IMI KALA ST NORTHBOUND					WILI PA LP EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	2	0	0	2	30	**7**	0	0	37	8	0	45	0	53	0	5	9	0	14	106
04:00 PM	**1**	0	**1**	**1**	3	**35**	2	1	0	**38**	9	1	39	0	49	0	**9**	**15**	0	**24**	**114**
04:15 PM	1	**3**	0	0	**4**	29	1	0	0	30	**10**	**2**	43	0	**55**	0	3	8	0	11	100
04:30 PM	1	1	0	0	2	28	7	**2**	0	37	2	1	**49**	0	52	0	3	10	0	13	104
Total Volume	3	6	1	1	11	122	17	3	0	142	29	4	176	0	209	0	20	42	0	62	424
% App. Total	27.3	54.5	9.1	9.1		85.9	12	2.1	0		13.9	1.9	84.2	0		0	32.3	67.7	0		
PHF	.750	.500	.250	.250	.688	.871	.607	.375	.000	.934	.725	.500	.898	.000	.950	.000	.556	.700	.000	.646	.930



Austin Tsutsumi & Associates

501 Sumner Street, Suite 521
Honolulu, HI 96817-5031
Phone: (808)533-3646 Fax: (808)526-1267

File Name : High St - Main St
Site Code : 16-014.07 Maui DOT Signal Optimization
Start Date : 5/1/2018
Page No : 1

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

	HIGH ST SOUTHBOUND				MAIN ST WESTBOUND				HIGH ST NORTHBOUND				MAIN ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:15 AM	5	49	0	2	48	8	8	2	6	14	30	0	2	18	8	0	200
06:30 AM	1	53	1	1	54	0	6	0	5	26	29	0	2	15	8	0	201
06:45 AM	2	86	1	1	61	13	5	2	6	37	62	2	1	21	10	0	310
Total	8	188	2	4	163	21	19	4	17	77	121	2	5	54	26	0	711
07:00 AM	4	95	3	2	79	7	14	5	8	59	67	2	1	26	7	1	380
07:15 AM	5	77	4	2	58	15	16	7	4	50	85	6	2	25	14	1	371
07:30 AM	5	79	5	2	55	15	14	3	13	54	84	3	2	58	17	0	409
07:45 AM	2	64	5	1	40	17	9	6	13	87	86	0	7	33	13	0	383
Total	16	315	17	7	232	54	53	21	38	250	322	11	12	142	51	2	1543
Grand Total	24	503	19	11	395	75	72	25	55	327	443	13	17	196	77	2	2254
Apprch %	4.3	90.3	3.4	2	69.7	13.2	12.7	4.4	6.6	39	52.9	1.6	5.8	67.1	26.4	0.7	
Total %	1.1	22.3	0.8	0.5	17.5	3.3	3.2	1.1	2.4	14.5	19.7	0.6	0.8	8.7	3.4	0.1	
Motorcycles	0	3	0	0	3	0	0	0	0	1	4	0	0	0	0	0	11
% Motorcycles	0	0.6	0	0	0.8	0	0	0	0	0.3	0.9	0	0	0	0	0	0.5
Cars & Light Goods	24	493	19	0	380	72	72	0	51	325	430	0	17	192	74	0	2149
% Cars & Light Goods	100	98	100	0	96.2	96	100	0	92.7	99.4	97.1	0	100	98	96.1	0	95.3
Buses	0	5	0	0	4	1	0	0	1	0	3	0	0	1	0	0	15
% Buses	0	1	0	0	1	1.3	0	0	1.8	0	0.7	0	0	0.5	0	0	0.7
Single-Unit Trucks	0	2	0	0	8	1	0	0	2	1	3	0	0	2	1	0	20
% Single-Unit Trucks	0	0.4	0	0	2	1.3	0	0	3.6	0.3	0.7	0	0	1	1.3	0	0.9
Articulated Trucks	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	3
% Articulated Trucks	0	0	0	0	0	1.3	0	0	0	0	0.2	0	0	0	1.3	0	0.1
Bicycles on Road	0	0	0	0	0	0	0	0	1	0	2	0	0	1	1	0	5
% Bicycles on Road	0	0	0	0	0	0	0	0	1.8	0	0.5	0	0	0.5	1.3	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	11	0	0	0	25	0	0	0	13	0	0	0	2	51
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	100	0	0	0	100	2.3

Austin Tsutsumi & Associates

501 Sumner Street, Suite 521
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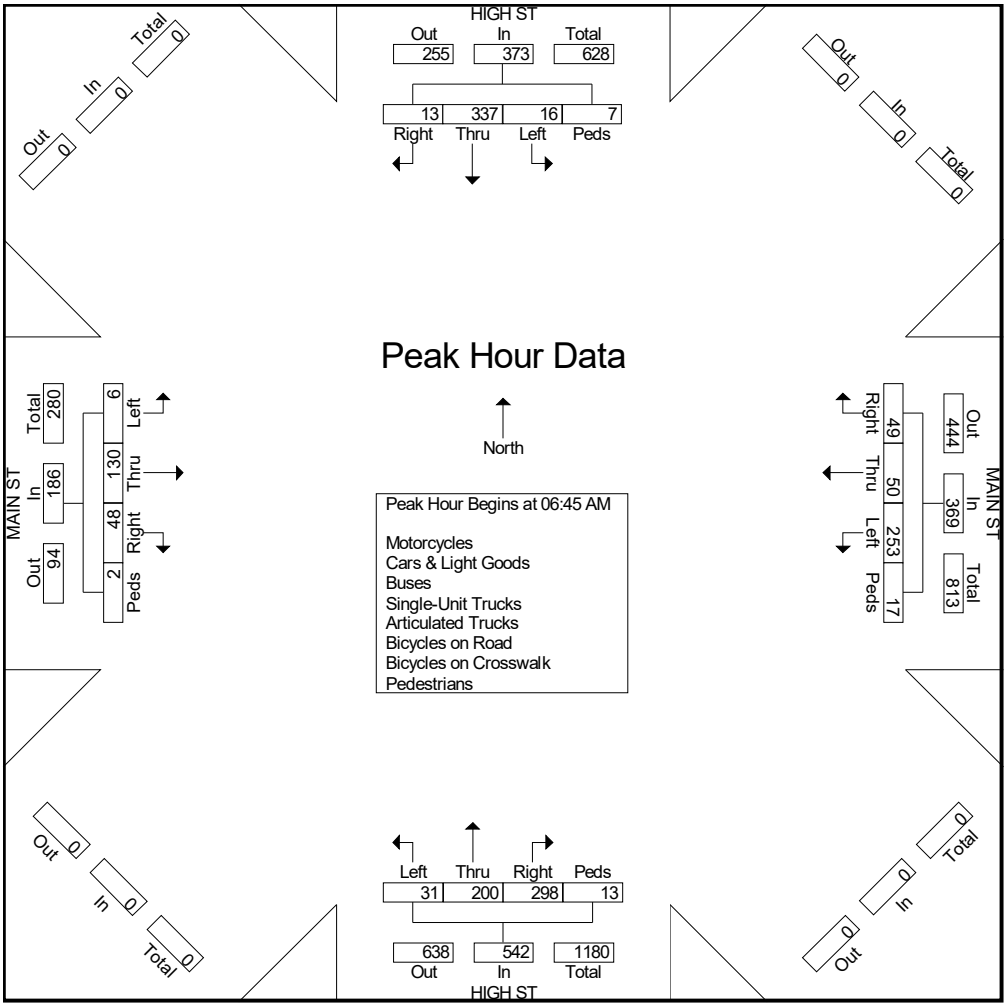
File Name : High St - Main St
Site Code : 16-014.07 Maui DOT Signal Optimization
Start Date : 5/1/2018
Page No : 2

	HIGH ST SOUTHBOUND					MAIN ST WESTBOUND					HIGH ST NORTHBOUND					MAIN ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	2	86	1	1	90	61	13	5	2	81	6	37	62	2	107	1	21	10	0	32	310
07:00 AM	4	**95**	3	**2**	**104**	**79**	7	14	5	**105**	8	**59**	67	2	136	1	26	7	**1**	35	380
07:15 AM	**5**	77	4	2	88	58	**15**	**16**	**7**	96	4	50	**85**	**6**	145	**2**	25	14	1	42	371
07:30 AM	5	79	**5**	2	91	55	15	14	3	87	**13**	54	84	3	**154**	2	**58**	**17**	0	**77**	**409**
Total Volume	16	337	13	7	373	253	50	49	17	369	31	200	298	13	542	6	130	48	2	186	1470
% App. Total	4.3	90.3	3.5	1.9		68.6	13.6	13.3	4.6		5.7	36.9	55	2.4		3.2	69.9	25.8	1.1		
PHF	.800	.887	.650	.875	.897	.801	.833	.766	.607	.879	.596	.847	.876	.542	.880	.750	.560	.706	.500	.604	.899



Austin Tsutsumi & Associates

501 Sumner Street, Suite 521
Honolulu, HI 96817-5031
Phone: (808)533-3646 Fax: (808)526-1267

File Name : High St - Main St
Site Code : 16-014.07 Maui DOT Signal Optimization
Start Date : 5/1/2018
Page No : 1

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

	HIGH ST SOUTHBOUND				MAIN ST WESTBOUND				HIGH ST NORTHBOUND				MAIN ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	6	54	5	4	79	24	13	3	14	59	59	2	10	44	30	0	406
03:45 PM	11	59	10	1	73	26	10	2	14	78	76	2	6	22	14	0	404
Total	17	113	15	5	152	50	23	5	28	137	135	4	16	66	44	0	810
04:00 PM	10	82	7	3	75	29	9	6	10	84	73	1	4	35	16	0	444
04:15 PM	13	63	8	1	81	36	10	3	15	79	64	1	4	30	9	0	417
04:30 PM	12	65	7	8	97	22	4	5	10	76	72	10	6	25	25	5	449
04:45 PM	13	74	7	0	82	31	2	2	13	71	51	0	1	25	12	2	386
Total	48	284	29	12	335	118	25	16	48	310	260	12	15	115	62	7	1696
05:00 PM	12	75	2	0	88	18	9	2	14	64	68	0	4	18	15	0	389
05:15 PM	7	65	0	1	72	26	5	0	10	58	53	0	7	17	11	0	332
Grand Total	84	537	46	18	647	212	62	23	100	569	516	16	42	216	132	7	3227
Apprch %	12.3	78.4	6.7	2.6	68.5	22.5	6.6	2.4	8.3	47.4	43	1.3	10.6	54.4	33.2	1.8	
Total %	2.6	16.6	1.4	0.6	20	6.6	1.9	0.7	3.1	17.6	16	0.5	1.3	6.7	4.1	0.2	
Motorcycles	0	1	0	0	5	0	0	0	0	2	3	0	0	1	0	0	12
% Motorcycles	0	0.2	0	0	0.8	0	0	0	0	0.4	0.6	0	0	0.5	0	0	0.4
Cars & Light Goods	84	531	45	0	638	212	60	0	100	561	507	0	42	214	129	0	3123
% Cars & Light Goods	100	98.9	97.8	0	98.6	100	96.8	0	100	98.6	98.3	0	100	99.1	97.7	0	96.8
Buses	0	0	0	0	1	0	0	0	0	0	6	0	0	0	0	0	7
% Buses	0	0	0	0	0.2	0	0	0	0	0	1.2	0	0	0	0	0	0.2
Single-Unit Trucks	0	1	1	0	2	0	2	0	0	6	0	0	0	0	3	0	15
% Single-Unit Trucks	0	0.2	2.2	0	0.3	0	3.2	0	0	1.1	0	0	0	0	2.3	0	0.5
Articulated Trucks	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
% Articulated Trucks	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5
% Bicycles on Road	0	0.7	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	18	0	0	0	23	0	0	0	16	0	0	0	7	64
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	100	0	0	0	100	2

Austin Tsutsumi & Associates

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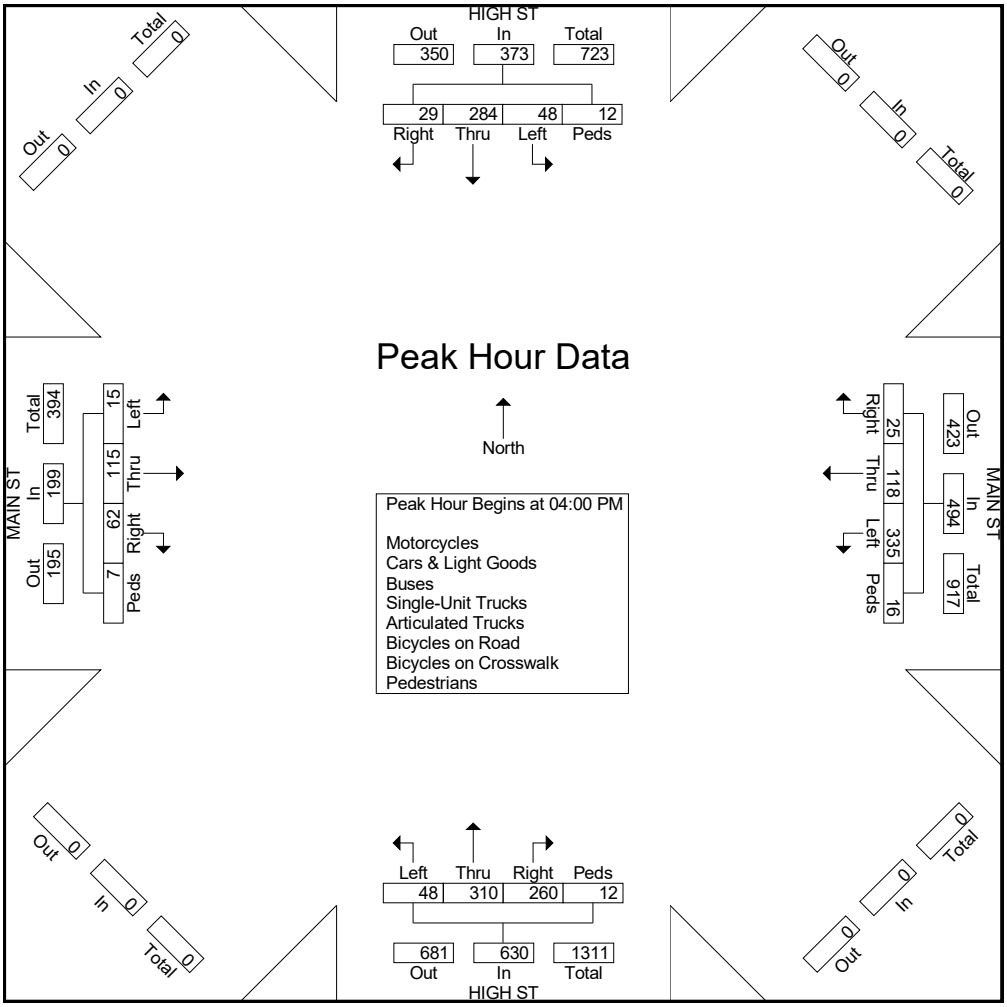
File Name : High St - Main St
Site Code : 16-014.07 Maui DOT Signal Optimization
Start Date : 5/1/2018
Page No : 2

	HIGH ST SOUTHBOUND					MAIN ST WESTBOUND					HIGH ST NORTHBOUND					MAIN ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	10	**82**	7	3	**102**	75	29	9	**6**	119	10	**84**	**73**	1	**168**	4	**35**	16	0	55	444
04:15 PM	**13**	63	**8**	1	85	81	**36**	**10**	3	**130**	**15**	79	64	1	159	4	30	9	0	43	417
04:30 PM	12	65	7	**8**	92	**97**	22	4	5	128	10	76	72	**10**	168	**6**	25	**25**	**5**	**61**	**449**
04:45 PM	13	74	7	0	94	82	31	2	2	117	13	71	51	0	135	1	25	12	2	40	386
Total Volume	48	284	29	12	373	335	118	25	16	494	48	310	260	12	630	15	115	62	7	199	1696
% App. Total	12.9	76.1	7.8	3.2		67.8	23.9	5.1	3.2		7.6	49.2	41.3	1.9		7.5	57.8	31.2	3.5		
PHF	.923	.866	.906	.375	.914	.863	.819	.625	.667	.950	.800	.923	.890	.300	.938	.625	.821	.620	.350	.816	.944



Austin, Tsutsumi & Associates

501 Sumner Street, Suite 521
Honolulu, HI 96817-5031
Phone: (808) 533-3646 Fax: (808)-526-1267

File Name : AM_Church St - Main St
Site Code : 00000000
Start Date : 2/2/2017
Page No : 1

Groups Printed- Unshifted - Bank 1

	CHURCH ST Southbound				MAIN ST Westbound				CHURCH ST Northbound				MAIN ST Eastbound				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	11	24	3	4	0	90	10	0	0	0	0	3	15	62	0	2	224
07:15 AM	14	32	6	1	0	119	10	0	0	0	0	5	14	79	0	2	282
07:30 AM	25	37	8	8	0	112	8	1	0	0	0	11	10	105	0	6	331
07:45 AM	19	16	10	5	1	92	9	0	0	0	0	9	10	95	0	1	267
Total	69	109	27	18	1	413	37	1	0	0	0	28	49	341	0	11	1104
Grand Total	69	109	27	18	1	413	37	1	0	0	0	28	49	341	0	11	1104
Apprch %	30.9	48.9	12.1	8.1	0.2	91.4	8.2	0.2	0	0	0	100	12.2	85	0	2.7	
Total %	6.2	9.9	2.4	1.6	0.1	37.4	3.4	0.1	0	0	0	2.5	4.4	30.9	0	1	
Unshifted	69	109	27	18	1	413	37	1	0	0	0	28	49	341	0	11	1104
% Unshifted	100	100	100	100	100	100	100	100	0	0	0	100	100	100	0	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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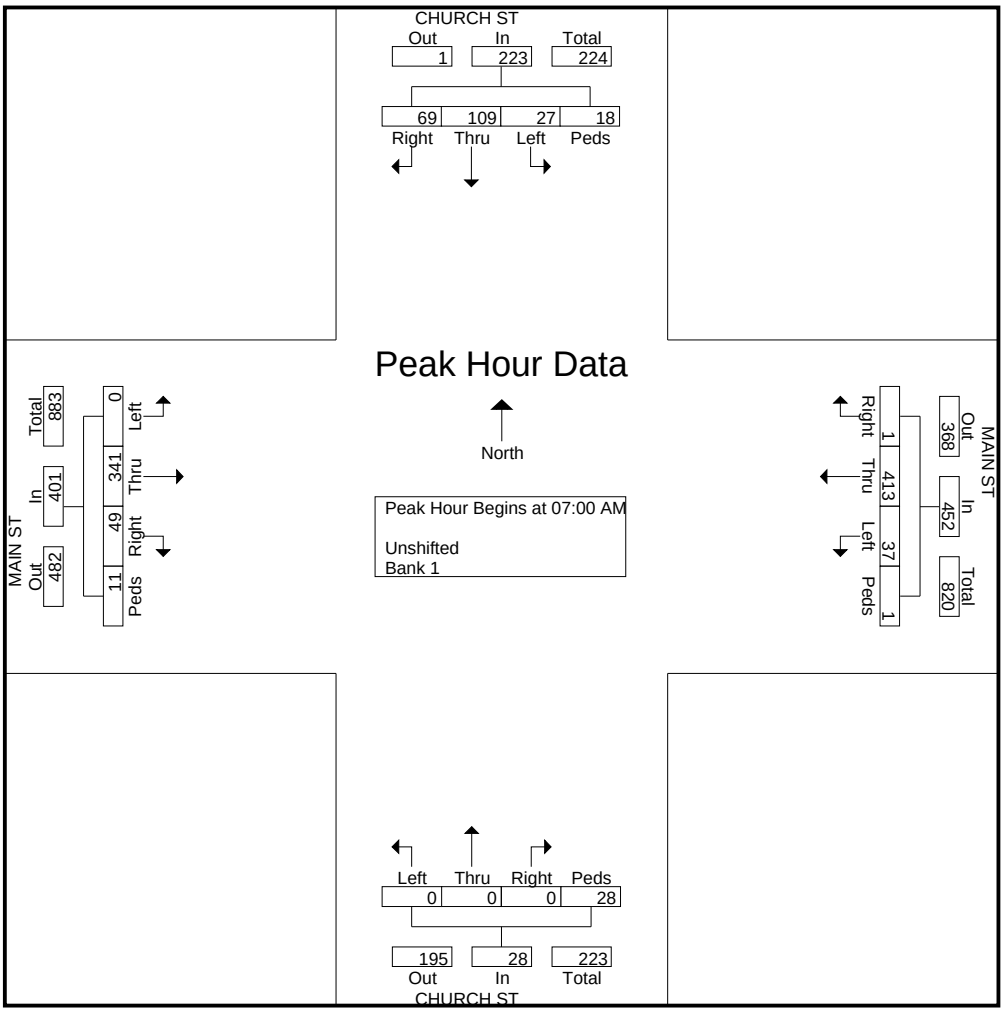
File Name : AM_Church St - Main St
Site Code : 00000000
Start Date : 2/2/2017
Page No : 2

	CHURCH ST Southbound					MAIN ST Westbound					CHURCH ST Northbound					MAIN ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	11	24	3	4	42	0	90	**10**	0	100	0	0	0	3	3	**15**	62	0	2	79	224
07:15 AM	14	32	6	1	53	0	**119**	10	0	**129**	0	0	0	5	5	14	79	0	2	95	282
07:30 AM	**25**	**37**	8	**8**	**78**	0	112	8	**1**	121	0	0	0	**11**	**11**	10	**105**	0	**6**	**121**	**331**
07:45 AM	19	16	**10**	5	50	**1**	92	9	0	102	0	0	0	9	9	10	95	0	1	106	267
Total Volume	69	109	27	18	223	1	413	37	1	452	0	0	0	28	28	49	341	0	11	401	1104
% App. Total	30.9	48.9	12.1	8.1		0.2	91.4	8.2	0.2		0	0	0	100		12.2	85	0	2.7		
PHF	.690	.736	.675	.563	.715	.250	.868	.925	.250	.876	.000	.000	.000	.636	.636	.817	.812	.000	.458	.829	.834



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File Name : PM_Church St - Main St
Site Code : 00000000
Start Date : 2/2/2017
Page No : 1

Groups Printed- Unshifted - Bank 1

	CHURCH ST Southbound				MAIN ST Westbound				CHURCH ST Northbound				MAIN ST Eastbound				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
03:45 PM	8	18	15	1	0	99	7	3	0	0	0	6	8	86	0	2	253
Total	8	18	15	1	0	99	7	3	0	0	0	6	8	86	0	2	253
04:00 PM	24	12	21	5	1	89	5	2	0	0	0	2	3	88	0	2	254
04:15 PM	13	12	21	5	1	95	9	1	0	0	0	9	9	99	0	3	277
04:30 PM	14	12	17	6	0	111	2	4	0	0	0	2	10	113	0	2	293
Grand Total	59	54	74	17	2	394	23	10	0	0	0	19	30	386	0	9	1077
Apprch %	28.9	26.5	36.3	8.3	0.5	91.8	5.4	2.3	0	0	0	100	7.1	90.8	0	2.1	
Total %	5.5	5	6.9	1.6	0.2	36.6	2.1	0.9	0	0	0	1.8	2.8	35.8	0	0.8	
Unshifted	59	54	74	17	2	394	23	10	0	0	0	19	30	386	0	9	1077
% Unshifted	100	100	100	100	100	100	100	100	0	0	0	100	100	100	0	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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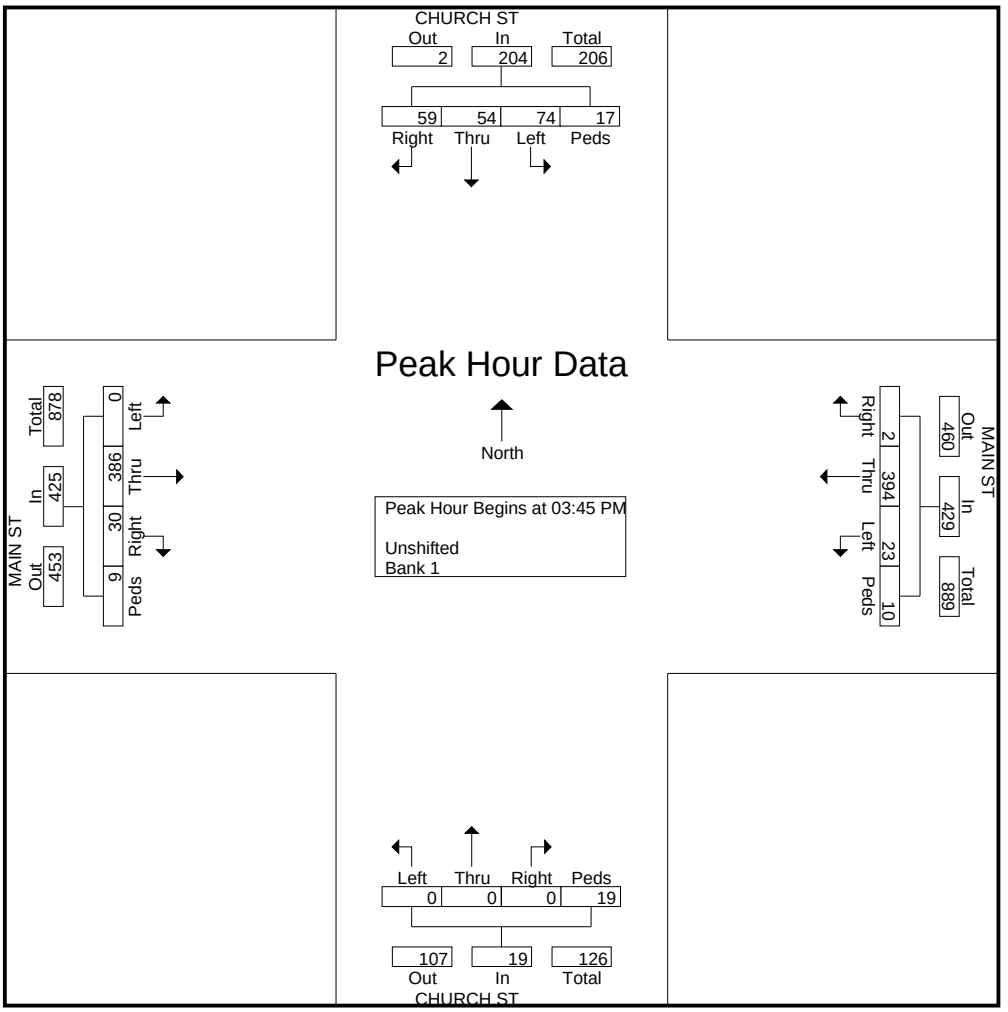
File Name : PM_Church St - Main St
Site Code : 00000000
Start Date : 2/2/2017
Page No : 2

	CHURCH ST Southbound					MAIN ST Westbound					CHURCH ST Northbound					MAIN ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	8	**18**	15	1	42	0	99	7	3	109	0	0	0	6	6	8	86	0	2	96	253
04:00 PM	**24**	12	**21**	5	**62**	**1**	89	5	2	97	0	0	0	2	2	3	88	0	2	93	254
04:15 PM	13	12	21	5	51	1	95	**9**	1	106	0	0	0	**9**	**9**	9	99	0	**3**	111	277
04:30 PM	14	12	17	**6**	49	0	**111**	2	**4**	**117**	0	0	0	2	2	**10**	**113**	0	2	**125**	**293**
Total Volume	59	54	74	17	204	2	394	23	10	429	0	0	0	19	19	30	386	0	9	425	1077
% App. Total	28.9	26.5	36.3	8.3		0.5	91.8	5.4	2.3		0	0	0	100		7.1	90.8	0	2.1		
PHF	.615	.750	.881	.708	.823	.500	.887	.639	.625	.917	.000	.000	.000	.528	.528	.750	.854	.000	.750	.850	.919



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File Name : AM_Market St - Main St
Site Code : 00000000
Start Date : 2/2/2017
Page No : 1

Groups Printed- Unshifted - Bank 1

	MARKET ST Southbound				MAIN ST Westbound				MARKET ST Northbound				MAIN ST Eastbound				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	0	0	0	4	19	101	0	7	3	28	1	3	1	49	13	6	235
07:15 AM	0	0	0	3	22	135	0	8	7	24	4	1	0	81	22	2	309
07:30 AM	0	0	0	4	25	102	0	4	5	35	11	4	0	113	28	5	336
07:45 AM	0	0	0	2	37	107	0	6	7	13	6	10	0	114	23	9	334
Total	0	0	0	13	103	445	0	25	22	100	22	18	1	357	86	22	1214
Grand Total	0	0	0	13	103	445	0	25	22	100	22	18	1	357	86	22	1214
Apprch %	0	0	0	100	18	77.7	0	4.4	13.6	61.7	13.6	11.1	0.2	76.6	18.5	4.7	
Total %	0	0	0	1.1	8.5	36.7	0	2.1	1.8	8.2	1.8	1.5	0.1	29.4	7.1	1.8	
Unshifted	0	0	0	13	103	445	0	25	22	100	22	18	1	357	86	22	1214
% Unshifted	0	0	0	100	100	100	0	100	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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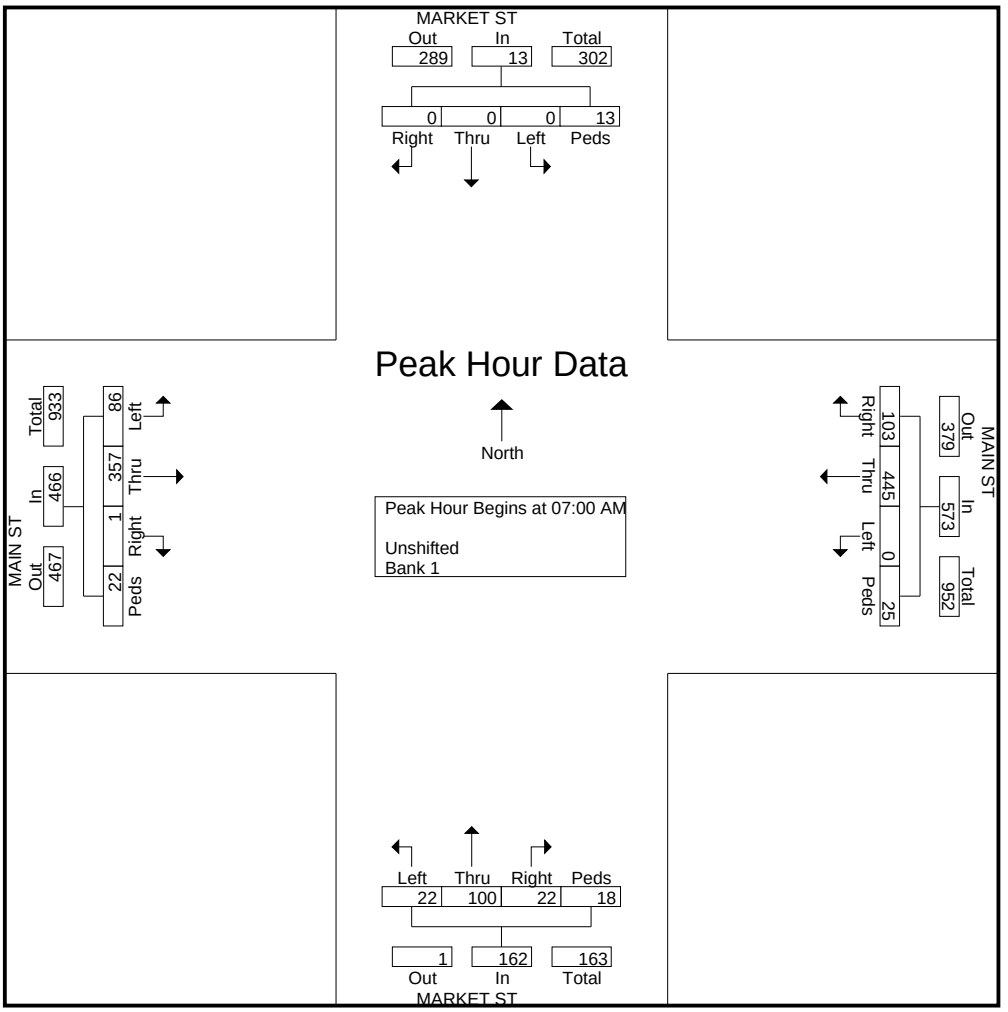
File Name : AM_Market St - Main St
Site Code : 00000000
Start Date : 2/2/2017
Page No : 2

	MARKET ST Southbound					MAIN ST Westbound					MARKET ST Northbound					MAIN ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	**4**	**4**	19	101	0	7	127	3	28	1	3	35	**1**	49	13	6	69	235
07:15 AM	0	0	0	3	3	22	**135**	0	**8**	**165**	**7**	24	4	1	36	0	81	22	2	105	309
07:30 AM	0	0	0	4	4	25	102	0	4	131	5	**35**	**11**	4	**55**	0	113	**28**	5	**146**	**336**
07:45 AM	0	0	0	2	2	**37**	107	0	6	150	7	13	6	**10**	36	0	**114**	23	**9**	146	334
Total Volume	0	0	0	13	13	103	445	0	25	573	22	100	22	18	162	1	357	86	22	466	1214
% App. Total	0	0	0	100		18	77.7	0	4.4		13.6	61.7	13.6	11.1		0.2	76.6	18.5	4.7		
PHF	.000	.000	.000	.813	.813	.696	.824	.000	.781	.868	.786	.714	.500	.450	.736	.250	.783	.768	.611	.798	.903



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File Name : PM_Market St - Main St
Site Code : 00000000
Start Date : 2/2/2017
Page No : 1

Groups Printed- Unshifted - Bank 1

	MARKET ST Southbound				MAIN ST Westbound				MARKET ST Northbound				MAIN ST Eastbound				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
03:45 PM	0	0	0	7	42	99	0	6	9	22	1	2	0	89	24	8	309
Total	0	0	0	7	42	99	0	6	9	22	1	2	0	89	24	8	309
04:00 PM	0	0	0	2	30	97	0	9	8	20	6	2	0	96	28	4	302
04:15 PM	0	0	0	3	38	118	3	4	13	29	6	1	0	116	33	4	368
04:30 PM	0	0	0	7	43	98	0	2	24	24	15	1	0	112	41	19	386
Grand Total	0	0	0	19	153	412	3	21	54	95	28	6	0	413	126	35	1365
Apprch %	0	0	0	100	26	69.9	0.5	3.6	29.5	51.9	15.3	3.3	0	72	22	6.1	
Total %	0	0	0	1.4	11.2	30.2	0.2	1.5	4	7	2.1	0.4	0	30.3	9.2	2.6	
Unshifted	0	0	0	19	153	412	3	21	54	95	28	6	0	413	126	35	1365
% Unshifted	0	0	0	100	100	100	100	100	100	100	100	100	0	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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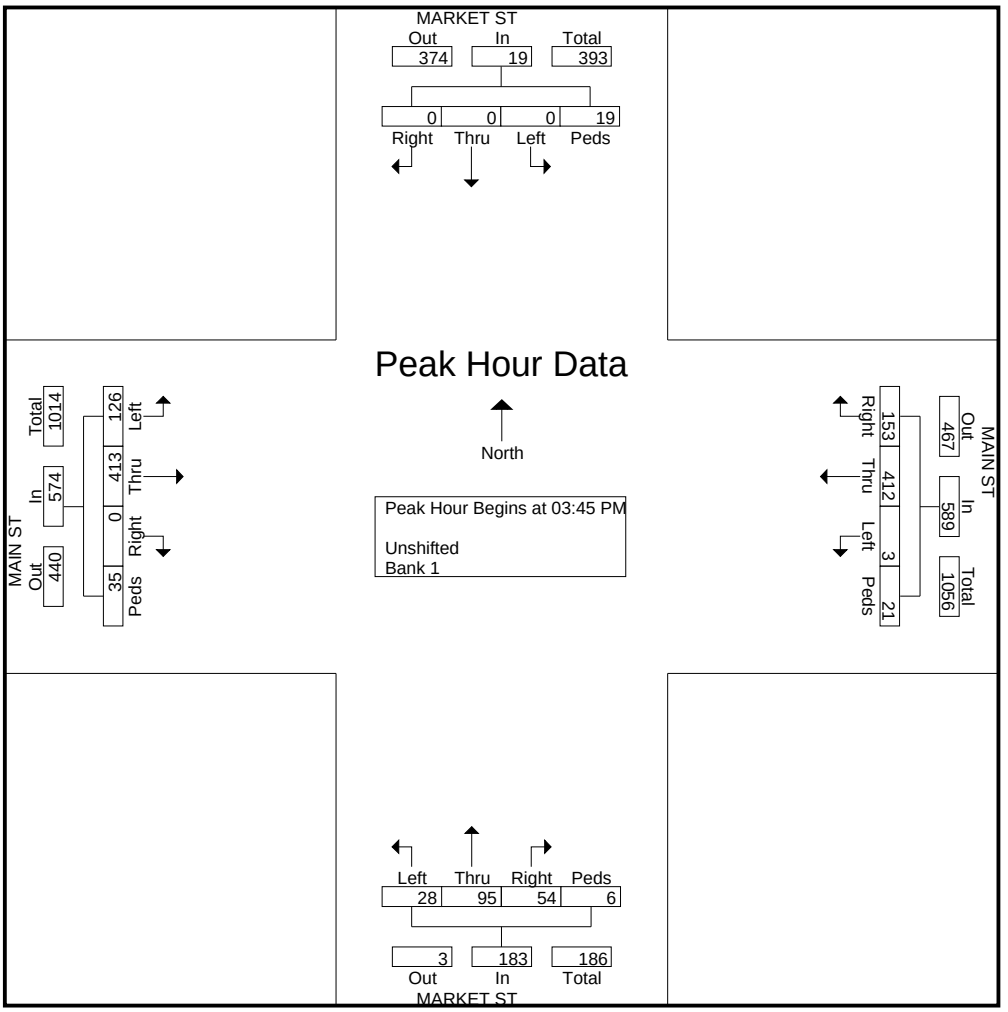
File Name : PM_Market St - Main St
Site Code : 00000000
Start Date : 2/2/2017
Page No : 2

	MARKET ST Southbound					MAIN ST Westbound					MARKET ST Northbound					MAIN ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	0	0	**7**	**7**	42	99	0	6	147	9	22	1	**2**	34	0	89	24	8	121	309
04:00 PM	0	0	0	2	2	30	97	0	**9**	136	8	20	6	2	36	0	96	28	4	128	302
04:15 PM	0	0	0	3	3	38	**118**	**3**	4	**163**	13	**29**	6	1	49	0	**116**	33	4	153	368
04:30 PM	0	0	0	7	7	**43**	98	0	2	143	**24**	24	**15**	1	**64**	0	112	**41**	**19**	**172**	**386**
Total Volume	0	0	0	19	19	153	412	3	21	589	54	95	28	6	183	0	413	126	35	574	1365
% App. Total	0	0	0	100		26	69.9	0.5	3.6		29.5	51.9	15.3	3.3		0	72	22	6.1		
PHF	.000	.000	.000	.679	.679	.890	.873	.250	.583	.903	.563	.819	.467	.750	.715	.000	.890	.768	.461	.834	.884



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File Name : Central Ave - Main St
Site Code : 16-014.07 Maui DOT Signal Optimization
Start Date : 5/8/2018
Page No : 1

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

	CENTRAL AVE SOUTHBOUND				MAIN ST WESTBOUND				NORTHBOUND				MAIN ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:15 AM	39	0	7	1	0	56	14	0	0	0	0	0	3	39	0	1	160
06:30 AM	74	0	14	0	0	77	21	0	0	0	0	0	6	46	0	2	240
06:45 AM	75	0	12	0	0	101	58	0	0	0	0	0	5	56	0	0	307
Total	188	0	33	1	0	234	93	0	0	0	0	0	14	141	0	3	707
07:00 AM	99	0	20	0	0	126	59	0	0	0	0	0	12	66	0	9	391
07:15 AM	119	0	18	0	0	124	64	0	0	0	0	0	17	80	0	0	422
07:30 AM	117	0	12	1	0	105	70	0	0	0	0	0	23	118	0	0	446
07:45 AM	87	0	18	1	0	122	96	1	0	0	0	0	19	88	0	0	432
Total	422	0	68	2	0	477	289	1	0	0	0	0	71	352	0	9	1691
Grand Total	610	0	101	3	0	711	382	1	0	0	0	0	85	493	0	12	2398
Apprch %	85.4	0	14.1	0.4	0	65	34.9	0.1	0	0	0	0	14.4	83.6	0	2	
Total %	25.4	0	4.2	0.1	0	29.6	15.9	0	0	0	0	0	3.5	20.6	0	0.5	
Motorcycles	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3
% Motorcycles	0.3	0	0	0	0	0	0.3	0	0	0	0	0	0	0	0	0	0.1
Cars & Light Goods	602	0	100	0	0	692	378	0	0	0	0	0	82	487	0	0	2341
% Cars & Light Goods	98.7	0	99	0	0	97.3	99	0	0	0	0	0	96.5	98.8	0	0	97.6
Buses	5	0	0	0	0	8	2	0	0	0	0	0	3	4	0	0	22
% Buses	0.8	0	0	0	0	1.1	0.5	0	0	0	0	0	3.5	0.8	0	0	0.9
Single-Unit Trucks	1	0	0	0	0	10	1	0	0	0	0	0	0	2	0	0	14
% Single-Unit Trucks	0.2	0	0	0	0	1.4	0.3	0	0	0	0	0	0	0.4	0	0	0.6
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
% Bicycles on Road	0	0	1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% Bicycles on Crosswalk	0	0	0	33.3	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	12	15
% Pedestrians	0	0	0	66.7	0	0	0	100	0	0	0	0	0	0	0	100	0.6

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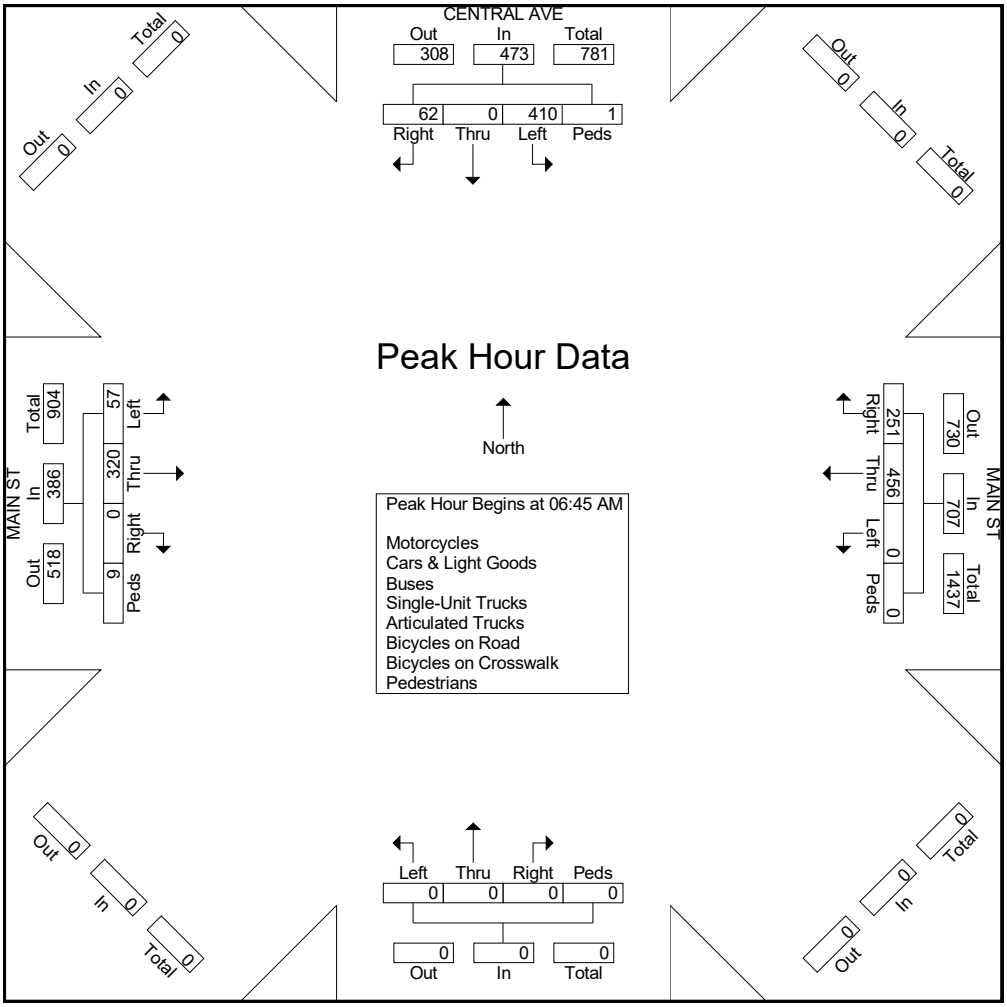
File Name : Central Ave - Main St
Site Code : 16-014.07 Maui DOT Signal Optimization
Start Date : 5/8/2018
Page No : 2

	CENTRAL AVE SOUTHBOUND					MAIN ST WESTBOUND					NORTHBOUND					MAIN ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	75	0	12	0	87	0	101	58	0	159	0	0	0	0	0	5	56	0	0	61	307
07:00 AM	99	0	**20**	0	119	0	**126**	59	0	185	0	0	0	0	0	12	66	0	**9**	87	391
07:15 AM	**119**	0	18	0	**137**	0	124	64	0	**188**	0	0	0	0	0	17	80	0	0	97	422
07:30 AM	117	0	12	**1**	130	0	105	**70**	0	175	0	0	0	0	0	**23**	**118**	0	0	**141**	**446**
Total Volume	410	0	62	1	473	0	456	251	0	707	0	0	0	0	0	57	320	0	9	386	1566
% App. Total	86.7	0	13.1	0.2		0	64.5	35.5	0		0	0	0	0		14.8	82.9	0	2.3		
PHF	.861	.000	.775	.250	.863	.000	.905	.896	.000	.940	.000	.000	.000	.000	.000	.620	.678	.000	.250	.684	.878



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File Name : Central Ave - Main St
Site Code : 16-014.07 Maui DOT Signal Optimization
Start Date : 5/8/2018
Page No : 1

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

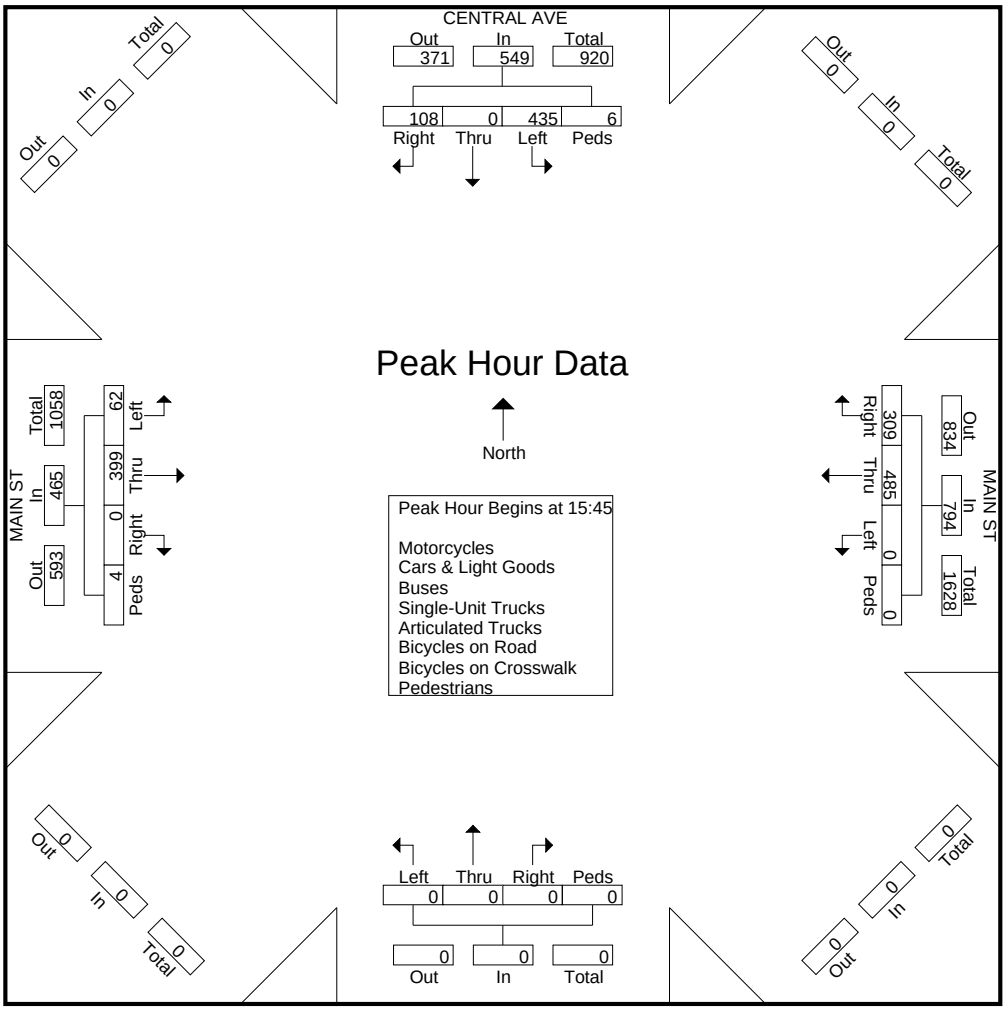
	CENTRAL AVE SOUTHBOUND				MAIN ST WESTBOUND				NORTHBOUND				MAIN ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:15	96	0	25	1	0	126	82	0	0	0	0	0	11	74	0	2	417
15:30	112	0	18	3	0	123	70	0	0	0	0	0	8	78	0	1	413
15:45	93	0	32	2	0	134	80	0	0	0	0	0	18	86	0	2	447
Total	301	0	75	6	0	383	232	0	0	0	0	0	37	238	0	5	1277
16:00	121	0	18	0	0	119	62	0	0	0	0	0	16	107	0	1	444
16:15	118	0	25	2	0	121	84	0	0	0	0	0	16	81	0	1	448
16:30	103	0	33	2	0	111	83	0	0	0	0	0	12	125	0	0	469
16:45	107	0	35	0	0	130	82	0	0	0	0	0	8	107	0	1	470
Total	449	0	111	4	0	481	311	0	0	0	0	0	52	420	0	3	1831
17:00	115	0	15	1	0	94	66	0	0	0	0	0	8	79	0	1	379
Grand Total	865	0	201	11	0	958	609	0	0	0	0	0	97	737	0	9	3487
Apprch %	80.3	0	18.7	1	0	61.1	38.9	0	0	0	0	0	11.5	87.4	0	1.1	
Total %	24.8	0	5.8	0.3	0	27.5	17.5	0	0	0	0	0	2.8	21.1	0	0.3	
Motorcycles	0	0	0	0	0	3	3	0	0	0	0	0	1	1	0	0	8
% Motorcycles	0	0	0	0	0	0.3	0.5	0	0	0	0	0	1	0.1	0	0	0.2
Cars & Light Goods	858	0	198	0	0	948	603	0	0	0	0	0	93	723	0	0	3423
% Cars & Light Goods	99.2	0	98.5	0	0	99	99	0	0	0	0	0	95.9	98.1	0	0	98.2
Buses	3	0	0	0	0	7	2	0	0	0	0	0	2	11	0	0	25
% Buses	0.3	0	0	0	0	0.7	0.3	0	0	0	0	0	2.1	1.5	0	0	0.7
Single-Unit Trucks	4	0	3	0	0	0	1	0	0	0	0	0	1	2	0	0	11
% Single-Unit Trucks	0.5	0	1.5	0	0	0	0.2	0	0	0	0	0	1	0.3	0	0	0.3
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	9	20
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	100	0.6

Austin Tsutsumi & Associates

501 Sumner Street, Suite 521
Honolulu, HI 96817-5031
Phone: 533-3646 Fax: 526-1267

File Name : Central Ave - Main St
Site Code : 16-014.07 Maui DOT Signal Optimization
Start Date : 5/8/2018
Page No : 2

	CENTRAL AVE SOUTHBOUND					MAIN ST WESTBOUND					NORTHBOUND					MAIN ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 15:45 to 16:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 15:45																					
15:45	93	0	32	**2**	127	0	**134**	80	0	**214**	0	0	0	0	0	**18**	86	0	**2**	106	447
16:00	**121**	0	18	0	139	0	119	62	0	181	0	0	0	0	0	16	107	0	1	124	444
16:15	118	0	25	2	**145**	0	121	**84**	0	205	0	0	0	0	0	16	81	0	1	98	448
16:30	103	0	**33**	2	138	0	111	83	0	194	0	0	0	0	0	12	**125**	0	0	**137**	**469**
Total Volume	435	0	108	6	549	0	485	309	0	794	0	0	0	0	0	62	399	0	4	465	1808
% App. Total	79.2	0	19.7	1.1		0	61.1	38.9	0		0	0	0	0		13.3	85.8	0	0.9		
PHF	.899	.000	.818	.750	.947	.000	.905	.920	.000	.928	.000	.000	.000	.000	.000	.861	.798	.000	.500	.849	.964



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Honolulu, HI 96817-5031
Phone: (808) 533-3646 Fax: (808)-526-1267

File Name : AM_Market St - Vineyard St
Site Code : 00000000
Start Date : 2/2/2017
Page No : 1

Groups Printed- Unshifted - Bank 1

	MARKET ST Southbound				VINEYARD ST Westbound				MARKET ST Northbound				VINEYARD ST Eastbound				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	96	0	10	2	7	21	0	0	5	44	4	0	0	8	35	15	247
07:15 AM	112	0	9	0	7	30	0	0	6	45	7	1	0	11	49	14	291
07:30 AM	97	0	15	0	11	49	0	0	12	50	6	1	0	8	41	9	299
07:45 AM	84	1	17	0	14	31	0	4	8	54	4	1	1	15	75	12	321
Total	389	1	51	2	39	131	0	4	31	193	21	3	1	42	200	50	1158
Grand Total	389	1	51	2	39	131	0	4	31	193	21	3	1	42	200	50	1158
Apprch %	87.8	0.2	11.5	0.5	22.4	75.3	0	2.3	12.5	77.8	8.5	1.2	0.3	14.3	68.3	17.1	
Total %	33.6	0.1	4.4	0.2	3.4	11.3	0	0.3	2.7	16.7	1.8	0.3	0.1	3.6	17.3	4.3	
Unshifted	389	1	51	2	39	131	0	4	31	193	21	3	1	42	200	50	1158
% Unshifted	100	100	100	100	100	100	0	100	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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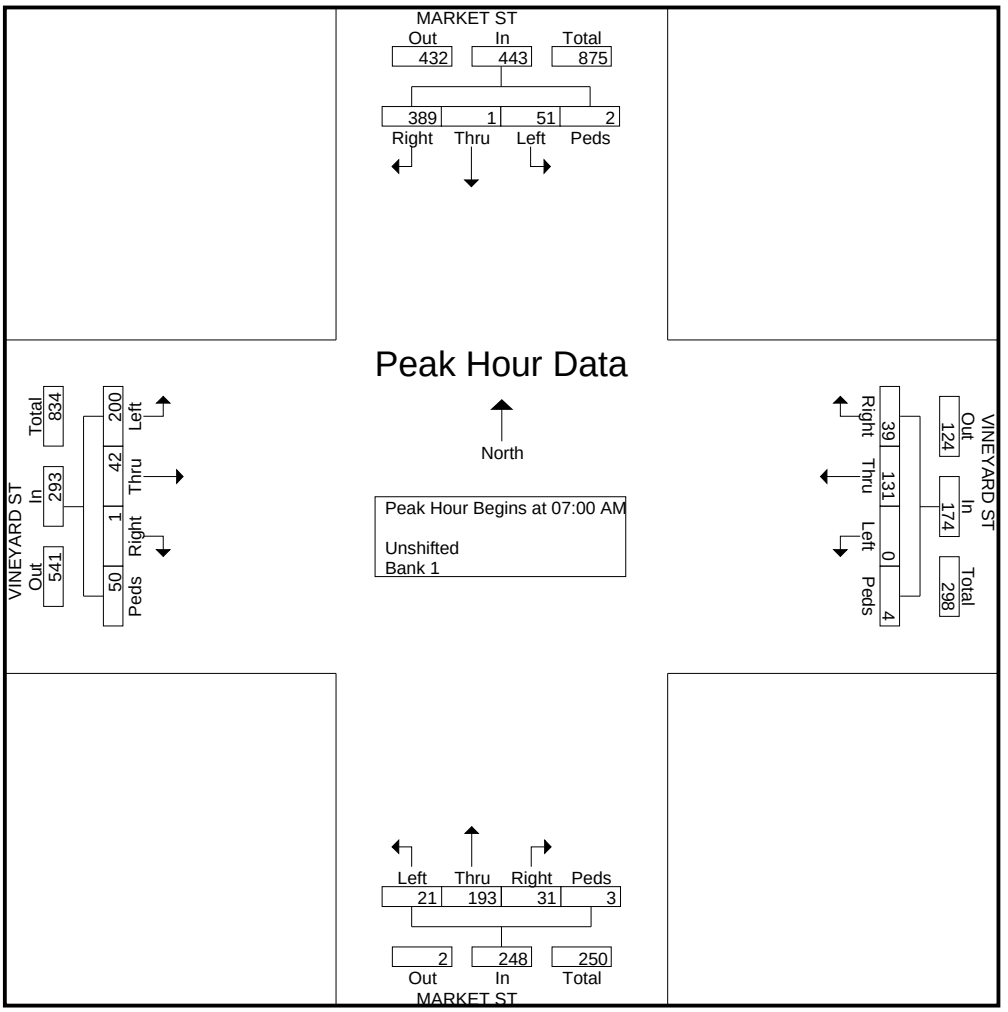
File Name : AM_Market St - Vineyard St
Site Code : 00000000
Start Date : 2/2/2017
Page No : 2

	MARKET ST Southbound					VINEYARD ST Westbound					MARKET ST Northbound					VINEYARD ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	96	0	10	**2**	108	7	21	0	0	28	5	44	4	0	53	0	8	35	**15**	58	247
07:15 AM	**112**	0	9	0	**121**	7	30	0	0	37	6	45	**7**	**1**	59	0	11	49	14	74	291
07:30 AM	97	0	15	0	112	11	**49**	0	0	**60**	**12**	50	6	1	**69**	0	8	41	9	58	299
07:45 AM	84	**1**	**17**	0	102	**14**	31	0	**4**	49	8	**54**	4	1	67	**1**	**15**	**75**	12	**103**	**321**
Total Volume	389	1	51	2	443	39	131	0	4	174	31	193	21	3	248	1	42	200	50	293	1158
% App. Total	87.8	0.2	11.5	0.5		22.4	75.3	0	2.3		12.5	77.8	8.5	1.2		0.3	14.3	68.3	17.1		
PHF	.868	.250	.750	.250	.915	.696	.668	.000	.250	.725	.646	.894	.750	.750	.899	.250	.700	.667	.833	.711	.902



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File Name : PM_Market St - Vineyard St
Site Code : 00000000
Start Date : 2/2/2017
Page No : 1

Groups Printed- Unshifted - Bank 1

	MARKET ST Southbound				VINEYARD ST Westbound				MARKET ST Northbound				VINEYARD ST Eastbound				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
03:45 PM	61	0	6	3	17	28	0	1	12	59	15	1	1	32	57	1	294
Total	61	0	6	3	17	28	0	1	12	59	15	1	1	32	57	1	294
04:00 PM	66	1	13	6	10	27	0	4	18	64	5	2	0	24	73	7	320
04:15 PM	64	0	11	1	11	28	0	1	13	71	10	0	0	24	68	4	306
04:30 PM	63	0	14	3	22	23	0	1	10	79	7	0	0	36	83	14	355
Grand Total	254	1	44	13	60	106	0	7	53	273	37	3	1	116	281	26	1275
Apprch %	81.4	0.3	14.1	4.2	34.7	61.3	0	4	14.5	74.6	10.1	0.8	0.2	27.4	66.3	6.1	
Total %	19.9	0.1	3.5	1	4.7	8.3	0	0.5	4.2	21.4	2.9	0.2	0.1	9.1	22	2	
Unshifted	254	1	44	13	60	106	0	7	53	273	37	3	1	116	281	26	1275
% Unshifted	100	100	100	100	100	100	0	100	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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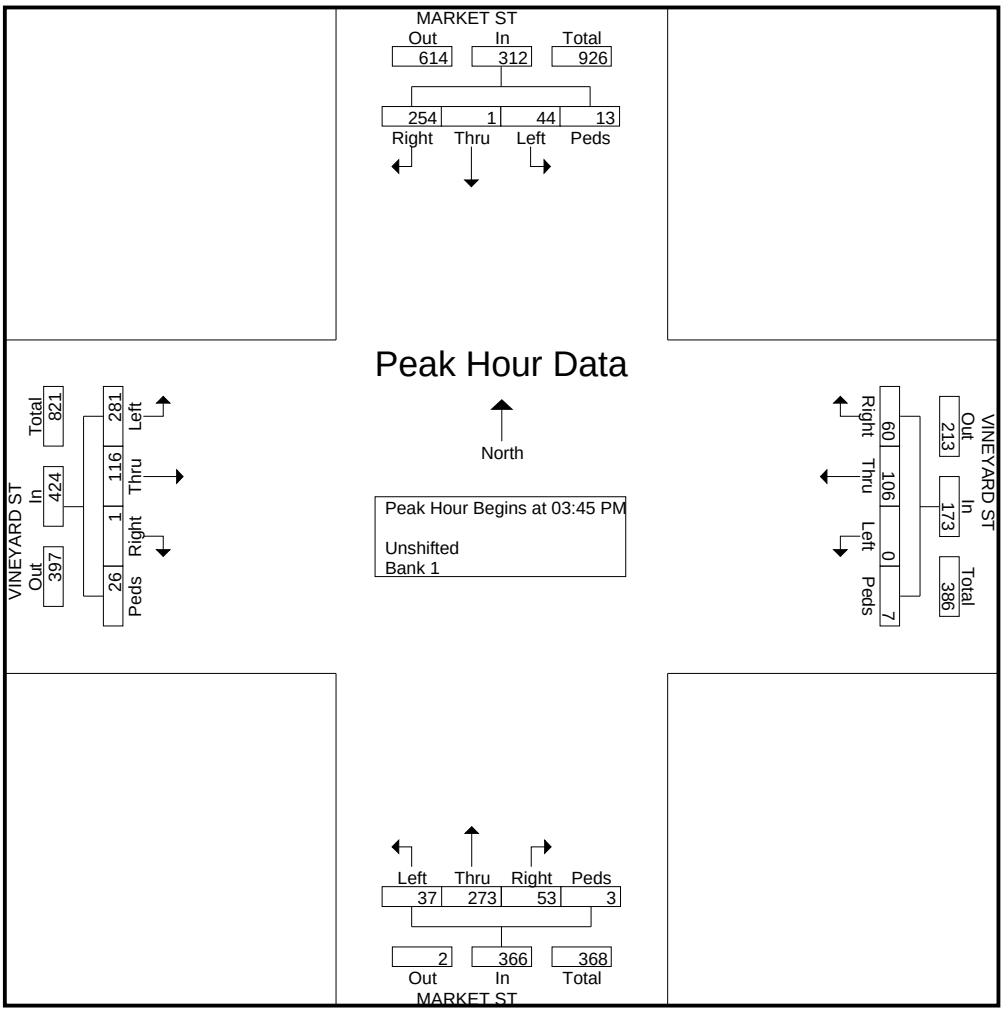
File Name : PM_Market St - Vineyard St
Site Code : 00000000
Start Date : 2/2/2017
Page No : 2

	MARKET ST Southbound					VINEYARD ST Westbound					MARKET ST Northbound					VINEYARD ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	61	0	6	3	70	17	**28**	0	1	**46**	12	59	**15**	1	87	**1**	32	57	1	91	294
04:00 PM	**66**	**1**	13	**6**	**86**	10	27	0	**4**	41	**18**	64	5	**2**	89	0	24	73	7	104	320
04:15 PM	64	0	11	1	76	11	28	0	1	40	13	71	10	0	94	0	24	68	4	96	306
04:30 PM	63	0	**14**	3	80	**22**	23	0	1	46	10	**79**	7	0	**96**	0	**36**	**83**	**14**	**133**	**355**
Total Volume	254	1	44	13	312	60	106	0	7	173	53	273	37	3	366	1	116	281	26	424	1275
% App. Total	81.4	0.3	14.1	4.2		34.7	61.3	0	4		14.5	74.6	10.1	0.8		0.2	27.4	66.3	6.1		
PHF	.962	.250	.786	.542	.907	.682	.946	.000	.438	.940	.736	.864	.617	.375	.953	.250	.806	.846	.464	.797	.898



APPENDIX B

LEVEL OF SERVICE CRITERIA

LEVEL OF SERVICE (LOS) CRITERIA

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

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

Level-of Service Criteria for Signalized Intersections

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

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

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

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

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

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

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

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Existing AM

Intersection	
Int Delay, s/veh	8.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	270	163	19	316	339
Future Vol, veh/h	36	270	163	19	316	339
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	293	177	21	343	368

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1242	188	0	0	198	0
Stage 1	188	-	-	-	-	-
Stage 2	1054	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	193	854	-	-	1375	-
Stage 1	844	-	-	-	-	-
Stage 2	335	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	132	854	-	-	1375	-
Mov Cap-2 Maneuver	132	-	-	-	-	-
Stage 1	844	-	-	-	-	-
Stage 2	230	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23.4	0	4.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	520	1375	-
HCM Lane V/C Ratio	-	-	0.64	0.25	-
HCM Control Delay (s)	-	-	23.4	8.5	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	4.5	1	-

Intersection	
Int Delay, s/veh	5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	136	49	146	59	83	333
Future Vol, veh/h	136	49	146	59	83	333
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	148	53	159	64	90	362

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	733	191	0	0	223	0
Stage 1	191	-	-	-	-	-
Stage 2	542	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	388	851	-	-	1346	-
Stage 1	841	-	-	-	-	-
Stage 2	583	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	362	851	-	-	1346	-
Mov Cap-2 Maneuver	362	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	544	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.4	0	1.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	362	851	1346	-
HCM Lane V/C Ratio	-	-	0.408	0.063	0.067	-
HCM Control Delay (s)	-	-	21.6	9.5	7.9	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q(veh)	-	-	1.9	0.2	0.2	-

Intersection	
Int Delay, s/veh	16.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	417	99	333	568	13
Future Vol, veh/h	7	417	99	333	568	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	100	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	453	108	362	617	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1202	624	631	0	-	0
Stage 1	624	-	-	-	-	-
Stage 2	578	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	204	485	951	-	-	-
Stage 1	534	-	-	-	-	-
Stage 2	561	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	181	485	951	-	-	-
Mov Cap-2 Maneuver	316	-	-	-	-	-
Stage 1	473	-	-	-	-	-
Stage 2	561	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	54.9	2.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	951	-	316	485	-	-
HCM Lane V/C Ratio	0.113	-	0.024	0.935	-	-
HCM Control Delay (s)	9.3	-	16.7	55.5	-	-
HCM Lane LOS	A	-	C	F	-	-
HCM 95th %tile Q(veh)	0.4	-	0.1	11.2	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	38	21	200	463	12
Future Vol, veh/h	11	38	21	200	463	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	115	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	41	23	217	503	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	773	510	516	0	-	0
Stage 1	510	-	-	-	-	-
Stage 2	263	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	367	563	1050	-	-	-
Stage 1	603	-	-	-	-	-
Stage 2	781	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	359	563	1050	-	-	-
Mov Cap-2 Maneuver	359	-	-	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	781	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.1	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1050	-	499	-	-
HCM Lane V/C Ratio	0.022	-	0.107	-	-
HCM Control Delay (s)	8.5	-	13.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	130	53	230	545	6
Future Vol, veh/h	5	130	53	230	545	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	141	58	250	592	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	962	596	599	0	-	0
Stage 1	596	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	284	504	978	-	-	-
Stage 1	550	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	267	504	978	-	-	-
Mov Cap-2 Maneuver	267	-	-	-	-	-
Stage 1	518	-	-	-	-	-
Stage 2	702	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.5	1.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	978	-	488	-	-
HCM Lane V/C Ratio	0.059	-	0.301	-	-
HCM Control Delay (s)	8.9	-	15.5	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	1.3	-	-

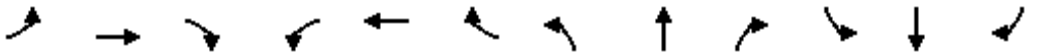
Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	0	39	56	0	7	34	277	28	5	696	7
Future Vol, veh/h	9	0	39	56	0	7	34	277	28	5	696	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	42	61	0	8	37	301	30	5	757	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1165	1176	761	1182	1165	316	765	0	0	331	0	0
Stage 1	771	771	-	390	390	-	-	-	-	-	-	-
Stage 2	394	405	-	792	775	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	171	191	405	167	194	724	848	-	-	1228	-	-
Stage 1	393	410	-	634	608	-	-	-	-	-	-	-
Stage 2	631	598	-	382	408	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	161	179	405	143	182	724	848	-	-	1228	-	-
Mov Cap-2 Maneuver	161	179	-	143	182	-	-	-	-	-	-	-
Stage 1	372	407	-	600	575	-	-	-	-	-	-	-
Stage 2	591	566	-	340	405	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.7	44.6	0.9	0.1
HCM LOS	C	E		

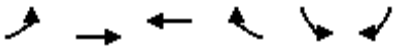
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	848	-	-	315	157	1228	-	-
HCM Lane V/C Ratio	0.044	-	-	0.166	0.436	0.004	-	-
HCM Control Delay (s)	9.4	0	-	18.7	44.6	7.9	0	-
HCM Lane LOS	A	A	-	C	E	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	2	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	2	41	12	5	3	110	392	3	2	779	404
Future Volume (veh/h)	127	2	41	12	5	3	110	392	3	2	779	404
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1034	1870
Adj Flow Rate, veh/h	138	2	3	13	5	0	120	426	3	2	847	419
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	195	2	180	169	61	0	137	1481	10	782	788	1209
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.00	0.06	0.80	0.80	0.02	0.76	0.76
Sat Flow, veh/h	1418	21	1578	1226	529	0	1781	1855	13	1781	1034	1585
Grp Volume(v), veh/h	140	0	3	18	0	0	120	0	429	2	847	419
Grp Sat Flow(s),veh/h/ln	1439	0	1578	1755	0	0	1781	0	1868	1781	1034	1585
Q Serve(g_s), s	18.8	0.0	0.4	0.0	0.0	0.0	10.5	0.0	13.1	0.1	166.0	18.5
Cycle Q Clear(g_c), s	20.7	0.0	0.4	1.9	0.0	0.0	10.5	0.0	13.1	0.1	166.0	18.5
Prop In Lane	0.99		1.00	0.72		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	197	0	180	229	0	0	137	0	1491	782	788	1209
V/C Ratio(X)	0.71	0.00	0.02	0.08	0.00	0.00	0.87	0.00	0.29	0.00	1.07	0.35
Avail Cap(c_a), veh/h	814	0	870	891	0	0	287	0	1597	831	788	1209
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	94.3	0.0	85.5	86.2	0.0	0.0	89.8	0.0	5.7	5.1	25.8	8.3
Incr Delay (d2), s/veh	12.2	0.0	0.1	0.1	0.0	0.0	15.5	0.0	0.1	0.0	53.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.6	0.0	0.2	0.9	0.0	0.0	7.4	0.0	5.2	0.0	49.9	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	106.4	0.0	85.6	86.3	0.0	0.0	105.2	0.0	5.8	5.1	79.7	9.1
LnGrp LOS	F	A	F	F	A	A	F	A	A	A	F	A
Approach Vol, veh/h		143			18			549			1268	
Approach Delay, s/veh		106.0			86.3			27.6			56.2	
Approach LOS		F			F			C			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.7	171.0		29.9	9.0	178.7		29.9				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	31.0	166.0		120.0	11.0	186.0		120.0				
Max Q Clear Time (g_c+I1), s	12.5	168.0		3.9	2.1	15.1		22.7				
Green Ext Time (p_c), s	0.3	0.0		0.1	0.0	3.1		2.2				

Intersection Summary			
HCM 6th Ctrl Delay		52.2	
HCM 6th LOS		D	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	48	702	733	506	847	25
Future Volume (veh/h)	48	702	733	506	847	25
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	52	763	797	437	944	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	219	1944	990	539	1151	512
Arrive On Green	0.04	0.55	0.45	0.45	0.32	0.00
Sat Flow, veh/h	1781	3647	2314	1209	3563	1585
Grp Volume(v), veh/h	52	763	637	597	944	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1653	1781	1585
Q Serve(g_s), s	1.2	10.5	26.2	26.5	20.6	0.0
Cycle Q Clear(g_c), s	1.2	10.5	26.2	26.5	20.6	0.0
Prop In Lane	1.00			0.73	1.00	1.00
Lane Grp Cap(c), veh/h	219	1944	793	737	1151	512
V/C Ratio(X)	0.24	0.39	0.80	0.81	0.82	0.00
Avail Cap(c_a), veh/h	461	2731	945	879	1474	656
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	15.8	11.1	20.2	20.3	26.4	0.0
Incr Delay (d2), s/veh	0.2	0.2	4.6	5.2	3.4	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	0.5	3.8	11.1	10.5	8.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.0	11.2	24.8	25.5	29.8	0.0
LnGrp LOS	B	B	C	C	C	A
Approach Vol, veh/h		815	1234		944	
Approach Delay, s/veh		11.5	25.1		29.8	
Approach LOS		B	C		C	

Timer - Assigned Phs	2	3	4		8
Phs Duration (G+Y+Rc), s	33.3	8.5	42.7		51.3
Change Period (Y+Rc), s	6.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	35.0	15.0	45.0		65.0
Max Q Clear Time (g_c+I1), s	22.6	3.2	28.5		12.5
Green Ext Time (p_c), s	4.7	0.0	9.2		7.9

Intersection Summary	
HCM 6th Ctrl Delay	22.9
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	8.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	33	149	303	153	419	478
Future Vol, veh/h	33	149	303	153	419	478
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	162	329	166	455	520

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1842	412	0	0	495	0
Stage 1	412	-	-	-	-	-
Stage 2	1430	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	83	640	-	-	1069	-
Stage 1	669	-	-	-	-	-
Stage 2	221	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	48	640	-	-	1069	-
Mov Cap-2 Maneuver	48	-	-	-	-	-
Stage 1	669	-	-	-	-	-
Stage 2	127	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	45	0	5.1
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	48	640	1069	-
HCM Lane V/C Ratio	-	-	0.747	0.253	0.426	-
HCM Control Delay (s)	-	-	191.8	12.5	10.8	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	3	1	2.2	-

Intersection	
Int Delay, s/veh	4.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	380	221	247	173	16	145
Future Vol, veh/h	380	221	247	173	16	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	413	240	268	188	17	158

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	653	0	1257	533
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	724	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	934	-	189	547
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	480	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	934	-	129	547
Mov Cap-2 Maneuver	-	-	-	-	129	-
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	326	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.1	19.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	414	-	-	934	-
HCM Lane V/C Ratio	0.423	-	-	0.287	-
HCM Control Delay (s)	19.9	-	-	10.4	0
HCM Lane LOS	C	-	-	B	A
HCM 95th %tile Q(veh)	2.1	-	-	1.2	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	479	68	32	357	23	44
Future Vol, veh/h	479	68	32	357	23	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	521	74	35	388	25	48

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	595	0	1016	558
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	458	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	981	-	264	529
Stage 1	-	-	-	-	573	-
Stage 2	-	-	-	-	637	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	981	-	252	529
Mov Cap-2 Maneuver	-	-	-	-	252	-
Stage 1	-	-	-	-	573	-
Stage 2	-	-	-	-	608	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	16.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	384	-	-	981	-
HCM Lane V/C Ratio	0.19	-	-	0.035	-
HCM Control Delay (s)	16.6	-	-	8.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	474	44	64	379	15	96
Future Vol, veh/h	474	44	64	379	15	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	515	48	70	412	16	104

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	563	0	1091	539
Stage 1	-	-	-	-	539	-
Stage 2	-	-	-	-	552	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1008	-	238	542
Stage 1	-	-	-	-	585	-
Stage 2	-	-	-	-	577	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1008	-	217	542
Mov Cap-2 Maneuver	-	-	-	-	217	-
Stage 1	-	-	-	-	585	-
Stage 2	-	-	-	-	525	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	15.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	451	-	-	1008	-
HCM Lane V/C Ratio	0.268	-	-	0.069	-
HCM Control Delay (s)	15.9	-	-	8.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.2	-

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	26	50	177	44	0	115	6	150	1	6	3
Future Vol, veh/h	3	26	50	177	44	0	115	6	150	1	6	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	28	54	192	48	0	125	7	163	1	7	3
Number of Lanes	0	1	0	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	8.2	10.4	9.3	8.2
HCM LOS	A	B	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	0%	4%	80%	10%
Vol Thru, %	0%	4%	33%	20%	60%
Vol Right, %	0%	96%	63%	0%	30%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	115	156	79	221	10
LT Vol	115	0	3	177	1
Through Vol	0	6	26	44	6
RT Vol	0	150	50	0	3
Lane Flow Rate	125	170	86	240	11
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.203	0.219	0.11	0.329	0.015
Departure Headway (Hd)	5.841	4.66	4.598	4.924	5.042
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	613	766	775	728	704
Service Time	3.591	2.409	2.65	2.963	3.112
HCM Lane V/C Ratio	0.204	0.222	0.111	0.33	0.016
HCM Control Delay	10.1	8.7	8.2	10.4	8.2
HCM Lane LOS	B	A	A	B	A
HCM 95th-tile Q	0.8	0.8	0.4	1.4	0

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	376	216	207	108	42	243
Future Vol, veh/h	376	216	207	108	42	243
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	140	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	409	235	225	117	46	264

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	225	0	-	0	1337	284
Stage 1	-	-	-	-	284	-
Stage 2	-	-	-	-	1053	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1344	-	-	-	169	755
Stage 1	-	-	-	-	764	-
Stage 2	-	-	-	-	336	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1344	-	-	-	110	755
Mov Cap-2 Maneuver	-	-	-	-	110	-
Stage 1	-	-	-	-	497	-
Stage 2	-	-	-	-	336	-

Approach	EB	WB	SB
HCM Control Delay, s	5.6	0	19.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1344	-	-	-	110	755
HCM Lane V/C Ratio	0.304	-	-	-	0.415	0.35
HCM Control Delay (s)	8.8	0	-	-	59.2	12.3
HCM Lane LOS	A	A	-	-	F	B
HCM 95th %tile Q(veh)	1.3	-	-	-	1.7	1.6

Intersection	
Intersection Delay, s/veh	19.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	200	42	0	0	131	39	21	201	31	53	0	405
Future Vol, veh/h	200	42	0	0	131	39	21	201	31	53	0	405
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	217	46	0	0	142	42	23	218	34	58	0	440
Number of Lanes	1	1	0	0	1	0	0	1	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	16.7	15.5	18.8	23.4
HCM LOS	C	C	C	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	8%	100%	0%	0%	100%	0%
Vol Thru, %	79%	0%	100%	77%	0%	0%
Vol Right, %	12%	0%	0%	23%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	253	200	42	170	53	405
LT Vol	21	200	0	0	53	0
Through Vol	201	0	42	131	0	0
RT Vol	31	0	0	39	0	405
Lane Flow Rate	275	217	46	185	58	440
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	0.55	0.48	0.094	0.391	0.118	0.749
Departure Headway (Hd)	7.201	7.943	7.43	7.614	7.354	6.128
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	501	452	481	471	487	590
Service Time	5.271	5.712	5.198	5.691	5.111	3.885
HCM Lane V/C Ratio	0.549	0.48	0.096	0.393	0.119	0.746
HCM Control Delay	18.8	17.9	11	15.5	11.1	25
HCM Lane LOS	C	C	B	C	B	C
HCM 95th-tile Q	3.3	2.5	0.3	1.8	0.4	6.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	134	49	261	52	49	32	200	307	16	337	13
Future Volume (veh/h)	6	134	49	261	52	49	32	200	307	16	337	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.99	0.99		0.97	0.98		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	7	146	46	284	57	37	35	217	88	17	366	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	438	315	99	625	516	335	403	585	482	84	545	19
Arrive On Green	0.23	0.23	0.23	0.18	0.49	0.49	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	1270	1353	426	1781	1053	684	993	1870	1542	33	1744	60
Grp Volume(v), veh/h	7	0	192	284	0	94	35	217	88	396	0	0
Grp Sat Flow(s),veh/h/ln	1270	0	1779	1781	0	1736	993	1870	1542	1837	0	0
Q Serve(g_s), s	0.2	0.0	4.7	5.3	0.0	1.5	0.0	4.6	2.1	0.3	0.0	0.0
Cycle Q Clear(g_c), s	0.2	0.0	4.7	5.3	0.0	1.5	1.8	4.6	2.1	9.5	0.0	0.0
Prop In Lane	1.00		0.24	1.00		0.39	1.00		1.00	0.04		0.03
Lane Grp Cap(c), veh/h	438	0	414	625	0	852	403	585	482	648	0	0
V/C Ratio(X)	0.02	0.00	0.46	0.45	0.00	0.11	0.09	0.37	0.18	0.61	0.00	0.00
Avail Cap(c_a), veh/h	917	0	1086	2412	0	3249	1852	3316	2733	3289	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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.0	0.0	16.7	9.7	0.0	7.0	12.6	13.6	12.7	15.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.8	0.9	0.0	0.1	0.1	0.4	0.2	1.0	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	0.1	0.0	1.8	1.9	0.0	0.5	0.3	1.8	0.7	3.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	0.0	17.6	10.6	0.0	7.1	12.7	14.0	12.9	16.3	0.0	0.0
LnGrp LOS	B	A	B	B	A	A	B	B	B	B	A	A
Approach Vol, veh/h		199			378			340			396	
Approach Delay, s/veh		17.5			9.7			13.6			16.3	
Approach LOS		B			A			B			B	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		29.9		20.9	13.1	16.8		20.9				
Change Period (Y+Rc), s		5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s		95.0		90.0	60.0	31.0		90.0				
Max Q Clear Time (g_c+I1), s		3.5		11.5	7.3	6.7		6.6				
Green Ext Time (p_c), s		1.1		3.3	2.0	1.2		2.2				

Intersection Summary												
HCM 6th Ctrl Delay			13.9									
HCM 6th LOS			B									

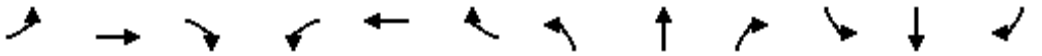
Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	355	49	37	430	0	0	0	0	28	109	72
Future Vol, veh/h	0	355	49	37	430	0	0	0	0	28	109	72
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	0	-	45
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	386	53	40	467	0	0	0	0	30	118	78

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	439	0	0	960	986	467
Stage 1	-	-	-	-	-	-	547	547	-
Stage 2	-	-	-	-	-	-	413	439	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	1121	-	0	285	248	596
Stage 1	0	-	-	-	-	0	580	517	-
Stage 2	0	-	-	-	-	0	668	578	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1121	-	-	271	0	596
Mov Cap-2 Maneuver	-	-	-	-	-	-	271	0	-
Stage 1	-	-	-	-	-	-	580	0	-
Stage 2	-	-	-	-	-	-	636	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.7	14.8
HCM LOS			B

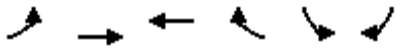
Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1121	-	271	596
HCM Lane V/C Ratio	-	-	0.036	-	0.112	0.33
HCM Control Delay (s)	-	-	8.3	0	20	14
HCM Lane LOS	-	-	A	A	C	B
HCM 95th %tile Q(veh)	-	-	0.1	-	0.4	1.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	371	0	0	463	103	22	100	22	0	0	0
Future Volume (veh/h)	86	371	0	0	463	103	22	100	22	0	0	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		1.00	1.00		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	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	93	403	0	0	503	80	24	109	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	734	1568	0	0	1445	1225	29	133	139			
Arrive On Green	0.04	0.84	0.00	0.00	0.77	0.77	0.09	0.09	0.09			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	334	1519	1585			
Grp Volume(v), veh/h	93	403	0	0	503	80	133	0	1			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1854	0	1585			
Q Serve(g_s), s	1.3	6.0	0.0	0.0	11.3	1.6	9.5	0.0	0.1			
Cycle Q Clear(g_c), s	1.3	6.0	0.0	0.0	11.3	1.6	9.5	0.0	0.1			
Prop In Lane	1.00		0.00	0.00		1.00	0.18		1.00			
Lane Grp Cap(c), veh/h	734	1568	0	0	1445	1225	163	0	139			
V/C Ratio(X)	0.13	0.26	0.00	0.00	0.35	0.07	0.82	0.00	0.01			
Avail Cap(c_a), veh/h	776	1568	0	0	1445	1225	288	0	247			
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	0.00	0.00	0.89	0.89	1.00	0.00	1.00			
Uniform Delay (d), s/veh	3.0	2.3	0.0	0.0	4.8	3.7	60.5	0.0	56.2			
Incr Delay (d2), s/veh	0.0	0.4	0.0	0.0	0.6	0.1	9.6	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			
%ile BackOfQ(50%),veh/ln	0.4	1.9	0.0	0.0	4.3	0.5	5.0	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.0	2.7	0.0	0.0	5.4	3.8	70.1	0.0	56.2			
LnGrp LOS	A	A	A	A	A	A	E	A	E			
Approach Vol, veh/h		496			583			134				
Approach Delay, s/veh		2.7			5.1			70.0				
Approach LOS		A			A			E				

Timer - Assigned Phs	1	2		4		6			
Phs Duration (G+Y+Rc), s	8.8	109.3		16.9		118.1			
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0			
Max Green Setting (Gmax), s	8.0	92.0		21.0		104.0			
Max Q Clear Time (g_c+I1), s	3.3	13.3		11.5		8.0			
Green Ext Time (p_c), s	0.0	4.3		0.4		3.0			

Intersection Summary		
HCM 6th Ctrl Delay		11.3
HCM 6th LOS		B



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	57	330	470	251	427	65
Future Volume (veh/h)	57	330	470	251	427	65
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	62	359	511	161	464	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	491	1215	1113	943	505	450
Arrive On Green	0.03	0.65	0.60	0.60	0.28	0.28
Sat Flow, veh/h	1781	1870	1870	1584	1781	1585
Grp Volume(v), veh/h	62	359	511	161	464	18
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1584	1781	1585
Q Serve(g_s), s	2.0	12.5	22.8	6.9	37.8	1.2
Cycle Q Clear(g_c), s	2.0	12.5	22.8	6.9	37.8	1.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	491	1215	1113	943	505	450
V/C Ratio(X)	0.13	0.30	0.46	0.17	0.92	0.04
Avail Cap(c_a), veh/h	596	1215	1113	943	772	687
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	12.5	11.4	16.9	13.7	52.0	38.9
Incr Delay (d2), s/veh	0.1	0.6	1.4	0.4	13.2	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	0.8	5.5	10.4	2.6	18.9	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.6	12.0	18.3	14.1	65.2	39.0
LnGrp LOS	B	B	B	B	E	D
Approach Vol, veh/h		421	672		482	
Approach Delay, s/veh		12.1	17.3		64.2	
Approach LOS		B	B		E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.2	94.3		47.6		102.4
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	13.6	58.0		65.0		75.0
Max Q Clear Time (g_c+I1), s	4.0	24.8		39.8		14.5
Green Ext Time (p_c), s	0.1	7.9		2.7		4.6

Intersection Summary	
HCM 6th Ctrl Delay	30.3
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	13.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	2	212	108	6	14	107	216	60	5	294	20
Future Vol, veh/h	44	2	212	108	6	14	107	216	60	5	294	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	50	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	2	230	117	7	15	116	235	65	5	320	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	852	873	331	957	852	268	342	0	0	300	0	0
Stage 1	341	341	-	500	500	-	-	-	-	-	-	-
Stage 2	511	532	-	457	352	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	280	289	711	237	297	771	1217	-	-	1261	-	-
Stage 1	674	639	-	553	543	-	-	-	-	-	-	-
Stage 2	545	526	-	583	632	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	249	260	711	147	268	771	1217	-	-	1261	-	-
Mov Cap-2 Maneuver	249	260	-	147	268	-	-	-	-	-	-	-
Stage 1	610	636	-	500	491	-	-	-	-	-	-	-
Stage 2	477	476	-	391	629	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.4	81.8	2.3	0.1
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1217	-	-	249	711	151	771	1261	-	-
HCM Lane V/C Ratio	0.096	-	-	0.201	0.324	0.821	0.02	0.004	-	-
HCM Control Delay (s)	8.3	-	-	23.1	12.5	90.6	9.8	7.9	-	-
HCM Lane LOS	A	-	-	C	B	F	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.7	1.4	5.3	0.1	0	-	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Existing PM

Intersection	
Int Delay, s/veh	8.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	31	315	204	68	232	108
Future Vol, veh/h	31	315	204	68	232	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	342	222	74	252	117

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	880	259	0	0	296	0
Stage 1	259	-	-	-	-	-
Stage 2	621	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	318	780	-	-	1265	-
Stage 1	784	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	250	780	-	-	1265	-
Mov Cap-2 Maneuver	250	-	-	-	-	-
Stage 1	784	-	-	-	-	-
Stage 2	422	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.6	0	5.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	655	1265	-
HCM Lane V/C Ratio	-	-	0.574	0.199	-
HCM Control Delay (s)	-	-	17.6	8.6	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	3.7	0.7	-

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	85	9	222	170	11	142
Future Vol, veh/h	85	9	222	170	11	142
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	92	10	241	185	12	154

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	512	334	0	0	426	0
Stage 1	334	-	-	-	-	-
Stage 2	178	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	522	708	-	-	1133	-
Stage 1	725	-	-	-	-	-
Stage 2	853	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	516	708	-	-	1133	-
Mov Cap-2 Maneuver	516	-	-	-	-	-
Stage 1	725	-	-	-	-	-
Stage 2	844	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.2	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	516	708	1133	-
HCM Lane V/C Ratio	-	-	0.179	0.014	0.011	-
HCM Control Delay (s)	-	-	13.5	10.2	8.2	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.6	0	0	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	201	314	646	448	18
Future Vol, veh/h	15	201	314	646	448	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	100	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	218	341	702	487	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1881	497	507	0	-	0
Stage 1	497	-	-	-	-	-
Stage 2	1384	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	78	573	1058	-	-	-
Stage 1	611	-	-	-	-	-
Stage 2	232	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	53	573	1058	-	-	-
Mov Cap-2 Maneuver	158	-	-	-	-	-
Stage 1	414	-	-	-	-	-
Stage 2	232	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.2	3.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1058	-	158	573	-	-
HCM Lane V/C Ratio	0.323	-	0.103	0.381	-	-
HCM Control Delay (s)	10	-	30.4	15.1	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	1.4	-	0.3	1.8	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	24	41	382	216	14
Future Vol, veh/h	15	24	41	382	216	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	115	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	26	45	415	235	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	748	243	250	0	-	0
Stage 1	243	-	-	-	-	-
Stage 2	505	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	380	796	1316	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	367	796	1316	-	-	-
Mov Cap-2 Maneuver	367	-	-	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	606	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1316	-	549	-	-
HCM Lane V/C Ratio	0.034	-	0.077	-	-
HCM Control Delay (s)	7.8	-	12.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	65	106	440	232	8
Future Vol, veh/h	5	65	106	440	232	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	71	115	478	252	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	965	257	261	0	-	0
Stage 1	257	-	-	-	-	-
Stage 2	708	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	283	782	1303	-	-	-
Stage 1	786	-	-	-	-	-
Stage 2	488	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	258	782	1303	-	-	-
Mov Cap-2 Maneuver	258	-	-	-	-	-
Stage 1	717	-	-	-	-	-
Stage 2	488	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	1.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1303	-	683	-	-
HCM Lane V/C Ratio	0.088	-	0.111	-	-
HCM Control Delay (s)	8	-	10.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.4	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	1	44	44	1	2	43	522	73	5	256	5
Future Vol, veh/h	5	1	44	44	1	2	43	522	73	5	256	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	48	48	1	2	47	567	79	5	278	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	993	1031	281	1016	994	607	283	0	0	646	0	0
Stage 1	291	291	-	701	701	-	-	-	-	-	-	-
Stage 2	702	740	-	315	293	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	224	233	758	216	245	496	1279	-	-	939	-	-
Stage 1	717	672	-	429	441	-	-	-	-	-	-	-
Stage 2	429	423	-	696	670	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	211	218	758	192	229	496	1279	-	-	939	-	-
Mov Cap-2 Maneuver	211	218	-	192	229	-	-	-	-	-	-	-
Stage 1	675	668	-	404	415	-	-	-	-	-	-	-
Stage 2	401	398	-	647	666	-	-	-	-	-	-	-

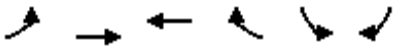
Approach	EB	WB	NB	SB
HCM Control Delay, s	11.9	29.4	0.5	0.2
HCM LOS	B	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1279	-	-	579	198	939	-	-
HCM Lane V/C Ratio	0.037	-	-	0.094	0.258	0.006	-	-
HCM Control Delay (s)	7.9	0	-	11.9	29.4	8.9	0	-
HCM Lane LOS	A	A	-	B	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	1	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	387	2	55	4	3	1	104	687	7	0	420	220
Future Volume (veh/h)	387	2	55	4	3	1	104	687	7	0	420	220
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	421	2	30	4	3	0	113	747	8	0	457	196
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	605	3	593	418	298	0	393	958	10	215	786	666
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.00	0.06	0.52	0.52	0.00	0.42	0.42
Sat Flow, veh/h	1409	7	1583	955	796	0	1781	1847	20	1781	1870	1585
Grp Volume(v), veh/h	423	0	30	7	0	0	113	0	755	0	457	196
Grp Sat Flow(s),veh/h/ln	1416	0	1583	1751	0	0	1781	0	1867	1781	1870	1585
Q Serve(g_s), s	24.7	0.0	1.1	0.0	0.0	0.0	3.2	0.0	30.6	0.0	17.5	7.7
Cycle Q Clear(g_c), s	24.9	0.0	1.1	0.2	0.0	0.0	3.2	0.0	30.6	0.0	17.5	7.7
Prop In Lane	1.00		1.00	0.57		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	607	0	593	716	0	0	393	0	968	215	786	666
V/C Ratio(X)	0.70	0.00	0.05	0.01	0.00	0.00	0.29	0.00	0.78	0.00	0.58	0.29
Avail Cap(c_a), veh/h	1889	0	2028	2148	0	0	884	0	1914	422	1518	1286
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	0.0	18.7	18.4	0.0	0.0	15.0	0.0	18.2	0.0	20.8	17.9
Incr Delay (d2), s/veh	3.9	0.0	0.1	0.0	0.0	0.0	0.4	0.0	1.4	0.0	3.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.9	0.0	0.4	0.1	0.0	0.0	1.3	0.0	12.6	0.0	8.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.0	0.0	18.8	18.4	0.0	0.0	15.4	0.0	19.6	0.0	23.9	19.1
LnGrp LOS	C	A	B	B	A	A	B	A	B	A	C	B
Approach Vol, veh/h		453			7			868			653	
Approach Delay, s/veh		29.3			18.4			19.1			22.5	
Approach LOS		C			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.2	44.4		40.1	0.0	53.6		40.1				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	31.0	76.0		120.0	11.0	96.0		120.0				
Max Q Clear Time (g_c+I1), s	5.2	19.5		2.2	0.0	32.6		26.9				
Green Ext Time (p_c), s	0.3	19.8		0.0	0.0	6.8		8.2				

Intersection Summary	
HCM 6th Ctrl Delay	22.5
HCM 6th LOS	C



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	813	767	821	486	15
Future Volume (veh/h)	55	813	767	821	486	15
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	60	884	834	758	541	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	208	2388	1044	893	706	314
Arrive On Green	0.04	0.67	0.58	0.58	0.20	0.00
Sat Flow, veh/h	1781	3647	1909	1552	3563	1585
Grp Volume(v), veh/h	60	884	815	777	541	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1591	1781	1585
Q Serve(g_s), s	1.2	10.0	33.2	37.4	13.3	0.0
Cycle Q Clear(g_c), s	1.2	10.0	33.2	37.4	13.3	0.0
Prop In Lane	1.00			0.98	1.00	1.00
Lane Grp Cap(c), veh/h	208	2388	1022	915	706	314
V/C Ratio(X)	0.29	0.37	0.80	0.85	0.77	0.00
Avail Cap(c_a), veh/h	422	3041	1135	1017	1351	601
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	16.6	6.6	15.4	16.3	35.0	0.0
Incr Delay (d2), s/veh	0.3	0.1	3.9	6.6	2.5	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	0.6	3.3	13.2	13.8	5.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.9	6.7	19.3	22.8	37.5	0.0
LnGrp LOS	B	A	B	C	D	A
Approach Vol, veh/h		944	1592		541	
Approach Delay, s/veh		7.4	21.0		37.5	
Approach LOS		A	C		D	

Timer - Assigned Phs	2	3	4		8
Phs Duration (G+Y+Rc), s	24.3	8.9	59.1		68.0
Change Period (Y+Rc), s	6.0	5.0	6.0		6.0
Max Green Setting (Gmax), s	35.0	15.0	59.0		79.0
Max Q Clear Time (g_c+I1), s	15.3	3.2	39.4		12.0
Green Ext Time (p_c), s	3.0	0.0	13.7		9.9

Intersection Summary	
HCM 6th Ctrl Delay	19.7
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	10.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	325	541	169	230	268
Future Vol, veh/h	36	325	541	169	230	268
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	353	588	184	250	291

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1471	680	0	0	772	0
Stage 1	680	-	-	-	-	-
Stage 2	791	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	140	451	-	-	843	-
Stage 1	503	-	-	-	-	-
Stage 2	447	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	98	451	-	-	843	-
Mov Cap-2 Maneuver	98	-	-	-	-	-
Stage 1	503	-	-	-	-	-
Stage 2	314	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	39.1	0	5.1
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	98	451	843	-
HCM Lane V/C Ratio	-	-	0.399	0.783	0.297	-
HCM Control Delay (s)	-	-	64.3	36.3	11.1	-
HCM Lane LOS	-	-	F	E	B	-
HCM 95th %tile Q(veh)	-	-	1.6	6.9	1.2	-

Intersection	
Int Delay, s/veh	7.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	305	104	246	313	51	143
Future Vol, veh/h	305	104	246	313	51	143
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	332	113	267	340	55	155

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	445	0	1263	389
Stage 1	-	-	-	-	389	-
Stage 2	-	-	-	-	874	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1115	-	187	659
Stage 1	-	-	-	-	685	-
Stage 2	-	-	-	-	408	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1115	-	132	659
Mov Cap-2 Maneuver	-	-	-	-	132	-
Stage 1	-	-	-	-	685	-
Stage 2	-	-	-	-	288	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	35.1
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	322	-	-	1115	-
HCM Lane V/C Ratio	0.655	-	-	0.24	-
HCM Control Delay (s)	35.1	-	-	9.2	0
HCM Lane LOS	E	-	-	A	A
HCM 95th %tile Q(veh)	4.3	-	-	0.9	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	412	33	24	474	33	32
Future Vol, veh/h	412	33	24	474	33	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	448	36	26	515	36	35

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	484	0	1033	466
Stage 1	-	-	-	-	466	-
Stage 2	-	-	-	-	567	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1079	-	258	597
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	568	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1079	-	249	597
Mov Cap-2 Maneuver	-	-	-	-	249	-
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	549	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	17.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	349	-	-	1079	-
HCM Lane V/C Ratio	0.202	-	-	0.024	-
HCM Control Delay (s)	17.9	-	-	8.4	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	440	8	82	456	33	77
Future Vol, veh/h	440	8	82	456	33	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	478	9	89	496	36	84

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	487	0	1157	483
Stage 1	-	-	-	-	483	-
Stage 2	-	-	-	-	674	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1076	-	217	584
Stage 1	-	-	-	-	620	-
Stage 2	-	-	-	-	506	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1076	-	192	584
Mov Cap-2 Maneuver	-	-	-	-	192	-
Stage 1	-	-	-	-	620	-
Stage 2	-	-	-	-	448	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	19.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	362	-	-	1076	-
HCM Lane V/C Ratio	0.33	-	-	0.083	-
HCM Control Delay (s)	19.8	-	-	8.6	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.4	-	-	0.3	-

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	26	54	157	22	4	37	5	226	4	8	1
Future Vol, veh/h	0	26	54	157	22	4	37	5	226	4	8	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	28	59	171	24	4	40	5	246	4	9	1
Number of Lanes	0	1	0	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	8.1	9.8	9.3	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	0%	0%	86%	31%
Vol Thru, %	0%	2%	32%	12%	62%
Vol Right, %	0%	98%	68%	2%	8%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	37	231	80	183	13
LT Vol	37	0	0	157	4
Through Vol	0	5	26	22	8
RT Vol	0	226	54	4	1
Lane Flow Rate	40	251	87	199	14
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.064	0.317	0.108	0.271	0.02
Departure Headway (Hd)	5.744	4.551	4.488	4.899	5.092
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	623	788	796	732	700
Service Time	3.48	2.288	2.533	2.935	3.146
HCM Lane V/C Ratio	0.064	0.319	0.109	0.272	0.02
HCM Control Delay	8.9	9.4	8.1	9.8	8.3
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.2	1.4	0.4	1.1	0.1

Intersection	
Int Delay, s/veh	16

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	354	209	227	101	100	368
Future Vol, veh/h	354	209	227	101	100	368
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	140	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	385	227	247	110	109	400

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	247	0	-	0	1299	302
Stage 1	-	-	-	-	302	-
Stage 2	-	-	-	-	997	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1319	-	-	-	178	738
Stage 1	-	-	-	-	750	-
Stage 2	-	-	-	-	357	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1319	-	-	-	119	738
Mov Cap-2 Maneuver	-	-	-	-	119	-
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	357	-

Approach	EB	WB	SB
HCM Control Delay, s	5.6	0	39.8
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1319	-	-	-	119	738
HCM Lane V/C Ratio	0.292	-	-	-	0.913	0.542
HCM Control Delay (s)	8.8	0	-	-	129	15.5
HCM Lane LOS	A	A	-	-	F	C
HCM 95th %tile Q(veh)	1.2	-	-	-	5.8	3.3

Intersection	
Intersection Delay, s/veh	27.5
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	281	116	0	0	106	60	37	284	53	46	0	264
Future Vol, veh/h	281	116	0	0	106	60	37	284	53	46	0	264
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	305	126	0	0	115	65	40	309	58	50	0	287
Number of Lanes	1	1	0	0	1	0	0	1	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	24.2	17.5	43.1	18.4
HCM LOS	C	C	E	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	10%	100%	0%	0%	100%	0%
Vol Thru, %	76%	0%	100%	64%	0%	0%
Vol Right, %	14%	0%	0%	36%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	374	281	116	166	46	264
LT Vol	37	281	0	0	46	0
Through Vol	284	0	116	106	0	0
RT Vol	53	0	0	60	0	264
Lane Flow Rate	407	305	126	180	50	287
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	0.867	0.704	0.272	0.421	0.118	0.576
Departure Headway (Hd)	7.676	8.292	7.777	8.4	8.46	7.221
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	476	437	461	428	424	499
Service Time	5.676	6.05	5.535	6.474	6.216	4.977
HCM Lane V/C Ratio	0.855	0.698	0.273	0.421	0.118	0.575
HCM Control Delay	43.1	28.6	13.4	17.5	12.4	19.4
HCM Lane LOS	E	D	B	C	B	C
HCM 95th-tile Q	9.1	5.3	1.1	2	0.4	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	118	64	345	122	25	49	310	268	48	284	29
Future Volume (veh/h)	15	118	64	345	122	25	49	310	268	48	284	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.99	0.99		0.97	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	128	59	375	133	24	53	337	83	52	309	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	396	269	124	640	762	138	369	612	506	112	437	40
Arrive On Green	0.22	0.22	0.22	0.20	0.50	0.50	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1201	1199	553	1781	1538	278	1030	1870	1544	121	1334	121
Grp Volume(v), veh/h	16	0	187	375	0	157	53	337	83	391	0	0
Grp Sat Flow(s),veh/h/ln	1201	0	1751	1781	0	1816	1030	1870	1544	1577	0	0
Q Serve(g_s), s	0.6	0.0	5.2	8.1	0.0	2.7	0.0	8.4	2.2	4.6	0.0	0.0
Cycle Q Clear(g_c), s	0.6	0.0	5.2	8.1	0.0	2.7	3.6	8.4	2.2	12.9	0.0	0.0
Prop In Lane	1.00		0.32	1.00		0.15	1.00		1.00	0.13		0.08
Lane Grp Cap(c), veh/h	396	0	392	640	0	900	369	612	506	588	0	0
V/C Ratio(X)	0.04	0.00	0.48	0.59	0.00	0.17	0.14	0.55	0.16	0.66	0.00	0.00
Avail Cap(c_a), veh/h	786	0	961	2173	0	3053	1673	2979	2459	2692	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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	17.2	0.0	19.0	11.1	0.0	7.9	14.0	15.6	13.5	16.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.9	0.9	0.0	0.1	0.2	0.8	0.2	1.3	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	0.0	2.1	2.9	0.0	0.9	0.5	3.4	0.7	4.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.3	0.0	19.9	12.0	0.0	8.0	14.2	16.4	13.7	18.1	0.0	0.0
LnGrp LOS	B	A	B	B	A	A	B	B	B	B	A	A
Approach Vol, veh/h		203			532			473			391	
Approach Delay, s/veh		19.7			10.8			15.6			18.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		33.0		23.5	15.3	17.7		23.5				
Change Period (Y+Rc), s		5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s		95.0		90.0	60.0	31.0		90.0				
Max Q Clear Time (g_c+I1), s		4.7		14.9	10.1	7.2		10.4				
Green Ext Time (p_c), s		1.1		3.1	1.2	1.2		3.0				

Intersection Summary												
HCM 6th Ctrl Delay			15.2									
HCM 6th LOS			B									

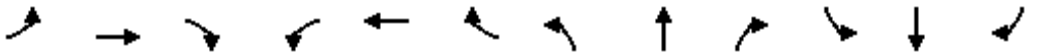
Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	402	30	23	410	0	0	0	0	77	54	61
Future Vol, veh/h	0	402	30	23	410	0	0	0	0	77	54	61
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	0	-	45
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	437	33	25	446	0	0	0	0	84	59	66

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	470	0	0	950	966	446
Stage 1	-	-	-	-	-	-	496	496	-
Stage 2	-	-	-	-	-	-	454	470	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	1092	-	0	289	255	612
Stage 1	0	-	-	-	-	0	612	545	-
Stage 2	0	-	-	-	-	0	640	560	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1092	-	-	280	0	612
Mov Cap-2 Maneuver	-	-	-	-	-	-	280	0	-
Stage 1	-	-	-	-	-	-	612	0	-
Stage 2	-	-	-	-	-	-	621	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.4	16.7
HCM LOS			C

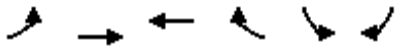
Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1092	-	280	612
HCM Lane V/C Ratio	-	-	0.023	-	0.299	0.204
HCM Control Delay (s)	-	-	8.4	0	23.2	12.4
HCM Lane LOS	-	-	A	A	C	B
HCM 95th %tile Q(veh)	-	-	0.1	-	1.2	0.8



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	430	0	0	429	153	28	95	54	0	0	0
Future Volume (veh/h)	126	430	0	0	429	153	28	95	54	0	0	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		1.00	1.00		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	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	137	467	0	0	466	116	30	103	2			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	757	1554	0	0	1421	1204	38	129	143			
Arrive On Green	0.04	0.83	0.00	0.00	0.76	0.76	0.09	0.09	0.09			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	417	1432	1585			
Grp Volume(v), veh/h	137	467	0	0	466	116	133	0	2			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1850	0	1585			
Q Serve(g_s), s	1.9	7.1	0.0	0.0	10.1	2.4	8.9	0.0	0.1			
Cycle Q Clear(g_c), s	1.9	7.1	0.0	0.0	10.1	2.4	8.9	0.0	0.1			
Prop In Lane	1.00		0.00	0.00		1.00	0.23		1.00			
Lane Grp Cap(c), veh/h	757	1554	0	0	1421	1204	166	0	143			
V/C Ratio(X)	0.18	0.30	0.00	0.00	0.33	0.10	0.80	0.00	0.01			
Avail Cap(c_a), veh/h	829	1554	0	0	1421	1204	367	0	314			
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	0.00	0.00	0.79	0.79	1.00	0.00	1.00			
Uniform Delay (d), s/veh	3.0	2.4	0.0	0.0	4.8	3.9	56.2	0.0	52.2			
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.0	0.5	0.1	8.5	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			
%ile BackOfQ(50%),veh/ln	0.6	2.3	0.0	0.0	3.8	0.8	4.6	0.0	0.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.1	2.9	0.0	0.0	5.3	4.1	64.7	0.0	52.3			
LnGrp LOS	A	A	A	A	A	A	E	A	D			
Approach Vol, veh/h		604			582			135				
Approach Delay, s/veh		2.9			5.1			64.6				
Approach LOS		A			A			E				

Timer - Assigned Phs	1	2		4		6			
Phs Duration (G+Y+Rc), s	9.0	100.7		16.3		109.7			
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0			
Max Green Setting (Gmax), s	10.0	77.0		25.0		91.0			
Max Q Clear Time (g_c+I1), s	3.9	12.1		10.9		9.1			
Green Ext Time (p_c), s	0.1	4.0		0.5		3.6			

Intersection Summary			
HCM 6th Ctrl Delay		10.2	
HCM 6th LOS		B	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	62	411	500	309	453	112
Future Volume (veh/h)	62	411	500	309	453	112
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	67	447	543	126	492	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	388	1048	854	723	546	486
Arrive On Green	0.05	0.56	0.46	0.46	0.31	0.31
Sat Flow, veh/h	1781	1870	1870	1583	1781	1585
Grp Volume(v), veh/h	67	447	543	126	492	33
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1583	1781	1585
Q Serve(g_s), s	1.4	10.4	16.7	3.5	19.8	1.1
Cycle Q Clear(g_c), s	1.4	10.4	16.7	3.5	19.8	1.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	388	1048	854	723	546	486
V/C Ratio(X)	0.17	0.43	0.64	0.17	0.90	0.07
Avail Cap(c_a), veh/h	441	1048	854	723	618	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.0	9.5	15.6	12.0	24.9	18.4
Incr Delay (d2), s/veh	0.1	1.2	3.6	0.5	15.9	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	0.5	4.2	7.5	1.3	10.4	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.1	10.8	19.2	12.5	40.9	18.5
LnGrp LOS	B	B	B	B	D	B
Approach Vol, veh/h		514	669		525	
Approach Delay, s/veh		10.8	17.9		39.4	
Approach LOS		B	B		D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	7.8	39.3		28.0		47.0
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	6.8	29.0		26.0		39.0
Max Q Clear Time (g_c+I1), s	3.4	18.7		21.8		12.4
Green Ext Time (p_c), s	0.0	4.5		1.1		5.2

Intersection Summary	
HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	12.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	4	143	72	4	3	205	341	115	15	253	62
Future Vol, veh/h	15	4	143	72	4	3	205	341	115	15	253	62
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	50	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	4	155	78	4	3	223	371	125	16	275	67

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1224	1283	309	1300	1254	434	342	0	0	496	0	0
Stage 1	341	341	-	880	880	-	-	-	-	-	-	-
Stage 2	883	942	-	420	374	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	156	165	731	138	172	622	1217	-	-	1068	-	-
Stage 1	674	639	-	342	365	-	-	-	-	-	-	-
Stage 2	340	342	-	611	618	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	129	133	731	90	138	622	1217	-	-	1068	-	-
Mov Cap-2 Maneuver	129	133	-	90	138	-	-	-	-	-	-	-
Stage 1	551	629	-	279	298	-	-	-	-	-	-	-
Stage 2	272	279	-	471	609	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.4	143.8	2.7	0.4
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1217	-	-	130	731	92	622	1068	-	-
HCM Lane V/C Ratio	0.183	-	-	0.159	0.213	0.898	0.005	0.015	-	-
HCM Control Delay (s)	8.6	-	-	37.9	11.3	149	10.8	8.4	-	-
HCM Lane LOS	A	-	-	E	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	0.5	0.8	5	0	0	-	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Base Year AM
No Imi Kala Street Extension
No Improvements

Intersection	
Int Delay, s/veh	17.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	44	295	192	43	346	401
Future Vol, veh/h	44	295	192	43	346	401
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	321	209	47	376	436

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1421	233	0	0	256	0
Stage 1	233	-	-	-	-	-
Stage 2	1188	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	150	806	-	-	1309	-
Stage 1	806	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	93	806	-	-	1309	-
Mov Cap-2 Maneuver	93	-	-	-	-	-
Stage 1	806	-	-	-	-	-
Stage 2	179	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	57.8	0	4.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	404	1309	-
HCM Lane V/C Ratio	-	-	0.912	0.287	-
HCM Control Delay (s)	-	-	57.8	8.9	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	9.7	1.2	-

Intersection	
Int Delay, s/veh	6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	146	55	170	61	94	394
Future Vol, veh/h	146	55	170	61	94	394
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	159	60	185	66	102	428

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	850	218	0	0	251	0
Stage 1	218	-	-	-	-	-
Stage 2	632	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	331	822	-	-	1314	-
Stage 1	818	-	-	-	-	-
Stage 2	530	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	305	822	-	-	1314	-
Mov Cap-2 Maneuver	305	-	-	-	-	-
Stage 1	818	-	-	-	-	-
Stage 2	489	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23.6	0	1.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	305	822	1314	-
HCM Lane V/C Ratio	-	-	0.52	0.073	0.078	-
HCM Control Delay (s)	-	-	28.9	9.7	8	-
HCM Lane LOS	-	-	D	A	A	-
HCM 95th %tile Q(veh)	-	-	2.8	0.2	0.3	-

Intersection	
Int Delay, s/veh	26.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	427	104	378	649	13
Future Vol, veh/h	7	427	104	378	649	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	100	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	464	113	411	705	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1349	712	719	0	-	0
Stage 1	712	-	-	-	-	-
Stage 2	637	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	166	~ 432	882	-	-	-
Stage 1	486	-	-	-	-	-
Stage 2	527	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	145	~ 432	882	-	-	-
Mov Cap-2 Maneuver	280	-	-	-	-	-
Stage 1	424	-	-	-	-	-
Stage 2	527	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	94.5	2.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	882	-	280	432	-	-
HCM Lane V/C Ratio	0.128	-	0.027	1.074	-	-
HCM Control Delay (s)	9.7	-	18.2	95.7	-	-
HCM Lane LOS	A	-	C	F	-	-
HCM 95th %tile Q(veh)	0.4	-	0.1	15.4	-	-

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

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	41	22	232	547	12
Future Vol, veh/h	11	41	22	232	547	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	115	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	45	24	252	595	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	902	602	608	0	-	0
Stage 1	602	-	-	-	-	-
Stage 2	300	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	308	500	970	-	-	-
Stage 1	547	-	-	-	-	-
Stage 2	752	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	300	500	970	-	-	-
Mov Cap-2 Maneuver	300	-	-	-	-	-
Stage 1	533	-	-	-	-	-
Stage 2	752	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.4	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	970	-	438	-	-
HCM Lane V/C Ratio	0.025	-	0.129	-	-
HCM Control Delay (s)	8.8	-	14.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	138	54	265	639	6
Future Vol, veh/h	5	138	54	265	639	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	150	59	288	695	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1105	699	702	0	-	0
Stage 1	699	-	-	-	-	-
Stage 2	406	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	233	440	895	-	-	-
Stage 1	493	-	-	-	-	-
Stage 2	673	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	218	440	895	-	-	-
Mov Cap-2 Maneuver	218	-	-	-	-	-
Stage 1	460	-	-	-	-	-
Stage 2	673	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.3	1.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	895	-	425	-	-
HCM Lane V/C Ratio	0.066	-	0.366	-	-
HCM Control Delay (s)	9.3	-	18.3	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	1.6	-	-

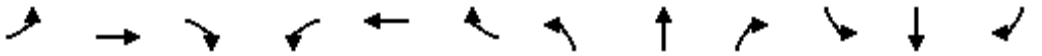
Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	9	0	41	59	0	7	35	318	29	5	812	7
Future Vol, veh/h	9	0	41	59	0	7	35	318	29	5	812	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	45	64	0	8	38	346	32	5	883	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1339	1351	887	1358	1339	362	891	0	0	378	0	0
Stage 1	897	897	-	438	438	-	-	-	-	-	-	-
Stage 2	442	454	-	920	901	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	130	150	343	126	153	683	761	-	-	1180	-	-
Stage 1	334	358	-	597	579	-	-	-	-	-	-	-
Stage 2	594	569	-	325	357	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	122	140	343	104	142	683	761	-	-	1180	-	-
Mov Cap-2 Maneuver	122	140	-	104	142	-	-	-	-	-	-	-
Stage 1	313	355	-	559	543	-	-	-	-	-	-	-
Stage 2	550	533	-	281	354	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.6	79.3	0.9	0
HCM LOS	C	F		

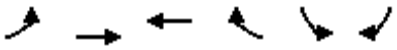
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	761	-	-	259	114	1180	-	-
HCM Lane V/C Ratio	0.05	-	-	0.21	0.629	0.005	-	-
HCM Control Delay (s)	10	0	-	22.6	79.3	8.1	0	-
HCM Lane LOS	A	A	-	C	F	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.8	3.2	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	2	41	12	5	3	110	443	3	2	877	417
Future Volume (veh/h)	131	2	41	12	5	3	110	443	3	2	877	417
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1034	1870
Adj Flow Rate, veh/h	142	2	3	13	5	0	120	482	3	2	953	435
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	199	2	185	172	62	0	137	1482	9	732	786	1205
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.00	0.06	0.80	0.80	0.02	0.76	0.76
Sat Flow, veh/h	1418	20	1578	1228	528	0	1781	1857	12	1781	1034	1585
Grp Volume(v), veh/h	144	0	3	18	0	0	120	0	485	2	953	435
Grp Sat Flow(s),veh/h/ln	1438	0	1578	1756	0	0	1781	0	1868	1781	1034	1585
Q Serve(g_s), s	19.4	0.0	0.4	0.0	0.0	0.0	10.5	0.0	15.5	0.1	166.0	19.8
Cycle Q Clear(g_c), s	21.4	0.0	0.4	1.9	0.0	0.0	10.5	0.0	15.5	0.1	166.0	19.8
Prop In Lane	0.99		1.00	0.72		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	201	0	185	234	0	0	137	0	1491	732	786	1205
V/C Ratio(X)	0.71	0.00	0.02	0.08	0.00	0.00	0.87	0.00	0.33	0.00	1.21	0.36
Avail Cap(c_a), veh/h	811	0	867	889	0	0	286	0	1591	785	786	1205
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	94.3	0.0	85.2	85.9	0.0	0.0	90.0	0.0	6.0	5.4	26.2	8.7
Incr Delay (d2), s/veh	12.2	0.0	0.1	0.1	0.0	0.0	15.5	0.0	0.1	0.0	107.5	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	8.8	0.0	0.2	0.9	0.0	0.0	7.4	0.0	6.2	0.0	61.7	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	106.5	0.0	85.3	86.1	0.0	0.0	105.5	0.0	6.1	5.4	133.7	9.5
LnGrp LOS	F	A	F	F	A	A	F	A	A	A	F	A
Approach Vol, veh/h		147			18			605			1390	
Approach Delay, s/veh		106.1			86.1			25.9			94.7	
Approach LOS		F			F			C			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.8	171.0		30.6	8.5	179.3		30.6				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	31.0	166.0		120.0	11.0	186.0		120.0				
Max Q Clear Time (g_c+I1), s	12.5	168.0		3.9	2.1	17.5		23.4				
Green Ext Time (p_c), s	0.3	0.0		0.1	0.0	3.6		2.3				

Intersection Summary			
HCM 6th Ctrl Delay		76.1	
HCM 6th LOS		E	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	54	768	802	567	951	28
Future Volume (veh/h)	54	768	802	567	951	28
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	1488
Adj Flow Rate, veh/h	59	835	872	555	1061	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	141	2036	1101	685	1244	441
Arrive On Green	0.01	0.57	0.52	0.52	0.35	0.00
Sat Flow, veh/h	1781	3647	2197	1308	3563	1261
Grp Volume(v), veh/h	59	835	733	694	1061	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1635	1781	1261
Q Serve(g_s), s	2.0	18.6	47.4	49.7	39.1	0.0
Cycle Q Clear(g_c), s	2.0	18.6	47.4	49.7	39.1	0.0
Prop In Lane	1.00			0.80	1.00	1.00
Lane Grp Cap(c), veh/h	141	2036	930	856	1244	441
V/C Ratio(X)	0.42	0.41	0.79	0.81	0.85	0.00
Avail Cap(c_a), veh/h	141	3515	1670	1536	2240	793
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	28.1	16.9	27.4	27.9	42.7	0.0
Incr Delay (d2), s/veh	0.7	0.2	1.8	2.3	2.5	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	0.9	7.6	20.3	19.6	17.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.9	17.0	29.2	30.2	45.2	0.0
LnGrp LOS	C	B	C	C	D	A
Approach Vol, veh/h		894	1427		1061	
Approach Delay, s/veh		17.8	29.7		45.2	
Approach LOS		B	C		D	

Timer - Assigned Phs	2	3	4		8
Phs Duration (G+Y+Rc), s	55.4	7.0	79.1		86.1
Change Period (Y+Rc), s	6.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	89.0	2.0	133.0		140.0
Max Q Clear Time (g_c+I1), s	41.1	4.0	51.7		20.6
Green Ext Time (p_c), s	8.4	0.0	22.4		9.2

Intersection Summary	
HCM 6th Ctrl Delay	31.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	12.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	39	163	347	157	423	572
Future Vol, veh/h	39	163	347	157	423	572
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	177	377	171	460	622

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2005	463	0	0	548	0
Stage 1	463	-	-	-	-	-
Stage 2	1542	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	65	599	-	-	1021	-
Stage 1	634	-	-	-	-	-
Stage 2	194	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 36	599	-	-	1021	-
Mov Cap-2 Maneuver	~ 36	-	-	-	-	-
Stage 1	634	-	-	-	-	-
Stage 2	107	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	84	0	4.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	36	599	1021	-
HCM Lane V/C Ratio	-	-	1.178	0.296	0.45	-
HCM Control Delay (s)	-	-	$ 378.6	13.5	11.4	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	4.4	1.2	2.4	-

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

Intersection	
Int Delay, s/veh	5.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	417	232	259	192	16	150
Future Vol, veh/h	417	232	259	192	16	150
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	453	252	282	209	17	163

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	705	0	1352	579
Stage 1	-	-	-	-	579	-
Stage 2	-	-	-	-	773	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	893	-	165	515
Stage 1	-	-	-	-	560	-
Stage 2	-	-	-	-	455	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	893	-	106	515
Mov Cap-2 Maneuver	-	-	-	-	106	-
Stage 1	-	-	-	-	560	-
Stage 2	-	-	-	-	293	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.2	23.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	375	-	-	893	-
HCM Lane V/C Ratio	0.481	-	-	0.315	-
HCM Control Delay (s)	23.2	-	-	10.9	0
HCM Lane LOS	C	-	-	B	A
HCM 95th %tile Q(veh)	2.5	-	-	1.4	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	529	69	32	404	24	44
Future Vol, veh/h	529	69	32	404	24	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	575	75	35	439	26	48

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	650	0	1122	613
Stage 1	-	-	-	-	613	-
Stage 2	-	-	-	-	509	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	936	-	228	492
Stage 1	-	-	-	-	541	-
Stage 2	-	-	-	-	604	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	936	-	217	492
Mov Cap-2 Maneuver	-	-	-	-	217	-
Stage 1	-	-	-	-	541	-
Stage 2	-	-	-	-	574	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	18.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	340	-	-	936	-
HCM Lane V/C Ratio	0.217	-	-	0.037	-
HCM Control Delay (s)	18.5	-	-	9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	523	44	64	427	16	96
Future Vol, veh/h	523	44	64	427	16	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	568	48	70	464	17	104

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	616	0	1196	592
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	604	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	964	-	206	506
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	546	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	964	-	186	506
Mov Cap-2 Maneuver	-	-	-	-	186	-
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	492	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	17.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	406	-	-	964	-
HCM Lane V/C Ratio	0.3	-	-	0.072	-
HCM Control Delay (s)	17.6	-	-	9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0.2	-

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	3	26	51	182	44	0	116	6	151	1	7	3
Future Vol, veh/h	3	26	51	182	44	0	116	6	151	1	7	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	28	55	198	48	0	126	7	164	1	8	3
Number of Lanes	0	1	0	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	8.2	10.5	9.4	8.2
HCM LOS	A	B	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	0%	4%	81%	9%
Vol Thru, %	0%	4%	33%	19%	64%
Vol Right, %	0%	96%	64%	0%	27%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	116	157	80	226	11
LT Vol	116	0	3	182	1
Through Vol	0	6	26	44	7
RT Vol	0	151	51	0	3
Lane Flow Rate	126	171	87	246	12
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.205	0.222	0.111	0.337	0.017
Departure Headway (Hd)	5.858	4.676	4.613	4.935	5.077
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	612	765	773	727	699
Service Time	3.61	2.427	2.667	2.977	3.15
HCM Lane V/C Ratio	0.206	0.224	0.113	0.338	0.017
HCM Control Delay	10.1	8.8	8.2	10.5	8.2
HCM Lane LOS	B	A	A	B	A
HCM 95th-tile Q	0.8	0.8	0.4	1.5	0.1

Intersection	
Int Delay, s/veh	7.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	378	239	232	108	42	249
Future Vol, veh/h	378	239	232	108	42	249
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	140	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	411	260	252	117	46	271

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	252	0	-	0	1393	311
Stage 1	-	-	-	-	311	-
Stage 2	-	-	-	-	1082	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1313	-	-	-	156	729
Stage 1	-	-	-	-	743	-
Stage 2	-	-	-	-	325	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1313	-	-	-	99	729
Mov Cap-2 Maneuver	-	-	-	-	99	-
Stage 1	-	-	-	-	471	-
Stage 2	-	-	-	-	325	-

Approach	EB	WB	SB
HCM Control Delay, s	5.5	0	21
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1313	-	-	-	99	729
HCM Lane V/C Ratio	0.313	-	-	-	0.461	0.371
HCM Control Delay (s)	9	0	-	-	69.3	12.8
HCM Lane LOS	A	A	-	-	F	B
HCM 95th %tile Q(veh)	1.4	-	-	-	2	1.7

Intersection	
Intersection Delay, s/veh	35.6
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	214	48	0	0	143	39	21	206	31	58	0	495
Future Vol, veh/h	214	48	0	0	143	39	21	206	31	58	0	495
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	233	52	0	0	155	42	23	224	34	63	0	538
Number of Lanes	1	1	0	0	1	0	0	1	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	19.8	18.4	22.8	54.8
HCM LOS	C	C	C	F

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	8%	100%	0%	0%	100%	0%
Vol Thru, %	80%	0%	100%	79%	0%	0%
Vol Right, %	12%	0%	0%	21%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	258	214	48	182	58	495
LT Vol	21	214	0	0	58	0
Through Vol	206	0	48	143	0	0
RT Vol	31	0	0	39	0	495
Lane Flow Rate	280	233	52	198	63	538
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	0.614	0.555	0.117	0.46	0.137	0.984
Departure Headway (Hd)	7.886	8.59	8.074	8.366	7.812	6.581
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	457	419	443	429	461	554
Service Time	5.95	6.353	5.837	6.439	5.512	4.281
HCM Lane V/C Ratio	0.613	0.556	0.117	0.462	0.137	0.971
HCM Control Delay	22.8	21.6	11.9	18.4	11.7	59.8
HCM Lane LOS	C	C	B	C	B	F
HCM 95th-tile Q	4	3.3	0.4	2.4	0.5	13.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	163	54	291	67	49	35	266	348	16	343	14
Future Volume (veh/h)	13	163	54	291	67	49	35	266	348	16	343	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.99	0.99		0.97	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	177	54	316	73	41	38	289	116	17	373	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	440	337	103	621	570	320	372	576	475	79	535	20
Arrive On Green	0.25	0.25	0.25	0.19	0.51	0.51	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	1250	1365	417	1781	1119	629	986	1870	1541	32	1737	64
Grp Volume(v), veh/h	14	0	231	316	0	114	38	289	116	404	0	0
Grp Sat Flow(s),veh/h/ln	1250	0	1782	1781	0	1748	986	1870	1541	1833	0	0
Q Serve(g_s), s	0.5	0.0	6.1	6.2	0.0	1.9	0.0	6.9	3.1	0.9	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	6.1	6.2	0.0	1.9	2.3	6.9	3.1	10.6	0.0	0.0
Prop In Lane	1.00		0.23	1.00		0.36	1.00		1.00	0.04		0.03
Lane Grp Cap(c), veh/h	440	0	440	621	0	890	372	576	475	633	0	0
V/C Ratio(X)	0.03	0.00	0.53	0.51	0.00	0.13	0.10	0.50	0.24	0.64	0.00	0.00
Avail Cap(c_a), veh/h	840	0	1010	2238	0	3035	1690	3077	2536	3041	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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.7	0.0	17.8	10.1	0.0	7.1	13.9	15.5	14.2	16.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.0	1.1	0.0	0.1	0.1	0.7	0.3	1.2	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	0.1	0.0	2.5	2.2	0.0	0.6	0.3	2.8	1.0	4.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	0.0	18.8	11.2	0.0	7.2	14.0	16.2	14.4	17.9	0.0	0.0
LnGrp LOS	B	A	B	B	A	A	B	B	B	B	A	A
Approach Vol, veh/h		245			430			443			404	
Approach Delay, s/veh		18.6			10.1			15.6			17.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		32.8		21.9	14.3	18.5		21.9				
Change Period (Y+Rc), s		5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s		95.0		90.0	60.0	31.0		90.0				
Max Q Clear Time (g_c+I1), s		3.9		12.6	8.2	8.1		8.9				
Green Ext Time (p_c), s		1.3		3.4	2.2	1.5		2.9				

Intersection Summary												
HCM 6th Ctrl Delay			15.1									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	404	49	38	481	64	0	0	0	56	115	78
Future Volume (veh/h)	12	404	49	38	481	64	0	0	0	56	115	78
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		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	1870				1870	1870	1870
Adj Flow Rate, veh/h	13	439	48	41	523	65				61	125	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2				2	2	2
Cap, veh/h	28	1046	114	68	1067	133				75	153	73
Arrive On Green	0.02	0.63	0.63	0.04	0.65	0.65				0.17	0.17	0.17
Sat Flow, veh/h	1781	1657	181	1781	1631	203				439	900	432
Grp Volume(v), veh/h	13	0	487	41	0	588				246	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1838	1781	0	1834				1771	0	0
Q Serve(g_s), s	0.5	0.0	10.0	1.7	0.0	12.2				10.0	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	10.0	1.7	0.0	12.2				10.0	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.11				0.25		0.24
Lane Grp Cap(c), veh/h	28	0	1161	68	0	1200				301	0	0
V/C Ratio(X)	0.46	0.00	0.42	0.60	0.00	0.49				0.82	0.00	0.00
Avail Cap(c_a), veh/h	214	0	1161	143	0	1200				449	0	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)	0.82	0.00	0.82	0.88	0.00	0.88				1.00	0.00	0.00
Uniform Delay (d), s/veh	36.6	0.0	6.9	35.5	0.0	6.6				30.0	0.0	0.0
Incr Delay (d2), s/veh	9.3	0.0	0.9	7.3	0.0	1.3				7.2	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
%ile BackOfQ(50%),veh/ln	0.3	0.0	3.6	0.9	0.0	4.4				4.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.9	0.0	7.8	42.8	0.0	7.9				37.2	0.0	0.0
LnGrp LOS	D	A	A	D	A	A				D	A	A
Approach Vol, veh/h		500			629						246	
Approach Delay, s/veh		8.8			10.1						37.2	
Approach LOS		A			B						D	

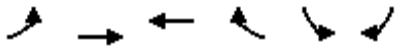
Timer - Assigned Phs	1	2		4	5	6
Phs Duration (G+Y+Rc), s	6.9	51.4		16.8	5.2	53.1
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s	6.9	38.0		19.0	9.0	35.0
Max Q Clear Time (g_c+I1), s	3.7	12.0		12.0	2.5	14.2
Green Ext Time (p_c), s	0.0	3.5		0.8	0.0	4.2

Intersection Summary		
HCM 6th Ctrl Delay		14.5
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	450	0	0	582	119	22	112	23	0	0	0
Future Volume (veh/h)	98	450	0	0	582	119	22	112	23	0	0	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		1.00	1.00		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	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	107	489	0	0	633	92	24	122	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	630	1554	0	0	1431	1212	29	147	151			
Arrive On Green	0.04	0.83	0.00	0.00	0.76	0.76	0.10	0.10	0.10			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	305	1550	1585			
Grp Volume(v), veh/h	107	489	0	0	633	92	146	0	1			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1855	0	1585			
Q Serve(g_s), s	1.6	8.1	0.0	0.0	16.2	2.0	10.4	0.0	0.1			
Cycle Q Clear(g_c), s	1.6	8.1	0.0	0.0	16.2	2.0	10.4	0.0	0.1			
Prop In Lane	1.00		0.00	0.00		1.00	0.16		1.00			
Lane Grp Cap(c), veh/h	630	1554	0	0	1431	1212	176	0	151			
V/C Ratio(X)	0.17	0.31	0.00	0.00	0.44	0.08	0.83	0.00	0.01			
Avail Cap(c_a), veh/h	671	1554	0	0	1431	1212	289	0	247			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.90	0.90	0.00	0.00	0.77	0.77	1.00	0.00	1.00			
Uniform Delay (d), s/veh	3.9	2.6	0.0	0.0	5.6	4.0	60.0	0.0	55.3			
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.0	0.8	0.1	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			
%ile BackOfQ(50%),veh/ln	0.5	2.7	0.0	0.0	6.2	0.6	5.4	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.9	3.1	0.0	0.0	6.4	4.1	69.9	0.0	55.3			
LnGrp LOS	A	A	A	A	A	A	E	A	E			
Approach Vol, veh/h		596			725			147				
Approach Delay, s/veh		3.2			6.1			69.8				
Approach LOS		A			A			E				

Timer - Assigned Phs	1	2		4		6			
Phs Duration (G+Y+Rc), s	8.9	108.3		17.8		117.2			
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0			
Max Green Setting (Gmax), s	8.0	92.0		21.0		104.0			
Max Q Clear Time (g_c+I1), s	3.6	18.2		12.4		10.1			
Green Ext Time (p_c), s	0.0	5.9		0.4		3.8			

Intersection Summary		
HCM 6th Ctrl Delay	11.3	
HCM 6th LOS	B	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	63	394	599	251	467	85
Future Volume (veh/h)	63	394	599	251	467	85
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	68	428	651	180	508	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	363	1168	1065	902	550	490
Arrive On Green	0.03	0.62	0.57	0.57	0.31	0.31
Sat Flow, veh/h	1781	1870	1870	1584	1781	1585
Grp Volume(v), veh/h	68	428	651	180	508	32
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1584	1781	1585
Q Serve(g_s), s	2.3	16.7	34.5	8.3	41.4	2.1
Cycle Q Clear(g_c), s	2.3	16.7	34.5	8.3	41.4	2.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	363	1168	1065	902	550	490
V/C Ratio(X)	0.19	0.37	0.61	0.20	0.92	0.07
Avail Cap(c_a), veh/h	468	1168	1065	902	772	687
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.7	13.7	21.3	15.7	50.1	36.5
Incr Delay (d2), s/veh	0.2	0.9	2.6	0.5	14.5	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	1.0	7.5	16.0	3.2	20.8	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.8	14.6	23.9	16.2	64.6	36.6
LnGrp LOS	B	B	C	B	E	D
Approach Vol, veh/h		496	831		540	
Approach Delay, s/veh		14.9	22.3		63.0	
Approach LOS		B	C		E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.2	90.4		51.4		98.6
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	13.6	58.0		65.0		75.0
Max Q Clear Time (g_c+I1), s	4.3	36.5		43.4		18.7
Green Ext Time (p_c), s	0.1	8.8		3.0		5.7

Intersection Summary	
HCM 6th Ctrl Delay	32.1
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	17.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	2	212	108	6	14	107	241	60	5	344	20
Future Vol, veh/h	44	2	212	108	6	14	107	241	60	5	344	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	50	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	2	230	117	7	15	116	262	65	5	374	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	933	954	385	1038	933	295	396	0	0	327	0	0
Stage 1	395	395	-	527	527	-	-	-	-	-	-	-
Stage 2	538	559	-	511	406	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	246	259	663	209	266	744	1163	-	-	1233	-	-
Stage 1	630	605	-	535	528	-	-	-	-	-	-	-
Stage 2	527	511	-	545	598	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	217	232	663	125	238	744	1163	-	-	1233	-	-
Mov Cap-2 Maneuver	217	232	-	125	238	-	-	-	-	-	-	-
Stage 1	567	603	-	482	475	-	-	-	-	-	-	-
Stage 2	458	460	-	353	596	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.6	123	2.2	0.1
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1163	-	-	218	663	128	744	1233	-	-
HCM Lane V/C Ratio	0.1	-	-	0.229	0.348	0.968	0.02	0.004	-	-
HCM Control Delay (s)	8.4	-	-	26.4	13.3	136.9	9.9	7.9	-	-
HCM Lane LOS	A	-	-	D	B	F	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.9	1.6	6.6	0.1	0	-	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Base Year PM
No Imi Kala Street Extension
No Improvements

Intersection	
Int Delay, s/veh	13.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	345	249	91	254	136
Future Vol, veh/h	50	345	249	91	254	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	375	271	99	276	148

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1021	321	0	0	370	0
Stage 1	321	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	262	720	-	-	1189	-
Stage 1	735	-	-	-	-	-
Stage 2	493	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	196	720	-	-	1189	-
Mov Cap-2 Maneuver	196	-	-	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	368	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	33.1	0	5.8
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	538	1189	-
HCM Lane V/C Ratio	-	-	0.798	0.232	-
HCM Control Delay (s)	-	-	33.1	8.9	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	7.6	0.9	-

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	93	27	275	183	20	172
Future Vol, veh/h	93	27	275	183	20	172
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	29	299	199	22	187

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	630	399	0	0	498	0
Stage 1	399	-	-	-	-	-
Stage 2	231	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	446	651	-	-	1066	-
Stage 1	678	-	-	-	-	-
Stage 2	807	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	437	651	-	-	1066	-
Mov Cap-2 Maneuver	437	-	-	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	790	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.6	0	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	437	651	1066	-
HCM Lane V/C Ratio	-	-	0.231	0.045	0.02	-
HCM Control Delay (s)	-	-	15.7	10.8	8.4	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.9	0.1	0.1	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	208	330	741	526	18
Future Vol, veh/h	15	208	330	741	526	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	100	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	226	359	805	572	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2105	582	592	0	-	0
Stage 1	582	-	-	-	-	-
Stage 2	1523	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	57	513	984	-	-	-
Stage 1	559	-	-	-	-	-
Stage 2	199	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	36	513	984	-	-	-
Mov Cap-2 Maneuver	131	-	-	-	-	-
Stage 1	355	-	-	-	-	-
Stage 2	199	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.7	3.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	984	-	131	513	-	-
HCM Lane V/C Ratio	0.365	-	0.124	0.441	-	-
HCM Control Delay (s)	10.7	-	36.3	17.4	-	-
HCM Lane LOS	B	-	E	C	-	-
HCM 95th %tile Q(veh)	1.7	-	0.4	2.2	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	27	44	463	262	14
Future Vol, veh/h	15	27	44	463	262	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	115	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	29	48	503	285	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	892	293	300	0	-	0
Stage 1	293	-	-	-	-	-
Stage 2	599	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	312	746	1261	-	-	-
Stage 1	757	-	-	-	-	-
Stage 2	549	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	300	746	1261	-	-	-
Mov Cap-2 Maneuver	300	-	-	-	-	-
Stage 1	728	-	-	-	-	-
Stage 2	549	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.2	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1261	-	487	-	-
HCM Lane V/C Ratio	0.038	-	0.094	-	-
HCM Control Delay (s)	8	-	13.2	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	70	113	529	281	8
Future Vol, veh/h	5	70	113	529	281	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	76	123	575	305	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1131	310	314	0	-	0
Stage 1	310	-	-	-	-	-
Stage 2	821	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	225	730	1246	-	-	-
Stage 1	744	-	-	-	-	-
Stage 2	432	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	203	730	1246	-	-	-
Mov Cap-2 Maneuver	203	-	-	-	-	-
Stage 1	670	-	-	-	-	-
Stage 2	432	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	1.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1246	-	622	-	-
HCM Lane V/C Ratio	0.099	-	0.131	-	-
HCM Control Delay (s)	8.2	-	11.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.5	-	-

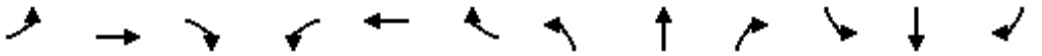
Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	1	48	48	1	2	46	626	78	5	313	5
Future Vol, veh/h	5	1	48	48	1	2	46	626	78	5	313	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	52	52	1	2	50	680	85	5	340	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1177	1218	343	1202	1178	723	345	0	0	765	0	0
Stage 1	353	353	-	823	823	-	-	-	-	-	-	-
Stage 2	824	865	-	379	355	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	168	181	700	161	191	426	1214	-	-	848	-	-
Stage 1	664	631	-	368	388	-	-	-	-	-	-	-
Stage 2	367	371	-	643	630	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	156	167	700	139	176	426	1214	-	-	848	-	-
Mov Cap-2 Maneuver	156	167	-	139	176	-	-	-	-	-	-	-
Stage 1	616	627	-	341	360	-	-	-	-	-	-	-
Stage 2	337	344	-	590	626	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13	45.3	0.5	0.1
HCM LOS	B	E		

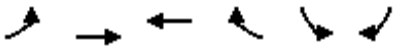
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1214	-	-	507	143	848	-	-
HCM Lane V/C Ratio	0.041	-	-	0.116	0.388	0.006	-	-
HCM Control Delay (s)	8.1	0	-	13	45.3	9.3	0	-
HCM Lane LOS	A	A	-	B	E	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	1.6	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	404	2	55	4	3	1	104	783	7	0	488	235
Future Volume (veh/h)	404	2	55	4	3	1	104	783	7	0	488	235
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	439	2	30	4	3	0	113	851	8	0	530	218
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	597	2	598	416	299	0	353	983	9	152	829	703
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.00	0.05	0.53	0.53	0.00	0.44	0.44
Sat Flow, veh/h	1409	6	1583	966	792	0	1781	1850	17	1781	1870	1585
Grp Volume(v), veh/h	441	0	30	7	0	0	113	0	859	0	530	218
Grp Sat Flow(s),veh/h/ln	1416	0	1583	1759	0	0	1781	0	1867	1781	1870	1585
Q Serve(g_s), s	30.7	0.0	1.3	0.0	0.0	0.0	3.6	0.0	44.0	0.0	24.3	9.8
Cycle Q Clear(g_c), s	31.0	0.0	1.3	0.3	0.0	0.0	3.6	0.0	44.0	0.0	24.3	9.8
Prop In Lane	1.00		1.00	0.57		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	600	0	598	715	0	0	353	0	993	152	829	703
V/C Ratio(X)	0.74	0.00	0.05	0.01	0.00	0.00	0.32	0.00	0.87	0.00	0.64	0.31
Avail Cap(c_a), veh/h	1605	0	1724	1839	0	0	761	0	1627	328	1290	1093
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	0.0	21.8	21.4	0.0	0.0	17.5	0.0	22.4	0.0	23.8	19.8
Incr Delay (d2), s/veh	4.8	0.0	0.1	0.0	0.0	0.0	0.5	0.0	2.9	0.0	3.8	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.3	0.0	0.5	0.1	0.0	0.0	1.5	0.0	19.0	0.0	11.3	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.7	0.0	21.8	21.4	0.0	0.0	18.0	0.0	25.3	0.0	27.6	20.9
LnGrp LOS	D	A	C	C	A	A	B	A	C	A	C	C
Approach Vol, veh/h		471			7			972			748	
Approach Delay, s/veh		34.9			21.4			24.4			25.6	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.7	53.8		46.6	0.0	63.6		46.6				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	31.0	76.0		120.0	11.0	96.0		120.0				
Max Q Clear Time (g_c+I1), s	5.6	26.3		2.3	0.0	46.0		33.0				
Green Ext Time (p_c), s	0.3	22.6		0.0	0.0	8.4		8.6				

Intersection Summary												
HCM 6th Ctrl Delay			27.1									
HCM 6th LOS			C									



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	62	889	839	927	559	18
Future Volume (veh/h)	62	889	839	927	559	18
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	67	966	912	901	626	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	145	2567	1194	1048	718	320
Arrive On Green	0.02	0.72	0.67	0.67	0.20	0.00
Sat Flow, veh/h	1781	3647	1885	1572	3563	1585
Grp Volume(v), veh/h	67	966	903	910	626	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1587	1781	1585
Q Serve(g_s), s	1.8	16.3	54.3	70.5	26.8	0.0
Cycle Q Clear(g_c), s	1.8	16.3	54.3	70.5	26.8	0.0
Prop In Lane	1.00			0.99	1.00	1.00
Lane Grp Cap(c), veh/h	145	2567	1184	1058	718	320
V/C Ratio(X)	0.46	0.38	0.76	0.86	0.87	0.00
Avail Cap(c_a), veh/h	261	3340	1444	1290	927	413
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	29.7	8.3	17.8	20.5	60.9	0.0
Incr Delay (d2), s/veh	0.9	0.1	2.1	5.4	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	1.6	6.2	22.2	26.6	13.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	30.6	8.5	20.0	25.9	69.1	0.0
LnGrp LOS	C	A	B	C	E	A
Approach Vol, veh/h		1033	1813		626	
Approach Delay, s/veh		9.9	23.0		69.1	
Approach LOS		A	C		E	

Timer - Assigned Phs	2	3	4		8
Phs Duration (G+Y+Rc), s	37.7	8.8	111.0		119.7
Change Period (Y+Rc), s	6.0	5.0	6.0		* 6
Max Green Setting (Gmax), s	41.0	14.0	128.0		* 1.5E2
Max Q Clear Time (g_c+I1), s	28.8	3.8	72.5		18.3
Green Ext Time (p_c), s	2.9	0.0	32.4		11.5

Intersection Summary	
HCM 6th Ctrl Delay	27.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	21.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	44	355	652	183	233	327
Future Vol, veh/h	44	355	652	183	233	327
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	386	709	199	253	355

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1670	809	0	0	908	0
Stage 1	809	-	-	-	-	-
Stage 2	861	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	106	~ 380	-	-	750	-
Stage 1	438	-	-	-	-	-
Stage 2	414	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	70	~ 380	-	-	750	-
Mov Cap-2 Maneuver	70	-	-	-	-	-
Stage 1	438	-	-	-	-	-
Stage 2	274	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	88.9	0	5.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	70	380	750	-
HCM Lane V/C Ratio	-	-	0.683	1.015	0.338	-
HCM Control Delay (s)	-	-	129.7	83.8	12.2	-
HCM Lane LOS	-	-	F	F	B	-
HCM 95th %tile Q(veh)	-	-	3.1	12.4	1.5	-

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

Intersection	
Int Delay, s/veh	11.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	344	110	258	343	55	158
Future Vol, veh/h	344	110	258	343	55	158
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	374	120	280	373	60	172

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	494	0	1367	434
Stage 1	-	-	-	-	434	-
Stage 2	-	-	-	-	933	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1070	-	162	622
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	383	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1070	-	109	622
Mov Cap-2 Maneuver	-	-	-	-	109	-
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	257	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	57.7
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	281	-	-	1070	-
HCM Lane V/C Ratio	0.824	-	-	0.262	-
HCM Control Delay (s)	57.7	-	-	9.6	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	6.7	-	-	1.1	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	474	35	24	530	34	32
Future Vol, veh/h	474	35	24	530	34	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	515	38	26	576	37	35

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	553	0	1162	534
Stage 1	-	-	-	-	534	-
Stage 2	-	-	-	-	628	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1017	-	216	546
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	532	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1017	-	208	546
Mov Cap-2 Maneuver	-	-	-	-	208	-
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	512	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	20.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	297	-	-	1017	-
HCM Lane V/C Ratio	0.242	-	-	0.026	-
HCM Control Delay (s)	20.9	-	-	8.6	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	504	8	82	509	34	77
Future Vol, veh/h	504	8	82	509	34	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	548	9	89	553	37	84

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	557	0	1284	553
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	731	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1014	-	182	533
Stage 1	-	-	-	-	576	-
Stage 2	-	-	-	-	476	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1014	-	159	533
Mov Cap-2 Maneuver	-	-	-	-	159	-
Stage 1	-	-	-	-	576	-
Stage 2	-	-	-	-	416	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	23.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	310	-	-	1014	-
HCM Lane V/C Ratio	0.389	-	-	0.088	-
HCM Control Delay (s)	23.8	-	-	8.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.8	-	-	0.3	-

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	0	26	55	161	22	4	39	5	236	4	8	1
Future Vol, veh/h	0	26	55	161	22	4	39	5	236	4	8	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	28	60	175	24	4	42	5	257	4	9	1
Number of Lanes	0	1	0	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	8.1	9.9	9.5	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	0%	0%	86%	31%
Vol Thru, %	0%	2%	32%	12%	62%
Vol Right, %	0%	98%	68%	2%	8%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	241	81	187	13
LT Vol	39	0	0	161	4
Through Vol	0	5	26	22	8
RT Vol	0	236	55	4	1
Lane Flow Rate	42	262	88	203	14
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.068	0.332	0.111	0.278	0.02
Departure Headway (Hd)	5.759	4.566	4.524	4.931	5.124
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	621	786	789	728	695
Service Time	3.499	2.306	2.572	2.972	3.184
HCM Lane V/C Ratio	0.068	0.333	0.112	0.279	0.02
HCM Control Delay	8.9	9.6	8.1	9.9	8.3
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.2	1.5	0.4	1.1	0.1

Intersection	
Int Delay, s/veh	20.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	367	239	253	101	100	374
Future Vol, veh/h	367	239	253	101	100	374
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	140	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	399	260	275	110	109	407

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	275	0	-	0	1388	330
Stage 1	-	-	-	-	330	-
Stage 2	-	-	-	-	1058	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1288	-	-	-	157	712
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	334	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1288	-	-	-	~ 100	712
Mov Cap-2 Maneuver	-	-	-	-	~ 100	-
Stage 1	-	-	-	-	464	-
Stage 2	-	-	-	-	334	-

Approach	EB	WB	SB
HCM Control Delay, s	5.5	0	54.2
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1288	-	-	-	100	712
HCM Lane V/C Ratio	0.31	-	-	-	1.087	0.571
HCM Control Delay (s)	9	0	-	-	194.7	16.6
HCM Lane LOS	A	A	-	-	F	C
HCM 95th %tile Q(veh)	1.3	-	-	-	7	3.6

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

Intersection	
Intersection Delay, s/veh	48
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	342	145	0	0	115	61	38	293	53	50	0	327
Future Vol, veh/h	342	145	0	0	115	61	38	293	53	50	0	327
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	372	158	0	0	125	66	41	318	58	54	0	355
Number of Lanes	1	1	0	0	1	0	0	1	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	48.2	22.5	74.4	32.9
HCM LOS	E	C	F	D

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	10%	100%	0%	0%	100%	0%
Vol Thru, %	76%	0%	100%	65%	0%	0%
Vol Right, %	14%	0%	0%	35%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	384	342	145	176	50	327
LT Vol	38	342	0	0	50	0
Through Vol	293	0	145	115	0	0
RT Vol	53	0	0	61	0	327
Lane Flow Rate	417	372	158	191	54	355
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	1.001	0.939	0.375	0.513	0.141	0.798
Departure Headway (Hd)	8.634	9.091	8.572	9.645	9.33	8.081
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	422	401	421	373	385	448
Service Time	6.671	6.831	6.312	7.72	7.067	5.818
HCM Lane V/C Ratio	0.988	0.928	0.375	0.512	0.14	0.792
HCM Control Delay	74.4	61.7	16.4	22.5	13.6	35.9
HCM Lane LOS	F	F	C	C	B	E
HCM 95th-tile Q	12.5	10.4	1.7	2.8	0.5	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	143	70	406	147	25	54	360	302	48	306	31
Future Volume (veh/h)	20	143	70	406	147	25	54	360	302	48	306	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.99	1.00		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	155	66	441	160	24	59	391	108	52	333	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	360	266	113	628	795	119	317	654	541	97	440	40
Arrive On Green	0.22	0.22	0.22	0.23	0.50	0.50	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1172	1232	525	1781	1586	238	1013	1870	1547	105	1259	113
Grp Volume(v), veh/h	22	0	221	441	0	184	59	391	108	417	0	0
Grp Sat Flow(s),veh/h/ln	1172	0	1757	1781	0	1824	1013	1870	1547	1477	0	0
Q Serve(g_s), s	1.0	0.0	7.6	11.7	0.0	3.8	0.0	11.5	3.3	6.5	0.0	0.0
Cycle Q Clear(g_c), s	1.0	0.0	7.6	11.7	0.0	3.8	6.2	11.5	3.3	18.1	0.0	0.0
Prop In Lane	1.00		0.30	1.00		0.13	1.00		1.00	0.12		0.08
Lane Grp Cap(c), veh/h	360	0	379	628	0	915	317	654	541	577	0	0
V/C Ratio(X)	0.06	0.00	0.58	0.70	0.00	0.20	0.19	0.60	0.20	0.72	0.00	0.00
Avail Cap(c_a), veh/h	649	0	812	1818	0	2582	1322	2509	2074	2220	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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.0	0.0	23.6	13.6	0.0	9.3	16.2	17.9	15.3	19.7	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	1.4	1.4	0.0	0.1	0.3	0.9	0.2	1.7	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	0.3	0.0	3.2	4.4	0.0	1.4	0.7	4.8	1.1	5.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.1	0.0	25.0	15.0	0.0	9.4	16.5	18.8	15.4	21.4	0.0	0.0
LnGrp LOS	C	A	C	B	A	A	B	B	B	C	A	A
Approach Vol, veh/h		243			625			558			417	
Approach Delay, s/veh		24.7			13.4			17.9			21.4	
Approach LOS		C			B			B			C	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		38.6		28.5	19.2	19.5		28.5				
Change Period (Y+Rc), s		5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s		95.0		90.0	60.0	31.0		90.0				
Max Q Clear Time (g_c+I1), s		5.8		20.1	13.7	9.6		13.5				
Green Ext Time (p_c), s		1.3		3.4	1.5	1.4		3.6				

Intersection Summary												
HCM 6th Ctrl Delay			18.0									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	453	30	24	462	49	0	0	0	200	83	90
Future Volume (veh/h)	9	453	30	24	462	49	0	0	0	200	83	90
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		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	1870				1870	1870	1870
Adj Flow Rate, veh/h	10	492	30	26	502	49				217	90	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2				2	2	2
Cap, veh/h	22	970	59	50	958	94				252	105	93
Arrive On Green	0.01	0.56	0.56	0.03	0.57	0.57				0.26	0.26	0.26
Sat Flow, veh/h	1781	1745	106	1781	1677	164				985	408	363
Grp Volume(v), veh/h	10	0	522	26	0	551				387	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1851	1781	0	1841				1756	0	0
Q Serve(g_s), s	0.4	0.0	13.1	1.1	0.0	13.7				15.8	0.0	0.0
Cycle Q Clear(g_c), s	0.4	0.0	13.1	1.1	0.0	13.7				15.8	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.09				0.56		0.21
Lane Grp Cap(c), veh/h	22	0	1029	50	0	1052				450	0	0
V/C Ratio(X)	0.45	0.00	0.51	0.52	0.00	0.52				0.86	0.00	0.00
Avail Cap(c_a), veh/h	143	0	1029	119	0	1052				585	0	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)	0.81	0.00	0.81	0.90	0.00	0.90				1.00	0.00	0.00
Uniform Delay (d), s/veh	36.8	0.0	10.3	36.0	0.0	9.8				26.6	0.0	0.0
Incr Delay (d2), s/veh	11.0	0.0	1.4	7.5	0.0	1.7				10.0	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	0.2	0.0	5.2	0.6	0.0	5.4				7.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.7	0.0	11.8	43.4	0.0	11.5				36.6	0.0	0.0
LnGrp LOS	D	A	B	D	A	B				D	A	A
Approach Vol, veh/h		532			577						387	
Approach Delay, s/veh		12.4			13.0						36.6	
Approach LOS		B			B						D	

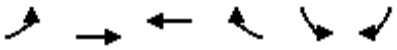
Timer - Assigned Phs	1	2		4	5	6
Phs Duration (G+Y+Rc), s	6.1	45.7		23.2	4.9	46.8
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s	5.0	33.0		25.0	6.0	32.0
Max Q Clear Time (g_c+I1), s	3.1	15.1		17.8	2.4	15.7
Green Ext Time (p_c), s	0.0	3.4		1.5	0.0	3.5

Intersection Summary		
HCM 6th Ctrl Delay		18.9
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	136	606	0	0	533	170	28	105	56	0	0	0
Future Volume (veh/h)	136	606	0	0	533	170	28	105	56	0	0	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		1.00	1.00		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	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	148	659	0	0	579	127	30	114	2			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	664	1542	0	0	1409	1194	37	141	152			
Arrive On Green	0.04	0.82	0.00	0.00	0.75	0.75	0.10	0.10	0.10			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	386	1465	1585			
Grp Volume(v), veh/h	148	659	0	0	579	127	144	0	2			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1851	0	1585			
Q Serve(g_s), s	2.2	12.0	0.0	0.0	13.9	2.7	9.6	0.0	0.1			
Cycle Q Clear(g_c), s	2.2	12.0	0.0	0.0	13.9	2.7	9.6	0.0	0.1			
Prop In Lane	1.00		0.00	0.00		1.00	0.21		1.00			
Lane Grp Cap(c), veh/h	664	1542	0	0	1409	1194	178	0	152			
V/C Ratio(X)	0.22	0.43	0.00	0.00	0.41	0.11	0.81	0.00	0.01			
Avail Cap(c_a), veh/h	735	1542	0	0	1409	1194	367	0	314			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.86	0.86	0.00	0.00	0.60	0.60	1.00	0.00	1.00			
Uniform Delay (d), s/veh	3.7	3.0	0.0	0.0	5.6	4.2	55.8	0.0	51.5			
Incr Delay (d2), s/veh	0.1	0.7	0.0	0.0	0.5	0.1	8.4	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			
%ile BackOfQ(50%),veh/ln	0.7	3.9	0.0	0.0	5.2	0.9	4.9	0.0	0.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.8	3.7	0.0	0.0	6.1	4.3	64.2	0.0	51.6			
LnGrp LOS	A	A	A	A	A	A	E	A	D			
Approach Vol, veh/h		807			706			146				
Approach Delay, s/veh		3.8			5.8			64.0				
Approach LOS		A			A			E				

Timer - Assigned Phs	1	2		4		6			
Phs Duration (G+Y+Rc), s	9.0	99.9		17.1		108.9			
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0			
Max Green Setting (Gmax), s	10.0	77.0		25.0		91.0			
Max Q Clear Time (g_c+I1), s	4.2	15.9		11.6		14.0			
Green Ext Time (p_c), s	0.1	5.3		0.6		5.9			

Intersection Summary			
HCM 6th Ctrl Delay		9.9	
HCM 6th LOS		A	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	567	616	309	497	136
Future Volume (veh/h)	83	567	616	309	497	136
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	90	616	670	122	540	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	281	1007	802	678	585	520
Arrive On Green	0.06	0.54	0.43	0.43	0.33	0.33
Sat Flow, veh/h	1781	1870	1870	1583	1781	1585
Grp Volume(v), veh/h	90	616	670	122	540	41
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1583	1781	1585
Q Serve(g_s), s	1.9	17.0	23.9	3.6	21.9	1.3
Cycle Q Clear(g_c), s	1.9	17.0	23.9	3.6	21.9	1.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	281	1007	802	678	585	520
V/C Ratio(X)	0.32	0.61	0.84	0.18	0.92	0.08
Avail Cap(c_a), veh/h	323	1007	802	678	618	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.5	11.9	19.1	13.3	24.3	17.4
Incr Delay (d2), s/veh	0.4	2.5	10.1	0.6	19.5	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	7.1	11.9	1.3	11.9	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.9	14.4	29.1	13.8	43.8	17.5
LnGrp LOS	B	B	C	B	D	B
Approach Vol, veh/h		706	792		581	
Approach Delay, s/veh		14.5	26.8		42.0	
Approach LOS		B	C		D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.2	37.1		29.6		45.4
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	6.0	29.0		26.0		39.0
Max Q Clear Time (g_c+I1), s	3.9	25.9		23.9		19.0
Green Ext Time (p_c), s	0.0	1.9		0.7		6.8

Intersection Summary	
HCM 6th Ctrl Delay	26.9
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	16

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	4	143	72	4	3	205	389	115	15	293	62
Future Vol, veh/h	15	4	143	72	4	3	205	389	115	15	293	62
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	50	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	4	155	78	4	3	223	423	125	16	318	67

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1319	1378	352	1395	1349	486	385	0	0	548	0	0
Stage 1	384	384	-	932	932	-	-	-	-	-	-	-
Stage 2	935	994	-	463	417	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	134	145	692	119	151	581	1173	-	-	1021	-	-
Stage 1	639	611	-	320	345	-	-	-	-	-	-	-
Stage 2	318	323	-	579	591	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	109	116	692	~ 76	120	581	1173	-	-	1021	-	-
Mov Cap-2 Maneuver	109	116	-	~ 76	120	-	-	-	-	-	-	-
Stage 1	518	601	-	259	279	-	-	-	-	-	-	-
Stage 2	252	262	-	439	582	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.6	211.4	2.5	0.3
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1173	-	-	110	692	77	581	1021	-	-
HCM Lane V/C Ratio	0.19	-	-	0.188	0.225	1.073	0.006	0.016	-	-
HCM Control Delay (s)	8.8	-	-	45.1	11.7	219.3	11.2	8.6	-	-
HCM Lane LOS	A	-	-	E	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	0.7	0.9	5.9	0	0	-	-

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

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Base Year AM
No Imi Kala Street Extension
With Improvements

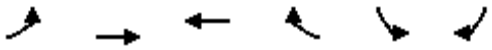
Intersection	
Int Delay, s/veh	7.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	44	295	192	43	346	401
Future Vol, veh/h	44	295	192	43	346	401
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	321	209	47	376	436

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1421	233	0	0	256	0
Stage 1	233	-	-	-	-	-
Stage 2	1188	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	150	806	-	-	1309	-
Stage 1	806	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	107	806	-	-	1309	-
Mov Cap-2 Maneuver	107	-	-	-	-	-
Stage 1	806	-	-	-	-	-
Stage 2	206	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19	0	4.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	107	806	1309	-
HCM Lane V/C Ratio	-	-	0.447	0.398	0.287	-
HCM Control Delay (s)	-	-	63.4	12.4	8.9	-
HCM Lane LOS	-	-	F	B	A	-
HCM 95th %tile Q(veh)	-	-	1.9	1.9	1.2	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	378	239	232	108	42	249
Future Volume (veh/h)	378	239	232	108	42	249
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	411	260	252	0	46	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	663	357	1190		125	111
Arrive On Green	0.64	0.64	0.64	0.00	0.07	0.07
Sat Flow, veh/h	744	561	1870	0	1781	1585
Grp Volume(v), veh/h	671	0	252	0	46	20
Grp Sat Flow(s),veh/h/ln	1305	0	1870	0	1781	1585
Q Serve(g_s), s	10.4	0.0	1.7	0.0	0.8	0.4
Cycle Q Clear(g_c), s	12.1	0.0	1.7	0.0	0.8	0.4
Prop In Lane	0.61			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	1020	0	1190		125	111
V/C Ratio(X)	0.66	0.00	0.21		0.37	0.18
Avail Cap(c_a), veh/h	1583	0	1982		1074	956
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	4.3	0.0	2.3	0.0	13.6	13.4
Incr Delay (d2), s/veh	0.7	0.0	0.1	0.0	1.8	0.8
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	0.0	0.2	0.0	0.3	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.1	0.0	2.4	0.0	15.4	14.2
LnGrp LOS	A	A	A		B	B
Approach Vol, veh/h		671	252	A	66	
Approach Delay, s/veh		5.1	2.4		15.0	
Approach LOS		A	A		B	

Timer - Assigned Phs			4		6	8
Phs Duration (G+Y+Rc), s			24.0		6.7	24.0
Change Period (Y+Rc), s			4.5		4.5	4.5
Max Green Setting (Gmax), s			32.5		18.5	32.5
Max Q Clear Time (g_c+I1), s			14.1		2.8	3.7
Green Ext Time (p_c), s			5.4		0.1	1.6

Intersection Summary		
HCM 6th Ctrl Delay	5.1	
HCM 6th LOS	A	

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Base Year PM
No Imi Kala Street Extension
With Improvements

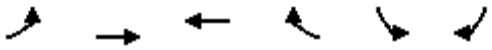
Intersection	
Int Delay, s/veh	8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	345	249	91	254	136
Future Vol, veh/h	50	345	249	91	254	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	375	271	99	276	148

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1021	321	0	0	370	0
Stage 1	321	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	262	720	-	-	1189	-
Stage 1	735	-	-	-	-	-
Stage 2	493	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	201	720	-	-	1189	-
Mov Cap-2 Maneuver	201	-	-	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	379	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.1	0	5.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	201	720	1189	-
HCM Lane V/C Ratio	-	-	0.27	0.521	0.232	-
HCM Control Delay (s)	-	-	29.4	15.3	8.9	-
HCM Lane LOS	-	-	D	C	A	-
HCM 95th %tile Q(veh)	-	-	1.1	3	0.9	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	367	239	253	101	100	374
Future Volume (veh/h)	367	239	253	101	100	374
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	399	260	275	0	109	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	617	343	1173		198	176
Arrive On Green	0.63	0.63	0.63	0.00	0.11	0.11
Sat Flow, veh/h	716	547	1870	0	1781	1585
Grp Volume(v), veh/h	659	0	275	0	109	43
Grp Sat Flow(s),veh/h/ln	1263	0	1870	0	1781	1585
Q Serve(g_s), s	12.4	0.0	2.2	0.0	2.0	0.9
Cycle Q Clear(g_c), s	14.6	0.0	2.2	0.0	2.0	0.9
Prop In Lane	0.61			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	960	0	1173		198	176
V/C Ratio(X)	0.69	0.00	0.23		0.55	0.24
Avail Cap(c_a), veh/h	1378	0	1766		958	852
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	5.4	0.0	2.8	0.0	14.5	14.0
Incr Delay (d2), s/veh	0.9	0.0	0.1	0.0	2.4	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	1.8	0.0	0.3	0.0	0.8	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.3	0.0	2.9	0.0	16.8	14.7
LnGrp LOS	A	A	A		B	B
Approach Vol, veh/h		659	275	A	152	
Approach Delay, s/veh		6.3	2.9		16.2	
Approach LOS		A	A		B	

Timer - Assigned Phs		4		6	8
Phs Duration (G+Y+Rc), s		26.1		8.3	26.1
Change Period (Y+Rc), s		4.5		4.5	4.5
Max Green Setting (Gmax), s		32.5		18.5	32.5
Max Q Clear Time (g_c+I1), s		16.6		4.0	4.2
Green Ext Time (p_c), s		5.0		0.3	1.8

Intersection Summary	
HCM 6th Ctrl Delay	6.8
HCM 6th LOS	A

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Base Year AM
With Imi Kala Street Extension
No Improvements

Intersection	
Int Delay, s/veh	8.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	44	286	200	43	206	541
Future Vol, veh/h	44	286	200	43	206	541
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	311	217	47	224	588

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1277	241	0	0	264	0
Stage 1	241	-	-	-	-	-
Stage 2	1036	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	184	798	-	-	1300	-
Stage 1	799	-	-	-	-	-
Stage 2	342	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	137	798	-	-	1300	-
Mov Cap-2 Maneuver	137	-	-	-	-	-
Stage 1	799	-	-	-	-	-
Stage 2	254	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	30.5	0	2.3
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	486	1300	-
HCM Lane V/C Ratio	-	-	0.738	0.172	-
HCM Control Delay (s)	-	-	30.5	8.3	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	6.1	0.6	-

Intersection	
Int Delay, s/veh	29.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	249	55	179	74	94	534
Future Vol, veh/h	249	55	179	74	94	534
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	271	60	195	80	102	580

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1019	235	0	0	275	0
Stage 1	235	-	-	-	-	-
Stage 2	784	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 263	804	-	-	1288	-
Stage 1	804	-	-	-	-	-
Stage 2	450	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 242	804	-	-	1288	-
Mov Cap-2 Maneuver	~ 242	-	-	-	-	-
Stage 1	804	-	-	-	-	-
Stage 2	414	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	114.1	0	1.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	242	804	1288	-
HCM Lane V/C Ratio	-	-	1.118	0.074	0.079	-
HCM Control Delay (s)	-	-	137.1	9.8	8	-
HCM Lane LOS	-	-	F	A	A	-
HCM 95th %tile Q(veh)	-	-	12	0.2	0.3	-

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

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	324	91	369	509	13
Future Vol, veh/h	7	324	91	369	509	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	100	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	352	99	401	553	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1159	560	567	0	-	0
Stage 1	560	-	-	-	-	-
Stage 2	599	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	216	528	1005	-	-	-
Stage 1	572	-	-	-	-	-
Stage 2	549	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	195	528	1005	-	-	-
Mov Cap-2 Maneuver	331	-	-	-	-	-
Stage 1	515	-	-	-	-	-
Stage 2	549	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.2	1.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1005	-	331	528	-	-
HCM Lane V/C Ratio	0.098	-	0.023	0.667	-	-
HCM Control Delay (s)	9	-	16.1	24.4	-	-
HCM Lane LOS	A	-	C	C	-	-
HCM 95th %tile Q(veh)	0.3	-	0.1	4.9	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	41	22	253	790	12
Future Vol, veh/h	11	41	22	253	790	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	115	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	45	24	275	859	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1189	866	872	0	-	0
Stage 1	866	-	-	-	-	-
Stage 2	323	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	208	353	773	-	-	-
Stage 1	412	-	-	-	-	-
Stage 2	734	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	202	353	773	-	-	-
Mov Cap-2 Maneuver	202	-	-	-	-	-
Stage 1	399	-	-	-	-	-
Stage 2	734	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.5	0.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	773	-	305	-	-
HCM Lane V/C Ratio	0.031	-	0.185	-	-
HCM Control Delay (s)	9.8	-	19.5	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	138	54	161	513	6
Future Vol, veh/h	5	138	54	161	513	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	150	59	175	558	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	855	562	565	0	-	0
Stage 1	562	-	-	-	-	-
Stage 2	293	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	329	526	1007	-	-	-
Stage 1	571	-	-	-	-	-
Stage 2	757	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	310	526	1007	-	-	-
Mov Cap-2 Maneuver	310	-	-	-	-	-
Stage 1	537	-	-	-	-	-
Stage 2	757	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15	2.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1007	-	513	-	-
HCM Lane V/C Ratio	0.058	-	0.303	-	-
HCM Control Delay (s)	8.8	-	15	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	1.3	-	-

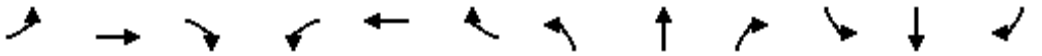
Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	0	41	59	0	7	35	214	29	5	686	7
Future Vol, veh/h	9	0	41	59	0	7	35	214	29	5	686	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	45	64	0	8	38	233	32	5	746	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1089	1101	750	1108	1089	249	754	0	0	265	0	0
Stage 1	760	760	-	325	325	-	-	-	-	-	-	-
Stage 2	329	341	-	783	764	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	193	212	411	187	215	790	856	-	-	1299	-	-
Stage 1	398	414	-	687	649	-	-	-	-	-	-	-
Stage 2	684	639	-	387	413	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	183	199	411	159	202	790	856	-	-	1299	-	-
Mov Cap-2 Maneuver	183	199	-	159	202	-	-	-	-	-	-	-
Stage 1	377	411	-	651	615	-	-	-	-	-	-	-
Stage 2	642	606	-	343	410	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.8	39.5	1.2	0.1
HCM LOS	C	E		

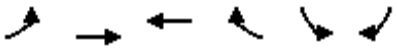
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	856	-	-	336	174	1299	-	-
HCM Lane V/C Ratio	0.044	-	-	0.162	0.412	0.004	-	-
HCM Control Delay (s)	9.4	0	-	17.8	39.5	7.8	0	-
HCM Lane LOS	A	A	-	C	E	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	1.8	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	119	2	41	12	5	3	110	434	3	2	715	336
Future Volume (veh/h)	119	2	41	12	5	3	110	434	3	2	715	336
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1034	1870
Adj Flow Rate, veh/h	129	2	2	13	5	1	120	472	3	2	777	304
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	186	2	160	152	54	9	192	1460	9	751	813	1247
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.03	0.79	0.79	0.03	0.79	0.79
Sat Flow, veh/h	1421	22	1577	1145	534	93	1781	1856	12	1781	1034	1585
Grp Volume(v), veh/h	131	0	2	19	0	0	120	0	475	2	777	304
Grp Sat Flow(s),veh/h/ln	1443	0	1577	1773	0	0	1781	0	1868	1781	1034	1585
Q Serve(g_s), s	13.6	0.0	0.2	0.0	0.0	0.0	2.3	0.0	12.4	0.0	109.8	8.6
Cycle Q Clear(g_c), s	15.2	0.0	0.2	1.6	0.0	0.0	2.3	0.0	12.4	0.0	109.8	8.6
Prop In Lane	0.98		1.00	0.68		0.05	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	189	0	160	216	0	0	192	0	1469	751	813	1247
V/C Ratio(X)	0.69	0.00	0.01	0.09	0.00	0.00	0.62	0.00	0.32	0.00	0.96	0.24
Avail Cap(c_a), veh/h	195	0	167	222	0	0	234	0	1572	751	846	1297
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	75.2	0.0	68.7	69.3	0.0	0.0	45.9	0.0	5.2	3.3	15.6	4.8
Incr Delay (d2), s/veh	14.4	0.0	0.1	0.2	0.0	0.0	3.6	0.0	0.1	0.0	22.4	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	6.5	0.0	0.1	0.8	0.0	0.0	4.2	0.0	4.6	0.0	27.6	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	89.7	0.0	68.7	69.5	0.0	0.0	49.5	0.0	5.3	3.3	38.0	5.2
LnGrp LOS	F	A	E	E	A	A	D	A	A	A	D	A
Approach Vol, veh/h		133			19			595			1083	
Approach Delay, s/veh		89.3			69.5			14.2			28.8	
Approach LOS		F			E			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	138.7		22.3	9.0	138.6		22.3				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	9.0	139.0		18.0	5.0	143.0		18.0				
Max Q Clear Time (g_c+I1), s	4.3	111.8		3.6	2.0	14.4		17.2				
Green Ext Time (p_c), s	0.1	21.9		0.0	0.0	3.5		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			28.9									
HCM 6th LOS			C									



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	53	768	802	558	793	23
Future Volume (veh/h)	53	768	802	558	793	23
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	58	835	872	549	884	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	195	2172	1132	697	1068	475
Arrive On Green	0.03	0.61	0.54	0.54	0.30	0.00
Sat Flow, veh/h	1781	3647	2206	1300	3563	1585
Grp Volume(v), veh/h	58	835	730	691	884	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1636	1781	1585
Q Serve(g_s), s	1.7	14.8	40.0	41.9	28.6	0.0
Cycle Q Clear(g_c), s	1.7	14.8	40.0	41.9	28.6	0.0
Prop In Lane	1.00			0.79	1.00	1.00
Lane Grp Cap(c), veh/h	195	2172	952	877	1068	475
V/C Ratio(X)	0.30	0.38	0.77	0.79	0.83	0.00
Avail Cap(c_a), veh/h	233	4052	1853	1707	2535	1128
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	20.1	12.2	22.6	23.1	40.3	0.0
Incr Delay (d2), s/veh	0.3	0.1	1.6	1.9	2.4	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	0.7	5.7	16.6	16.1	12.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.4	12.4	24.2	25.0	42.7	0.0
LnGrp LOS	C	B	C	C	D	A
Approach Vol, veh/h		893	1421		884	
Approach Delay, s/veh		12.9	24.6		42.7	
Approach LOS		B	C		D	

Timer - Assigned Phs	2	3	4		8
Phs Duration (G+Y+Rc), s	43.1	9.3	71.3		80.6
Change Period (Y+Rc), s	6.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	88.0	7.0	129.0		141.0
Max Q Clear Time (g_c+I1), s	30.6	3.7	43.9		16.8
Green Ext Time (p_c), s	6.5	0.0	22.3		9.2

Intersection Summary	
HCM 6th Ctrl Delay	26.3
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	5.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	39	59	347	157	297	572
Future Vol, veh/h	39	59	347	157	297	572
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	64	377	171	323	622

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1731	463	0	0	548	0
Stage 1	463	-	-	-	-	-
Stage 2	1268	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	97	599	-	-	1021	-
Stage 1	634	-	-	-	-	-
Stage 2	265	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	66	599	-	-	1021	-
Mov Cap-2 Maneuver	66	-	-	-	-	-
Stage 1	634	-	-	-	-	-
Stage 2	181	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	58.1	0	3.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	66	599	1021	-
HCM Lane V/C Ratio	-	-	0.642	0.107	0.316	-
HCM Control Delay (s)	-	-	128.2	11.7	10.1	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	2.8	0.4	1.4	-

Intersection	
Int Delay, s/veh	7.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	338	186	467	98	8	167
Future Vol, veh/h	338	186	467	98	8	167
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	367	202	508	107	9	182

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	569	0	1591	468
Stage 1	-	-	-	-	468	-
Stage 2	-	-	-	-	1123	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1003	-	118	595
Stage 1	-	-	-	-	630	-
Stage 2	-	-	-	-	311	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1003	-	55	595
Mov Cap-2 Maneuver	-	-	-	-	55	-
Stage 1	-	-	-	-	630	-
Stage 2	-	-	-	-	144	-

Approach	EB	WB	NB
HCM Control Delay, s	0	10.1	21.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	411	-	-	1003	-
HCM Lane V/C Ratio	0.463	-	-	0.506	-
HCM Control Delay (s)	21.1	-	-	12.2	0
HCM Lane LOS	C	-	-	B	A
HCM 95th %tile Q(veh)	2.4	-	-	2.9	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	477	59	42	523	18	49
Future Vol, veh/h	477	59	42	523	18	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	518	64	46	568	20	53

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	582	0	1210	550
Stage 1	-	-	-	-	550	-
Stage 2	-	-	-	-	660	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	992	-	202	535
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	514	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	992	-	188	535
Mov Cap-2 Maneuver	-	-	-	-	188	-
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	479	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	17.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	358	-	-	992	-
HCM Lane V/C Ratio	0.203	-	-	0.046	-
HCM Control Delay (s)	17.6	-	-	8.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	483	38	70	560	12	100
Future Vol, veh/h	483	38	70	560	12	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	525	41	76	609	13	109

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	566	0	1307	546
Stage 1	-	-	-	-	546	-
Stage 2	-	-	-	-	761	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1006	-	176	538
Stage 1	-	-	-	-	580	-
Stage 2	-	-	-	-	461	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1006	-	156	538
Mov Cap-2 Maneuver	-	-	-	-	156	-
Stage 1	-	-	-	-	580	-
Stage 2	-	-	-	-	408	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	16.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	426	-	-	1006	-
HCM Lane V/C Ratio	0.286	-	-	0.076	-
HCM Control Delay (s)	16.8	-	-	8.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0.2	-

Intersection	
Intersection Delay, s/veh	15.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	26	42	165	44	30	99	89	140	93	265	20
Future Vol, veh/h	12	26	42	165	44	30	99	89	140	93	265	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	28	46	179	48	33	108	97	152	101	288	22
Number of Lanes	0	1	0	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	10.7	14.4	12.1	19.1
HCM LOS	B	B	B	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	0%	15%	69%	25%
Vol Thru, %	0%	39%	32%	18%	70%
Vol Right, %	0%	61%	53%	13%	5%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	99	229	80	239	378
LT Vol	99	0	12	165	93
Through Vol	0	89	26	44	265
RT Vol	0	140	42	30	20
Lane Flow Rate	108	249	87	260	411
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.202	0.402	0.156	0.45	0.654
Departure Headway (Hd)	6.755	5.811	6.46	6.232	5.73
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	528	615	558	574	625
Service Time	4.541	3.596	4.46	4.32	3.808
HCM Lane V/C Ratio	0.205	0.405	0.156	0.453	0.658
HCM Control Delay	11.3	12.5	10.7	14.4	19.1
HCM Lane LOS	B	B	B	B	C
HCM 95th-tile Q	0.7	1.9	0.5	2.3	4.8

Intersection	
Int Delay, s/veh	11.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	365	215	193	147	66	427
Future Vol, veh/h	365	215	193	147	66	427
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	140	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	397	234	210	160	72	464

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	210	0	-	0	1318	290
Stage 1	-	-	-	-	290	-
Stage 2	-	-	-	-	1028	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1361	-	-	-	173	749
Stage 1	-	-	-	-	759	-
Stage 2	-	-	-	-	345	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1361	-	-	-	115	749
Mov Cap-2 Maneuver	-	-	-	-	115	-
Stage 1	-	-	-	-	505	-
Stage 2	-	-	-	-	345	-

Approach	EB	WB	SB
HCM Control Delay, s	5.5	0	25.4
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1361	-	-	-	115	749
HCM Lane V/C Ratio	0.292	-	-	-	0.624	0.62
HCM Control Delay (s)	8.7	0	-	-	78	17.3
HCM Lane LOS	A	A	-	-	F	C
HCM 95th %tile Q(veh)	1.2	-	-	-	3.1	4.4

Intersection	
Intersection Delay, s/veh	35.6
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	214	48	0	0	143	39	21	206	31	58	0	495
Future Vol, veh/h	214	48	0	0	143	39	21	206	31	58	0	495
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	233	52	0	0	155	42	23	224	34	63	0	538
Number of Lanes	1	1	0	0	1	0	0	1	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	19.8	18.4	22.8	54.8
HCM LOS	C	C	C	F

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	8%	100%	0%	0%	100%	0%
Vol Thru, %	80%	0%	100%	79%	0%	0%
Vol Right, %	12%	0%	0%	21%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	258	214	48	182	58	495
LT Vol	21	214	0	0	58	0
Through Vol	206	0	48	143	0	0
RT Vol	31	0	0	39	0	495
Lane Flow Rate	280	233	52	198	63	538
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	0.614	0.555	0.117	0.46	0.137	0.984
Departure Headway (Hd)	7.886	8.59	8.074	8.366	7.812	6.581
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	457	419	443	429	461	554
Service Time	5.95	6.353	5.837	6.439	5.512	4.281
HCM Lane V/C Ratio	0.613	0.556	0.117	0.462	0.137	0.971
HCM Control Delay	22.8	21.6	11.9	18.4	11.7	59.8
HCM Lane LOS	C	C	B	C	B	F
HCM 95th-tile Q	4	3.3	0.4	2.4	0.5	13.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	163	54	291	67	49	35	266	348	16	343	14
Future Volume (veh/h)	13	163	54	291	67	49	35	266	348	16	343	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.99	0.99		0.97	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	177	54	316	73	41	38	289	99	17	373	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	440	337	103	621	570	320	372	576	475	79	535	20
Arrive On Green	0.25	0.25	0.25	0.19	0.51	0.51	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	1250	1365	417	1781	1119	629	986	1870	1541	32	1737	64
Grp Volume(v), veh/h	14	0	231	316	0	114	38	289	99	404	0	0
Grp Sat Flow(s),veh/h/ln	1250	0	1782	1781	0	1748	986	1870	1541	1833	0	0
Q Serve(g_s), s	0.5	0.0	6.1	6.2	0.0	1.9	0.0	6.9	2.6	0.9	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	6.1	6.2	0.0	1.9	2.3	6.9	2.6	10.6	0.0	0.0
Prop In Lane	1.00		0.23	1.00		0.36	1.00		1.00	0.04		0.03
Lane Grp Cap(c), veh/h	440	0	440	621	0	890	372	576	475	633	0	0
V/C Ratio(X)	0.03	0.00	0.53	0.51	0.00	0.13	0.10	0.50	0.21	0.64	0.00	0.00
Avail Cap(c_a), veh/h	840	0	1010	2238	0	3035	1690	3077	2536	3041	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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.7	0.0	17.8	10.1	0.0	7.1	13.9	15.5	14.0	16.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.0	1.1	0.0	0.1	0.1	0.7	0.2	1.2	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	0.1	0.0	2.5	2.2	0.0	0.6	0.3	2.8	0.9	4.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	0.0	18.8	11.2	0.0	7.2	14.0	16.2	14.2	17.9	0.0	0.0
LnGrp LOS	B	A	B	B	A	A	B	B	B	B	A	A
Approach Vol, veh/h		245			430			426			404	
Approach Delay, s/veh		18.6			10.1			15.6			17.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		32.8		21.9	14.3	18.5		21.9				
Change Period (Y+Rc), s		5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s		95.0		90.0	60.0	31.0		90.0				
Max Q Clear Time (g_c+I1), s		3.9		12.6	8.2	8.1		8.9				
Green Ext Time (p_c), s		1.3		3.4	2.2	1.5		2.8				

Intersection Summary												
HCM 6th Ctrl Delay			15.1									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	404	49	38	481	64	0	0	0	56	115	78
Future Volume (veh/h)	12	404	49	38	481	64	0	0	0	56	115	78
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		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	1870				1870	1870	1870
Adj Flow Rate, veh/h	13	439	48	41	523	65				61	125	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2				2	2	2
Cap, veh/h	28	1046	114	68	1067	133				75	153	73
Arrive On Green	0.02	0.63	0.63	0.04	0.65	0.65				0.17	0.17	0.17
Sat Flow, veh/h	1781	1657	181	1781	1631	203				439	900	432
Grp Volume(v), veh/h	13	0	487	41	0	588				246	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1838	1781	0	1834				1771	0	0
Q Serve(g_s), s	0.5	0.0	10.0	1.7	0.0	12.2				10.0	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	10.0	1.7	0.0	12.2				10.0	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.11				0.25		0.24
Lane Grp Cap(c), veh/h	28	0	1161	68	0	1200				301	0	0
V/C Ratio(X)	0.46	0.00	0.42	0.60	0.00	0.49				0.82	0.00	0.00
Avail Cap(c_a), veh/h	214	0	1161	143	0	1200				449	0	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)	0.82	0.00	0.82	0.88	0.00	0.88				1.00	0.00	0.00
Uniform Delay (d), s/veh	36.6	0.0	6.9	35.5	0.0	6.6				30.0	0.0	0.0
Incr Delay (d2), s/veh	9.3	0.0	0.9	7.3	0.0	1.3				7.2	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
%ile BackOfQ(50%),veh/ln	0.3	0.0	3.6	0.9	0.0	4.4				4.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.9	0.0	7.8	42.8	0.0	7.9				37.2	0.0	0.0
LnGrp LOS	D	A	A	D	A	A				D	A	A
Approach Vol, veh/h		500			629						246	
Approach Delay, s/veh		8.8			10.1						37.2	
Approach LOS		A			B						D	

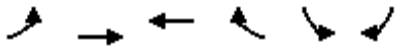
Timer - Assigned Phs	1	2		4	5	6
Phs Duration (G+Y+Rc), s	6.9	51.4		16.8	5.2	53.1
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s	6.9	38.0		19.0	9.0	35.0
Max Q Clear Time (g_c+I1), s	3.7	12.0		12.0	2.5	14.2
Green Ext Time (p_c), s	0.0	3.5		0.8	0.0	4.2

Intersection Summary		
HCM 6th Ctrl Delay		14.5
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	450	0	0	582	119	22	112	23	0	0	0
Future Volume (veh/h)	98	450	0	0	582	119	22	112	23	0	0	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		1.00	1.00		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	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	107	489	0	0	633	92	24	122	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	630	1554	0	0	1431	1212	29	147	151			
Arrive On Green	0.04	0.83	0.00	0.00	0.76	0.76	0.10	0.10	0.10			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	305	1550	1585			
Grp Volume(v), veh/h	107	489	0	0	633	92	146	0	1			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1855	0	1585			
Q Serve(g_s), s	1.6	8.1	0.0	0.0	16.2	2.0	10.4	0.0	0.1			
Cycle Q Clear(g_c), s	1.6	8.1	0.0	0.0	16.2	2.0	10.4	0.0	0.1			
Prop In Lane	1.00		0.00	0.00		1.00	0.16		1.00			
Lane Grp Cap(c), veh/h	630	1554	0	0	1431	1212	176	0	151			
V/C Ratio(X)	0.17	0.31	0.00	0.00	0.44	0.08	0.83	0.00	0.01			
Avail Cap(c_a), veh/h	671	1554	0	0	1431	1212	289	0	247			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.90	0.90	0.00	0.00	0.66	0.66	1.00	0.00	1.00			
Uniform Delay (d), s/veh	3.9	2.6	0.0	0.0	5.6	4.0	60.0	0.0	55.3			
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.0	0.7	0.1	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			
%ile BackOfQ(50%),veh/ln	0.5	2.7	0.0	0.0	6.2	0.6	5.4	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.9	3.1	0.0	0.0	6.3	4.0	69.9	0.0	55.3			
LnGrp LOS	A	A	A	A	A	A	E	A	E			
Approach Vol, veh/h		596			725			147				
Approach Delay, s/veh		3.2			6.0			69.8				
Approach LOS		A			A			E				

Timer - Assigned Phs	1	2		4		6			
Phs Duration (G+Y+Rc), s	8.9	108.3		17.8		117.2			
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0			
Max Green Setting (Gmax), s	8.0	92.0		21.0		104.0			
Max Q Clear Time (g_c+I1), s	3.6	18.2		12.4		10.1			
Green Ext Time (p_c), s	0.0	5.9		0.4		3.8			

Intersection Summary		
HCM 6th Ctrl Delay	11.3	
HCM 6th LOS	B	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	63	394	599	260	629	85
Future Volume (veh/h)	63	394	599	260	629	85
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	68	428	651	181	684	47
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	253	993	885	749	717	638
Arrive On Green	0.03	0.53	0.47	0.47	0.40	0.40
Sat Flow, veh/h	1781	1870	1870	1583	1781	1585
Grp Volume(v), veh/h	68	428	651	181	684	47
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1583	1781	1585
Q Serve(g_s), s	2.9	20.9	42.2	10.2	55.9	2.7
Cycle Q Clear(g_c), s	2.9	20.9	42.2	10.2	55.9	2.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	253	993	885	749	717	638
V/C Ratio(X)	0.27	0.43	0.74	0.24	0.95	0.07
Avail Cap(c_a), veh/h	352	993	885	749	772	687
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.3	21.4	31.9	23.5	43.4	27.6
Incr Delay (d2), s/veh	0.4	1.3	5.4	0.8	21.5	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	1.3	9.7	20.6	4.1	29.0	1.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	25.7	22.7	37.3	24.3	64.9	27.7
LnGrp LOS	C	C	D	C	E	C
Approach Vol, veh/h		496	832		731	
Approach Delay, s/veh		23.1	34.5		62.5	
Approach LOS		C	C		E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.6	76.0		65.4		84.6
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	13.6	58.0		65.0		75.0
Max Q Clear Time (g_c+I1), s	4.9	44.2		57.9		22.9
Green Ext Time (p_c), s	0.1	6.8		2.5		5.6

Intersection Summary	
HCM 6th Ctrl Delay	41.7
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	3.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	126	166	0	369	520
Future Vol, veh/h	0	126	166	0	369	520
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	250	0	-	250	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	137	180	0	401	565

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1547	180	0	0	180	0
Stage 1	180	-	-	-	-	-
Stage 2	1367	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	126	863	-	-	1396	-
Stage 1	851	-	-	-	-	-
Stage 2	237	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	90	863	-	-	1396	-
Mov Cap-2 Maneuver	90	-	-	-	-	-
Stage 1	851	-	-	-	-	-
Stage 2	169	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	3.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	863	1396	-
HCM Lane V/C Ratio	-	-	-	0.159	0.287	-
HCM Control Delay (s)	-	-	0	10	8.6	-
HCM Lane LOS	-	-	A	B	A	-
HCM 95th %tile Q(veh)	-	-	-	0.6	1.2	-

Intersection	
Int Delay, s/veh	10.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	2	212	108	6	14	107	232	60	5	204	20
Future Vol, veh/h	44	2	212	108	6	14	107	232	60	5	204	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	50	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	2	230	117	7	15	116	252	65	5	222	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	771	792	233	876	771	285	244	0	0	317	0	0
Stage 1	243	243	-	517	517	-	-	-	-	-	-	-
Stage 2	528	549	-	359	254	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	317	322	806	269	331	754	1322	-	-	1243	-	-
Stage 1	761	705	-	541	534	-	-	-	-	-	-	-
Stage 2	534	516	-	659	697	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	284	292	806	178	301	754	1322	-	-	1243	-	-
Mov Cap-2 Maneuver	284	292	-	178	301	-	-	-	-	-	-	-
Stage 1	694	702	-	493	487	-	-	-	-	-	-	-
Stage 2	471	471	-	467	694	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.8	53.5	2.1	0.2
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1322	-	-	284	806	182	754	1243	-	-
HCM Lane V/C Ratio	0.088	-	-	0.176	0.286	0.681	0.02	0.004	-	-
HCM Control Delay (s)	8	-	-	20.4	11.2	58.9	9.9	7.9	-	-
HCM Lane LOS	A	-	-	C	B	F	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.6	1.2	4.1	0.1	0	-	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Base Year PM
With Imi Kala Street Extension
No Improvements

Intersection	
Int Delay, s/veh	11.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	329	265	91	206	184
Future Vol, veh/h	50	329	265	91	206	184
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	358	288	99	224	200

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	986	338	0	0	387	0
Stage 1	338	-	-	-	-	-
Stage 2	648	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	275	704	-	-	1171	-
Stage 1	722	-	-	-	-	-
Stage 2	521	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	216	704	-	-	1171	-
Mov Cap-2 Maneuver	216	-	-	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	409	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	29.7	0	4.6
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	542	1171	-
HCM Lane V/C Ratio	-	-	0.76	0.191	-
HCM Control Delay (s)	-	-	29.7	8.8	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	6.7	0.7	-

Intersection	
Int Delay, s/veh	2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	115	27	290	222	20	219
Future Vol, veh/h	115	27	290	222	20	219
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	29	315	241	22	238

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	718	436	0	0	556	0
Stage 1	436	-	-	-	-	-
Stage 2	282	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	396	620	-	-	1015	-
Stage 1	652	-	-	-	-	-
Stage 2	766	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	387	620	-	-	1015	-
Mov Cap-2 Maneuver	387	-	-	-	-	-
Stage 1	652	-	-	-	-	-
Stage 2	749	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.3	0	0.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	387	620	1015	-
HCM Lane V/C Ratio	-	-	0.323	0.047	0.021	-
HCM Control Delay (s)	-	-	18.7	11.1	8.6	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	1.4	0.1	0.1	-

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	187	291	725	479	18
Future Vol, veh/h	15	187	291	725	479	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	100	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	203	316	788	521	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1951	531	541	0	-	0
Stage 1	531	-	-	-	-	-
Stage 2	1420	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	71	548	1028	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	223	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	49	548	1028	-	-	-
Mov Cap-2 Maneuver	152	-	-	-	-	-
Stage 1	409	-	-	-	-	-
Stage 2	223	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.6	2.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1028	-	152	548	-	-
HCM Lane V/C Ratio	0.308	-	0.107	0.371	-	-
HCM Control Delay (s)	10.1	-	31.5	15.4	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	1.3	-	0.4	1.7	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	27	44	517	330	14
Future Vol, veh/h	15	27	44	517	330	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	115	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	29	48	562	359	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1025	367	374	0	-	0
Stage 1	367	-	-	-	-	-
Stage 2	658	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	260	678	1184	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	515	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	249	678	1184	-	-	-
Mov Cap-2 Maneuver	249	-	-	-	-	-
Stage 1	672	-	-	-	-	-
Stage 2	515	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.6	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1184	-	420	-	-
HCM Lane V/C Ratio	0.04	-	0.109	-	-
HCM Control Delay (s)	8.2	-	14.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	70	113	302	212	8
Future Vol, veh/h	5	70	113	302	212	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	76	123	328	230	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	809	235	239	0	-	0
Stage 1	235	-	-	-	-	-
Stage 2	574	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	350	804	1328	-	-	-
Stage 1	804	-	-	-	-	-
Stage 2	563	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	317	804	1328	-	-	-
Mov Cap-2 Maneuver	317	-	-	-	-	-
Stage 1	729	-	-	-	-	-
Stage 2	563	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	2.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1328	-	729	-	-
HCM Lane V/C Ratio	0.092	-	0.112	-	-
HCM Control Delay (s)	8	-	10.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.4	-	-

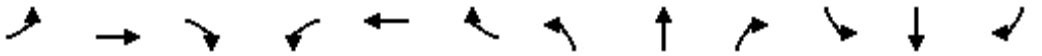
Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	1	48	48	1	2	46	398	78	5	244	5
Future Vol, veh/h	5	1	48	48	1	2	46	398	78	5	244	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	52	52	1	2	50	433	85	5	265	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	855	896	268	880	856	476	270	0	0	518	0	0
Stage 1	278	278	-	576	576	-	-	-	-	-	-	-
Stage 2	577	618	-	304	280	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	278	280	771	268	295	589	1293	-	-	1048	-	-
Stage 1	728	680	-	503	502	-	-	-	-	-	-	-
Stage 2	502	481	-	705	679	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	263	263	771	237	277	589	1293	-	-	1048	-	-
Mov Cap-2 Maneuver	263	263	-	237	277	-	-	-	-	-	-	-
Stage 1	688	676	-	475	474	-	-	-	-	-	-	-
Stage 2	472	455	-	652	675	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.2	24.1	0.7	0.2
HCM LOS	B	C		

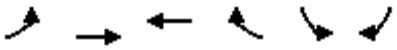
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1293	-	-	635	243	1048	-	-
HCM Lane V/C Ratio	0.039	-	-	0.092	0.228	0.005	-	-
HCM Control Delay (s)	7.9	0	-	11.2	24.1	8.5	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.9	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	366	2	55	4	3	1	104	767	7	0	464	191
Future Volume (veh/h)	366	2	55	4	3	1	104	767	7	0	464	191
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	398	2	25	4	3	0	113	834	8	0	504	143
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	565	2	551	392	279	0	393	1012	10	192	851	721
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.00	0.05	0.55	0.55	0.00	0.45	0.45
Sat Flow, veh/h	1409	7	1583	956	801	0	1781	1849	18	1781	1870	1585
Grp Volume(v), veh/h	400	0	25	7	0	0	113	0	842	0	504	143
Grp Sat Flow(s),veh/h/ln	1416	0	1583	1757	0	0	1781	0	1867	1781	1870	1585
Q Serve(g_s), s	24.3	0.0	1.0	0.0	0.0	0.0	3.1	0.0	35.5	0.0	19.2	5.2
Cycle Q Clear(g_c), s	24.5	0.0	1.0	0.2	0.0	0.0	3.1	0.0	35.5	0.0	19.2	5.2
Prop In Lane	0.99		1.00	0.57		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	568	0	551	671	0	0	393	0	1022	192	851	721
V/C Ratio(X)	0.70	0.00	0.05	0.01	0.00	0.00	0.29	0.00	0.82	0.00	0.59	0.20
Avail Cap(c_a), veh/h	1008	0	1043	1162	0	0	433	0	1915	283	1879	1592
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	28.3	0.0	20.6	20.4	0.0	0.0	14.1	0.0	17.8	0.0	19.4	15.6
Incr Delay (d2), s/veh	4.4	0.0	0.1	0.0	0.0	0.0	0.4	0.0	1.7	0.0	3.0	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	8.9	0.0	0.4	0.1	0.0	0.0	1.2	0.0	14.5	0.0	8.7	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.7	0.0	20.7	20.4	0.0	0.0	14.5	0.0	19.6	0.0	22.5	16.2
LnGrp LOS	C	A	C	C	A	A	B	A	B	A	C	B
Approach Vol, veh/h		425			7			955			647	
Approach Delay, s/veh		32.0			20.4			19.0			21.1	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.9	48.5		38.2	0.0	57.3		38.2				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	96.0		63.0	5.0	98.0		63.0				
Max Q Clear Time (g_c+I1), s	5.1	21.2		2.2	0.0	37.5		26.5				
Green Ext Time (p_c), s	0.0	22.2		0.0	0.0	8.3		6.7				

Intersection Summary			
HCM 6th Ctrl Delay		22.4	
HCM 6th LOS		C	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	61	889	839	913	536	17
Future Volume (veh/h)	61	889	839	913	536	17
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	66	966	912	899	599	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	156	2615	1218	1067	692	308
Arrive On Green	0.03	0.74	0.68	0.68	0.19	0.00
Sat Flow, veh/h	1781	3647	1887	1571	3563	1585
Grp Volume(v), veh/h	66	966	903	908	599	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1588	1781	1585
Q Serve(g_s), s	1.9	17.0	57.1	73.9	28.0	0.0
Cycle Q Clear(g_c), s	1.9	17.0	57.1	73.9	28.0	0.0
Prop In Lane	1.00			0.99	1.00	1.00
Lane Grp Cap(c), veh/h	156	2615	1207	1078	692	308
V/C Ratio(X)	0.42	0.37	0.75	0.84	0.86	0.00
Avail Cap(c_a), veh/h	158	3673	1733	1549	1034	460
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	29.5	8.2	18.0	20.7	67.2	0.0
Incr Delay (d2), s/veh	0.7	0.1	1.3	3.3	6.3	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	1.6	6.5	23.3	27.5	13.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	30.2	8.4	19.3	24.0	73.5	0.0
LnGrp LOS	C	A	B	C	E	A
Approach Vol, veh/h		1032	1811		599	
Approach Delay, s/veh		9.7	21.7		73.5	
Approach LOS		A	C		E	

Timer - Assigned Phs	2	3	4		8
Phs Duration (G+Y+Rc), s	39.5	9.8	123.0		132.7
Change Period (Y+Rc), s	6.0	5.0	6.0		6.0
Max Green Setting (Gmax), s	50.0	5.0	168.0		178.0
Max Q Clear Time (g_c+I1), s	30.0	3.9	75.9		19.0
Green Ext Time (p_c), s	3.4	0.0	41.0		11.5

Intersection Summary	
HCM 6th Ctrl Delay	27.1
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	44	128	652	183	164	327
Future Vol, veh/h	44	128	652	183	164	327
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	139	709	199	178	355

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1520	809	0	0	908	0
Stage 1	809	-	-	-	-	-
Stage 2	711	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	131	380	-	-	750	-
Stage 1	438	-	-	-	-	-
Stage 2	487	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	100	380	-	-	750	-
Mov Cap-2 Maneuver	100	-	-	-	-	-
Stage 1	438	-	-	-	-	-
Stage 2	372	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	32.7	0	3.8
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	100	380	750	-
HCM Lane V/C Ratio	-	-	0.478	0.366	0.238	-
HCM Control Delay (s)	-	-	70.3	19.8	11.3	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	2.1	1.6	0.9	-

Intersection	
Int Delay, s/veh	6.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	293	92	300	148	23	206
Future Vol, veh/h	293	92	300	148	23	206
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	318	100	326	161	25	224

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	418	0	1181	368
Stage 1	-	-	-	-	368	-
Stage 2	-	-	-	-	813	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1141	-	210	677
Stage 1	-	-	-	-	700	-
Stage 2	-	-	-	-	436	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1141	-	144	677
Mov Cap-2 Maneuver	-	-	-	-	144	-
Stage 1	-	-	-	-	700	-
Stage 2	-	-	-	-	299	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.3	19.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	494	-	-	1141	-
HCM Lane V/C Ratio	0.504	-	-	0.286	-
HCM Control Delay (s)	19.5	-	-	9.4	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	2.8	-	-	1.2	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	474	31	28	389	21	45
Future Vol, veh/h	474	31	28	389	21	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	515	34	30	423	23	49

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	549	0	1015	532
Stage 1	-	-	-	-	532	-
Stage 2	-	-	-	-	483	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1021	-	264	547
Stage 1	-	-	-	-	589	-
Stage 2	-	-	-	-	620	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1021	-	254	547
Mov Cap-2 Maneuver	-	-	-	-	254	-
Stage 1	-	-	-	-	589	-
Stage 2	-	-	-	-	596	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	16
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	400	-	-	1021	-
HCM Lane V/C Ratio	0.179	-	-	0.03	-
HCM Control Delay (s)	16	-	-	8.6	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	518	7	83	385	22	89
Future Vol, veh/h	518	7	83	385	22	89
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	563	8	90	418	24	97

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	571	0	1165	567
Stage 1	-	-	-	-	567	-
Stage 2	-	-	-	-	598	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1002	-	215	523
Stage 1	-	-	-	-	568	-
Stage 2	-	-	-	-	549	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1002	-	190	523
Mov Cap-2 Maneuver	-	-	-	-	190	-
Stage 1	-	-	-	-	568	-
Stage 2	-	-	-	-	485	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	18.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	388	-	-	1002	-
HCM Lane V/C Ratio	0.311	-	-	0.09	-
HCM Control Delay (s)	18.4	-	-	8.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.3	-	-	0.3	-

Intersection	
Intersection Delay, s/veh	14.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	26	29	123	22	80	35	180	224	60	84	5
Future Vol, veh/h	26	26	29	123	22	80	35	180	224	60	84	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	28	32	134	24	87	38	196	243	65	91	5
Number of Lanes	0	1	0	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	10.1	12.3	17	10.9
HCM LOS	B	B	C	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	0%	32%	55%	40%
Vol Thru, %	0%	45%	32%	10%	56%
Vol Right, %	0%	55%	36%	36%	3%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	404	81	225	149
LT Vol	35	0	26	123	60
Through Vol	0	180	26	22	84
RT Vol	0	224	29	80	5
Lane Flow Rate	38	439	88	245	162
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.066	0.654	0.146	0.386	0.261
Departure Headway (Hd)	6.257	5.359	5.971	5.688	5.81
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	573	672	598	631	617
Service Time	3.995	3.096	4.033	3.738	3.862
HCM Lane V/C Ratio	0.066	0.653	0.147	0.388	0.263
HCM Control Delay	9.4	17.7	10.1	12.3	10.9
HCM Lane LOS	A	C	B	B	B
HCM 95th-tile Q	0.2	4.9	0.5	1.8	1

Intersection	
Int Delay, s/veh	30.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	410	222	189	166	117	316
Future Vol, veh/h	410	222	189	166	117	316
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	140	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	446	241	205	180	127	343

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	205	0	-	0	1428	295
Stage 1	-	-	-	-	295	-
Stage 2	-	-	-	-	1133	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1366	-	-	-	149	744
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	307	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1366	-	-	-	~ 93	744
Mov Cap-2 Maneuver	-	-	-	-	~ 93	-
Stage 1	-	-	-	-	470	-
Stage 2	-	-	-	-	307	-

Approach	EB	WB	SB
HCM Control Delay, s	5.8	0	91.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1366	-	-	-	93	744
HCM Lane V/C Ratio	0.326	-	-	-	1.367	0.462
HCM Control Delay (s)	8.9	0	-	-	$ 301.5	13.9
HCM Lane LOS	A	A	-	-	F	B
HCM 95th %tile Q(veh)	1.4	-	-	-	9.4	2.5

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

Intersection	
Intersection Delay, s/veh	48
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	342	145	0	0	115	61	38	293	53	50	0	327
Future Vol, veh/h	342	145	0	0	115	61	38	293	53	50	0	327
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	372	158	0	0	125	66	41	318	58	54	0	355
Number of Lanes	1	1	0	0	1	0	0	1	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	48.2	22.5	74.4	32.9
HCM LOS	E	C	F	D

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	10%	100%	0%	0%	100%	0%
Vol Thru, %	76%	0%	100%	65%	0%	0%
Vol Right, %	14%	0%	0%	35%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	384	342	145	176	50	327
LT Vol	38	342	0	0	50	0
Through Vol	293	0	145	115	0	0
RT Vol	53	0	0	61	0	327
Lane Flow Rate	417	372	158	191	54	355
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	1.001	0.939	0.375	0.513	0.141	0.798
Departure Headway (Hd)	8.634	9.091	8.572	9.645	9.33	8.081
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	422	401	421	373	385	448
Service Time	6.671	6.831	6.312	7.72	7.067	5.818
HCM Lane V/C Ratio	0.988	0.928	0.375	0.512	0.14	0.792
HCM Control Delay	74.4	61.7	16.4	22.5	13.6	35.9
HCM Lane LOS	F	F	C	C	B	E
HCM 95th-tile Q	12.5	10.4	1.7	2.8	0.5	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	143	70	406	147	25	54	360	302	48	306	31
Future Volume (veh/h)	20	143	70	406	147	25	54	360	302	48	306	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.99	1.00		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	155	66	441	160	24	59	391	108	52	333	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	360	266	113	628	795	119	317	654	541	97	440	40
Arrive On Green	0.22	0.22	0.22	0.23	0.50	0.50	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1172	1232	525	1781	1586	238	1013	1870	1547	105	1259	113
Grp Volume(v), veh/h	22	0	221	441	0	184	59	391	108	417	0	0
Grp Sat Flow(s),veh/h/ln	1172	0	1757	1781	0	1824	1013	1870	1547	1477	0	0
Q Serve(g_s), s	1.0	0.0	7.6	11.7	0.0	3.8	0.0	11.5	3.3	6.5	0.0	0.0
Cycle Q Clear(g_c), s	1.0	0.0	7.6	11.7	0.0	3.8	6.2	11.5	3.3	18.1	0.0	0.0
Prop In Lane	1.00		0.30	1.00		0.13	1.00		1.00	0.12		0.08
Lane Grp Cap(c), veh/h	360	0	379	628	0	915	317	654	541	577	0	0
V/C Ratio(X)	0.06	0.00	0.58	0.70	0.00	0.20	0.19	0.60	0.20	0.72	0.00	0.00
Avail Cap(c_a), veh/h	649	0	812	1818	0	2582	1322	2509	2074	2220	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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.0	0.0	23.6	13.6	0.0	9.3	16.2	17.9	15.3	19.7	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	1.4	1.4	0.0	0.1	0.3	0.9	0.2	1.7	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	0.3	0.0	3.2	4.4	0.0	1.4	0.7	4.8	1.1	5.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.1	0.0	25.0	15.0	0.0	9.4	16.5	18.8	15.4	21.4	0.0	0.0
LnGrp LOS	C	A	C	B	A	A	B	B	B	C	A	A
Approach Vol, veh/h		243			625			558			417	
Approach Delay, s/veh		24.7			13.4			17.9			21.4	
Approach LOS		C			B			B			C	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		38.6		28.5	19.2	19.5		28.5				
Change Period (Y+Rc), s		5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s		95.0		90.0	60.0	31.0		90.0				
Max Q Clear Time (g_c+I1), s		5.8		20.1	13.7	9.6		13.5				
Green Ext Time (p_c), s		1.3		3.4	1.5	1.4		3.6				

Intersection Summary												
HCM 6th Ctrl Delay			18.0									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	453	30	24	462	49	0	0	0	200	83	90
Future Volume (veh/h)	9	453	30	24	462	49	0	0	0	200	83	90
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		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	1870				1870	1870	1870
Adj Flow Rate, veh/h	10	492	30	26	502	49				217	90	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2				2	2	2
Cap, veh/h	22	970	59	50	958	94				252	105	93
Arrive On Green	0.01	0.56	0.56	0.03	0.57	0.57				0.26	0.26	0.26
Sat Flow, veh/h	1781	1745	106	1781	1677	164				985	408	363
Grp Volume(v), veh/h	10	0	522	26	0	551				387	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1851	1781	0	1841				1756	0	0
Q Serve(g_s), s	0.4	0.0	13.1	1.1	0.0	13.7				15.8	0.0	0.0
Cycle Q Clear(g_c), s	0.4	0.0	13.1	1.1	0.0	13.7				15.8	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.09				0.56		0.21
Lane Grp Cap(c), veh/h	22	0	1029	50	0	1052				450	0	0
V/C Ratio(X)	0.45	0.00	0.51	0.52	0.00	0.52				0.86	0.00	0.00
Avail Cap(c_a), veh/h	143	0	1029	119	0	1052				585	0	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)	0.81	0.00	0.81	0.90	0.00	0.90				1.00	0.00	0.00
Uniform Delay (d), s/veh	36.8	0.0	10.3	36.0	0.0	9.8				26.6	0.0	0.0
Incr Delay (d2), s/veh	11.0	0.0	1.4	7.5	0.0	1.7				10.0	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	0.2	0.0	5.2	0.6	0.0	5.4				7.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.7	0.0	11.8	43.4	0.0	11.5				36.6	0.0	0.0
LnGrp LOS	D	A	B	D	A	B				D	A	A
Approach Vol, veh/h		532			577						387	
Approach Delay, s/veh		12.4			13.0						36.6	
Approach LOS		B			B						D	

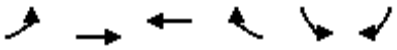
Timer - Assigned Phs	1	2		4	5	6
Phs Duration (G+Y+Rc), s	6.1	45.7		23.2	4.9	46.8
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s	5.0	33.0		25.0	6.0	32.0
Max Q Clear Time (g_c+I1), s	3.1	15.1		17.8	2.4	15.7
Green Ext Time (p_c), s	0.0	3.4		1.5	0.0	3.5

Intersection Summary		
HCM 6th Ctrl Delay		18.9
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	136	606	0	0	533	170	28	105	56	0	0	0
Future Volume (veh/h)	136	606	0	0	533	170	28	105	56	0	0	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		1.00	1.00		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	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	148	659	0	0	579	127	30	114	2			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	664	1542	0	0	1409	1194	37	141	152			
Arrive On Green	0.04	0.82	0.00	0.00	0.75	0.75	0.10	0.10	0.10			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	386	1465	1585			
Grp Volume(v), veh/h	148	659	0	0	579	127	144	0	2			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1851	0	1585			
Q Serve(g_s), s	2.2	12.0	0.0	0.0	13.9	2.7	9.6	0.0	0.1			
Cycle Q Clear(g_c), s	2.2	12.0	0.0	0.0	13.9	2.7	9.6	0.0	0.1			
Prop In Lane	1.00		0.00	0.00		1.00	0.21		1.00			
Lane Grp Cap(c), veh/h	664	1542	0	0	1409	1194	178	0	152			
V/C Ratio(X)	0.22	0.43	0.00	0.00	0.41	0.11	0.81	0.00	0.01			
Avail Cap(c_a), veh/h	735	1542	0	0	1409	1194	367	0	314			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.86	0.86	0.00	0.00	0.58	0.58	1.00	0.00	1.00			
Uniform Delay (d), s/veh	3.7	3.0	0.0	0.0	5.6	4.2	55.8	0.0	51.5			
Incr Delay (d2), s/veh	0.1	0.7	0.0	0.0	0.5	0.1	8.4	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			
%ile BackOfQ(50%),veh/ln	0.7	3.9	0.0	0.0	5.2	0.9	4.9	0.0	0.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.8	3.7	0.0	0.0	6.1	4.3	64.2	0.0	51.6			
LnGrp LOS	A	A	A	A	A	A	E	A	D			
Approach Vol, veh/h		807			706			146				
Approach Delay, s/veh		3.8			5.7			64.0				
Approach LOS		A			A			E				

Timer - Assigned Phs	1	2		4		6			
Phs Duration (G+Y+Rc), s	9.0	99.9		17.1		108.9			
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0			
Max Green Setting (Gmax), s	10.0	77.0		25.0		91.0			
Max Q Clear Time (g_c+I1), s	4.2	15.9		11.6		14.0			
Green Ext Time (p_c), s	0.1	5.3		0.6		5.9			

Intersection Summary			
HCM 6th Ctrl Delay		9.9	
HCM 6th LOS		A	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	567	616	325	522	136
Future Volume (veh/h)	83	567	616	325	522	136
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	90	616	670	126	567	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	267	986	781	661	605	538
Arrive On Green	0.06	0.53	0.42	0.42	0.34	0.34
Sat Flow, veh/h	1781	1870	1870	1583	1781	1585
Grp Volume(v), veh/h	90	616	670	126	567	43
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1583	1781	1585
Q Serve(g_s), s	2.0	17.4	24.4	3.8	23.1	1.4
Cycle Q Clear(g_c), s	2.0	17.4	24.4	3.8	23.1	1.4
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	267	986	781	661	605	538
V/C Ratio(X)	0.34	0.62	0.86	0.19	0.94	0.08
Avail Cap(c_a), veh/h	309	986	781	661	618	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.1	12.5	19.8	13.8	24.0	16.8
Incr Delay (d2), s/veh	0.5	2.7	11.8	0.6	22.2	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	0.8	7.4	12.4	1.4	13.0	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.6	15.2	31.6	14.5	46.2	16.9
LnGrp LOS	B	B	C	B	D	B
Approach Vol, veh/h		706	796		610	
Approach Delay, s/veh		15.3	28.9		44.1	
Approach LOS		B	C		D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.2	36.3		30.5		44.5
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	6.0	29.0		26.0		39.0
Max Q Clear Time (g_c+I1), s	4.0	26.4		25.1		19.4
Green Ext Time (p_c), s	0.0	1.7		0.3		6.8

Intersection Summary	
HCM 6th Ctrl Delay	28.7
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	5.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	282	307	0	137	220
Future Vol, veh/h	0	282	307	0	137	220
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	250	0	-	250	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	307	334	0	149	239

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	871	334	0	0	334	0
Stage 1	334	-	-	-	-	-
Stage 2	537	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	322	708	-	-	1225	-
Stage 1	725	-	-	-	-	-
Stage 2	586	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	283	708	-	-	1225	-
Mov Cap-2 Maneuver	283	-	-	-	-	-
Stage 1	725	-	-	-	-	-
Stage 2	515	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.9	0	3.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	708	1225	-
HCM Lane V/C Ratio	-	-	-	0.433	0.122	-
HCM Control Delay (s)	-	-	0	13.9	8.3	-
HCM Lane LOS	-	-	A	B	A	-
HCM 95th %tile Q(veh)	-	-	-	2.2	0.4	-

Intersection	
Int Delay, s/veh	13.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	4	143	72	4	3	205	373	115	15	246	62
Future Vol, veh/h	15	4	143	72	4	3	205	373	115	15	246	62
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	50	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	4	155	78	4	3	223	405	125	16	267	67

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1250	1309	301	1326	1280	468	334	0	0	530	0	0
Stage 1	333	333	-	914	914	-	-	-	-	-	-	-
Stage 2	917	976	-	412	366	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	150	159	739	133	166	595	1225	-	-	1037	-	-
Stage 1	681	644	-	327	352	-	-	-	-	-	-	-
Stage 2	326	329	-	617	623	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	124	128	739	87	134	595	1225	-	-	1037	-	-
Mov Cap-2 Maneuver	124	128	-	87	134	-	-	-	-	-	-	-
Stage 1	557	634	-	267	288	-	-	-	-	-	-	-
Stage 2	261	269	-	476	614	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.5	154.6	2.5	0.4
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1225	-	-	125	739	89	595	1037	-	-
HCM Lane V/C Ratio	0.182	-	-	0.165	0.21	0.928	0.005	0.016	-	-
HCM Control Delay (s)	8.6	-	-	39.4	11.2	160.3	11.1	8.5	-	-
HCM Lane LOS	A	-	-	E	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	0.6	0.8	5.2	0	0	-	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Base Year AM
With Imi Kala Street Extension
With Improvements

Intersection	
Int Delay, s/veh	5.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	44	286	200	43	206	541
Future Vol, veh/h	44	286	200	43	206	541
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	311	217	47	224	588

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1277	241	0	0	264	0
Stage 1	241	-	-	-	-	-
Stage 2	1036	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	184	798	-	-	1300	-
Stage 1	799	-	-	-	-	-
Stage 2	342	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	152	798	-	-	1300	-
Mov Cap-2 Maneuver	152	-	-	-	-	-
Stage 1	799	-	-	-	-	-
Stage 2	283	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16	0	2.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	152	798	1300	-
HCM Lane V/C Ratio	-	-	0.315	0.39	0.172	-
HCM Control Delay (s)	-	-	39.2	12.4	8.3	-
HCM Lane LOS	-	-	E	B	A	-
HCM 95th %tile Q(veh)	-	-	1.3	1.9	0.6	-

Intersection	
Int Delay, s/veh	10.8

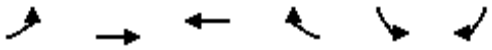
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	249	55	179	74	94	534
Future Vol, veh/h	249	55	179	74	94	534
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	271	60	195	80	102	580

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1019	235	0	0	275	0
Stage 1	235	-	-	-	-	-
Stage 2	784	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 263	804	-	-	1288	-
Stage 1	804	-	-	-	-	-
Stage 2	450	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 242	804	-	-	1288	-
Mov Cap-2 Maneuver	341	-	-	-	-	-
Stage 1	804	-	-	-	-	-
Stage 2	414	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	39.5	0	1.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	341	804	1288	-
HCM Lane V/C Ratio	-	-	0.794	0.074	0.079	-
HCM Control Delay (s)	-	-	46.1	9.8	8	-
HCM Lane LOS	-	-	E	A	A	-
HCM 95th %tile Q(veh)	-	-	6.6	0.2	0.3	-

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



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	365	215	193	147	66	427
Future Volume (veh/h)	365	215	193	147	66	427
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	397	234	210	0	72	46
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	662	331	1119		185	165
Arrive On Green	0.60	0.60	0.60	0.00	0.10	0.10
Sat Flow, veh/h	783	554	1870	0	1781	1585
Grp Volume(v), veh/h	631	0	210	0	72	46
Grp Sat Flow(s),veh/h/ln	1337	0	1870	0	1781	1585
Q Serve(g_s), s	9.6	0.0	1.5	0.0	1.1	0.8
Cycle Q Clear(g_c), s	11.1	0.0	1.5	0.0	1.1	0.8
Prop In Lane	0.63			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	994	0	1119		185	165
V/C Ratio(X)	0.64	0.00	0.19		0.39	0.28
Avail Cap(c_a), veh/h	1643	0	2012		1091	970
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	4.7	0.0	2.7	0.0	12.6	12.5
Incr Delay (d2), s/veh	0.7	0.0	0.1	0.0	1.3	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.2	0.0	0.4	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.4	0.0	2.8	0.0	14.0	13.4
LnGrp LOS	A	A	A		B	B
Approach Vol, veh/h		631	210	A	118	
Approach Delay, s/veh		5.4	2.8		13.7	
Approach LOS		A	A		B	

Timer - Assigned Phs			4		6	8
Phs Duration (G+Y+Rc), s			22.6		7.6	22.6
Change Period (Y+Rc), s			4.5		4.5	4.5
Max Green Setting (Gmax), s			32.5		18.5	32.5
Max Q Clear Time (g_c+I1), s			13.1		3.1	3.5
Green Ext Time (p_c), s			5.0		0.3	1.3

Intersection Summary		
HCM 6th Ctrl Delay		5.9
HCM 6th LOS		A

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Base Year PM
With Imi Kala Street Extension
With Improvements

Intersection	
Int Delay, s/veh	7.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	329	265	91	206	184
Future Vol, veh/h	50	329	265	91	206	184
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	358	288	99	224	200

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	986	338	0	0	387	0
Stage 1	338	-	-	-	-	-
Stage 2	648	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	275	704	-	-	1171	-
Stage 1	722	-	-	-	-	-
Stage 2	521	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	222	704	-	-	1171	-
Mov Cap-2 Maneuver	222	-	-	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	421	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.8	0	4.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	222	704	1171	-
HCM Lane V/C Ratio	-	-	0.245	0.508	0.191	-
HCM Control Delay (s)	-	-	26.4	15.3	8.8	-
HCM Lane LOS	-	-	D	C	A	-
HCM 95th %tile Q(veh)	-	-	0.9	2.9	0.7	-

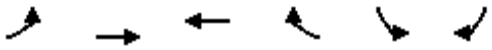
Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	115	27	290	222	20	219
Future Vol, veh/h	115	27	290	222	20	219
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	29	315	241	22	238

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	718	436	0	0	556	0
Stage 1	436	-	-	-	-	-
Stage 2	282	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	396	620	-	-	1015	-
Stage 1	652	-	-	-	-	-
Stage 2	766	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	387	620	-	-	1015	-
Mov Cap-2 Maneuver	493	-	-	-	-	-
Stage 1	652	-	-	-	-	-
Stage 2	749	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.1	0	0.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	493	620	1015	-
HCM Lane V/C Ratio	-	-	0.254	0.047	0.021	-
HCM Control Delay (s)	-	-	14.8	11.1	8.6	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	1	0.1	0.1	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	410	222	189	166	117	316
Future Volume (veh/h)	410	222	189	166	117	316
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	446	241	205	0	127	36
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	683	306	1179		202	180
Arrive On Green	0.63	0.63	0.63	0.00	0.11	0.11
Sat Flow, veh/h	815	485	1870	0	1781	1585
Grp Volume(v), veh/h	687	0	205	0	127	36
Grp Sat Flow(s),veh/h/ln	1300	0	1870	0	1781	1585
Q Serve(g_s), s	13.5	0.0	1.6	0.0	2.4	0.7
Cycle Q Clear(g_c), s	15.1	0.0	1.6	0.0	2.4	0.7
Prop In Lane	0.65			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	989	0	1179		202	180
V/C Ratio(X)	0.69	0.00	0.17		0.63	0.20
Avail Cap(c_a), veh/h	1388	0	1731		938	835
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	5.5	0.0	2.7	0.0	14.9	14.1
Incr Delay (d2), s/veh	0.9	0.0	0.1	0.0	3.2	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	1.8	0.0	0.2	0.0	1.0	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.4	0.0	2.8	0.0	18.1	14.7
LnGrp LOS	A	A	A		B	B
Approach Vol, veh/h		687	205	A	163	
Approach Delay, s/veh		6.4	2.8		17.3	
Approach LOS		A	A		B	

Timer - Assigned Phs			4		6	8
Phs Duration (G+Y+Rc), s			26.6		8.5	26.6
Change Period (Y+Rc), s			4.5		4.5	4.5
Max Green Setting (Gmax), s			32.5		18.5	32.5
Max Q Clear Time (g_c+I1), s			17.1		4.4	3.6
Green Ext Time (p_c), s			5.0		0.4	1.3

Intersection Summary	
HCM 6th Ctrl Delay	7.4
HCM 6th LOS	A

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Future Year AM
No Imi Kala Street Extension
No Improvements

Intersection	
Int Delay, s/veh	166.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	104	295	263	186	346	437
Future Vol, veh/h	104	295	263	186	346	437
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	113	321	286	202	376	475

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1614	387	0	0	488	0
Stage 1	387	-	-	-	-	-
Stage 2	1227	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	114	661	-	-	1075	-
Stage 1	686	-	-	-	-	-
Stage 2	277	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 60	661	-	-	1075	-
Mov Cap-2 Maneuver	~ 60	-	-	-	-	-
Stage 1	686	-	-	-	-	-
Stage 2	145	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 673.5	0	4.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	183	1075	-
HCM Lane V/C Ratio	-	-	2.37	0.35	-
HCM Control Delay (s)	-	-	$ 673.5	10.1	0
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	35.9	1.6	-

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

Intersection	
Int Delay, s/veh	19.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	146	109	193	61	233	454
Future Vol, veh/h	146	109	193	61	233	454
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	159	118	210	66	253	493

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1242	243	0	0	276	0
Stage 1	243	-	-	-	-	-
Stage 2	999	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	193	796	-	-	1287	-
Stage 1	797	-	-	-	-	-
Stage 2	356	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 155	796	-	-	1287	-
Mov Cap-2 Maneuver	~ 155	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	286	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	83	0	2.9
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	155	796	1287	-
HCM Lane V/C Ratio	-	-	1.024	0.149	0.197	-
HCM Control Delay (s)	-	-	137.2	10.3	8.5	-
HCM Lane LOS	-	-	F	B	A	-
HCM 95th %tile Q(veh)	-	-	7.9	0.5	0.7	-

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

Intersection	
Int Delay, s/veh	104.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	560	151	426	783	18
Future Vol, veh/h	13	560	151	426	783	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	100	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	609	164	463	851	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1652	861	871	0	-	0
Stage 1	861	-	-	-	-	-
Stage 2	791	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	108	~ 355	774	-	-	-
Stage 1	414	-	-	-	-	-
Stage 2	447	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	85	~ 355	774	-	-	-
Mov Cap-2 Maneuver	210	-	-	-	-	-
Stage 1	326	-	-	-	-	-
Stage 2	447	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s$	351.9	2.9	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	774	-	210	355	-	-
HCM Lane V/C Ratio	0.212	-	0.067	1.715	-	-
HCM Control Delay (s)	10.9	-	23.4$	359.5	-	-
HCM Lane LOS	B	-	C	F	-	-
HCM 95th %tile Q(veh)	0.8	-	0.2	37.8	-	-

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

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	41	22	254	607	12
Future Vol, veh/h	12	41	22	254	607	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	115	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	45	24	276	660	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	991	667	673	0	-	0
Stage 1	667	-	-	-	-	-
Stage 2	324	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	273	459	918	-	-	-
Stage 1	510	-	-	-	-	-
Stage 2	733	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	266	459	918	-	-	-
Mov Cap-2 Maneuver	266	-	-	-	-	-
Stage 1	497	-	-	-	-	-
Stage 2	733	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.7	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	918	-	394	-	-
HCM Lane V/C Ratio	0.026	-	0.146	-	-
HCM Control Delay (s)	9	-	15.7	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	138	54	287	699	6
Future Vol, veh/h	5	138	54	287	699	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	150	59	312	760	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1194	764	767	0	-	0
Stage 1	764	-	-	-	-	-
Stage 2	430	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	206	404	847	-	-	-
Stage 1	460	-	-	-	-	-
Stage 2	656	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	192	404	847	-	-	-
Mov Cap-2 Maneuver	192	-	-	-	-	-
Stage 1	428	-	-	-	-	-
Stage 2	656	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.3	1.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	847	-	389	-	-
HCM Lane V/C Ratio	0.069	-	0.4	-	-
HCM Control Delay (s)	9.6	-	20.3	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	1.9	-	-

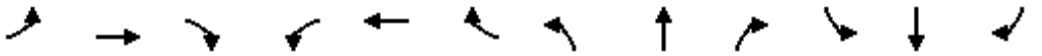
Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	10	0	41	59	0	8	35	339	29	5	871	8
Future Vol, veh/h	10	0	41	59	0	8	35	339	29	5	871	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	45	64	0	9	38	368	32	5	947	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1427	1438	952	1444	1426	384	956	0	0	400	0	0
Stage 1	962	962	-	460	460	-	-	-	-	-	-	-
Stage 2	465	476	-	984	966	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	113	133	315	110	135	664	719	-	-	1159	-	-
Stage 1	308	334	-	581	566	-	-	-	-	-	-	-
Stage 2	578	557	-	299	333	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	105	123	315	89	125	664	719	-	-	1159	-	-
Mov Cap-2 Maneuver	105	123	-	89	125	-	-	-	-	-	-	-
Stage 1	287	331	-	541	528	-	-	-	-	-	-	-
Stage 2	532	519	-	254	330	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26	106.7	0.9	0
HCM LOS	D	F		

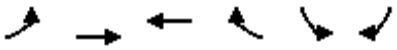
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	719	-	-	226	99	1159	-	-
HCM Lane V/C Ratio	0.053	-	-	0.245	0.736	0.005	-	-
HCM Control Delay (s)	10.3	0	-	26	106.7	8.1	0	-
HCM Lane LOS	B	A	-	D	F	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.9	3.8	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	167	2	41	12	5	3	110	502	3	2	1048	514
Future Volume (veh/h)	167	2	41	12	5	3	110	502	3	2	1048	514
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1034	1870
Adj Flow Rate, veh/h	182	2	5	13	5	1	120	546	3	2	1139	537
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	240	2	233	199	74	14	137	1429	8	649	757	1161
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.06	0.77	0.77	0.02	0.73	0.73
Sat Flow, veh/h	1416	16	1580	1172	499	93	1781	1858	10	1781	1034	1585
Grp Volume(v), veh/h	184	0	5	19	0	0	120	0	549	2	1139	537
Grp Sat Flow(s),veh/h/ln	1432	0	1580	1765	0	0	1781	0	1869	1781	1034	1585
Q Serve(g_s), s	26.4	0.0	0.6	0.0	0.0	0.0	11.1	0.0	21.8	0.1	166.0	31.1
Cycle Q Clear(g_c), s	28.4	0.0	0.6	2.0	0.0	0.0	11.1	0.0	21.8	0.1	166.0	31.1
Prop In Lane	0.99		1.00	0.68		0.05	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	242	0	233	287	0	0	137	0	1437	649	757	1161
V/C Ratio(X)	0.76	0.00	0.02	0.07	0.00	0.00	0.88	0.00	0.38	0.00	1.51	0.46
Avail Cap(c_a), veh/h	781	0	836	867	0	0	275	0	1533	696	757	1161
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	94.3	0.0	82.7	83.3	0.0	0.0	92.2	0.0	8.6	7.3	30.4	12.3
Incr Delay (d2), s/veh	12.5	0.0	0.1	0.1	0.0	0.0	16.0	0.0	0.2	0.0	234.1	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.6	0.0	0.3	1.0	0.0	0.0	7.7	0.0	9.1	0.0	88.8	11.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	106.8	0.0	82.8	83.4	0.0	0.0	108.1	0.0	8.7	7.3	264.5	13.6
LnGrp LOS	F	A	F	F	A	A	F	A	A	A	F	B
Approach Vol, veh/h		189			19			669			1678	
Approach Delay, s/veh		106.2			83.4			26.6			183.9	
Approach LOS		F			F			C			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.3	171.0		38.4	9.0	179.3		38.4				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	31.0	166.0		120.0	11.0	186.0		120.0				
Max Q Clear Time (g_c+I1), s	13.1	168.0		4.0	2.1	23.8		30.4				
Green Ext Time (p_c), s	0.3	0.0		0.1	0.0	4.2		3.0				

Intersection Summary												
HCM 6th Ctrl Delay			136.2									
HCM 6th LOS			F									



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	59	768	802	621	1116	33
Future Volume (veh/h)	59	768	802	621	1116	33
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	64	835	872	609	1246	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	104	1967	1047	708	1383	615
Arrive On Green	0.01	0.55	0.52	0.52	0.39	0.00
Sat Flow, veh/h	1781	3647	2122	1372	3563	1585
Grp Volume(v), veh/h	64	835	760	721	1246	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1623	1781	1585
Q Serve(g_s), s	2.0	25.8	68.1	72.6	61.9	0.0
Cycle Q Clear(g_c), s	2.0	25.8	68.1	72.6	61.9	0.0
Prop In Lane	1.00			0.85	1.00	1.00
Lane Grp Cap(c), veh/h	104	1967	917	838	1383	615
V/C Ratio(X)	0.62	0.42	0.83	0.86	0.90	0.00
Avail Cap(c_a), veh/h	104	2645	1256	1148	1686	750
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	55.6	24.5	38.5	39.6	54.1	0.0
Incr Delay (d2), s/veh	8.0	0.2	3.8	5.5	6.6	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	2.3	11.2	30.7	30.3	29.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	63.6	24.7	42.3	45.0	60.7	0.0
LnGrp LOS	E	C	D	D	E	A
Approach Vol, veh/h		899	1481		1246	
Approach Delay, s/veh		27.5	43.6		60.7	
Approach LOS		C	D		E	

Timer - Assigned Phs	2	3	4		8
Phs Duration (G+Y+Rc), s	79.0	7.0	102.1		109.1
Change Period (Y+Rc), s	6.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	89.0	2.0	133.0		140.0
Max Q Clear Time (g_c+I1), s	63.9	4.0	74.6		27.8
Green Ext Time (p_c), s	9.1	0.0	22.4		9.2

Intersection Summary	
HCM 6th Ctrl Delay	45.5
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	16.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	39	170	360	157	450	604
Future Vol, veh/h	39	170	360	157	450	604
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	185	391	171	489	657

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2112	477	0	0	562	0
Stage 1	477	-	-	-	-	-
Stage 2	1635	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	56	588	-	-	1009	-
Stage 1	624	-	-	-	-	-
Stage 2	175	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 29	588	-	-	1009	-
Mov Cap-2 Maneuver	~ 29	-	-	-	-	-
Stage 1	624	-	-	-	-	-
Stage 2	90	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	111.5	0	5.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	29	588	1009	-
HCM Lane V/C Ratio	-	-	1.462	0.314	0.485	-
HCM Control Delay (s)	-	-	$ 537.1	13.9	11.9	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	4.9	1.3	2.7	-

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

Intersection	
Int Delay, s/veh	5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	435	242	259	198	17	150
Future Vol, veh/h	435	242	259	198	17	150
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	473	263	282	215	18	163

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	736	0	1384	605
Stage 1	-	-	-	-	605	-
Stage 2	-	-	-	-	779	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	870	-	158	498
Stage 1	-	-	-	-	545	-
Stage 2	-	-	-	-	452	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	870	-	100	498
Mov Cap-2 Maneuver	-	-	-	-	100	-
Stage 1	-	-	-	-	545	-
Stage 2	-	-	-	-	286	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.3	25.4
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	354	-	-	870	-
HCM Lane V/C Ratio	0.513	-	-	0.324	-
HCM Control Delay (s)	25.4	-	-	11.1	0
HCM Lane LOS	D	-	-	B	A
HCM 95th %tile Q(veh)	2.8	-	-	1.4	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	544	71	32	409	24	44
Future Vol, veh/h	544	71	32	409	24	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	591	77	35	445	26	48

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	668	0	1145	630
Stage 1	-	-	-	-	630	-
Stage 2	-	-	-	-	515	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	922	-	221	482
Stage 1	-	-	-	-	531	-
Stage 2	-	-	-	-	600	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	922	-	210	482
Mov Cap-2 Maneuver	-	-	-	-	210	-
Stage 1	-	-	-	-	531	-
Stage 2	-	-	-	-	570	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	19
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	331	-	-	922	-
HCM Lane V/C Ratio	0.223	-	-	0.038	-
HCM Control Delay (s)	19	-	-	9.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	537	45	64	433	16	96
Future Vol, veh/h	537	45	64	433	16	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	584	49	70	471	17	104

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	633	0	1220	609
Stage 1	-	-	-	-	609	-
Stage 2	-	-	-	-	611	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	950	-	199	495
Stage 1	-	-	-	-	543	-
Stage 2	-	-	-	-	542	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	950	-	179	495
Mov Cap-2 Maneuver	-	-	-	-	179	-
Stage 1	-	-	-	-	543	-
Stage 2	-	-	-	-	488	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	18.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	395	-	-	950	-
HCM Lane V/C Ratio	0.308	-	-	0.073	-
HCM Control Delay (s)	18.1	-	-	9.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.3	-	-	0.2	-

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	26	52	184	44	0	120	7	156	1	7	3
Future Vol, veh/h	3	26	52	184	44	0	120	7	156	1	7	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	28	57	200	48	0	130	8	170	1	8	3
Number of Lanes	0	1	0	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	8.3	10.6	9.5	8.3
HCM LOS	A	B	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	0%	4%	81%	9%
Vol Thru, %	0%	4%	32%	19%	64%
Vol Right, %	0%	96%	64%	0%	27%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	120	163	81	228	11
LT Vol	120	0	3	184	1
Through Vol	0	7	26	44	7
RT Vol	0	156	52	0	3
Lane Flow Rate	130	177	88	248	12
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.213	0.231	0.113	0.342	0.017
Departure Headway (Hd)	5.869	4.691	4.64	4.963	5.103
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	609	762	768	724	695
Service Time	3.623	2.444	2.697	3.005	3.178
HCM Lane V/C Ratio	0.213	0.232	0.115	0.343	0.017
HCM Control Delay	10.2	8.9	8.3	10.6	8.3
HCM Lane LOS	B	A	A	B	A
HCM 95th-tile Q	0.8	0.9	0.4	1.5	0.1

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	387	244	235	108	42	252
Future Vol, veh/h	387	244	235	108	42	252
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	140	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	421	265	255	117	46	274

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	255	0	-	0	1421	314
Stage 1	-	-	-	-	314	-
Stage 2	-	-	-	-	1107	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1310	-	-	-	150	726
Stage 1	-	-	-	-	741	-
Stage 2	-	-	-	-	316	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1310	-	-	-	93	726
Mov Cap-2 Maneuver	-	-	-	-	93	-
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	316	-

Approach	EB	WB	SB
HCM Control Delay, s	5.5	0	22
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1310	-	-	-	93	726
HCM Lane V/C Ratio	0.321	-	-	-	0.491	0.377
HCM Control Delay (s)	9	0	-	-	76.4	12.9
HCM Lane LOS	A	A	-	-	F	B
HCM 95th %tile Q(veh)	1.4	-	-	-	2.1	1.8

Intersection	
Intersection Delay, s/veh	41.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	220	48	0	0	143	40	21	212	31	62	0	522
Future Vol, veh/h	220	48	0	0	143	40	21	212	31	62	0	522
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	239	52	0	0	155	43	23	230	34	67	0	567
Number of Lanes	1	1	0	0	1	0	0	1	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	20.5	18.6	23.4	66.4
HCM LOS	C	C	C	F

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	8%	100%	0%	0%	100%	0%
Vol Thru, %	80%	0%	100%	78%	0%	0%
Vol Right, %	12%	0%	0%	22%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	264	220	48	183	62	522
LT Vol	21	220	0	0	62	0
Through Vol	212	0	48	143	0	0
RT Vol	31	0	0	40	0	522
Lane Flow Rate	287	239	52	199	67	567
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	0.622	0.566	0.116	0.457	0.146	1.034
Departure Headway (Hd)	8.035	8.749	8.232	8.567	7.792	6.561
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	453	416	438	424	460	556
Service Time	6.035	6.449	5.932	6.567	5.537	4.305
HCM Lane V/C Ratio	0.634	0.575	0.119	0.469	0.146	1.02
HCM Control Delay	23.4	22.3	12	18.6	11.9	72.9
HCM Lane LOS	C	C	B	C	B	F
HCM 95th-tile Q	4.1	3.4	0.4	2.3	0.5	15.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	165	54	291	73	50	35	270	348	17	356	15
Future Volume (veh/h)	13	165	54	291	73	50	35	270	348	17	356	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.99	0.99		0.97	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	179	54	316	79	42	38	293	102	18	387	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	444	341	103	594	566	301	379	596	492	80	552	21
Arrive On Green	0.25	0.25	0.25	0.17	0.50	0.50	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1242	1370	413	1781	1143	608	973	1870	1543	33	1733	65
Grp Volume(v), veh/h	14	0	233	316	0	121	38	293	102	420	0	0
Grp Sat Flow(s),veh/h/ln	1242	0	1783	1781	0	1751	973	1870	1543	1832	0	0
Q Serve(g_s), s	0.5	0.0	6.1	6.3	0.0	2.0	0.0	6.8	2.6	1.0	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	6.1	6.3	0.0	2.0	2.3	6.8	2.6	10.7	0.0	0.0
Prop In Lane	1.00		0.23	1.00		0.35	1.00		1.00	0.04		0.04
Lane Grp Cap(c), veh/h	444	0	444	594	0	867	379	596	492	654	0	0
V/C Ratio(X)	0.03	0.00	0.52	0.53	0.00	0.14	0.10	0.49	0.21	0.64	0.00	0.00
Avail Cap(c_a), veh/h	851	0	1029	2278	0	3097	1698	3133	2585	3094	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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.3	0.0	17.4	10.4	0.0	7.4	13.2	14.8	13.4	16.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.0	0.7	0.0	0.1	0.1	0.7	0.2	1.2	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	0.1	0.0	2.4	2.2	0.0	0.7	0.3	2.7	0.9	4.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.3	0.0	18.4	11.2	0.0	7.5	13.4	15.5	13.6	17.3	0.0	0.0
LnGrp LOS	B	A	B	B	A	A	B	B	B	B	A	A
Approach Vol, veh/h		247			437			433			420	
Approach Delay, s/veh		18.2			10.1			14.8			17.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		31.6		22.1	13.2	18.4		22.1				
Change Period (Y+Rc), s		5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s		95.0		90.0	60.0	31.0		90.0				
Max Q Clear Time (g_c+I1), s		4.0		12.7	8.3	8.1		8.8				
Green Ext Time (p_c), s		1.4		3.5	1.0	1.5		2.9				

Intersection Summary												
HCM 6th Ctrl Delay			14.7									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	407	49	38	483	64	0	0	0	57	120	81
Future Volume (veh/h)	12	407	49	38	483	64	0	0	0	57	120	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		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	1870				1870	1870	1870
Adj Flow Rate, veh/h	13	442	48	41	525	65				62	130	63
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2				2	2	2
Cap, veh/h	28	1039	113	68	1059	131				75	158	77
Arrive On Green	0.02	0.63	0.63	0.04	0.65	0.65				0.18	0.18	0.18
Sat Flow, veh/h	1781	1658	180	1781	1632	202				430	902	437
Grp Volume(v), veh/h	13	0	490	41	0	590				255	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1838	1781	0	1834				1770	0	0
Q Serve(g_s), s	0.5	0.0	10.2	1.7	0.0	12.5				10.4	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	10.2	1.7	0.0	12.5				10.4	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.11				0.24		0.25
Lane Grp Cap(c), veh/h	28	0	1152	68	0	1190				310	0	0
V/C Ratio(X)	0.46	0.00	0.43	0.60	0.00	0.50				0.82	0.00	0.00
Avail Cap(c_a), veh/h	214	0	1152	143	0	1190				448	0	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)	0.82	0.00	0.82	0.88	0.00	0.88				1.00	0.00	0.00
Uniform Delay (d), s/veh	36.6	0.0	7.1	35.5	0.0	6.8				29.8	0.0	0.0
Incr Delay (d2), s/veh	9.3	0.0	0.9	7.3	0.0	1.3				7.9	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
%ile BackOfQ(50%),veh/ln	0.3	0.0	3.7	0.9	0.0	4.5				5.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.9	0.0	8.1	42.8	0.0	8.1				37.7	0.0	0.0
LnGrp LOS	D	A	A	D	A	A				D	A	A
Approach Vol, veh/h		503			631						255	
Approach Delay, s/veh		9.1			10.4						37.7	
Approach LOS		A			B						D	

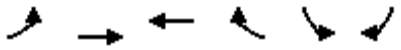
Timer - Assigned Phs	1	2		4	5	6
Phs Duration (G+Y+Rc), s	6.9	51.0		17.1	5.2	52.7
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s	6.9	38.0		19.0	9.0	35.0
Max Q Clear Time (g_c+I1), s	3.7	12.2		12.4	2.5	14.5
Green Ext Time (p_c), s	0.0	3.5		0.8	0.0	4.2

Intersection Summary		
HCM 6th Ctrl Delay	14.9	
HCM 6th LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	452	0	0	584	121	22	114	23	0	0	0
Future Volume (veh/h)	100	452	0	0	584	121	22	114	23	0	0	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		1.00	1.00		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	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	109	491	0	0	635	94	24	124	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	627	1552	0	0	1429	1211	29	149	152			
Arrive On Green	0.04	0.83	0.00	0.00	0.76	0.76	0.10	0.10	0.10			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	301	1554	1585			
Grp Volume(v), veh/h	109	491	0	0	635	94	148	0	1			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1855	0	1585			
Q Serve(g_s), s	1.6	8.2	0.0	0.0	16.4	2.0	10.6	0.0	0.1			
Cycle Q Clear(g_c), s	1.6	8.2	0.0	0.0	16.4	2.0	10.6	0.0	0.1			
Prop In Lane	1.00		0.00	0.00		1.00	0.16		1.00			
Lane Grp Cap(c), veh/h	627	1552	0	0	1429	1211	178	0	152			
V/C Ratio(X)	0.17	0.32	0.00	0.00	0.44	0.08	0.83	0.00	0.01			
Avail Cap(c_a), veh/h	668	1552	0	0	1429	1211	289	0	247			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.90	0.90	0.00	0.00	0.76	0.76	1.00	0.00	1.00			
Uniform Delay (d), s/veh	3.9	2.7	0.0	0.0	5.7	4.0	59.9	0.0	55.2			
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.0	0.8	0.1	10.3	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			
%ile BackOfQ(50%),veh/ln	0.5	2.7	0.0	0.0	6.2	0.7	5.5	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.0	3.1	0.0	0.0	6.5	4.1	70.2	0.0	55.2			
LnGrp LOS	A	A	A	A	A	A	E	A	E			
Approach Vol, veh/h		600			729			149				
Approach Delay, s/veh		3.3			6.2			70.1				
Approach LOS		A			A			E				

Timer - Assigned Phs	1	2		4		6			
Phs Duration (G+Y+Rc), s	8.9	108.1		18.0		117.0			
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0			
Max Green Setting (Gmax), s	8.0	92.0		21.0		104.0			
Max Q Clear Time (g_c+I1), s	3.6	18.4		12.6		10.2			
Green Ext Time (p_c), s	0.0	5.9		0.4		3.9			

Intersection Summary		
HCM 6th Ctrl Delay	11.4	
HCM 6th LOS	B	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	63	396	601	252	479	86
Future Volume (veh/h)	63	396	601	252	479	86
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	68	430	653	178	521	34
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	353	1154	1052	891	564	501
Arrive On Green	0.03	0.62	0.56	0.56	0.32	0.32
Sat Flow, veh/h	1781	1870	1870	1584	1781	1585
Grp Volume(v), veh/h	68	430	653	178	521	34
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1584	1781	1585
Q Serve(g_s), s	2.4	17.2	35.2	8.3	42.4	2.2
Cycle Q Clear(g_c), s	2.4	17.2	35.2	8.3	42.4	2.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	353	1154	1052	891	564	501
V/C Ratio(X)	0.19	0.37	0.62	0.20	0.92	0.07
Avail Cap(c_a), veh/h	458	1154	1052	891	772	687
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.3	14.3	22.0	16.2	49.5	35.8
Incr Delay (d2), s/veh	0.2	0.9	2.8	0.5	14.9	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	1.0	7.7	16.4	3.2	21.4	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.5	15.2	24.8	16.7	64.5	35.9
LnGrp LOS	B	B	C	B	E	D
Approach Vol, veh/h		498	831		555	
Approach Delay, s/veh		15.5	23.1		62.7	
Approach LOS		B	C		E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.2	89.4		52.5		97.5
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	13.0	58.0		65.0		75.0
Max Q Clear Time (g_c+I1), s	4.4	37.2		44.4		19.2
Green Ext Time (p_c), s	0.1	8.7		3.1		5.7

Intersection Summary	
HCM 6th Ctrl Delay	32.7
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	8.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	126	0	115	18	0	9	51	321	3	11	501	73
Future Vol, veh/h	126	0	115	18	0	9	51	321	3	11	501	73
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	250	-	50	50	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	137	0	125	20	0	10	55	349	3	12	545	79

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1035	1031	545	1130	1107	349	624	0	0	352	0	0
Stage 1	569	569	-	459	459	-	-	-	-	-	-	-
Stage 2	466	462	-	671	648	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	210	233	538	181	210	694	957	-	-	1207	-	-
Stage 1	507	506	-	582	566	-	-	-	-	-	-	-
Stage 2	577	565	-	446	466	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	197	218	538	132	196	694	957	-	-	1207	-	-
Mov Cap-2 Maneuver	197	218	-	132	196	-	-	-	-	-	-	-
Stage 1	478	501	-	549	534	-	-	-	-	-	-	-
Stage 2	536	533	-	339	461	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	36.2	28.7	1.2	0.2
HCM LOS	E	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	957	-	-	197	538	181	1207	-	-
HCM Lane V/C Ratio	0.058	-	-	0.695	0.232	0.162	0.01	-	-
HCM Control Delay (s)	9	-	-	56.8	13.7	28.7	8	-	-
HCM Lane LOS	A	-	-	F	B	D	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	4.3	0.9	0.6	0	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	92	92	30	277	603	30
Future Vol, veh/h	92	92	30	277	603	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	0	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	100	100	33	301	655	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1022	655	688	0	-	0
Stage 1	655	-	-	-	-	-
Stage 2	367	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	261	466	906	-	-	-
Stage 1	517	-	-	-	-	-
Stage 2	701	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	252	466	906	-	-	-
Mov Cap-2 Maneuver	375	-	-	-	-	-
Stage 1	498	-	-	-	-	-
Stage 2	701	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.5	0.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	906	-	375	466	-	-
HCM Lane V/C Ratio	0.036	-	0.267	0.215	-	-
HCM Control Delay (s)	9.1	-	18.1	14.8	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.1	0.8	-	-

Intersection	
Int Delay, s/veh	37.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	49	2	212	108	6	14	107	294	60	5	483	25
Future Vol, veh/h	49	2	212	108	6	14	107	294	60	5	483	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	50	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	2	230	117	7	15	116	320	65	5	525	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1145	1166	539	1250	1147	353	552	0	0	385	0	0
Stage 1	549	549	-	585	585	-	-	-	-	-	-	-
Stage 2	596	617	-	665	562	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	177	194	542	150	199	691	1018	-	-	1173	-	-
Stage 1	520	516	-	497	498	-	-	-	-	-	-	-
Stage 2	490	481	-	449	510	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	153	171	542	~ 78	176	691	1018	-	-	1173	-	-
Mov Cap-2 Maneuver	153	171	-	~ 78	176	-	-	-	-	-	-	-
Stage 1	461	514	-	440	441	-	-	-	-	-	-	-
Stage 2	418	426	-	256	508	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.3	$ 347.9	2.1	0.1
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1018	-	-	154	542	80	691	1173	-	-
HCM Lane V/C Ratio	0.114	-	-	0.36	0.425	1.549	0.022	0.005	-	-
HCM Control Delay (s)	9	-	-	41	16.5	$ 389.4	10.3	8.1	-	-
HCM Lane LOS	A	-	-	E	C	F	B	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	1.5	2.1	10.1	0.1	0	-	-

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

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Future Year PM
No Imi Kala Street Extension
No Improvements

Intersection	
Int Delay, s/veh	223.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	217	345	293	195	254	200
Future Vol, veh/h	217	345	293	195	254	200
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	236	375	318	212	276	217

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1193	424	0	0	530	0
Stage 1	424	-	-	-	-	-
Stage 2	769	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 206	630	-	-	1037	-
Stage 1	660	-	-	-	-	-
Stage 2	457	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 144	630	-	-	1037	-
Mov Cap-2 Maneuver	~ 144	-	-	-	-	-
Stage 1	660	-	-	-	-	-
Stage 2	319	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 594.3	0	5.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	274	1037	-
HCM Lane V/C Ratio	-	-	2.229	0.266	-
HCM Control Delay (s)	-	-	$ 594.3	9.7	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	47	1.1	-

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

Intersection	
Int Delay, s/veh	5.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	93	187	339	183	119	212
Future Vol, veh/h	93	187	339	183	119	212
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	203	368	199	129	230

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	956	468	0	0	567	0
Stage 1	468	-	-	-	-	-
Stage 2	488	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	286	595	-	-	1005	-
Stage 1	630	-	-	-	-	-
Stage 2	617	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	249	595	-	-	1005	-
Mov Cap-2 Maneuver	249	-	-	-	-	-
Stage 1	630	-	-	-	-	-
Stage 2	538	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.1	0	3.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	249	595	1005	-
HCM Lane V/C Ratio	-	-	0.406	0.342	0.129	-
HCM Control Delay (s)	-	-	29	14.2	9.1	-
HCM Lane LOS	-	-	D	B	A	-
HCM 95th %tile Q(veh)	-	-	1.9	1.5	0.4	-

Intersection	
Int Delay, s/veh	7.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	300	481	892	618	25
Future Vol, veh/h	24	300	481	892	618	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	100	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	326	523	970	672	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2702	686	699	0	-	0
Stage 1	686	-	-	-	-	-
Stage 2	2016	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 24	447	898	-	-	-
Stage 1	500	-	-	-	-	-
Stage 2	113	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 10	447	898	-	-	-
Mov Cap-2 Maneuver	71	-	-	-	-	-
Stage 1	209	-	-	-	-	-
Stage 2	113	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	35.7	5.1	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	898	-	71	447	-	-
HCM Lane V/C Ratio	0.582	-	0.367	0.73	-	-
HCM Control Delay (s)	14.4	-	82.6	31.9	-	-
HCM Lane LOS	B	-	F	D	-	-
HCM 95th %tile Q(veh)	3.9	-	1.4	5.8	-	-

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

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	18	27	44	525	302	14
Future Vol, veh/h	18	27	44	525	302	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	115	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	29	48	571	328	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1003	336	343	0	-	0
Stage 1	336	-	-	-	-	-
Stage 2	667	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	268	706	1216	-	-	-
Stage 1	724	-	-	-	-	-
Stage 2	510	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	258	706	1216	-	-	-
Mov Cap-2 Maneuver	258	-	-	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	510	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.8	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1216	-	417	-	-
HCM Lane V/C Ratio	0.039	-	0.117	-	-
HCM Control Delay (s)	8.1	-	14.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	70	113	591	321	8
Future Vol, veh/h	5	70	113	591	321	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	76	123	642	349	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1242	354	358	0	-	0
Stage 1	354	-	-	-	-	-
Stage 2	888	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	193	690	1201	-	-	-
Stage 1	710	-	-	-	-	-
Stage 2	402	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	173	690	1201	-	-	-
Mov Cap-2 Maneuver	173	-	-	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	402	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.3	1.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1201	-	575	-	-
HCM Lane V/C Ratio	0.102	-	0.142	-	-
HCM Control Delay (s)	8.3	-	12.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.5	-	-

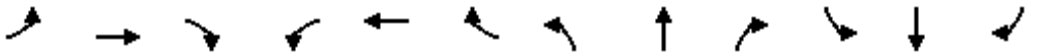
Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	1	48	48	1	2	46	686	78	6	351	6
Future Vol, veh/h	6	1	48	48	1	2	46	686	78	6	351	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	1	52	52	1	2	50	746	85	7	382	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1290	1331	386	1315	1292	789	389	0	0	831	0	0
Stage 1	400	400	-	889	889	-	-	-	-	-	-	-
Stage 2	890	931	-	426	403	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	140	154	662	135	163	391	1170	-	-	801	-	-
Stage 1	626	602	-	338	361	-	-	-	-	-	-	-
Stage 2	337	346	-	606	600	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	129	140	662	115	148	391	1170	-	-	801	-	-
Mov Cap-2 Maneuver	129	140	-	115	148	-	-	-	-	-	-	-
Stage 1	575	595	-	311	332	-	-	-	-	-	-	-
Stage 2	307	318	-	551	593	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.6	59.2	0.5	0.2
HCM LOS	B	F		

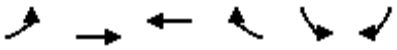
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1170	-	-	436	119	801	-	-
HCM Lane V/C Ratio	0.043	-	-	0.137	0.466	0.008	-	-
HCM Control Delay (s)	8.2	0	-	14.6	59.2	9.5	0	-
HCM Lane LOS	A	A	-	B	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	2.1	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	507	2	55	4	3	1	104	982	7	0	608	298
Future Volume (veh/h)	507	2	55	4	3	1	104	982	7	0	608	298
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	551	2	34	4	3	1	113	1067	8	0	661	281
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	648	2	685	405	299	97	232	953	7	40	836	708
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.05	0.51	0.51	0.00	0.45	0.45
Sat Flow, veh/h	1409	5	1583	870	692	223	1781	1854	14	1781	1870	1585
Grp Volume(v), veh/h	553	0	34	8	0	0	113	0	1075	0	661	281
Grp Sat Flow(s),veh/h/ln	1414	0	1583	1786	0	0	1781	0	1868	1781	1870	1585
Q Serve(g_s), s	67.6	0.0	2.3	0.0	0.0	0.0	6.3	0.0	96.0	0.0	56.4	22.3
Cycle Q Clear(g_c), s	68.0	0.0	2.3	0.5	0.0	0.0	6.3	0.0	96.0	0.0	56.4	22.3
Prop In Lane	1.00		1.00	0.50		0.12	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	650	0	685	801	0	0	232	0	960	40	836	708
V/C Ratio(X)	0.85	0.00	0.05	0.01	0.00	0.00	0.49	0.00	1.12	0.00	0.79	0.40
Avail Cap(c_a), veh/h	947	0	1017	1133	0	0	446	0	960	143	836	708
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	49.3	0.0	30.7	30.2	0.0	0.0	35.3	0.0	45.4	0.0	44.2	34.7
Incr Delay (d2), s/veh	9.2	0.0	0.1	0.0	0.0	0.0	1.6	0.0	67.7	0.0	7.5	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	25.8	0.0	0.9	0.2	0.0	0.0	2.9	0.0	62.2	0.0	28.1	9.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.6	0.0	30.8	30.2	0.0	0.0	36.9	0.0	113.1	0.0	51.7	36.4
LnGrp LOS	E	A	C	C	A	A	D	A	F	A	D	D
Approach Vol, veh/h		587			8			1188			942	
Approach Delay, s/veh		57.0			30.2			105.9			47.1	
Approach LOS		E			C			F			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.5	88.5		85.7	0.0	101.0		85.7				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	31.0	76.0		120.0	11.0	96.0		120.0				
Max Q Clear Time (g_c+I1), s	8.3	58.4		2.5	0.0	98.0		70.0				
Green Ext Time (p_c), s	0.3	13.7		0.0	0.0	0.0		10.7				

Intersection Summary			
HCM 6th Ctrl Delay		74.8	
HCM 6th LOS		E	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	75	889	839	1113	676	21
Future Volume (veh/h)	75	889	839	1113	676	21
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	82	966	912	1086	755	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	99	2576	1180	1053	758	337
Arrive On Green	0.03	0.72	0.66	0.66	0.21	0.00
Sat Flow, veh/h	1781	3647	1870	1585	3563	1585
Grp Volume(v), veh/h	82	966	912	1086	755	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1781	1585
Q Serve(g_s), s	4.7	19.8	68.2	128.0	40.8	0.0
Cycle Q Clear(g_c), s	4.7	19.8	68.2	128.0	40.8	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	99	2576	1180	1053	758	337
V/C Ratio(X)	0.83	0.37	0.77	1.03	1.00	0.00
Avail Cap(c_a), veh/h	167	2711	1180	1053	758	337
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	65.5	10.0	22.3	32.3	75.8	0.0
Incr Delay (d2), s/veh	6.4	0.1	3.3	36.1	31.7	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	4.3	7.9	29.3	57.9	22.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	71.8	10.1	25.6	68.5	107.4	0.0
LnGrp LOS	E	B	C	F	F	A
Approach Vol, veh/h		1048	1998		755	
Approach Delay, s/veh		14.9	48.9		107.4	
Approach LOS		B	D		F	

Timer - Assigned Phs	2	3	4		8
Phs Duration (G+Y+Rc), s	47.0	11.7	134.0		145.7
Change Period (Y+Rc), s	6.0	5.0	6.0		6.0
Max Green Setting (Gmax), s	41.0	14.0	128.0		147.0
Max Q Clear Time (g_c+I1), s	42.8	6.7	130.0		21.8
Green Ext Time (p_c), s	0.0	0.0	0.0		11.5

Intersection Summary	
HCM 6th Ctrl Delay	51.2
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	31.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	44	378	690	183	250	348
Future Vol, veh/h	44	378	690	183	250	348
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	411	750	199	272	378

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1772	850	0	0	949	0
Stage 1	850	-	-	-	-	-
Stage 2	922	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	91	~ 360	-	-	724	-
Stage 1	419	-	-	-	-	-
Stage 2	387	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	57	~ 360	-	-	724	-
Mov Cap-2 Maneuver	57	-	-	-	-	-
Stage 1	419	-	-	-	-	-
Stage 2	241	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	132	0	5.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	57	360	724	-
HCM Lane V/C Ratio	-	-	0.839	1.141	0.375	-
HCM Control Delay (s)	-	-	190.6	125.2	12.9	-
HCM Lane LOS	-	-	F	F	B	-
HCM 95th %tile Q(veh)	-	-	3.7	16	1.7	-

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

Intersection	
Int Delay, s/veh	14.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	357	114	258	363	58	158
Future Vol, veh/h	357	114	258	363	58	158
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	388	124	280	395	63	172

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	512	0	1405	450
Stage 1	-	-	-	-	450	-
Stage 2	-	-	-	-	955	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1053	-	154	609
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	374	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1053	-	101	609
Mov Cap-2 Maneuver	-	-	-	-	101	-
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	246	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4	76
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	259	-	-	1053	-
HCM Lane V/C Ratio	0.906	-	-	0.266	-
HCM Control Delay (s)	76	-	-	9.7	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	8	-	-	1.1	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	486	36	24	548	35	32
Future Vol, veh/h	486	36	24	548	35	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	528	39	26	596	38	35

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	567	0	1196	548
Stage 1	-	-	-	-	548	-
Stage 2	-	-	-	-	648	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1005	-	206	536
Stage 1	-	-	-	-	579	-
Stage 2	-	-	-	-	521	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1005	-	198	536
Mov Cap-2 Maneuver	-	-	-	-	198	-
Stage 1	-	-	-	-	579	-
Stage 2	-	-	-	-	501	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	22.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	283	-	-	1005	-
HCM Lane V/C Ratio	0.257	-	-	0.026	-
HCM Control Delay (s)	22.1	-	-	8.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	516	8	82	526	35	77
Future Vol, veh/h	516	8	82	526	35	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	561	9	89	572	38	84

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	570	0	1316	566
Stage 1	-	-	-	-	566	-
Stage 2	-	-	-	-	750	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1002	-	174	524
Stage 1	-	-	-	-	568	-
Stage 2	-	-	-	-	467	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1002	-	151	524
Mov Cap-2 Maneuver	-	-	-	-	151	-
Stage 1	-	-	-	-	568	-
Stage 2	-	-	-	-	406	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	25.4
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	296	-	-	1002	-
HCM Lane V/C Ratio	0.411	-	-	0.089	-
HCM Control Delay (s)	25.4	-	-	8.9	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	1.9	-	-	0.3	-

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	0	26	58	168	22	4	40	6	243	4	8	1
Future Vol, veh/h	0	26	58	168	22	4	40	6	243	4	8	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	28	63	183	24	4	43	7	264	4	9	1
Number of Lanes	0	1	0	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	8.2	10	9.7	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	0%	0%	87%	31%
Vol Thru, %	0%	2%	31%	11%	62%
Vol Right, %	0%	98%	69%	2%	8%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	40	249	84	194	13
LT Vol	40	0	0	168	4
Through Vol	0	6	26	22	8
RT Vol	0	243	58	4	1
Lane Flow Rate	43	271	91	211	14
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.07	0.346	0.116	0.291	0.02
Departure Headway (Hd)	5.789	4.598	4.554	4.962	5.17
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	618	779	782	721	688
Service Time	3.533	2.341	2.607	3.007	3.236
HCM Lane V/C Ratio	0.07	0.348	0.116	0.293	0.02
HCM Control Delay	9	9.8	8.2	10	8.3
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.2	1.5	0.4	1.2	0.1

Intersection	
Int Delay, s/veh	21.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	374	243	260	101	100	385
Future Vol, veh/h	374	243	260	101	100	385
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	140	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	407	264	283	110	109	418

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	283	0	-	0	1416	338
Stage 1	-	-	-	-	338	-
Stage 2	-	-	-	-	1078	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1279	-	-	-	151	704
Stage 1	-	-	-	-	722	-
Stage 2	-	-	-	-	327	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1279	-	-	-	~ 95	704
Mov Cap-2 Maneuver	-	-	-	-	~ 95	-
Stage 1	-	-	-	-	453	-
Stage 2	-	-	-	-	327	-

Approach	EB	WB	SB
HCM Control Delay, s	5.5	0	58.8
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1279	-	-	-	95	704
HCM Lane V/C Ratio	0.318	-	-	-	1.144	0.594
HCM Control Delay (s)	9.1	0	-	-	218.7	17.3
HCM Lane LOS	A	A	-	-	F	C
HCM 95th %tile Q(veh)	1.4	-	-	-	7.3	4

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

Intersection	
Intersection Delay, s/veh	55.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	359	145	0	0	115	64	38	311	53	53	0	345
Future Vol, veh/h	359	145	0	0	115	64	38	311	53	53	0	345
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	390	158	0	0	125	70	41	338	58	58	0	375
Number of Lanes	1	1	0	0	1	0	0	1	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	53.3	23	92.2	36.2
HCM LOS	F	C	F	E

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	9%	100%	0%	0%	100%	0%
Vol Thru, %	77%	0%	100%	64%	0%	0%
Vol Right, %	13%	0%	0%	36%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	402	359	145	179	53	345
LT Vol	38	359	0	0	53	0
Through Vol	311	0	145	115	0	0
RT Vol	53	0	0	64	0	345
Lane Flow Rate	437	390	158	195	58	375
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	1.063	0.965	0.368	0.512	0.146	0.826
Departure Headway (Hd)	8.76	9.286	8.766	9.983	9.504	8.254
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	419	394	413	364	380	443
Service Time	6.76	6.986	6.466	7.983	7.204	5.954
HCM Lane V/C Ratio	1.043	0.99	0.383	0.536	0.153	0.847
HCM Control Delay	92.2	68.1	16.5	23	13.8	39.6
HCM Lane LOS	F	F	C	C	B	E
HCM 95th-tile Q	14.5	11	1.7	2.8	0.5	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	149	70	406	150	26	54	373	302	49	315	32
Future Volume (veh/h)	21	149	70	406	150	26	54	373	302	49	315	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.99	1.00		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	23	162	67	441	163	25	59	405	119	53	342	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	363	280	116	617	793	122	302	673	557	94	445	40
Arrive On Green	0.22	0.22	0.22	0.22	0.50	0.50	0.36	0.36	0.36	0.36	0.36	0.36
Sat Flow, veh/h	1169	1245	515	1781	1581	242	1008	1870	1548	104	1236	112
Grp Volume(v), veh/h	23	0	229	441	0	188	59	405	119	428	0	0
Grp Sat Flow(s),veh/h/ln	1169	0	1760	1781	0	1823	1008	1870	1548	1453	0	0
Q Serve(g_s), s	1.1	0.0	8.4	12.5	0.0	4.1	0.0	12.8	3.8	7.6	0.0	0.0
Cycle Q Clear(g_c), s	1.1	0.0	8.4	12.5	0.0	4.1	7.2	12.8	3.8	20.4	0.0	0.0
Prop In Lane	1.00		0.29	1.00		0.13	1.00		1.00	0.12		0.08
Lane Grp Cap(c), veh/h	363	0	396	617	0	914	302	673	557	579	0	0
V/C Ratio(X)	0.06	0.00	0.58	0.71	0.00	0.21	0.20	0.60	0.21	0.74	0.00	0.00
Avail Cap(c_a), veh/h	602	0	756	1705	0	2400	1196	2333	1931	2047	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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.1	0.0	24.9	14.5	0.0	10.0	17.1	18.9	16.0	20.9	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	1.3	1.6	0.0	0.2	0.3	0.9	0.2	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	0.3	0.0	3.5	4.7	0.0	1.5	0.7	5.3	1.3	6.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	0.0	26.2	16.0	0.0	10.2	17.4	19.8	16.2	22.9	0.0	0.0
LnGrp LOS	C	A	C	B	A	B	B	B	B	C	A	A
Approach Vol, veh/h		252			629			583			428	
Approach Delay, s/veh		25.9			14.3			18.8			22.9	
Approach LOS		C			B			B			C	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		41.2		31.0	20.0	21.2		31.0				
Change Period (Y+Rc), s		5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s		95.0		90.0	60.0	31.0		90.0				
Max Q Clear Time (g_c+I1), s		6.1		22.4	14.5	10.4		14.8				
Green Ext Time (p_c), s		2.1		3.6	1.5	1.4		4.0				

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)	9	460	30	24	464	49	0	0	0	202	84	92
Future Volume (veh/h)	9	460	30	24	464	49	0	0	0	202	84	92
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		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	1870				1870	1870	1870
Adj Flow Rate, veh/h	10	500	30	26	504	49				220	91	82
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2				2	2	2
Cap, veh/h	22	966	58	50	954	93				254	105	95
Arrive On Green	0.01	0.55	0.55	0.03	0.57	0.57				0.26	0.26	0.26
Sat Flow, veh/h	1781	1747	105	1781	1678	163				983	406	366
Grp Volume(v), veh/h	10	0	530	26	0	553				393	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1851	1781	0	1841				1755	0	0
Q Serve(g_s), s	0.4	0.0	13.4	1.1	0.0	13.9				16.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	0.0	13.4	1.1	0.0	13.9				16.0	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.09				0.56		0.21
Lane Grp Cap(c), veh/h	22	0	1024	50	0	1047				454	0	0
V/C Ratio(X)	0.45	0.00	0.52	0.52	0.00	0.53				0.86	0.00	0.00
Avail Cap(c_a), veh/h	143	0	1024	119	0	1047				585	0	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)	0.81	0.00	0.81	0.90	0.00	0.90				1.00	0.00	0.00
Uniform Delay (d), s/veh	36.8	0.0	10.5	36.0	0.0	10.0				26.5	0.0	0.0
Incr Delay (d2), s/veh	11.0	0.0	1.5	7.5	0.0	1.7				10.5	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
%ile BackOfQ(50%),veh/ln	0.2	0.0	5.2	0.6	0.0	5.3				7.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.7	0.0	12.0	43.4	0.0	11.7				37.0	0.0	0.0
LnGrp LOS	D	A	B	D	A	B				D	A	A
Approach Vol, veh/h		540			579						393	
Approach Delay, s/veh		12.7			13.1						37.0	
Approach LOS		B			B						D	

Timer - Assigned Phs	1	2		4	5	6
Phs Duration (G+Y+Rc), s	6.1	45.5		23.4	4.9	46.6
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s	5.0	33.0		25.0	6.0	32.0
Max Q Clear Time (g_c+I1), s	3.1	15.4		18.0	2.4	15.9
Green Ext Time (p_c), s	0.0	3.3		1.4	0.0	3.3

Intersection Summary	
HCM 6th Ctrl Delay	19.2
HCM 6th LOS	B

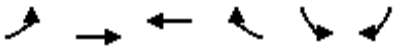
Notes

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)	142	609	0	0	534	177	28	109	56	0	0	0
Future Volume (veh/h)	142	609	0	0	534	177	28	109	56	0	0	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		1.00	1.00		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	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	154	662	0	0	580	132	30	118	2			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	661	1538	0	0	1405	1191	37	145	156			
Arrive On Green	0.04	0.82	0.00	0.00	0.75	0.75	0.10	0.10	0.10			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	375	1476	1585			
Grp Volume(v), veh/h	154	662	0	0	580	132	148	0	2			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1852	0	1585			
Q Serve(g_s), s	2.3	12.3	0.0	0.0	14.1	2.8	9.9	0.0	0.1			
Cycle Q Clear(g_c), s	2.3	12.3	0.0	0.0	14.1	2.8	9.9	0.0	0.1			
Prop In Lane	1.00		0.00	0.00		1.00	0.20		1.00			
Lane Grp Cap(c), veh/h	661	1538	0	0	1405	1191	182	0	156			
V/C Ratio(X)	0.23	0.43	0.00	0.00	0.41	0.11	0.81	0.00	0.01			
Avail Cap(c_a), veh/h	732	1538	0	0	1405	1191	367	0	314			
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	0.00	0.00	0.58	0.58	1.00	0.00	1.00			
Uniform Delay (d), s/veh	3.8	3.1	0.0	0.0	5.7	4.3	55.7	0.0	51.3			
Incr Delay (d2), s/veh	0.1	0.7	0.0	0.0	0.5	0.1	8.5	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			
%ile BackOfQ(50%),veh/ln	0.7	3.7	0.0	0.0	5.1	0.9	5.0	0.0	0.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.9	3.8	0.0	0.0	6.2	4.4	64.2	0.0	51.3			
LnGrp LOS	A	A	A	A	A	A	E	A	D			
Approach Vol, veh/h		816			712			150				
Approach Delay, s/veh		3.8			5.8			64.0				
Approach LOS		A			A			E				

Timer - Assigned Phs	1	2		4		6			
Phs Duration (G+Y+Rc), s	9.0	99.6		17.4		108.6			
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0			
Max Green Setting (Gmax), s	10.0	77.0		25.0		91.0			
Max Q Clear Time (g_c+I1), s	4.3	16.1		11.9		14.3			
Green Ext Time (p_c), s	0.1	5.0		0.6		5.5			

Intersection Summary		
HCM 6th Ctrl Delay	10.1	
HCM 6th LOS	B	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	84	570	623	315	503	137
Future Volume (veh/h)	84	570	623	315	503	137
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	91	620	677	124	547	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	273	1001	796	674	590	525
Arrive On Green	0.06	0.54	0.43	0.43	0.33	0.33
Sat Flow, veh/h	1781	1870	1870	1583	1781	1585
Grp Volume(v), veh/h	91	620	677	124	547	41
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1583	1781	1585
Q Serve(g_s), s	2.0	17.3	24.4	3.7	22.2	1.3
Cycle Q Clear(g_c), s	2.0	17.3	24.4	3.7	22.2	1.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	273	1001	796	674	590	525
V/C Ratio(X)	0.33	0.62	0.85	0.18	0.93	0.08
Avail Cap(c_a), veh/h	314	1001	796	674	618	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.8	12.1	19.4	13.4	24.2	17.2
Incr Delay (d2), s/veh	0.5	2.6	11.1	0.6	20.2	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	0.7	7.0	12.1	1.3	12.0	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.3	14.7	30.5	14.0	44.4	17.3
LnGrp LOS	B	B	C	B	D	B
Approach Vol, veh/h		711	801		588	
Approach Delay, s/veh		14.8	27.9		42.5	
Approach LOS		B	C		D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.2	36.9		29.8		45.2
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	6.0	29.0		26.0		39.0
Max Q Clear Time (g_c+I1), s	4.0	26.4		24.2		19.3
Green Ext Time (p_c), s	0.0	1.6		0.6		6.6

Intersection Summary	
HCM 6th Ctrl Delay	27.6
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	100	0	84	12	0	7	131	335	11	20	267	145
Future Vol, veh/h	100	0	84	12	0	7	131	335	11	20	267	145
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	250	-	50	50	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	109	0	91	13	0	8	142	364	12	22	290	158

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	992	994	290	1107	1140	364	448	0	0	376	0	0
Stage 1	334	334	-	648	648	-	-	-	-	-	-	-
Stage 2	658	660	-	459	492	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	225	245	749	188	201	681	1112	-	-	1182	-	-
Stage 1	680	643	-	459	466	-	-	-	-	-	-	-
Stage 2	453	460	-	582	548	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	198	209	749	147	172	681	1112	-	-	1182	-	-
Mov Cap-2 Maneuver	198	209	-	147	172	-	-	-	-	-	-	-
Stage 1	593	631	-	400	406	-	-	-	-	-	-	-
Stage 2	391	401	-	502	538	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28.3	24.3	2.4	0.4
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1112	-	-	198	749	207	1182	-	-
HCM Lane V/C Ratio	0.128	-	-	0.549	0.122	0.1	0.018	-	-
HCM Control Delay (s)	8.7	-	-	43.3	10.5	24.3	8.1	-	-
HCM Lane LOS	A	-	-	E	B	C	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	2.9	0.4	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	60	100	427	272	91
Future Vol, veh/h	54	60	100	427	272	91
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	0	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	65	109	464	296	99

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	978	296	395	0	-	0
Stage 1	296	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	278	743	1164	-	-	-
Stage 1	755	-	-	-	-	-
Stage 2	502	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	252	743	1164	-	-	-
Mov Cap-2 Maneuver	375	-	-	-	-	-
Stage 1	684	-	-	-	-	-
Stage 2	502	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.2	1.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1164	-	375	743	-	-
HCM Lane V/C Ratio	0.093	-	0.157	0.088	-	-
HCM Control Delay (s)	8.4	-	16.4	10.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.5	0.3	-	-

Intersection	
Int Delay, s/veh	32.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	4	143	72	4	3	205	548	115	15	392	68
Future Vol, veh/h	23	4	143	72	4	3	205	548	115	15	392	68
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	50	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	25	4	155	78	4	3	223	596	125	16	426	74

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1603	1662	463	1680	1637	659	500	0	0	721	0	0
Stage 1	495	495	-	1105	1105	-	-	-	-	-	-	-
Stage 2	1108	1167	-	575	532	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	85	97	599	~ 75	101	464	1064	-	-	881	-	-
Stage 1	556	546	-	256	286	-	-	-	-	-	-	-
Stage 2	255	268	-	503	526	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	67	75	599	~ 44	78	464	1064	-	-	881	-	-
Mov Cap-2 Maneuver	67	75	-	~ 44	78	-	-	-	-	-	-	-
Stage 1	439	536	-	202	226	-	-	-	-	-	-	-
Stage 2	196	212	-	363	517	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.8	$ 569.6	2.2	0.3
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1064	-	-	68	599	45	464	881	-	-
HCM Lane V/C Ratio	0.209	-	-	0.432	0.259	1.836	0.007	0.019	-	-
HCM Control Delay (s)	9.3	-	-	93.3	13.1	$ 591.6	12.8	9.2	-	-
HCM Lane LOS	A	-	-	F	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.8	-	-	1.7	1	8.4	0	0.1	-	-

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

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Future Year AM
No Imi Kala Street Extension
With Improvements

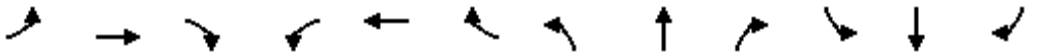
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	104	295	263	186	346	437
Future Volume (veh/h)	104	295	263	186	346	437
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	113	28	286	173	376	475
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	161	143	829	501	828	1421
Arrive On Green	0.09	0.09	1.00	1.00	0.76	0.76
Sat Flow, veh/h	1781	1585	1091	660	933	1870
Grp Volume(v), veh/h	113	28	0	459	376	475
Grp Sat Flow(s),veh/h/ln	1781	1585	0	1752	933	1870
Q Serve(g_s), s	3.7	1.0	0.0	0.0	9.7	4.9
Cycle Q Clear(g_c), s	3.7	1.0	0.0	0.0	9.7	4.9
Prop In Lane	1.00	1.00		0.38	1.00	
Lane Grp Cap(c), veh/h	161	143	0	1330	828	1421
V/C Ratio(X)	0.70	0.20	0.00	0.35	0.45	0.33
Avail Cap(c_a), veh/h	609	542	0	1330	828	1421
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.97	1.00	1.00
Uniform Delay (d), s/veh	26.5	25.3	0.0	0.0	2.9	2.3
Incr Delay (d2), s/veh	5.5	0.7	0.0	0.7	1.8	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.4	0.0	0.3	1.1	1.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.0	25.9	0.0	0.7	4.7	3.0
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	141		459			851
Approach Delay, s/veh	30.8		0.7			3.7
Approach LOS	C		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		50.1			50.1	9.9
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		30.5			30.5	20.5
Max Q Clear Time (g_c+I1), s		2.0			11.7	5.7
Green Ext Time (p_c), s		3.3			5.2	0.3

Intersection Summary	
HCM 6th Ctrl Delay	5.4
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)	126	0	115	18	0	9	51	321	3	11	501	73
Future Volume (veh/h)	126	0	115	18	0	9	51	321	3	11	501	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	137	0	12	20	0	1	55	349	2	12	545	52
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	300	0	197	314	3	10	745	1357	1150	804	1357	1150
Arrive On Green	0.12	0.00	0.12	0.12	0.00	0.12	0.73	0.73	0.73	1.00	1.00	1.00
Sat Flow, veh/h	1447	0	1585	1585	24	80	862	1870	1585	1032	1870	1585
Grp Volume(v), veh/h	137	0	12	21	0	0	55	349	2	12	545	52
Grp Sat Flow(s),veh/h/ln	1447	0	1585	1689	0	0	862	1870	1585	1032	1870	1585
Q Serve(g_s), s	4.8	0.0	0.4	0.0	0.0	0.0	1.1	3.8	0.0	0.1	0.0	0.0
Cycle Q Clear(g_c), s	5.4	0.0	0.4	0.6	0.0	0.0	1.1	3.8	0.0	3.8	0.0	0.0
Prop In Lane	1.00		1.00	0.95		0.05	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	300	0	197	327	0	0	745	1357	1150	804	1357	1150
V/C Ratio(X)	0.46	0.00	0.06	0.06	0.00	0.00	0.07	0.26	0.00	0.01	0.40	0.05
Avail Cap(c_a), veh/h	560	0	489	589	0	0	745	1357	1150	804	1357	1150
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	25.3	0.0	23.2	23.3	0.0	0.0	2.4	2.8	2.3	0.2	0.0	0.0
Incr Delay (d2), s/veh	1.1	0.0	0.1	0.1	0.0	0.0	0.2	0.5	0.0	0.0	0.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.1	0.3	0.0	0.0	0.1	0.9	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.4	0.0	23.3	23.3	0.0	0.0	2.6	3.2	2.3	0.2	0.8	0.1
LnGrp LOS	C	A	C	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		149			21			406			609	
Approach Delay, s/veh		26.1			23.3			3.1			0.7	
Approach LOS		C			C			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		48.0		12.0		48.0		12.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		32.5		18.5		32.5		18.5				
Max Q Clear Time (g_c+I1), s		5.8		7.4		5.8		2.6				
Green Ext Time (p_c), s		2.6		0.5		4.1		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			5.2									
HCM 6th LOS			A									

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	104	295	263	186	346	437
Future Volume (veh/h)	104	295	263	186	346	437
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	113	49	286	101	376	475
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	216	192	1100	932	744	1100
Arrive On Green	0.12	0.12	0.59	0.59	0.59	0.59
Sat Flow, veh/h	1781	1585	1870	1585	997	1870
Grp Volume(v), veh/h	113	49	286	101	376	475
Grp Sat Flow(s),veh/h/ln	1781	1585	1870	1585	997	1870
Q Serve(g_s), s	1.8	0.9	2.3	0.9	9.1	4.3
Cycle Q Clear(g_c), s	1.8	0.9	2.3	0.9	11.4	4.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	216	192	1100	932	744	1100
V/C Ratio(X)	0.52	0.25	0.26	0.11	0.51	0.43
Avail Cap(c_a), veh/h	1179	1049	1842	1561	1140	1842
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh	12.8	12.3	3.1	2.8	5.9	3.5
Incr Delay (d2), s/veh	2.0	0.7	0.1	0.1	0.5	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	0.7	0.3	0.3	0.1	0.9	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.7	13.0	3.2	2.9	6.4	3.8
LnGrp LOS	B	B	A	A	A	A
Approach Vol, veh/h	162		387			851
Approach Delay, s/veh	14.2		3.1			4.9
Approach LOS	B		A			A

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	22.7			22.7	8.3
Change Period (Y+Rc), s	4.5			4.5	4.5
Max Green Setting (Gmax), s	30.5			30.5	20.5
Max Q Clear Time (g_c+I1), s	4.3			13.4	3.8
Green Ext Time (p_c), s	2.1			4.8	0.4

Intersection Summary	
HCM 6th Ctrl Delay	5.5
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	8.1

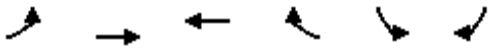
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	146	109	193	61	233	454
Future Vol, veh/h	146	109	193	61	233	454
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	159	118	210	66	253	493

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1242	243	0	0	276	0
Stage 1	243	-	-	-	-	-
Stage 2	999	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	193	796	-	-	1287	-
Stage 1	797	-	-	-	-	-
Stage 2	356	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 155	796	-	-	1287	-
Mov Cap-2 Maneuver	241	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	286	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	30	0	2.9
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	241	796	1287	-
HCM Lane V/C Ratio	-	-	0.658	0.149	0.197	-
HCM Control Delay (s)	-	-	44.7	10.3	8.5	-
HCM Lane LOS	-	-	E	B	A	-
HCM 95th %tile Q(veh)	-	-	4.1	0.5	0.7	-

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



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	387	244	235	108	42	252
Future Volume (veh/h)	387	244	235	108	42	252
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	421	265	255	95	46	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	623	338	881	328	120	107
Arrive On Green	0.68	0.68	0.68	0.68	0.07	0.07
Sat Flow, veh/h	677	499	1299	484	1781	1585
Grp Volume(v), veh/h	686	0	0	350	46	20
Grp Sat Flow(s),veh/h/ln	1176	0	0	1783	1781	1585
Q Serve(g_s), s	14.2	0.0	0.0	2.8	0.9	0.4
Cycle Q Clear(g_c), s	17.0	0.0	0.0	2.8	0.9	0.4
Prop In Lane	0.61			0.27	1.00	1.00
Lane Grp Cap(c), veh/h	961	0	0	1209	120	107
V/C Ratio(X)	0.71	0.00	0.00	0.29	0.38	0.19
Avail Cap(c_a), veh/h	1263	0	0	1641	933	830
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.0	0.0	0.0	2.3	15.8	15.6
Incr Delay (d2), s/veh	1.3	0.0	0.0	0.1	2.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.0	0.3	0.4	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.3	0.0	0.0	2.4	17.8	16.4
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		686	350		66	
Approach Delay, s/veh		6.3	2.4		17.3	
Approach LOS		A	A		B	

Timer - Assigned Phs			4		6	8
Phs Duration (G+Y+Rc), s			28.4		6.9	28.4
Change Period (Y+Rc), s			4.5		4.5	4.5
Max Green Setting (Gmax), s			32.5		18.5	32.5
Max Q Clear Time (g_c+I1), s			19.0		2.9	4.8
Green Ext Time (p_c), s			5.0		0.1	2.4

Intersection Summary		
HCM 6th Ctrl Delay	5.7	
HCM 6th LOS	A	

MOVEMENT SUMMARY

Site: 101 [Kahekili Hwy-North Project DW (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kahekili Hwy														
3	L2	51	3.0	55	3.0	0.328	10.8	LOS B	2.2	55.5	0.41	0.22	0.41	27.0
7	T1	321	2.0	338	2.0	0.328	0.9	LOS A	2.2	55.5	0.41	0.22	0.41	20.1
25	R2	3	2.0	3	2.0	0.328	0.9	LOS A	2.2	55.5	0.41	0.22	0.41	20.1
Approach		375	2.1	396	2.1	0.328	2.2	LOS A	2.2	55.5	0.41	0.22	0.41	20.9
East: WB Waiehu Aff Housing DW														
19	L2	18	2.0	19	2.0	0.032	5.2	LOS A	0.2	4.3	0.57	0.50	0.57	20.8
6	T1	1	3.0	1	3.0	0.032	6.1	LOS A	0.2	4.3	0.57	0.50	0.57	25.6
24	R2	9	2.0	9	2.0	0.032	2.4	LOS A	0.2	4.3	0.57	0.50	0.57	19.4
Approach		28	2.0	30	2.0	0.032	4.4	LOS A	0.2	4.3	0.57	0.50	0.57	20.5
North: SB Kahekili Hwy														
15	L2	11	2.0	12	2.0	0.474	3.4	LOS A	3.6	91.1	0.33	0.15	0.33	21.8
2	T1	501	2.0	527	2.0	0.474	0.6	LOS A	3.6	91.1	0.33	0.15	0.33	20.2
14	R2	73	3.0	79	3.0	0.474	4.3	LOS A	3.6	91.1	0.33	0.15	0.33	26.5
Approach		585	2.1	618	2.1	0.474	1.1	LOS A	3.6	91.1	0.33	0.15	0.33	20.9
West: EB: Waiehu MP North DW														
5	L2	126	3.0	137	3.0	0.318	13.7	LOS B	2.0	51.6	0.71	0.79	0.71	34.4
2	T1	1	3.0	1	3.0	0.318	7.6	LOS A	2.0	51.6	0.71	0.79	0.71	34.3
12	R2	115	3.0	125	3.0	0.318	7.7	LOS A	2.0	51.6	0.71	0.79	0.71	33.2
Approach		242	3.0	263	3.0	0.318	10.8	LOS B	2.0	51.6	0.71	0.79	0.71	33.8
All Vehicles		1230	2.3	1307	2.3	0.474	3.5	LOS A	3.6	91.1	0.43	0.31	0.43	22.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Kahekili Hwy-Waiehu Beach Rd (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kahekili Hwy														
7	T1	263	2.0	277	2.0	0.460	2.4	LOS A	3.3	83.7	0.66	0.46	0.66	19.4
25	R2	186	2.0	196	2.0	0.460	2.4	LOS A	3.3	83.7	0.66	0.46	0.66	19.4
Approach		449	2.0	473	2.0	0.460	2.4	LOS A	3.3	83.7	0.66	0.46	0.66	19.4
East: WB Waiehu Beach Rd														
19	L2	104	2.0	109	2.0	0.385	4.4	LOS A	2.7	67.3	0.57	0.43	0.57	20.9
24	R2	295	2.0	311	2.0	0.385	1.7	LOS A	2.7	67.3	0.57	0.43	0.57	19.5
Approach		399	2.0	420	2.0	0.385	2.4	LOS A	2.7	67.3	0.57	0.43	0.57	19.8
North: SB Kahekili Hwy														
15	L2	346	2.0	364	2.0	0.654	3.8	LOS A	6.9	174.3	0.54	0.32	0.54	20.8
2	T1	437	2.0	460	2.0	0.654	1.1	LOS A	6.9	174.3	0.54	0.32	0.54	19.3
Approach		783	2.0	824	2.0	0.654	2.3	LOS A	6.9	174.3	0.54	0.32	0.54	19.9
All Vehicles		1631	2.0	1717	2.0	0.654	2.3	LOS A	6.9	174.3	0.58	0.38	0.58	19.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX C

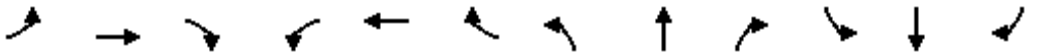
LEVEL OF SERVICE CALCULATIONS

Future Year PM
No Imi Kala Street Extension
With Improvements

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	217	345	293	195	254	200
Future Volume (veh/h)	217	345	293	195	254	200
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	236	74	318	172	276	217
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	342	304	638	345	552	1045
Arrive On Green	0.19	0.19	0.56	0.56	0.56	0.56
Sat Flow, veh/h	1781	1585	1142	618	906	1870
Grp Volume(v), veh/h	236	74	0	490	276	217
Grp Sat Flow(s),veh/h/ln	1781	1585	0	1759	906	1870
Q Serve(g_s), s	4.5	1.4	0.0	6.1	9.7	2.1
Cycle Q Clear(g_c), s	4.5	1.4	0.0	6.1	15.8	2.1
Prop In Lane	1.00	1.00		0.35	1.00	
Lane Grp Cap(c), veh/h	342	304	0	983	552	1045
V/C Ratio(X)	0.69	0.24	0.00	0.50	0.50	0.21
Avail Cap(c_a), veh/h	1012	901	0	1487	812	1581
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.6	12.4	0.0	4.9	9.7	4.0
Incr Delay (d2), s/veh	2.5	0.4	0.0	0.4	0.7	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	1.7	0.4	0.0	1.2	1.4	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.1	12.8	0.0	5.3	10.4	4.1
LnGrp LOS	B	B	A	A	B	A
Approach Vol, veh/h	310		490			493
Approach Delay, s/veh	15.3		5.3			7.6
Approach LOS	B		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		24.7			24.7	11.4
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		30.5			30.5	20.5
Max Q Clear Time (g_c+I1), s		8.1			17.8	6.5
Green Ext Time (p_c), s		3.3			2.3	0.8

Intersection Summary	
HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	0	84	12	0	7	131	335	11	20	267	145
Future Volume (veh/h)	100	0	84	12	0	7	131	335	11	20	267	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	109	0	6	13	0	1	142	364	8	22	290	107
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	265	0	159	269	4	12	887	1402	1188	822	1402	1188
Arrive On Green	0.10	0.00	0.10	0.10	0.00	0.10	0.75	0.75	0.75	0.75	0.75	0.75
Sat Flow, veh/h	1442	0	1585	1527	44	121	1089	1870	1585	1018	1870	1585
Grp Volume(v), veh/h	109	0	6	14	0	0	142	364	8	22	290	107
Grp Sat Flow(s),veh/h/ln	1442	0	1585	1691	0	0	1089	1870	1585	1018	1870	1585
Q Serve(g_s), s	4.0	0.0	0.2	0.0	0.0	0.0	2.7	3.6	0.1	0.4	2.8	1.1
Cycle Q Clear(g_c), s	4.4	0.0	0.2	0.4	0.0	0.0	5.4	3.6	0.1	4.0	2.8	1.1
Prop In Lane	1.00		1.00	0.93		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	265	0	159	285	0	0	887	1402	1188	822	1402	1188
V/C Ratio(X)	0.41	0.00	0.04	0.05	0.00	0.00	0.16	0.26	0.01	0.03	0.21	0.09
Avail Cap(c_a), veh/h	630	0	568	654	0	0	887	1402	1188	822	1402	1188
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.94	0.94	0.94
Uniform Delay (d), s/veh	26.2	0.0	24.4	24.5	0.0	0.0	3.0	2.3	1.9	3.0	2.2	2.0
Incr Delay (d2), s/veh	1.0	0.0	0.1	0.1	0.0	0.0	0.4	0.4	0.0	0.1	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.1	0.2	0.0	0.0	0.4	0.8	0.0	0.1	0.6	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.2	0.0	24.5	24.5	0.0	0.0	3.4	2.8	1.9	3.0	2.5	2.2
LnGrp LOS	C	A	C	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		115			14			514			419	
Approach Delay, s/veh		27.1			24.5			2.9			2.5	
Approach LOS		C			C			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		49.5		10.5		49.5		10.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		29.5		21.5		29.5		21.5				
Max Q Clear Time (g_c+I1), s		7.4		6.4		6.0		2.4				
Green Ext Time (p_c), s		2.9		0.4		2.2		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			5.7									
HCM 6th LOS			A									

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	217	345	293	195	254	200
Future Volume (veh/h)	217	345	293	195	254	200
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	236	97	318	76	246	258
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	368	327	895	759	620	895
Arrive On Green	0.21	0.21	0.48	0.48	0.48	0.48
Sat Flow, veh/h	1781	1585	1870	1585	990	1870
Grp Volume(v), veh/h	236	97	318	76	246	258
Grp Sat Flow(s),veh/h/ln	1781	1585	1870	1585	990	1870
Q Serve(g_s), s	3.5	1.5	3.1	0.8	5.9	2.4
Cycle Q Clear(g_c), s	3.5	1.5	3.1	0.8	9.0	2.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	368	327	895	759	620	895
V/C Ratio(X)	0.64	0.30	0.36	0.10	0.40	0.29
Avail Cap(c_a), veh/h	1278	1137	1996	1692	1203	1996
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh	10.4	9.6	4.7	4.1	7.5	4.5
Incr Delay (d2), s/veh	1.9	0.5	0.2	0.1	0.4	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	1.1	0.4	0.5	0.1	0.8	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.2	10.1	4.9	4.1	7.9	4.7
LnGrp LOS	B	B	A	A	A	A
Approach Vol, veh/h	333		394			504
Approach Delay, s/veh	11.6		4.8			6.3
Approach LOS	B		A			A

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	18.2			18.2	10.4
Change Period (Y+Rc), s	4.5			4.5	4.5
Max Green Setting (Gmax), s	30.5			30.5	20.5
Max Q Clear Time (g_c+I1), s	5.1			11.0	5.5
Green Ext Time (p_c), s	2.2			2.7	0.9

Intersection Summary	
HCM 6th Ctrl Delay	7.2
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

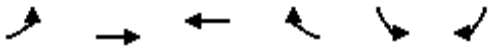
Intersection	
Int Delay, s/veh	4.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	93	187	339	183	119	212
Future Vol, veh/h	93	187	339	183	119	212
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	203	368	199	129	230

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	956	468	0	0	567	0
Stage 1	468	-	-	-	-	-
Stage 2	488	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	286	595	-	-	1005	-
Stage 1	630	-	-	-	-	-
Stage 2	617	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	249	595	-	-	1005	-
Mov Cap-2 Maneuver	377	-	-	-	-	-
Stage 1	630	-	-	-	-	-
Stage 2	538	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.5	0	3.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	377	595	1005	-
HCM Lane V/C Ratio	-	-	0.268	0.342	0.129	-
HCM Control Delay (s)	-	-	18	14.2	9.1	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	1.1	1.5	0.4	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	374	243	260	101	100	385
Future Volume (veh/h)	374	243	260	101	100	385
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	407	264	283	90	109	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	581	325	908	289	184	164
Arrive On Green	0.67	0.67	0.67	0.67	0.10	0.10
Sat Flow, veh/h	650	487	1360	433	1781	1585
Grp Volume(v), veh/h	671	0	0	373	109	44
Grp Sat Flow(s),veh/h/ln	1137	0	0	1793	1781	1585
Q Serve(g_s), s	16.6	0.0	0.0	3.4	2.3	1.0
Cycle Q Clear(g_c), s	20.1	0.0	0.0	3.4	2.3	1.0
Prop In Lane	0.61			0.24	1.00	1.00
Lane Grp Cap(c), veh/h	906	0	0	1197	184	164
V/C Ratio(X)	0.74	0.00	0.00	0.31	0.59	0.27
Avail Cap(c_a), veh/h	1103	0	0	1483	839	747
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.2	0.0	0.0	2.7	16.8	16.2
Incr Delay (d2), s/veh	2.1	0.0	0.0	0.1	3.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	0.0	0.5	1.0	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.4	0.0	0.0	2.9	19.8	17.1
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		671	373		153	
Approach Delay, s/veh		8.4	2.9		19.1	
Approach LOS		A	A		B	

Timer - Assigned Phs			4		6	8
Phs Duration (G+Y+Rc), s			30.7		8.6	30.7
Change Period (Y+Rc), s			4.5		4.5	4.5
Max Green Setting (Gmax), s			32.5		18.5	32.5
Max Q Clear Time (g_c+I1), s			22.1		4.3	5.4
Green Ext Time (p_c), s			4.1		0.3	2.6

Intersection Summary		
HCM 6th Ctrl Delay	8.0	
HCM 6th LOS	A	

MOVEMENT SUMMARY

Site: 101 [Kahekili Hwy-North Project DW (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kahekili Hwy														
3	L2	131	3.0	142	3.0	0.409	10.8	LOS B	2.9	72.7	0.40	0.29	0.40	28.0
7	T1	335	2.0	353	2.0	0.409	0.8	LOS A	2.9	72.7	0.40	0.29	0.40	20.7
25	R2	11	2.0	12	2.0	0.409	0.8	LOS A	2.9	72.7	0.40	0.29	0.40	20.7
Approach		477	2.3	507	2.3	0.409	3.6	LOS A	2.9	72.7	0.40	0.29	0.40	22.3
East: WB Waiehu Aff Housing DW														
19	L2	12	2.0	13	2.0	0.024	5.7	LOS A	0.1	3.3	0.61	0.52	0.61	20.9
6	T1	1	3.0	1	3.0	0.024	6.5	LOS A	0.1	3.3	0.61	0.52	0.61	25.7
24	R2	7	2.0	7	2.0	0.024	2.9	LOS A	0.1	3.3	0.61	0.52	0.61	19.4
Approach		20	2.1	21	2.1	0.024	4.7	LOS A	0.1	3.3	0.61	0.52	0.61	20.5
North: SB Kahekili Hwy														
15	L2	20	2.0	21	2.0	0.378	3.8	LOS A	2.5	63.3	0.42	0.30	0.42	22.8
2	T1	267	2.0	281	2.0	0.378	1.0	LOS A	2.5	63.3	0.42	0.30	0.42	21.1
14	R2	145	3.0	158	3.0	0.378	4.7	LOS A	2.5	63.3	0.42	0.30	0.42	28.1
Approach		432	2.3	460	2.3	0.378	2.4	LOS A	2.5	63.3	0.42	0.30	0.42	23.2
West: EB: Waiehu MP North DW														
5	L2	100	3.0	109	3.0	0.200	11.7	LOS B	1.2	29.7	0.52	0.66	0.52	35.3
2	T1	1	3.0	1	3.0	0.200	5.6	LOS A	1.2	29.7	0.52	0.66	0.52	35.1
12	R2	84	3.0	91	3.0	0.200	5.7	LOS A	1.2	29.7	0.52	0.66	0.52	34.0
Approach		185	3.0	201	3.0	0.200	8.9	LOS A	1.2	29.7	0.52	0.66	0.52	34.7
All Vehicles		1114	2.4	1188	2.4	0.409	4.1	LOS A	2.9	72.7	0.43	0.36	0.43	24.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Kahekili Hwy-Waiehu Beach Rd (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kahekili Hwy														
7	T1	293	2.0	308	2.0	0.463	1.8	LOS A	3.4	85.7	0.59	0.34	0.59	19.5
25	R2	195	2.0	205	2.0	0.463	1.8	LOS A	3.4	85.7	0.59	0.34	0.59	19.5
Approach		488	2.0	514	2.0	0.463	1.8	LOS A	3.4	85.7	0.59	0.34	0.59	19.5
East: WB Waiehu Beach Rd														
19	L2	217	2.0	228	2.0	0.553	5.1	LOS A	4.5	114.7	0.69	0.59	0.70	20.8
24	R2	345	2.0	363	2.0	0.553	2.4	LOS A	4.5	114.7	0.69	0.59	0.70	19.3
Approach		562	2.0	592	2.0	0.553	3.4	LOS A	4.5	114.7	0.69	0.59	0.70	19.9
North: SB Kahekili Hwy														
15	L2	254	2.0	267	2.0	0.421	4.2	LOS A	3.0	77.4	0.55	0.42	0.55	20.7
2	T1	200	2.0	211	2.0	0.421	1.4	LOS A	3.0	77.4	0.55	0.42	0.55	19.3
Approach		454	2.0	478	2.0	0.421	3.0	LOS A	3.0	77.4	0.55	0.42	0.55	20.1
All Vehicles		1504	2.0	1583	2.0	0.553	2.8	LOS A	4.5	114.7	0.61	0.46	0.62	19.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Future Year AM
With Imi Kala Street Extension
No Improvements

Intersection	
Int Delay, s/veh	75.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	99	286	271	157	206	577
Future Vol, veh/h	99	286	271	157	206	577
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	108	311	295	171	224	627

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1456	381	0	0	466	0
Stage 1	381	-	-	-	-	-
Stage 2	1075	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	143	666	-	-	1095	-
Stage 1	691	-	-	-	-	-
Stage 2	328	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 98	666	-	-	1095	-
Mov Cap-2 Maneuver	~ 98	-	-	-	-	-
Stage 1	691	-	-	-	-	-
Stage 2	225	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 306.8	0	2.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	267	1095	-
HCM Lane V/C Ratio	-	-	1.567	0.204	-
HCM Control Delay (s)	-	-	$ 306.8	9.1	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	25.2	0.8	-

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

Intersection	
Int Delay, s/veh	100.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	249	101	215	74	212	645
Future Vol, veh/h	249	101	215	74	212	645
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	250	0	-	250	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	271	110	234	80	230	701

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1395	234	0	0	314	0
Stage 1	234	-	-	-	-	-
Stage 2	1161	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 156	805	-	-	1246	-
Stage 1	805	-	-	-	-	-
Stage 2	298	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 127	805	-	-	1246	-
Mov Cap-2 Maneuver	~ 127	-	-	-	-	-
Stage 1	805	-	-	-	-	-
Stage 2	~ 243	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 423.5	0	2.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	127	805	1246	-
HCM Lane V/C Ratio	-	-	2.131	0.136	0.185	-
HCM Control Delay (s)	-	-	$ 591.1	10.2	8.5	-
HCM Lane LOS	-	-	F	B	A	-
HCM 95th %tile Q(veh)	-	-	22.5	0.5	0.7	-

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

Intersection	
Int Delay, s/veh	23.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	436	131	412	614	18
Future Vol, veh/h	13	436	131	412	614	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	100	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	474	142	448	667	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1409	677	687	0	-	0
Stage 1	677	-	-	-	-	-
Stage 2	732	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	153	~ 453	907	-	-	-
Stage 1	505	-	-	-	-	-
Stage 2	476	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	129	~ 453	907	-	-	-
Mov Cap-2 Maneuver	264	-	-	-	-	-
Stage 1	426	-	-	-	-	-
Stage 2	476	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	83.5	2.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	907	-	264	453	-	-
HCM Lane V/C Ratio	0.157	-	0.054	1.046	-	-
HCM Control Delay (s)	9.7	-	19.4	85.4	-	-
HCM Lane LOS	A	-	C	F	-	-
HCM 95th %tile Q(veh)	0.6	-	0.2	14.7	-	-

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

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	41	22	288	901	12
Future Vol, veh/h	12	41	22	288	901	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	115	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	45	24	313	979	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1347	986	992	0	-	0
Stage 1	986	-	-	-	-	-
Stage 2	361	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	167	301	697	-	-	-
Stage 1	361	-	-	-	-	-
Stage 2	705	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	161	301	697	-	-	-
Mov Cap-2 Maneuver	161	-	-	-	-	-
Stage 1	349	-	-	-	-	-
Stage 2	705	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	23.6	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	697	-	251	-	-
HCM Lane V/C Ratio	0.034	-	0.23	-	-
HCM Control Delay (s)	10.3	-	23.6	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.9	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	138	54	178	565	6
Future Vol, veh/h	5	138	54	178	565	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	150	59	193	614	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	929	618	621	0	-	0
Stage 1	618	-	-	-	-	-
Stage 2	311	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	297	489	960	-	-	-
Stage 1	538	-	-	-	-	-
Stage 2	743	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	279	489	960	-	-	-
Mov Cap-2 Maneuver	279	-	-	-	-	-
Stage 1	505	-	-	-	-	-
Stage 2	743	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.2	2.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	960	-	476	-	-
HCM Lane V/C Ratio	0.061	-	0.327	-	-
HCM Control Delay (s)	9	-	16.2	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	1.4	-	-

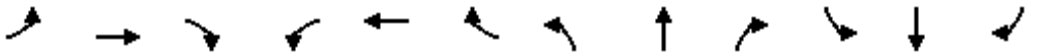
Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	0	41	59	0	8	35	229	29	5	737	8
Future Vol, veh/h	10	0	41	59	0	8	35	229	29	5	737	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	45	64	0	9	38	249	32	5	801	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1162	1173	806	1179	1161	265	810	0	0	281	0	0
Stage 1	816	816	-	341	341	-	-	-	-	-	-	-
Stage 2	346	357	-	838	820	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	172	192	382	167	195	774	816	-	-	1282	-	-
Stage 1	371	391	-	674	639	-	-	-	-	-	-	-
Stage 2	670	628	-	361	389	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	162	180	382	141	183	774	816	-	-	1282	-	-
Mov Cap-2 Maneuver	162	180	-	141	183	-	-	-	-	-	-	-
Stage 1	351	388	-	637	604	-	-	-	-	-	-	-
Stage 2	626	593	-	317	386	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.6	46.8	1.1	0.1
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	816	-	-	302	156	1282	-	-
HCM Lane V/C Ratio	0.047	-	-	0.184	0.467	0.004	-	-
HCM Control Delay (s)	9.6	0	-	19.6	46.8	7.8	0	-
HCM Lane LOS	A	A	-	C	E	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	2.2	0	-	-



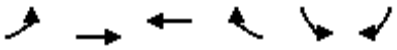
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	2	41	12	5	3	110	484	3	2	854	414
Future Volume (veh/h)	150	2	41	12	5	3	110	484	3	2	854	414
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1034	1870
Adj Flow Rate, veh/h	163	2	0	13	5	0	120	526	3	2	928	388
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	182	2	159	159	56	0	129	1476	8	713	798	1224
Arrive On Green	0.10	0.10	0.00	0.10	0.10	0.00	0.05	0.79	0.79	0.03	0.77	0.77
Sat Flow, veh/h	1424	17	1585	1248	560	0	1781	1858	11	1781	1034	1585
Grp Volume(v), veh/h	165	0	0	18	0	0	120	0	529	2	928	388
Grp Sat Flow(s),veh/h/ln	1441	0	1585	1808	0	0	1781	0	1868	1781	1034	1585
Q Serve(g_s), s	16.4	0.0	0.0	0.0	0.0	0.0	8.0	0.0	14.6	0.0	139.0	13.3
Cycle Q Clear(g_c), s	18.0	0.0	0.0	1.6	0.0	0.0	8.0	0.0	14.6	0.0	139.0	13.3
Prop In Lane	0.99		1.00	0.72		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	184	0	159	215	0	0	129	0	1484	713	798	1224
V/C Ratio(X)	0.90	0.00	0.00	0.08	0.00	0.00	0.93	0.00	0.36	0.00	1.16	0.32
Avail Cap(c_a), veh/h	184	0	159	215	0	0	129	0	1484	713	798	1224
HCM Platoon Ratio	1.00	1.00	1.00	1.00	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	1.00	1.00
Uniform Delay (d), s/veh	82.0	0.0	0.0	73.6	0.0	0.0	73.7	0.0	5.3	3.9	20.5	6.2
Incr Delay (d2), s/veh	41.4	0.0	0.0	0.2	0.0	0.0	58.0	0.0	0.1	0.0	86.8	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.9	0.0	0.0	0.8	0.0	0.0	7.7	0.0	5.5	0.0	49.0	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	123.4	0.0	0.0	73.8	0.0	0.0	131.7	0.0	5.4	3.9	107.3	6.9
LnGrp LOS	F	A	A	E	A	A	F	A	A	A	F	A
Approach Vol, veh/h		165			18			649			1318	
Approach Delay, s/veh		123.4			73.8			28.8			77.6	
Approach LOS		F			E			C			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	144.0		23.0	9.0	148.0		23.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	9.0	139.0		18.0	5.0	143.0		18.0				
Max Q Clear Time (g_c+I1), s	10.0	141.0		3.6	2.0	16.6		20.0				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	4.0		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			66.3									
HCM 6th LOS			E									

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	58	768	810	604	928	27
Future Volume (veh/h)	58	768	810	604	928	27
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	63	835	880	595	1035	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	153	2105	1096	719	1199	533
Arrive On Green	0.03	0.59	0.53	0.53	0.34	0.00
Sat Flow, veh/h	1781	3647	2149	1349	3563	1585
Grp Volume(v), veh/h	63	835	757	718	1035	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1628	1781	1585
Q Serve(g_s), s	2.4	19.3	53.5	56.9	42.0	0.0
Cycle Q Clear(g_c), s	2.4	19.3	53.5	56.9	42.0	0.0
Prop In Lane	1.00			0.83	1.00	1.00
Lane Grp Cap(c), veh/h	153	2105	947	868	1199	533
V/C Ratio(X)	0.41	0.40	0.80	0.83	0.86	0.00
Avail Cap(c_a), veh/h	186	3245	1484	1360	2030	903
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	28.2	16.8	29.3	30.1	47.9	0.0
Incr Delay (d2), s/veh	0.7	0.1	2.0	2.9	2.9	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	1.1	8.0	23.1	22.7	19.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.9	16.9	31.4	33.0	50.8	0.0
LnGrp LOS	C	B	C	C	D	A
Approach Vol, veh/h		898	1475		1035	
Approach Delay, s/veh		17.8	32.2		50.8	
Approach LOS		B	C		D	

Timer - Assigned Phs	2	3	4		8
Phs Duration (G+Y+Rc), s	58.0	9.1	87.3		96.5
Change Period (Y+Rc), s	6.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	88.0	7.0	129.0		141.0
Max Q Clear Time (g_c+I1), s	44.0	4.4	58.9		21.3
Green Ext Time (p_c), s	8.0	0.0	23.4		9.2

Intersection Summary	
HCM 6th Ctrl Delay	34.0
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	39	61	360	157	316	604
Future Vol, veh/h	39	61	360	157	316	604
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	66	391	171	343	657

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1820	477	0	0	562	0
Stage 1	477	-	-	-	-	-
Stage 2	1343	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	85	588	-	-	1009	-
Stage 1	624	-	-	-	-	-
Stage 2	243	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	56	588	-	-	1009	-
Mov Cap-2 Maneuver	56	-	-	-	-	-
Stage 1	624	-	-	-	-	-
Stage 2	160	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	74.5	0	3.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	56	588	1009	-
HCM Lane V/C Ratio	-	-	0.757	0.113	0.34	-
HCM Control Delay (s)	-	-	172.4	11.9	10.4	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	3.2	0.4	1.5	-

Intersection	
Int Delay, s/veh	8.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	350	193	501	99	8	169
Future Vol, veh/h	350	193	501	99	8	169
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	380	210	545	108	9	184

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	590	0	1683	485
Stage 1	-	-	-	-	485	-
Stage 2	-	-	-	-	1198	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	985	-	104	582
Stage 1	-	-	-	-	619	-
Stage 2	-	-	-	-	286	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	985	-	43	582
Mov Cap-2 Maneuver	-	-	-	-	43	-
Stage 1	-	-	-	-	619	-
Stage 2	-	-	-	-	118	-

Approach	EB	WB	NB
HCM Control Delay, s	0	10.9	24.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	372	-	-	985	-
HCM Lane V/C Ratio	0.517	-	-	0.553	-
HCM Control Delay (s)	24.6	-	-	13.1	0
HCM Lane LOS	C	-	-	B	A
HCM 95th %tile Q(veh)	2.9	-	-	3.5	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	489	60	43	559	18	50
Future Vol, veh/h	489	60	43	559	18	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	532	65	47	608	20	54

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	597	0	1267	565
Stage 1	-	-	-	-	565	-
Stage 2	-	-	-	-	702	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	980	-	186	524
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	491	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	980	-	173	524
Mov Cap-2 Maneuver	-	-	-	-	173	-
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	456	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	18.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	341	-	-	980	-
HCM Lane V/C Ratio	0.217	-	-	0.048	-
HCM Control Delay (s)	18.5	-	-	8.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	494	39	70	597	12	100
Future Vol, veh/h	494	39	70	597	12	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	537	42	76	649	13	109

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	579	0	1359	558
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	801	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	995	-	164	529
Stage 1	-	-	-	-	573	-
Stage 2	-	-	-	-	442	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	995	-	144	529
Mov Cap-2 Maneuver	-	-	-	-	144	-
Stage 1	-	-	-	-	573	-
Stage 2	-	-	-	-	389	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	17.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	411	-	-	995	-
HCM Lane V/C Ratio	0.296	-	-	0.076	-
HCM Control Delay (s)	17.4	-	-	8.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0.2	-

Intersection	
Intersection Delay, s/veh	19.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	26	42	166	44	42	102	94	144	113	303	21
Future Vol, veh/h	13	26	42	166	44	42	102	94	144	113	303	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	28	46	180	48	46	111	102	157	123	329	23
Number of Lanes	0	1	0	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	11.3	16	13.1	27.9
HCM LOS	B	C	B	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	0%	16%	66%	26%
Vol Thru, %	0%	39%	32%	17%	69%
Vol Right, %	0%	61%	52%	17%	5%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	102	238	81	252	437
LT Vol	102	0	13	166	113
Through Vol	0	94	26	44	303
RT Vol	0	144	42	42	21
Lane Flow Rate	111	259	88	274	475
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.218	0.441	0.168	0.5	0.791
Departure Headway (Hd)	7.081	6.138	6.849	6.566	5.996
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	507	585	522	548	608
Service Time	4.83	3.887	4.915	4.614	3.996
HCM Lane V/C Ratio	0.219	0.443	0.169	0.5	0.781
HCM Control Delay	11.8	13.7	11.3	16	27.9
HCM Lane LOS	B	B	B	C	D
HCM 95th-tile Q	0.8	2.2	0.6	2.8	7.6

Intersection	
Int Delay, s/veh	12.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	373	219	194	149	67	464
Future Vol, veh/h	373	219	194	149	67	464
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	140	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	405	238	211	162	73	504

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	211	0	-	0	1340	292
Stage 1	-	-	-	-	292	-
Stage 2	-	-	-	-	1048	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1360	-	-	-	168	747
Stage 1	-	-	-	-	758	-
Stage 2	-	-	-	-	338	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1360	-	-	-	110	747
Mov Cap-2 Maneuver	-	-	-	-	110	-
Stage 1	-	-	-	-	498	-
Stage 2	-	-	-	-	338	-

Approach	EB	WB	SB
HCM Control Delay, s	5.5	0	27.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1360	-	-	-	110	747
HCM Lane V/C Ratio	0.298	-	-	-	0.662	0.675
HCM Control Delay (s)	8.8	0	-	-	86.3	19.2
HCM Lane LOS	A	A	-	-	F	C
HCM 95th %tile Q(veh)	1.3	-	-	-	3.4	5.3

Intersection	
Intersection Delay, s/veh	41.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	220	48	0	0	143	40	21	212	31	62	0	522
Future Vol, veh/h	220	48	0	0	143	40	21	212	31	62	0	522
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	239	52	0	0	155	43	23	230	34	67	0	567
Number of Lanes	1	1	0	0	1	0	0	1	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	20.5	18.6	23.4	66.4
HCM LOS	C	C	C	F

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	8%	100%	0%	0%	100%	0%
Vol Thru, %	80%	0%	100%	78%	0%	0%
Vol Right, %	12%	0%	0%	22%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	264	220	48	183	62	522
LT Vol	21	220	0	0	62	0
Through Vol	212	0	48	143	0	0
RT Vol	31	0	0	40	0	522
Lane Flow Rate	287	239	52	199	67	567
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	0.622	0.566	0.116	0.457	0.146	1.034
Departure Headway (Hd)	8.035	8.749	8.232	8.567	7.792	6.561
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	453	416	438	424	460	556
Service Time	6.035	6.449	5.932	6.567	5.537	4.305
HCM Lane V/C Ratio	0.634	0.575	0.119	0.469	0.146	1.02
HCM Control Delay	23.4	22.3	12	18.6	11.9	72.9
HCM Lane LOS	C	C	B	C	B	F
HCM 95th-tile Q	4.1	3.4	0.4	2.3	0.5	15.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	165	54	291	73	50	35	270	348	17	356	15
Future Volume (veh/h)	13	165	54	291	73	50	35	270	348	17	356	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.99	0.99		0.97	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	179	54	316	79	42	38	293	102	18	387	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	444	341	103	594	566	301	379	596	492	80	552	21
Arrive On Green	0.25	0.25	0.25	0.17	0.50	0.50	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1242	1370	413	1781	1143	608	973	1870	1543	33	1733	65
Grp Volume(v), veh/h	14	0	233	316	0	121	38	293	102	420	0	0
Grp Sat Flow(s),veh/h/ln	1242	0	1783	1781	0	1751	973	1870	1543	1832	0	0
Q Serve(g_s), s	0.5	0.0	6.1	6.3	0.0	2.0	0.0	6.8	2.6	1.0	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	6.1	6.3	0.0	2.0	2.3	6.8	2.6	10.7	0.0	0.0
Prop In Lane	1.00		0.23	1.00		0.35	1.00		1.00	0.04		0.04
Lane Grp Cap(c), veh/h	444	0	444	594	0	867	379	596	492	654	0	0
V/C Ratio(X)	0.03	0.00	0.52	0.53	0.00	0.14	0.10	0.49	0.21	0.64	0.00	0.00
Avail Cap(c_a), veh/h	851	0	1029	2278	0	3097	1698	3133	2585	3094	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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.3	0.0	17.4	10.4	0.0	7.4	13.2	14.8	13.4	16.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.0	0.7	0.0	0.1	0.1	0.7	0.2	1.2	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	0.1	0.0	2.4	2.2	0.0	0.7	0.3	2.7	0.9	4.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.3	0.0	18.4	11.2	0.0	7.5	13.4	15.5	13.6	17.3	0.0	0.0
LnGrp LOS	B	A	B	B	A	A	B	B	B	B	A	A
Approach Vol, veh/h		247			437			433			420	
Approach Delay, s/veh		18.2			10.1			14.8			17.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		31.6		22.1	13.2	18.4		22.1				
Change Period (Y+Rc), s		5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s		95.0		90.0	60.0	31.0		90.0				
Max Q Clear Time (g_c+I1), s		4.0		12.7	8.3	8.1		8.8				
Green Ext Time (p_c), s		1.4		3.5	1.0	1.5		2.9				

Intersection Summary												
HCM 6th Ctrl Delay			14.7									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	407	49	38	483	64	0	0	0	57	120	81
Future Volume (veh/h)	12	407	49	38	483	64	0	0	0	57	120	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		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	1870				1870	1870	1870
Adj Flow Rate, veh/h	13	442	48	41	525	65				62	130	63
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2				2	2	2
Cap, veh/h	28	1039	113	68	1059	131				75	158	77
Arrive On Green	0.02	0.63	0.63	0.04	0.65	0.65				0.18	0.18	0.18
Sat Flow, veh/h	1781	1658	180	1781	1632	202				430	902	437
Grp Volume(v), veh/h	13	0	490	41	0	590				255	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1838	1781	0	1834				1770	0	0
Q Serve(g_s), s	0.5	0.0	10.2	1.7	0.0	12.5				10.4	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	10.2	1.7	0.0	12.5				10.4	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.11				0.24		0.25
Lane Grp Cap(c), veh/h	28	0	1152	68	0	1190				310	0	0
V/C Ratio(X)	0.46	0.00	0.43	0.60	0.00	0.50				0.82	0.00	0.00
Avail Cap(c_a), veh/h	214	0	1152	143	0	1190				448	0	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)	0.82	0.00	0.82	0.88	0.00	0.88				1.00	0.00	0.00
Uniform Delay (d), s/veh	36.6	0.0	7.1	35.5	0.0	6.8				29.8	0.0	0.0
Incr Delay (d2), s/veh	9.3	0.0	0.9	7.3	0.0	1.3				7.9	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
%ile BackOfQ(50%),veh/ln	0.3	0.0	3.7	0.9	0.0	4.5				5.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.9	0.0	8.1	42.8	0.0	8.1				37.7	0.0	0.0
LnGrp LOS	D	A	A	D	A	A				D	A	A
Approach Vol, veh/h		503			631						255	
Approach Delay, s/veh		9.1			10.4						37.7	
Approach LOS		A			B						D	

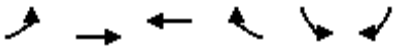
Timer - Assigned Phs	1	2		4	5	6
Phs Duration (G+Y+Rc), s	6.9	51.0		17.1	5.2	52.7
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s	6.9	38.0		19.0	9.0	35.0
Max Q Clear Time (g_c+I1), s	3.7	12.2		12.4	2.5	14.5
Green Ext Time (p_c), s	0.0	3.5		0.8	0.0	4.2

Intersection Summary		
HCM 6th Ctrl Delay		14.9
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	452	0	0	584	121	22	114	23	0	0	0
Future Volume (veh/h)	100	452	0	0	584	121	22	114	23	0	0	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		1.00	1.00		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	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	109	491	0	0	635	94	24	124	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	627	1552	0	0	1429	1211	29	149	152			
Arrive On Green	0.04	0.83	0.00	0.00	0.76	0.76	0.10	0.10	0.10			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	301	1554	1585			
Grp Volume(v), veh/h	109	491	0	0	635	94	148	0	1			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1855	0	1585			
Q Serve(g_s), s	1.6	8.2	0.0	0.0	16.4	2.0	10.6	0.0	0.1			
Cycle Q Clear(g_c), s	1.6	8.2	0.0	0.0	16.4	2.0	10.6	0.0	0.1			
Prop In Lane	1.00		0.00	0.00		1.00	0.16		1.00			
Lane Grp Cap(c), veh/h	627	1552	0	0	1429	1211	178	0	152			
V/C Ratio(X)	0.17	0.32	0.00	0.00	0.44	0.08	0.83	0.00	0.01			
Avail Cap(c_a), veh/h	668	1552	0	0	1429	1211	289	0	247			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.90	0.90	0.00	0.00	0.63	0.63	1.00	0.00	1.00			
Uniform Delay (d), s/veh	3.9	2.7	0.0	0.0	5.7	4.0	59.9	0.0	55.2			
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.0	0.6	0.1	10.3	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			
%ile BackOfQ(50%),veh/ln	0.5	2.7	0.0	0.0	6.2	0.6	5.5	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.0	3.1	0.0	0.0	6.3	4.1	70.2	0.0	55.2			
LnGrp LOS	A	A	A	A	A	A	E	A	E			
Approach Vol, veh/h		600			729			149				
Approach Delay, s/veh		3.3			6.0			70.1				
Approach LOS		A			A			E				

Timer - Assigned Phs	1	2		4		6			
Phs Duration (G+Y+Rc), s	8.9	108.1		18.0		117.0			
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0			
Max Green Setting (Gmax), s	8.0	92.0		21.0		104.0			
Max Q Clear Time (g_c+I1), s	3.6	18.4		12.6		10.2			
Green Ext Time (p_c), s	0.0	5.9		0.4		3.9			

Intersection Summary		
HCM 6th Ctrl Delay	11.4	
HCM 6th LOS	B	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	63	396	601	262	672	86
Future Volume (veh/h)	63	396	601	262	672	86
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	68	430	653	170	730	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	228	955	845	716	753	670
Arrive On Green	0.03	0.51	0.45	0.45	0.42	0.42
Sat Flow, veh/h	1781	1870	1870	1583	1781	1585
Grp Volume(v), veh/h	68	430	653	170	730	58
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1583	1781	1585
Q Serve(g_s), s	3.0	21.9	44.1	9.9	60.1	3.3
Cycle Q Clear(g_c), s	3.0	21.9	44.1	9.9	60.1	3.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	228	955	845	716	753	670
V/C Ratio(X)	0.30	0.45	0.77	0.24	0.97	0.09
Avail Cap(c_a), veh/h	326	955	845	716	772	687
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.5	23.3	34.6	25.2	42.3	25.9
Incr Delay (d2), s/veh	0.5	1.5	6.8	0.8	24.8	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	1.3	10.3	21.8	4.0	31.6	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.0	24.8	41.4	26.0	67.1	26.0
LnGrp LOS	C	C	D	C	E	C
Approach Vol, veh/h		498	823		788	
Approach Delay, s/veh		25.3	38.2		64.1	
Approach LOS		C	D		E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.8	72.8		68.4		81.6
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	13.8	58.0		65.0		75.0
Max Q Clear Time (g_c+I1), s	5.0	46.1		62.1		23.9
Green Ext Time (p_c), s	0.1	6.1		1.3		5.7

Intersection Summary	
HCM 6th Ctrl Delay	44.8
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	144	183	0	428	572
Future Vol, veh/h	0	144	183	0	428	572
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	250	0	-	250	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	157	199	0	465	622

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1751	199	0	0	199	0
Stage 1	199	-	-	-	-	-
Stage 2	1552	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	94	842	-	-	1373	-
Stage 1	835	-	-	-	-	-
Stage 2	192	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	62	842	-	-	1373	-
Mov Cap-2 Maneuver	62	-	-	-	-	-
Stage 1	835	-	-	-	-	-
Stage 2	127	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	3.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	842	1373	-
HCM Lane V/C Ratio	-	-	-	0.186	0.339	-
HCM Control Delay (s)	-	-	0	10.2	9	-
HCM Lane LOS	-	-	A	B	A	-
HCM 95th %tile Q(veh)	-	-	-	0.7	1.5	-

Intersection	
Int Delay, s/veh	9.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	109	0	132	18	0	9	54	318	3	11	639	70
Future Vol, veh/h	109	0	132	18	0	9	54	318	3	11	639	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	250	-	50	50	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	118	0	143	20	0	10	59	346	3	12	695	76

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1190	1186	695	1293	1259	346	771	0	0	349	0	0
Stage 1	719	719	-	464	464	-	-	-	-	-	-	-
Stage 2	471	467	-	829	795	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	165	189	442	140	171	697	844	-	-	1210	-	-
Stage 1	420	433	-	578	564	-	-	-	-	-	-	-
Stage 2	573	562	-	365	399	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	153	174	442	89	157	697	844	-	-	1210	-	-
Mov Cap-2 Maneuver	153	174	-	89	157	-	-	-	-	-	-	-
Stage 1	391	429	-	538	525	-	-	-	-	-	-	-
Stage 2	525	523	-	244	395	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	46.2	42.4	1.4	0.1
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	844	-	-	153	442	125	1210	-	-
HCM Lane V/C Ratio	0.07	-	-	0.774	0.325	0.235	0.01	-	-
HCM Control Delay (s)	9.6	-	-	81.6	17	42.4	8	-	-
HCM Lane LOS	A	-	-	F	C	E	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	4.8	1.4	0.9	0	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	80	105	32	289	759	29
Future Vol, veh/h	80	105	32	289	759	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	250	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	114	35	314	825	32

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1209	825	857	0	-	0
Stage 1	825	-	-	-	-	-
Stage 2	384	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	202	372	783	-	-	-
Stage 1	430	-	-	-	-	-
Stage 2	688	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	193	372	783	-	-	-
Mov Cap-2 Maneuver	314	-	-	-	-	-
Stage 1	411	-	-	-	-	-
Stage 2	688	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.7	1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	783	-	314	372	-	-
HCM Lane V/C Ratio	0.044	-	0.277	0.307	-	-
HCM Control Delay (s)	9.8	-	20.8	18.9	-	-
HCM Lane LOS	A	-	C	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.1	1.3	-	-

Intersection	
Int Delay, s/veh	17.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	49	2	212	108	6	14	107	280	60	5	314	25
Future Vol, veh/h	49	2	212	108	6	14	107	280	60	5	314	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	2	230	117	7	15	116	304	65	5	341	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	945	966	355	1050	947	337	368	0	0	369	0	0
Stage 1	365	365	-	569	569	-	-	-	-	-	-	-
Stage 2	580	601	-	481	378	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	242	255	689	205	261	705	1191	-	-	1190	-	-
Stage 1	654	623	-	507	506	-	-	-	-	-	-	-
Stage 2	500	489	-	566	615	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	214	229	689	125	235	705	1191	-	-	1190	-	-
Mov Cap-2 Maneuver	214	229	-	125	235	-	-	-	-	-	-	-
Stage 1	591	621	-	458	457	-	-	-	-	-	-	-
Stage 2	435	442	-	374	613	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.7	123	2	0.1
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1191	-	-	215	689	128	705	1190	-	-
HCM Lane V/C Ratio	0.098	-	-	0.258	0.334	0.968	0.022	0.005	-	-
HCM Control Delay (s)	8.3	-	-	27.5	12.8	136.9	10.2	8	-	-
HCM Lane LOS	A	-	-	D	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	1	1.5	6.6	0.1	0	-	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Future Year PM
With Imi Kala Street Extension
No Improvements

Intersection	
Int Delay, s/veh	163

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	200	329	308	182	206	248
Future Vol, veh/h	200	329	308	182	206	248
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	217	358	335	198	224	270

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1152	434	0	0	533	0
Stage 1	434	-	-	-	-	-
Stage 2	718	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	219	622	-	-	1035	-
Stage 1	653	-	-	-	-	-
Stage 2	483	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 163	622	-	-	1035	-
Mov Cap-2 Maneuver	~ 163	-	-	-	-	-
Stage 1	653	-	-	-	-	-
Stage 2	360	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 450.3	0	4.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	301	1035	-
HCM Lane V/C Ratio	-	-	1.91	0.216	-
HCM Control Delay (s)	-	-	$ 450.3	9.4	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	39.7	0.8	-

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

Intersection	
Int Delay, s/veh	5.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	115	163	397	222	113	278
Future Vol, veh/h	115	163	397	222	113	278
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	250	0	-	250	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	177	432	241	123	302

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	980	432	0	0	673	0
Stage 1	432	-	-	-	-	-
Stage 2	548	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	277	624	-	-	918	-
Stage 1	655	-	-	-	-	-
Stage 2	579	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	240	624	-	-	918	-
Mov Cap-2 Maneuver	240	-	-	-	-	-
Stage 1	655	-	-	-	-	-
Stage 2	501	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.2	0	2.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	240	624	918	-
HCM Lane V/C Ratio	-	-	0.521	0.284	0.134	-
HCM Control Delay (s)	-	-	35.2	13	9.5	-
HCM Lane LOS	-	-	E	B	A	-
HCM 95th %tile Q(veh)	-	-	2.7	1.2	0.5	-

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	273	418	858	558	25
Future Vol, veh/h	24	273	418	858	558	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	100	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	297	454	933	607	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2462	621	634	0	-	0
Stage 1	621	-	-	-	-	-
Stage 2	1841	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	34	487	949	-	-	-
Stage 1	536	-	-	-	-	-
Stage 2	138	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 18	487	949	-	-	-
Mov Cap-2 Maneuver	92	-	-	-	-	-
Stage 1	280	-	-	-	-	-
Stage 2	138	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	26.2	4	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	949	-	92	487	-	-
HCM Lane V/C Ratio	0.479	-	0.284	0.609	-	-
HCM Control Delay (s)	12.2	-	58.9	23.3	-	-
HCM Lane LOS	B	-	F	C	-	-
HCM 95th %tile Q(veh)	2.6	-	1.1	4	-	-

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

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	18	27	44	621	389	14
Future Vol, veh/h	18	27	44	621	389	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	115	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	29	48	675	423	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1202	431	438	0	-	0
Stage 1	431	-	-	-	-	-
Stage 2	771	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	204	624	1122	-	-	-
Stage 1	655	-	-	-	-	-
Stage 2	456	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	195	624	1122	-	-	-
Mov Cap-2 Maneuver	195	-	-	-	-	-
Stage 1	627	-	-	-	-	-
Stage 2	456	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.7	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1122	-	332	-	-
HCM Lane V/C Ratio	0.043	-	0.147	-	-
HCM Control Delay (s)	8.4	-	17.7	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	70	113	347	247	8
Future Vol, veh/h	5	70	113	347	247	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	76	123	377	268	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	896	273	277	0	-	0
Stage 1	273	-	-	-	-	-
Stage 2	623	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	311	766	1286	-	-	-
Stage 1	773	-	-	-	-	-
Stage 2	535	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	281	766	1286	-	-	-
Mov Cap-2 Maneuver	281	-	-	-	-	-
Stage 1	699	-	-	-	-	-
Stage 2	535	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1286	-	687	-	-
HCM Lane V/C Ratio	0.096	-	0.119	-	-
HCM Control Delay (s)	8.1	-	10.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.4	-	-

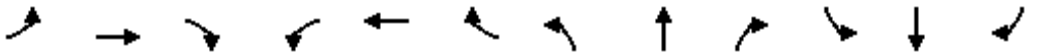
Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	1	48	48	1	2	46	443	78	6	277	6
Future Vol, veh/h	6	1	48	48	1	2	46	443	78	6	277	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	1	52	52	1	2	50	482	85	7	301	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	945	986	305	970	947	525	308	0	0	567	0	0
Stage 1	319	319	-	625	625	-	-	-	-	-	-	-
Stage 2	626	667	-	345	322	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	242	248	735	233	261	552	1253	-	-	1005	-	-
Stage 1	693	653	-	473	477	-	-	-	-	-	-	-
Stage 2	472	457	-	671	651	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	228	231	735	205	244	552	1253	-	-	1005	-	-
Mov Cap-2 Maneuver	228	231	-	205	244	-	-	-	-	-	-	-
Stage 1	652	648	-	445	449	-	-	-	-	-	-	-
Stage 2	441	430	-	617	646	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12	28	0.6	0.2
HCM LOS	B	D		

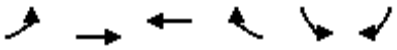
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1253	-	-	573	211	1005	-	-
HCM Lane V/C Ratio	0.04	-	-	0.104	0.263	0.006	-	-
HCM Control Delay (s)	8	0	-	12	28	8.6	0	-
HCM Lane LOS	A	A	-	B	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	1	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	458	2	55	4	3	1	104	935	7	0	578	241
Future Volume (veh/h)	458	2	55	4	3	1	104	935	7	0	578	241
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	498	2	32	4	3	0	113	1016	8	0	628	203
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	565	2	586	406	295	0	319	1055	8	70	941	797
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.00	0.04	0.57	0.57	0.00	0.50	0.50
Sat Flow, veh/h	1410	6	1583	1003	799	0	1781	1853	15	1781	1870	1585
Grp Volume(v), veh/h	500	0	32	7	0	0	113	0	1024	0	628	203
Grp Sat Flow(s),veh/h/ln	1416	0	1583	1802	0	0	1781	0	1868	1781	1870	1585
Q Serve(g_s), s	56.1	0.0	2.1	0.0	0.0	0.0	4.9	0.0	85.9	0.0	41.3	12.0
Cycle Q Clear(g_c), s	56.5	0.0	2.1	0.4	0.0	0.0	4.9	0.0	85.9	0.0	41.3	12.0
Prop In Lane	1.00		1.00	0.57		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	567	0	586	701	0	0	319	0	1063	70	941	797
V/C Ratio(X)	0.88	0.00	0.05	0.01	0.00	0.00	0.35	0.00	0.96	0.00	0.67	0.25
Avail Cap(c_a), veh/h	586	0	607	722	0	0	320	0	1114	124	1093	926
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	0.0	33.3	32.7	0.0	0.0	23.9	0.0	33.7	0.0	30.6	23.3
Incr Delay (d2), s/veh	16.0	0.0	0.1	0.0	0.0	0.0	0.7	0.0	18.3	0.0	3.7	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	22.7	0.0	0.9	0.2	0.0	0.0	2.1	0.0	43.4	0.0	19.7	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.4	0.0	33.4	32.7	0.0	0.0	24.5	0.0	52.1	0.0	34.3	24.0
LnGrp LOS	E	A	C	C	A	A	C	A	D	A	C	C
Approach Vol, veh/h		532			7			1137			831	
Approach Delay, s/veh		64.4			32.7			49.4			31.8	
Approach LOS		E			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.9	87.6		65.8	0.0	98.5		65.8				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	96.0		63.0	5.0	98.0		63.0				
Max Q Clear Time (g_c+I1), s	6.9	43.3		2.4	0.0	87.9		58.5				
Green Ext Time (p_c), s	0.0	27.3		0.0	0.0	5.6		2.3				

Intersection Summary			
HCM 6th Ctrl Delay		46.7	
HCM 6th LOS		D	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	73	889	866	1068	646	21
Future Volume (veh/h)	73	889	866	1068	646	21
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	79	966	941	1060	722	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	86	2626	1238	1104	749	333
Arrive On Green	0.02	0.74	0.70	0.70	0.21	0.00
Sat Flow, veh/h	1781	3647	1870	1585	3563	1585
Grp Volume(v), veh/h	79	966	941	1060	722	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1781	1585
Q Serve(g_s), s	4.0	23.0	80.7	144.8	47.5	0.0
Cycle Q Clear(g_c), s	4.0	23.0	80.7	144.8	47.5	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	86	2626	1238	1104	749	333
V/C Ratio(X)	0.92	0.37	0.76	0.96	0.96	0.00
Avail Cap(c_a), veh/h	86	2675	1262	1126	753	335
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	71.9	11.1	23.1	32.8	92.5	0.0
Incr Delay (d2), s/veh	68.3	0.1	2.8	17.9	24.3	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	6.6	9.5	35.1	60.0	24.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	140.2	11.2	25.9	50.7	116.8	0.0
LnGrp LOS	F	B	C	D	F	A
Approach Vol, veh/h		1045	2001		722	
Approach Delay, s/veh		20.9	39.1		116.8	
Approach LOS		C	D		F	

Timer - Assigned Phs	2	3	4		8
Phs Duration (G+Y+Rc), s	55.7	10.0	170.8		180.8
Change Period (Y+Rc), s	6.0	5.0	6.0		6.0
Max Green Setting (Gmax), s	50.0	5.0	168.0		178.0
Max Q Clear Time (g_c+I1), s	49.5	6.0	146.8		25.0
Green Ext Time (p_c), s	0.2	0.0	18.0		11.5

Intersection Summary	
HCM 6th Ctrl Delay	48.9
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	5.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	44	135	690	183	176	348
Future Vol, veh/h	44	135	690	183	176	348
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	-	60	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	147	750	199	191	378

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1610	850	0	0	949	0
Stage 1	850	-	-	-	-	-
Stage 2	760	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	115	360	-	-	724	-
Stage 1	419	-	-	-	-	-
Stage 2	462	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	85	360	-	-	724	-
Mov Cap-2 Maneuver	85	-	-	-	-	-
Stage 1	419	-	-	-	-	-
Stage 2	340	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	38.9	0	3.9
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	85	360	724	-
HCM Lane V/C Ratio	-	-	0.563	0.408	0.264	-
HCM Control Delay (s)	-	-	91.8	21.7	11.7	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	2.5	1.9	1.1	-

Intersection	
Int Delay, s/veh	7.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	302	95	308	153	24	212
Future Vol, veh/h	302	95	308	153	24	212
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	328	103	335	166	26	230

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	431	0	1216	380
Stage 1	-	-	-	-	380	-
Stage 2	-	-	-	-	836	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1129	-	200	667
Stage 1	-	-	-	-	691	-
Stage 2	-	-	-	-	425	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1129	-	135	667
Mov Cap-2 Maneuver	-	-	-	-	135	-
Stage 1	-	-	-	-	691	-
Stage 2	-	-	-	-	286	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.4	21.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	476	-	-	1129	-
HCM Lane V/C Ratio	0.539	-	-	0.297	-
HCM Control Delay (s)	21.1	-	-	9.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	3.1	-	-	1.2	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	489	32	29	402	22	46
Future Vol, veh/h	489	32	29	402	22	46
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	532	35	32	437	24	50

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	567	0	1051	550
Stage 1	-	-	-	-	550	-
Stage 2	-	-	-	-	501	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1005	-	251	535
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	609	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1005	-	240	535
Mov Cap-2 Maneuver	-	-	-	-	240	-
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	583	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	16.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	383	-	-	1005	-
HCM Lane V/C Ratio	0.193	-	-	0.031	-
HCM Control Delay (s)	16.6	-	-	8.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	533	7	83	398	22	90
Future Vol, veh/h	533	7	83	398	22	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	579	8	90	433	24	98

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	587	0	1196	583
Stage 1	-	-	-	-	583	-
Stage 2	-	-	-	-	613	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	988	-	206	512
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	541	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	988	-	181	512
Mov Cap-2 Maneuver	-	-	-	-	181	-
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	476	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	19
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	377	-	-	988	-
HCM Lane V/C Ratio	0.323	-	-	0.091	-
HCM Control Delay (s)	19	-	-	9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.4	-	-	0.3	-

Intersection	
Intersection Delay, s/veh	16.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	26	30	128	22	121	36	195	229	74	95	6
Future Vol, veh/h	28	26	30	128	22	121	36	195	229	74	95	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	28	33	139	24	132	39	212	249	80	103	7
Number of Lanes	0	1	0	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	10.6	14.2	20.7	12.1
HCM LOS	B	B	C	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	0%	33%	47%	42%
Vol Thru, %	0%	46%	31%	8%	54%
Vol Right, %	0%	54%	36%	45%	3%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	36	424	84	271	175
LT Vol	36	0	28	128	74
Through Vol	0	195	26	22	95
RT Vol	0	229	30	121	6
Lane Flow Rate	39	461	91	295	190
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.071	0.72	0.16	0.477	0.322
Departure Headway (Hd)	6.513	5.623	6.324	5.833	6.099
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	548	641	562	613	586
Service Time	4.273	3.382	4.42	3.906	4.179
HCM Lane V/C Ratio	0.071	0.719	0.162	0.481	0.324
HCM Control Delay	9.8	21.6	10.6	14.2	12.1
HCM Lane LOS	A	C	B	B	B
HCM 95th-tile Q	0.2	6.1	0.6	2.6	1.4

Intersection	
Int Delay, s/veh	35.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	423	225	191	171	119	326
Future Vol, veh/h	423	225	191	171	119	326
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	-	-	-	-	140	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	460	245	208	186	129	354

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	208	0	-	0	1466	301
Stage 1	-	-	-	-	301	-
Stage 2	-	-	-	-	1165	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1363	-	-	-	141	739
Stage 1	-	-	-	-	751	-
Stage 2	-	-	-	-	297	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1363	-	-	-	~ 86	739
Mov Cap-2 Maneuver	-	-	-	-	~ 86	-
Stage 1	-	-	-	-	457	-
Stage 2	-	-	-	-	297	-

Approach	EB	WB	SB
HCM Control Delay, s	5.9	0	107.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1363	-	-	-	86	739
HCM Lane V/C Ratio	0.337	-	-	-	1.504	0.479
HCM Control Delay (s)	9	0	-	-	$ 363.2	14.3
HCM Lane LOS	A	A	-	-	F	B
HCM 95th %tile Q(veh)	1.5	-	-	-	10.2	2.6

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

Intersection	
Intersection Delay, s/veh	55.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	359	145	0	0	115	64	38	311	53	53	0	345
Future Vol, veh/h	359	145	0	0	115	64	38	311	53	53	0	345
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	390	158	0	0	125	70	41	338	58	58	0	375
Number of Lanes	1	1	0	0	1	0	0	1	0	1	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	53.3	23	92.2	36.2
HCM LOS	F	C	F	E

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	9%	100%	0%	0%	100%	0%
Vol Thru, %	77%	0%	100%	64%	0%	0%
Vol Right, %	13%	0%	0%	36%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	402	359	145	179	53	345
LT Vol	38	359	0	0	53	0
Through Vol	311	0	145	115	0	0
RT Vol	53	0	0	64	0	345
Lane Flow Rate	437	390	158	195	58	375
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	1.063	0.965	0.368	0.512	0.146	0.826
Departure Headway (Hd)	8.76	9.286	8.766	9.983	9.504	8.254
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	419	394	413	364	380	443
Service Time	6.76	6.986	6.466	7.983	7.204	5.954
HCM Lane V/C Ratio	1.043	0.99	0.383	0.536	0.153	0.847
HCM Control Delay	92.2	68.1	16.5	23	13.8	39.6
HCM Lane LOS	F	F	C	C	B	E
HCM 95th-tile Q	14.5	11	1.7	2.8	0.5	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	149	70	406	150	26	54	373	302	49	315	32
Future Volume (veh/h)	21	149	70	406	150	26	54	373	302	49	315	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.99	1.00		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	23	162	67	441	163	25	59	405	136	53	342	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	363	281	116	619	794	122	300	672	556	93	444	40
Arrive On Green	0.23	0.23	0.23	0.22	0.50	0.50	0.36	0.36	0.36	0.36	0.36	0.36
Sat Flow, veh/h	1169	1245	515	1781	1581	242	1008	1870	1548	104	1234	112
Grp Volume(v), veh/h	23	0	229	441	0	188	59	405	136	428	0	0
Grp Sat Flow(s),veh/h/ln	1169	0	1760	1781	0	1823	1008	1870	1548	1450	0	0
Q Serve(g_s), s	1.1	0.0	8.4	12.5	0.0	4.1	0.0	12.8	4.5	7.7	0.0	0.0
Cycle Q Clear(g_c), s	1.1	0.0	8.4	12.5	0.0	4.1	7.2	12.8	4.5	20.5	0.0	0.0
Prop In Lane	1.00		0.29	1.00		0.13	1.00		1.00	0.12		0.08
Lane Grp Cap(c), veh/h	363	0	397	619	0	916	300	672	556	577	0	0
V/C Ratio(X)	0.06	0.00	0.58	0.71	0.00	0.21	0.20	0.60	0.24	0.74	0.00	0.00
Avail Cap(c_a), veh/h	601	0	755	1703	0	2397	1193	2329	1927	2043	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	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.1	0.0	24.9	14.5	0.0	10.0	17.1	18.9	16.3	21.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	1.3	1.5	0.0	0.1	0.3	0.9	0.2	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	0.3	0.0	3.5	4.9	0.0	1.6	0.7	5.4	1.6	6.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	0.0	26.2	16.0	0.0	10.1	17.5	19.8	16.5	22.9	0.0	0.0
LnGrp LOS	C	A	C	B	A	B	B	B	B	C	A	A
Approach Vol, veh/h		252			629			600			428	
Approach Delay, s/veh		25.9			14.2			18.8			22.9	
Approach LOS		C			B			B			C	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		41.3		31.0	20.0	21.3		31.0				
Change Period (Y+Rc), s		5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s		95.0		90.0	60.0	31.0		90.0				
Max Q Clear Time (g_c+I1), s		6.1		22.5	14.5	10.4		14.8				
Green Ext Time (p_c), s		1.3		3.5	1.5	1.4		3.9				

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)	9	460	30	24	464	49	0	0	0	202	84	92
Future Volume (veh/h)	9	460	30	24	464	49	0	0	0	202	84	92
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		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	1870				1870	1870	1870
Adj Flow Rate, veh/h	10	500	30	26	504	49				220	91	82
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2				2	2	2
Cap, veh/h	22	965	58	50	953	93				255	105	95
Arrive On Green	0.01	0.55	0.55	0.03	0.57	0.57				0.26	0.26	0.26
Sat Flow, veh/h	1781	1747	105	1781	1678	163				983	406	366
Grp Volume(v), veh/h	10	0	530	26	0	553				393	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1851	1781	0	1841				1755	0	0
Q Serve(g_s), s	0.4	0.0	13.5	1.1	0.0	13.9				16.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	0.0	13.5	1.1	0.0	13.9				16.0	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.09				0.56		0.21
Lane Grp Cap(c), veh/h	22	0	1023	50	0	1046				455	0	0
V/C Ratio(X)	0.45	0.00	0.52	0.52	0.00	0.53				0.86	0.00	0.00
Avail Cap(c_a), veh/h	143	0	1023	119	0	1046				585	0	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)	0.81	0.00	0.81	0.90	0.00	0.90				1.00	0.00	0.00
Uniform Delay (d), s/veh	36.8	0.0	10.5	36.0	0.0	10.0				26.5	0.0	0.0
Incr Delay (d2), s/veh	11.0	0.0	1.5	7.5	0.0	1.7				10.3	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
%ile BackOfQ(50%),veh/ln	0.2	0.0	5.4	0.6	0.0	5.5				7.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.7	0.0	12.0	43.4	0.0	11.7				36.8	0.0	0.0
LnGrp LOS	D	A	B	D	A	B				D	A	A
Approach Vol, veh/h		540			579						393	
Approach Delay, s/veh		12.7			13.2						36.8	
Approach LOS		B			B						D	

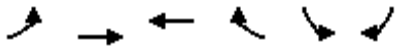
Timer - Assigned Phs	1	2		4	5	6
Phs Duration (G+Y+Rc), s	6.1	45.4		23.5	4.9	46.6
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s	5.0	33.0		25.0	6.0	32.0
Max Q Clear Time (g_c+I1), s	3.1	15.5		18.0	2.4	15.9
Green Ext Time (p_c), s	0.0	3.4		1.4	0.0	3.5

Intersection Summary		
HCM 6th Ctrl Delay		19.1
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	609	0	0	534	177	28	109	56	0	0	0
Future Volume (veh/h)	142	609	0	0	534	177	28	109	56	0	0	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		1.00	1.00		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	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	154	662	0	0	580	132	30	118	2			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	660	1538	0	0	1405	1190	37	145	156			
Arrive On Green	0.04	0.82	0.00	0.00	0.75	0.75	0.10	0.10	0.10			
Sat Flow, veh/h	1781	1870	0	0	1870	1585	375	1476	1585			
Grp Volume(v), veh/h	154	662	0	0	580	132	148	0	2			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1870	1585	1852	0	1585			
Q Serve(g_s), s	2.3	12.3	0.0	0.0	14.1	2.9	9.9	0.0	0.1			
Cycle Q Clear(g_c), s	2.3	12.3	0.0	0.0	14.1	2.9	9.9	0.0	0.1			
Prop In Lane	1.00		0.00	0.00		1.00	0.20		1.00			
Lane Grp Cap(c), veh/h	660	1538	0	0	1405	1190	182	0	156			
V/C Ratio(X)	0.23	0.43	0.00	0.00	0.41	0.11	0.81	0.00	0.01			
Avail Cap(c_a), veh/h	731	1538	0	0	1405	1190	367	0	314			
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	0.00	0.00	0.56	0.56	1.00	0.00	1.00			
Uniform Delay (d), s/veh	3.8	3.1	0.0	0.0	5.7	4.3	55.7	0.0	51.3			
Incr Delay (d2), s/veh	0.1	0.7	0.0	0.0	0.5	0.1	8.4	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			
%ile BackOfQ(50%),veh/ln	0.7	4.0	0.0	0.0	5.3	0.9	5.1	0.0	0.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.9	3.8	0.0	0.0	6.2	4.4	64.0	0.0	51.3			
LnGrp LOS	A	A	A	A	A	A	E	A	D			
Approach Vol, veh/h		816			712			150				
Approach Delay, s/veh		3.8			5.8			63.9				
Approach LOS		A			A			E				

Timer - Assigned Phs	1	2		4		6			
Phs Duration (G+Y+Rc), s	9.0	99.6		17.4		108.6			
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0			
Max Green Setting (Gmax), s	10.0	77.0		25.0		91.0			
Max Q Clear Time (g_c+I1), s	4.3	16.1		11.9		14.3			
Green Ext Time (p_c), s	0.1	5.3		0.6		5.9			

Intersection Summary		
HCM 6th Ctrl Delay	10.1	
HCM 6th LOS	B	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	84	570	623	334	534	137
Future Volume (veh/h)	84	570	623	334	534	137
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	91	620	677	128	580	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	257	977	771	652	614	546
Arrive On Green	0.06	0.52	0.41	0.41	0.34	0.34
Sat Flow, veh/h	1781	1870	1870	1583	1781	1585
Grp Volume(v), veh/h	91	620	677	128	580	42
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1583	1781	1585
Q Serve(g_s), s	2.0	17.8	25.0	3.9	23.7	1.3
Cycle Q Clear(g_c), s	2.0	17.8	25.0	3.9	23.7	1.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	257	977	771	652	614	546
V/C Ratio(X)	0.35	0.63	0.88	0.20	0.95	0.08
Avail Cap(c_a), veh/h	298	977	771	652	618	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.6	12.8	20.3	14.1	23.9	16.5
Incr Delay (d2), s/veh	0.6	2.9	13.5	0.7	23.6	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	0.8	7.5	13.0	1.5	13.5	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.1	15.7	33.8	14.8	47.5	16.6
LnGrp LOS	B	B	C	B	D	B
Approach Vol, veh/h		711	805		622	
Approach Delay, s/veh		15.7	30.8		45.4	
Approach LOS		B	C		D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.2	35.9		30.8		44.2
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	6.0	29.0		26.0		39.0
Max Q Clear Time (g_c+I1), s	4.0	27.0		25.7		19.8
Green Ext Time (p_c), s	0.0	1.3		0.1		6.7

Intersection Summary	
HCM 6th Ctrl Delay	30.0
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	6.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	339	353	0	161	255
Future Vol, veh/h	0	339	353	0	161	255
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	250	0	-	250	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	368	384	0	175	277

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1011	384	0	0	384	0
Stage 1	384	-	-	-	-	-
Stage 2	627	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	265	664	-	-	1174	-
Stage 1	688	-	-	-	-	-
Stage 2	532	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	226	664	-	-	1174	-
Mov Cap-2 Maneuver	226	-	-	-	-	-
Stage 1	688	-	-	-	-	-
Stage 2	453	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17	0	3.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	664	1174	-
HCM Lane V/C Ratio	-	-	-	0.555	0.149	-
HCM Control Delay (s)	-	-	0	17	8.6	-
HCM Lane LOS	-	-	A	C	A	-
HCM 95th %tile Q(veh)	-	-	-	3.4	0.5	-

Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	92	0	92	12	0	7	141	348	11	20	307	134
Future Vol, veh/h	92	0	92	12	0	7	141	348	11	20	307	134
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	250	-	50	50	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	100	0	100	13	0	8	153	378	12	22	334	146

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1072	1074	334	1185	1208	378	480	0	0	390	0	0
Stage 1	378	378	-	684	684	-	-	-	-	-	-	-
Stage 2	694	696	-	501	524	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	198	220	708	166	183	669	1082	-	-	1169	-	-
Stage 1	644	615	-	439	449	-	-	-	-	-	-	-
Stage 2	433	443	-	552	530	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	172	185	708	125	154	669	1082	-	-	1169	-	-
Mov Cap-2 Maneuver	172	185	-	125	154	-	-	-	-	-	-	-
Stage 1	553	603	-	377	386	-	-	-	-	-	-	-
Stage 2	368	381	-	465	520	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.2	27.9	2.5	0.4
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1082	-	-	172	708	178	1169	-	-
HCM Lane V/C Ratio	0.142	-	-	0.581	0.141	0.116	0.019	-	-
HCM Control Delay (s)	8.9	-	-	51.5	10.9	27.9	8.1	-	-
HCM Lane LOS	A	-	-	F	B	D	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	3.1	0.5	0.4	0.1	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	50	65	108	452	326	84
Future Vol, veh/h	50	65	108	452	326	84
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	250	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	71	117	491	354	91

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1079	354	445	0	-	0
Stage 1	354	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	242	690	1115	-	-	-
Stage 1	710	-	-	-	-	-
Stage 2	479	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	217	690	1115	-	-	-
Mov Cap-2 Maneuver	345	-	-	-	-	-
Stage 1	635	-	-	-	-	-
Stage 2	479	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.7	1.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1115	-	345	690	-	-
HCM Lane V/C Ratio	0.105	-	0.158	0.102	-	-
HCM Control Delay (s)	8.6	-	17.4	10.8	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.4	-	0.6	0.3	-	-

Intersection	
Int Delay, s/veh	24.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	4	143	72	4	3	205	515	115	15	331	68
Future Vol, veh/h	23	4	143	72	4	3	205	515	115	15	331	68
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	25	4	155	78	4	3	223	560	125	16	360	74

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1501	1560	397	1578	1535	623	434	0	0	685	0	0
Stage 1	429	429	-	1069	1069	-	-	-	-	-	-	-
Stage 2	1072	1131	-	509	466	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	100	112	652	89	116	486	1126	-	-	908	-	-
Stage 1	604	584	-	268	298	-	-	-	-	-	-	-
Stage 2	267	278	-	547	562	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	80	88	652	~ 55	91	486	1126	-	-	908	-	-
Mov Cap-2 Maneuver	80	88	-	~ 55	91	-	-	-	-	-	-	-
Stage 1	484	573	-	215	239	-	-	-	-	-	-	-
Stage 2	209	223	-	406	552	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.8	$ 393.8	2.2	0.3
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1126	-	-	81	652	56	486	908	-	-
HCM Lane V/C Ratio	0.198	-	-	0.362	0.238	1.475	0.007	0.018	-	-
HCM Control Delay (s)	9	-	-	72.8	12.2	$ 408.8	12.5	9	-	-
HCM Lane LOS	A	-	-	F	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	1.4	0.9	7.5	0	0.1	-	-

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

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Future Year AM
With Imi Kala Street Extension
With Improvements

Intersection	
Int Delay, s/veh	38.9

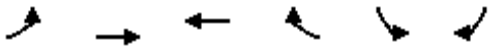
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	249	101	215	74	212	645
Future Vol, veh/h	249	101	215	74	212	645
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	250	0	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	271	110	234	80	230	701

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1435	274	0	0	314	0
Stage 1	274	-	-	-	-	-
Stage 2	1161	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 147	765	-	-	1246	-
Stage 1	772	-	-	-	-	-
Stage 2	298	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 120	765	-	-	1246	-
Mov Cap-2 Maneuver	~ 204	-	-	-	-	-
Stage 1	772	-	-	-	-	-
Stage 2	~ 243	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	161.3	0	2.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	204	765	1246	-
HCM Lane V/C Ratio	-	-	1.327	0.144	0.185	-
HCM Control Delay (s)	-	-	222.4	10.5	8.5	-
HCM Lane LOS	-	-	F	B	A	-
HCM 95th %tile Q(veh)	-	-	15.1	0.5	0.7	-

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



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	373	219	194	149	67	464
Future Volume (veh/h)	373	219	194	149	67	464
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	405	238	211	123	73	52
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	610	311	718	419	177	158
Arrive On Green	0.65	0.65	0.65	0.65	0.10	0.10
Sat Flow, veh/h	687	480	1108	646	1781	1585
Grp Volume(v), veh/h	643	0	0	334	73	52
Grp Sat Flow(s),veh/h/ln	1167	0	0	1754	1781	1585
Q Serve(g_s), s	13.5	0.0	0.0	3.0	1.4	1.1
Cycle Q Clear(g_c), s	16.5	0.0	0.0	3.0	1.4	1.1
Prop In Lane	0.63			0.37	1.00	1.00
Lane Grp Cap(c), veh/h	921	0	0	1137	177	158
V/C Ratio(X)	0.70	0.00	0.00	0.29	0.41	0.33
Avail Cap(c_a), veh/h	1249	0	0	1598	924	822
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.6	0.0	0.0	2.7	15.1	15.0
Incr Delay (d2), s/veh	1.1	0.0	0.0	0.1	1.5	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	0.0	0.4	0.6	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.7	0.0	0.0	2.9	16.6	16.2
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		643	334		125	
Approach Delay, s/veh		6.7	2.9		16.4	
Approach LOS		A	A		B	

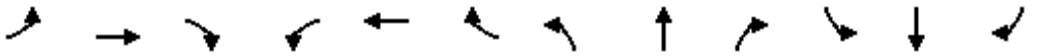
Timer - Assigned Phs		4		6	8
Phs Duration (G+Y+Rc), s		27.6		8.1	27.6
Change Period (Y+Rc), s		4.5		4.5	4.5
Max Green Setting (Gmax), s		32.5		18.5	32.5
Max Q Clear Time (g_c+I1), s		18.5		3.4	5.0
Green Ext Time (p_c), s		4.7		0.3	2.3

Intersection Summary	
HCM 6th Ctrl Delay	6.6
HCM 6th LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	99	286	271	157	206	577
Future Volume (veh/h)	99	286	271	157	206	577
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	108	25	295	114	224	627
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	155	138	980	379	684	1427
Arrive On Green	0.09	0.09	0.25	0.25	0.76	0.76
Sat Flow, veh/h	1781	1585	1285	496	977	1870
Grp Volume(v), veh/h	108	25	0	409	224	627
Grp Sat Flow(s),veh/h/ln	1781	1585	0	1781	977	1870
Q Serve(g_s), s	3.5	0.9	0.0	11.2	7.6	7.2
Cycle Q Clear(g_c), s	3.5	0.9	0.0	11.2	18.7	7.2
Prop In Lane	1.00	1.00		0.28	1.00	
Lane Grp Cap(c), veh/h	155	138	0	1359	684	1427
V/C Ratio(X)	0.70	0.18	0.00	0.30	0.33	0.44
Avail Cap(c_a), veh/h	772	687	0	1359	684	1427
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.98	1.00	1.00
Uniform Delay (d), s/veh	26.6	25.4	0.0	9.5	7.0	2.5
Incr Delay (d2), s/veh	5.5	0.6	0.0	0.6	1.3	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	1.7	0.3	0.0	5.3	1.4	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.2	26.0	0.0	10.1	8.2	3.5
LnGrp LOS	C	C	A	B	A	A
Approach Vol, veh/h	133		409			851
Approach Delay, s/veh	31.0		10.1			4.8
Approach LOS	C		B			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		50.3			50.3	9.7
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		25.0			25.0	26.0
Max Q Clear Time (g_c+I1), s		13.2			20.7	5.5
Green Ext Time (p_c), s		2.0			2.1	0.3

Intersection Summary	
HCM 6th Ctrl Delay	8.8
HCM 6th LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	109	0	132	18	0	9	54	318	3	11	639	70
Future Volume (veh/h)	109	0	132	18	0	9	54	318	3	11	639	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	118	0	11	20	0	1	59	346	2	12	695	51
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	278	0	172	288	3	9	676	1387	1175	827	1387	1175
Arrive On Green	0.11	0.00	0.11	0.11	0.00	0.11	0.74	0.74	0.74	1.00	1.00	1.00
Sat Flow, veh/h	1452	0	1585	1578	27	80	750	1870	1585	1035	1870	1585
Grp Volume(v), veh/h	118	0	11	21	0	0	59	346	2	12	695	51
Grp Sat Flow(s),veh/h/ln	1452	0	1585	1685	0	0	750	1870	1585	1035	1870	1585
Q Serve(g_s), s	4.1	0.0	0.4	0.0	0.0	0.0	1.3	3.5	0.0	0.1	0.0	0.0
Cycle Q Clear(g_c), s	4.7	0.0	0.4	0.6	0.0	0.0	1.3	3.5	0.0	3.6	0.0	0.0
Prop In Lane	1.00		1.00	0.95		0.05	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	278	0	172	300	0	0	676	1387	1175	827	1387	1175
V/C Ratio(X)	0.43	0.00	0.06	0.07	0.00	0.00	0.09	0.25	0.00	0.01	0.50	0.04
Avail Cap(c_a), veh/h	549	0	476	573	0	0	676	1387	1175	827	1387	1175
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.88	0.88	0.88
Uniform Delay (d), s/veh	25.9	0.0	24.0	24.1	0.0	0.0	2.2	2.5	2.0	0.1	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.0	0.2	0.1	0.0	0.0	0.3	0.4	0.0	0.0	1.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.1	0.3	0.0	0.0	0.1	0.8	0.0	0.0	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.9	0.0	24.2	24.2	0.0	0.0	2.4	2.9	2.0	0.2	1.1	0.1
LnGrp LOS	C	A	C	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		129			21			407			758	
Approach Delay, s/veh		26.7			24.2			2.8			1.1	
Approach LOS		C			C			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		49.0		11.0		49.0		11.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		33.0		18.0		33.0		18.0				
Max Q Clear Time (g_c+I1), s		5.5		6.7		5.6		2.6				
Green Ext Time (p_c), s		2.7		0.4		5.6		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			4.5									
HCM 6th LOS			A									

MOVEMENT SUMMARY

Site: 101 [Kahekili Hwy-North Project DW (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kahekili Hwy														
3	L2	54	3.0	59	3.0	0.324	10.7	LOS B	2.2	56.0	0.40	0.21	0.40	27.1
7	T1	318	2.0	335	2.0	0.324	0.8	LOS A	2.2	56.0	0.40	0.21	0.40	20.2
25	R2	3	2.0	3	2.0	0.324	0.8	LOS A	2.2	56.0	0.40	0.21	0.40	20.2
Approach		375	2.1	397	2.1	0.324	2.2	LOS A	2.2	56.0	0.40	0.21	0.40	21.0
East: WB Waiehu Aff Housing DW														
19	L2	18	2.0	19	2.0	0.032	5.1	LOS A	0.2	4.2	0.55	0.49	0.55	20.9
6	T1	1	3.0	1	3.0	0.032	5.9	LOS A	0.2	4.2	0.55	0.49	0.55	25.7
24	R2	9	2.0	9	2.0	0.032	2.3	LOS A	0.2	4.2	0.55	0.49	0.55	19.4
Approach		28	2.0	30	2.0	0.032	4.2	LOS A	0.2	4.2	0.55	0.49	0.55	20.5
North: SB Kahekili Hwy														
15	L2	11	2.0	12	2.0	0.585	3.5	LOS A	5.2	133.0	0.39	0.16	0.39	21.6
2	T1	639	2.0	673	2.0	0.585	0.7	LOS A	5.2	133.0	0.39	0.16	0.39	20.0
14	R2	70	3.0	76	3.0	0.585	4.5	LOS A	5.2	133.0	0.39	0.16	0.39	26.2
Approach		720	2.1	760	2.1	0.585	1.1	LOS A	5.2	133.0	0.39	0.16	0.39	20.5
West: EB: Waiehu MP North DW														
5	L2	109	3.0	118	3.0	0.370	15.2	LOS C	2.5	63.7	0.81	0.87	0.81	33.9
2	T1	1	3.0	1	3.0	0.370	9.1	LOS A	2.5	63.7	0.81	0.87	0.81	33.7
12	R2	132	3.0	143	3.0	0.370	9.2	LOS A	2.5	63.7	0.81	0.87	0.81	32.7
Approach		242	3.0	263	3.0	0.370	11.9	LOS B	2.5	63.7	0.81	0.87	0.81	33.2
All Vehicles		1365	2.3	1449	2.3	0.585	3.4	LOS A	5.2	133.0	0.47	0.31	0.47	22.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Kahekili Hwy-Waiehu Beach Rd (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kahekili Hwy														
7	T1	271	2.0	285	2.0	0.390	1.3	LOS A	2.7	67.4	0.50	0.25	0.50	19.5
25	R2	157	2.0	165	2.0	0.390	1.3	LOS A	2.7	67.4	0.50	0.25	0.50	19.5
Approach		428	2.0	451	2.0	0.390	1.3	LOS A	2.7	67.4	0.50	0.25	0.50	19.5
East: WB Waiehu Beach Rd														
19	L2	99	2.0	104	2.0	0.370	4.4	LOS A	2.4	61.7	0.55	0.43	0.55	21.0
24	R2	286	2.0	301	2.0	0.370	1.7	LOS A	2.4	61.7	0.55	0.43	0.55	19.5
Approach		385	2.0	405	2.0	0.370	2.4	LOS A	2.4	61.7	0.55	0.43	0.55	19.8
North: SB Kahekili Hwy														
15	L2	206	2.0	217	2.0	0.650	3.8	LOS A	6.8	172.8	0.53	0.26	0.53	20.9
2	T1	577	2.0	607	2.0	0.650	1.0	LOS A	6.8	172.8	0.53	0.26	0.53	19.4
Approach		783	2.0	824	2.0	0.650	1.8	LOS A	6.8	172.8	0.53	0.26	0.53	19.8
All Vehicles		1596	2.0	1680	2.0	0.650	1.8	LOS A	6.8	172.8	0.53	0.30	0.53	19.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Future Year PM
With Imi Kala Street Extension
With Improvements

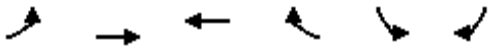
Intersection	
Int Delay, s/veh	4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	115	163	397	222	113	278
Future Vol, veh/h	115	163	397	222	113	278
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	250	0	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	177	432	241	123	302

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1101	553	0	0	673	0
Stage 1	553	-	-	-	-	-
Stage 2	548	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	235	533	-	-	918	-
Stage 1	576	-	-	-	-	-
Stage 2	579	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	204	533	-	-	918	-
Mov Cap-2 Maneuver	337	-	-	-	-	-
Stage 1	576	-	-	-	-	-
Stage 2	501	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.9	0	2.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	337	533	918	-
HCM Lane V/C Ratio	-	-	0.371	0.332	0.134	-
HCM Control Delay (s)	-	-	21.8	15.1	9.5	-
HCM Lane LOS	-	-	C	C	A	-
HCM 95th %tile Q(veh)	-	-	1.7	1.4	0.5	-



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	423	225	191	171	119	326
Future Volume (veh/h)	423	225	191	171	119	326
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	460	245	208	140	129	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	621	274	715	481	192	171
Arrive On Green	0.69	0.69	0.69	0.69	0.11	0.11
Sat Flow, veh/h	707	400	1042	702	1781	1585
Grp Volume(v), veh/h	705	0	0	348	129	38
Grp Sat Flow(s),veh/h/ln	1107	0	0	1744	1781	1585
Q Serve(g_s), s	21.9	0.0	0.0	3.4	3.0	1.0
Cycle Q Clear(g_c), s	25.3	0.0	0.0	3.4	3.0	1.0
Prop In Lane	0.65			0.40	1.00	1.00
Lane Grp Cap(c), veh/h	896	0	0	1196	192	171
V/C Ratio(X)	0.79	0.00	0.00	0.29	0.67	0.22
Avail Cap(c_a), veh/h	969	0	0	1301	756	673
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.3	0.0	0.0	2.7	18.7	17.8
Incr Delay (d2), s/veh	4.1	0.0	0.0	0.1	4.1	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	4.2	0.0	0.0	0.5	1.3	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.4	0.0	0.0	2.8	22.8	18.4
LnGrp LOS	B	A	A	A	C	B
Approach Vol, veh/h		705	348		167	
Approach Delay, s/veh		11.4	2.8		21.8	
Approach LOS		B	A		C	

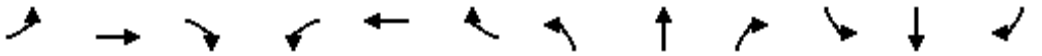
Timer - Assigned Phs	4	6	8
Phs Duration (G+Y+Rc), s	34.4	9.2	34.4
Change Period (Y+Rc), s	4.5	4.5	4.5
Max Green Setting (Gmax), s	32.5	18.5	32.5
Max Q Clear Time (g_c+I1), s	27.3	5.0	5.4
Green Ext Time (p_c), s	2.6	0.4	2.4

Intersection Summary	
HCM 6th Ctrl Delay	10.4
HCM 6th LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	200	329	308	182	206	248
Future Volume (veh/h)	200	329	308	182	206	248
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	217	54	335	119	224	270
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	285	254	909	323	766	1290
Arrive On Green	0.16	0.16	1.00	1.00	0.69	0.69
Sat Flow, veh/h	1781	1585	1318	468	937	1870
Grp Volume(v), veh/h	217	54	0	454	224	270
Grp Sat Flow(s),veh/h/ln	1781	1585	0	1786	937	1870
Q Serve(g_s), s	7.0	1.8	0.0	0.0	5.8	3.1
Cycle Q Clear(g_c), s	7.0	1.8	0.0	0.0	5.8	3.1
Prop In Lane	1.00	1.00		0.26	1.00	
Lane Grp Cap(c), veh/h	285	254	0	1232	766	1290
V/C Ratio(X)	0.76	0.21	0.00	0.37	0.29	0.21
Avail Cap(c_a), veh/h	772	687	0	1232	766	1290
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.97	1.00	1.00
Uniform Delay (d), s/veh	24.1	21.9	0.0	0.0	3.8	3.4
Incr Delay (d2), s/veh	4.2	0.4	0.0	0.8	1.0	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	3.1	0.7	0.0	0.3	0.9	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.3	22.3	0.0	0.8	4.8	3.7
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	271		454			494
Approach Delay, s/veh	27.1		0.8			4.2
Approach LOS	C		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		45.9			45.9	14.1
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		25.0			25.0	26.0
Max Q Clear Time (g_c+I1), s		2.0			7.8	9.0
Green Ext Time (p_c), s		3.0			2.6	0.7

Intersection Summary	
HCM 6th Ctrl Delay	8.0
HCM 6th LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	0	92	12	0	7	141	348	11	20	307	134
Future Volume (veh/h)	92	0	92	12	0	7	141	348	11	20	307	134
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	100	0	7	13	0	1	153	378	8	22	334	99
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	254	0	147	257	4	11	912	1417	1201	819	1417	1201
Arrive On Green	0.09	0.00	0.09	0.09	0.00	0.09	0.76	0.76	0.76	1.00	1.00	1.00
Sat Flow, veh/h	1444	0	1585	1522	47	121	1046	1870	1585	1005	1870	1585
Grp Volume(v), veh/h	100	0	7	14	0	0	153	378	8	22	334	99
Grp Sat Flow(s),veh/h/ln	1444	0	1585	1690	0	0	1046	1870	1585	1005	1870	1585
Q Serve(g_s), s	3.6	0.0	0.2	0.0	0.0	0.0	2.5	3.7	0.1	0.1	0.0	0.0
Cycle Q Clear(g_c), s	4.0	0.0	0.2	0.4	0.0	0.0	2.5	3.7	0.1	3.8	0.0	0.0
Prop In Lane	1.00		1.00	0.93		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	254	0	147	272	0	0	912	1417	1201	819	1417	1201
V/C Ratio(X)	0.39	0.00	0.05	0.05	0.00	0.00	0.17	0.27	0.01	0.03	0.24	0.08
Avail Cap(c_a), veh/h	630	0	568	652	0	0	912	1417	1201	819	1417	1201
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	26.5	0.0	24.8	24.9	0.0	0.0	2.1	2.2	1.8	0.2	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.0	0.1	0.1	0.0	0.0	0.4	0.5	0.0	0.1	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.1	0.2	0.0	0.0	0.3	0.7	0.0	0.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.5	0.0	24.9	25.0	0.0	0.0	2.5	2.7	1.8	0.2	0.4	0.1
LnGrp LOS	C	A	C	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		107			14			539			455	
Approach Delay, s/veh		27.3			25.0			2.6			0.3	
Approach LOS		C			C			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		49.9		10.1		49.9		10.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		29.5		21.5		29.5		21.5				
Max Q Clear Time (g_c+I1), s		5.7		6.0		5.8		2.4				
Green Ext Time (p_c), s		3.1		0.4		2.5		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			4.3									
HCM 6th LOS			A									

MOVEMENT SUMMARY

Site: 101 [Kahekili Hwy-North Project DW (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kahekili Hwy														
3	L2	141	3.0	153	3.0	0.426	10.7	LOS B	3.1	78.1	0.40	0.29	0.40	28.1
7	T1	348	2.0	366	2.0	0.426	0.8	LOS A	3.1	78.1	0.40	0.29	0.40	20.7
25	R2	11	2.0	12	2.0	0.426	0.8	LOS A	3.1	78.1	0.40	0.29	0.40	20.7
Approach		500	2.3	531	2.3	0.426	3.7	LOS A	3.1	78.1	0.40	0.29	0.40	22.4
East: WB Waiehu Aff Housing DW														
19	L2	12	2.0	13	2.0	0.025	5.8	LOS A	0.1	3.4	0.62	0.52	0.62	20.8
6	T1	1	3.0	1	3.0	0.025	6.6	LOS A	0.1	3.4	0.62	0.52	0.62	25.7
24	R2	7	2.0	7	2.0	0.025	3.0	LOS A	0.1	3.4	0.62	0.52	0.62	19.4
Approach		20	2.1	21	2.1	0.025	4.8	LOS A	0.1	3.4	0.62	0.52	0.62	20.5
North: SB Kahekili Hwy														
15	L2	20	2.0	21	2.0	0.407	3.9	LOS A	2.7	69.9	0.44	0.30	0.44	22.6
2	T1	307	2.0	323	2.0	0.407	1.1	LOS A	2.7	69.9	0.44	0.30	0.44	20.9
14	R2	134	3.0	146	3.0	0.407	4.8	LOS A	2.7	69.9	0.44	0.30	0.44	27.7
Approach		461	2.3	490	2.3	0.407	2.3	LOS A	2.7	69.9	0.44	0.30	0.44	22.6
West: EB: Waiehu MP North DW														
5	L2	92	3.0	100	3.0	0.208	12.0	LOS B	1.2	31.3	0.56	0.68	0.56	35.3
2	T1	1	3.0	1	3.0	0.208	5.8	LOS A	1.2	31.3	0.56	0.68	0.56	35.2
12	R2	92	3.0	100	3.0	0.208	6.0	LOS A	1.2	31.3	0.56	0.68	0.56	34.1
Approach		185	3.0	201	3.0	0.208	9.0	LOS A	1.2	31.3	0.56	0.68	0.56	34.7
All Vehicles		1166	2.4	1243	2.4	0.426	4.0	LOS A	3.1	78.1	0.45	0.36	0.45	23.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Kahekili Hwy-Waiehu Beach Rd (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Kahekili Hwy														
7	T1	308	2.0	324	2.0	0.447	1.4	LOS A	3.2	81.7	0.53	0.27	0.53	19.5
25	R2	182	2.0	192	2.0	0.447	1.4	LOS A	3.2	81.7	0.53	0.27	0.53	19.5
Approach		490	2.0	516	2.0	0.447	1.4	LOS A	3.2	81.7	0.53	0.27	0.53	19.5
East: WB Waiehu Beach Rd														
19	L2	200	2.0	211	2.0	0.525	5.0	LOS A	4.0	101.9	0.67	0.57	0.67	20.8
24	R2	329	2.0	346	2.0	0.525	2.3	LOS A	4.0	101.9	0.67	0.57	0.67	19.3
Approach		529	2.0	557	2.0	0.525	3.3	LOS A	4.0	101.9	0.67	0.57	0.67	19.9
North: SB Kahekili Hwy														
15	L2	206	2.0	217	2.0	0.415	4.0	LOS A	3.0	75.8	0.52	0.37	0.52	20.8
2	T1	248	2.0	261	2.0	0.415	1.3	LOS A	3.0	75.8	0.52	0.37	0.52	19.3
Approach		454	2.0	478	2.0	0.415	2.6	LOS A	3.0	75.8	0.52	0.37	0.52	20.0
All Vehicles		1473	2.0	1551	2.0	0.525	2.5	LOS A	4.0	101.9	0.58	0.41	0.58	19.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX D

SIGNAL WARRANT ANALYSIS

Kahekili Highway/Waiehu Beach Road
Existing Conditions

Weekday Kahekili Hwy/Waiehu Beach Road 8-Hour Signal Warra

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						aiehu Beach Ro			0			70 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			350	525	420	350	525	420			
	1						1			1			Minor Threshold			105	53	84	105	53	84			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	33	0	4	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	67	0	6	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	130	0	15	-	-	-	-	-	-	0	0	0
5:00	0	1	1	19	12	0	0	0	0	4	0	0	192	0	18	-	-	-	-	-	-	0	0	0
5:15	0	0	0	25	9	0	0	0	0	2	0	0	258	0	15	-	-	-	-	-	-	0	0	0
5:30	0	3	2	40	18	0	0	0	0	9	0	0	344	0	20	-	-	-	-	-	-	0	0	0
5:45	0	4	1	45	12	0	0	0	0	3	0	0	467	0	15	-	-	-	-	-	-	0	0	0
6:00	0	11	5	44	39	0	0	0	0	1	0	0	613	0	17	-	-	-	-	-	-	0	0	0
6:15	0	12	8	66	34	0	0	0	0	7	0	0	789	0	26	-	-	-	-	-	-	0	0	0
6:30	0	25	3	107	51	0	0	0	0	4	0	0	884	0	28	-	-	-	-	-	-	0	0	0
6:45	0	37	2	109	60	0	0	0	0	5	0	0	886	0	34	-	-	-	-	-	-	0	0	0
7:00	0	43	5	130	97	0	0	0	0	10	0	0	812	0	35	-	-	-	-	-	-	0	0	0
7:15	0	57	5	53	100	0	0	0	0	9	0	0	650	0	29	-	-	-	-	-	-	0	0	0
7:30	0	32	4	61	91	0	0	0	0	10	0	0	539	0	39	-	-	-	-	-	-	0	0	0
7:45	0	26	4	63	41	0	0	0	0	6	0	0	473	0	37	-	-	-	-	-	-	0	0	0
8:00	0	27	7	50	29	0	0	0	0	4	0	0	428	0	38	-	-	-	-	-	-	0	0	0
8:15	0	21	8	43	32	0	0	0	0	19	0	0	392	0	35	-	-	-	-	-	-	0	0	0
8:30	0	32	11	58	21	0	0	0	0	8	0	0	385	0	21	-	-	-	-	-	-	0	0	0
8:45	0	13	6	50	20	0	0	0	0	7	0	0	347	0	18	-	-	-	-	-	-	0	0	0
9:00	0	14	3	42	18	0	0	0	0	1	0	0	346	0	16	-	-	-	-	-	-	0	0	0
9:15	0	22	3	45	27	0	0	0	0	5	0	0	342	0	23	-	-	-	-	-	-	0	0	0
9:30	0	13	4	49	18	0	0	0	0	5	0	0	333	0	22	-	-	-	-	-	-	0	0	0
9:45	0	17	6	49	16	0	0	0	0	5	0	0	322	0	24	-	-	-	-	-	-	0	0	0
10:00	0	5	6	46	16	0	0	0	0	8	0	0	310	0	27	-	-	-	-	-	-	0	0	0
10:15	0	21	10	37	20	0	0	0	0	4	0	0	334	0	24	-	-	-	-	-	-	0	0	0
10:30	0	16	4	36	17	0	0	0	0	7	0	0	336	0	24	-	-	-	-	-	-	0	0	0
10:45	0	15	11	28	22	0	0	0	0	8	0	0	371	0	25	-	-	-	-	-	-	0	0	0
11:00	0	27	9	29	32	0	0	0	0	5	0	0	395	0	21	-	-	-	-	-	-	0	0	0
11:15	0	19	8	45	18	0	0	0	0	4	0	0	385	0	22	-	-	-	-	-	-	0	0	0
11:30	0	32	7	44	25	0	0	0	0	8	0	0	398	0	26	-	-	-	-	-	-	0	0	0
11:45	0	16	9	45	30	0	0	0	0	4	0	0	390	0	28	-	-	-	-	-	-	0	0	0
12:00	0	9	8	55	15	0	0	0	0	6	0	0	391	0	31	-	-	-	-	-	-	0	0	0
12:15	0	24	7	41	31	0	0	0	0	8	0	0	399	0	34	-	-	-	-	-	-	0	0	0
12:30	0	10	7	54	29	0	0	0	0	10	0	0	407	0	29	-	-	-	-	-	-	0	0	0
12:45	0	25	9	40	27	0	0	0	0	7	0	0	426	0	23	-	-	-	-	-	-	0	0	0
13:00	0	9	8	46	32	0	0	0	0	9	0	0	447	0	24	-	-	-	-	-	-	0	0	0
13:15	0	20	20	50	21	0	0	0	0	3	0	0	550	0	18	-	-	-	-	-	-	0	0	0
13:30	0	32	7	49	31	0	0	0	0	4	0	0	620	0	24	-	-	-	-	-	-	0	0	0
13:45	0	35	9	45	33	0	0	0	0	8	0	0	660	0	24	-	-	-	-	-	-	0	0	0
14:00	0	43	6	93	56	0	0	0	0	3	0	0	688	0	22	-	-	-	-	-	-	0	0	0
14:15	0	36	7	88	50	0	0	0	0	9	0	0	652	0	30	-	-	-	-	-	-	0	0	0
14:30	0	34	18	64	43	0	0	0	0	4	0	0	593	0	28	-	-	-	-	-	-	0	0	0
14:45	0	36	19	59	36	0	0	0	0	6	0	0	571	0	31	-	-	-	-	-	-	0	0	0
15:00	0	47	11	60	44	0	0	0	0	11	0	0	573	0	30	-	-	-	-	-	-	0	0	0
15:15	0	30	9	56	27	0	0	0	0	7	0	0	555	0	28	-	-	-	-	-	-	0	0	0
15:30	0	27	21	62	27	0	0	0	0	7	0	0	615	0	29	-	-	-	-	-	-	0	0	0
15:45	0	37	17	63	35	0	0	0	0	5	0	0	612	0	32	-	-	-	-	-	-	0	0	0
16:00	0	50	13	55	26	0	0	0	0	9	0	0	594	0	30	-	-	-	-	-	-	0	0	0
16:15	0	57	26	62	37	0	0	0	0	8	0	0	611	0	29	-	-	-	-	-	-	0	0	0
16:30	0	44	10	49	31	0	0	0	0	10	0	0	565	0	25	-	-	-	-	-	-	0	0	0
16:45	0	47	17	59	11	0	0	0	0	3	0	0	558	0	19	-	-	-	-	-	-	0	0	0
17:00	0	39	25	65	32	0	0	0	0	8	0	0	544	0	29	-	-	-	-	-	-	0	0	0
17:15	0	30	19	61	26	0	0	0	0	4	0	0	509	0	27	-	-	-	-	-	-	0	0	0
17:30	0	31	17	52	27	0	0	0	0	4	0	0	478	0	25	-	-	-	-	-	-	0	0	0
17:45	0	42	11	36	31	0	0	0	0	13	0	0	446	0	24	-	-	-	-	-	-	0	0	0
18:00	0	26	21	47	32	0	0	0	0	6	0	0	399	0	17	-	-	-	-	-	-	0	0	0
18:15	0	30	17	40	18	0	0	0	0	2	0	0	354	0	18	-	-	-	-	-	-	0	0	0
18:30	0	41	7	34	13	0	0	0	0	3	0	0	319	0	18	-	-	-	-	-	-	0	0	0
18:45	0	19	4	37	13	0	0	0	0	6	0	0	296	0	20	-	-	-	-	-	-	0	0	0
19:00	0	24	11	30	16	0	0	0	0	7	0	0	272	0	16	-	-	-	-	-	-	0	0	0
19:15	0	24	8	21	17	0	0	0	0	2	0	0	191	0	9	-	-	-	-	-	-	0	0	0
19:30	0	15	14	27	16	0	0	0	0	5	0	0	121	0	7	-	-	-	-	-	-	0	0	0
19:45	0	10	8	18	13	0	0	0	0	2	0	0	49	0	2	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						0	0	0
															Signal Warranted?						No		
															Notes								

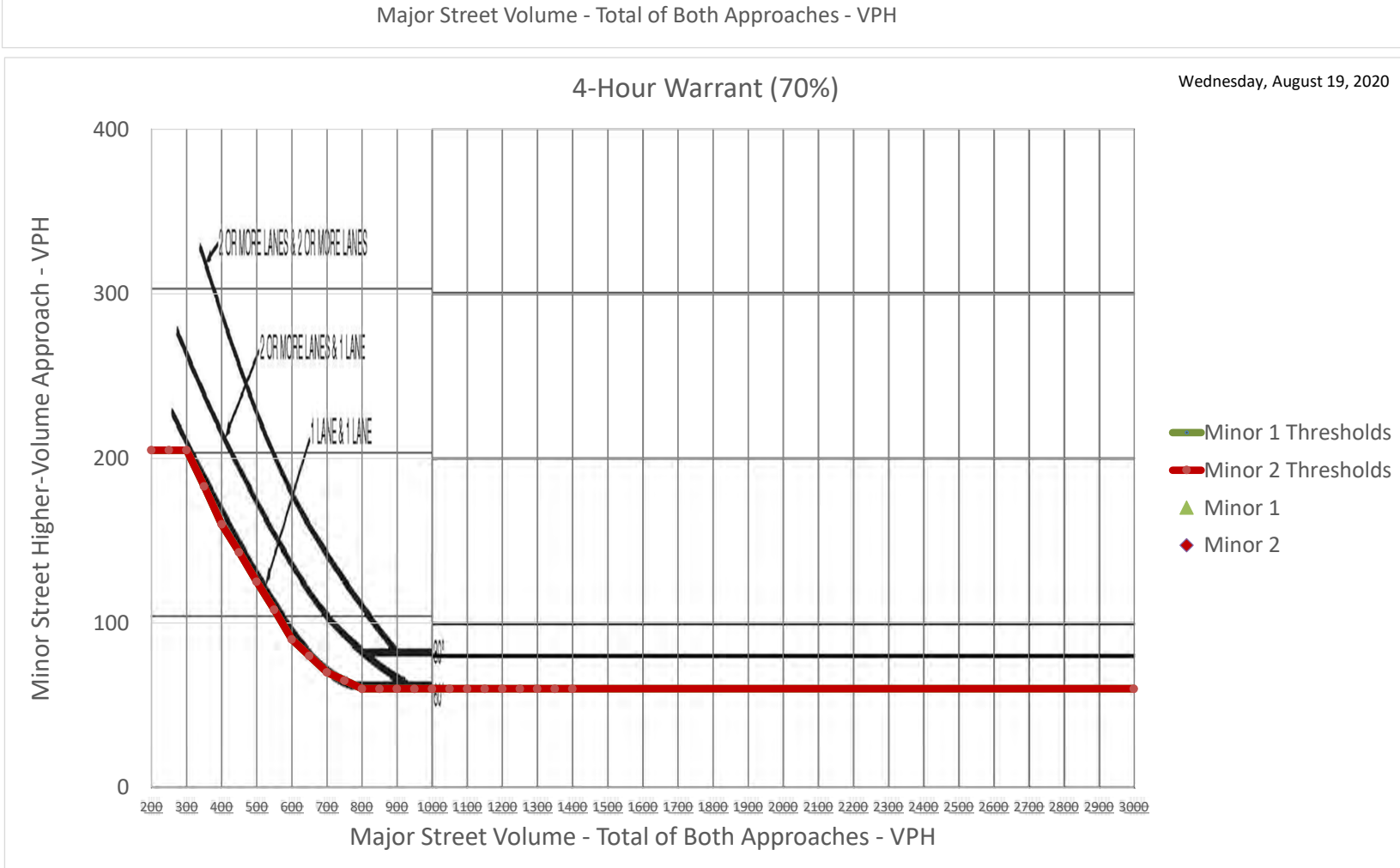
Weekday Kahekili Hwy/Waiehu Beach Road 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						aiehu Beach Ro			0			70 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction: 0%			RT Reduction: 100%												
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	33	0	4			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	67	0	6			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	130	0	15			0	0	0	0
5:00	0	1	1	19	12	0	0	0	0	4	0	0	192	0	18			0	0	0	0
5:15	0	0	0	25	9	0	0	0	0	2	0	0	258	0	15			0	0	0	0
5:30	0	3	2	40	18	0	0	0	0	9	0	0	344	0	20			0	0	0	0
5:45	0	4	1	45	12	0	0	0	0	3	0	0	467	0	15			0	0	0	0
6:00	0	11	5	44	39	0	0	0	0	1	0	0	613	0	17			0	0	0	0
6:15	0	12	8	66	34	0	0	0	0	7	0	0	789	0	26			0	0	0	0
6:30	0	25	3	107	51	0	0	0	0	4	0	0	884	0	28			0	0	0	0
6:45	0	37	2	109	60	0	0	0	0	5	0	0	886	0	34			0	0	0	0
7:00	0	43	5	130	97	0	0	0	0	10	0	0	812	0	35			0	0	0	0
7:15	0	57	5	53	100	0	0	0	0	9	0	0	650	0	29			0	0	0	0
7:30	0	32	4	61	91	0	0	0	0	10	0	0	539	0	39			0	0	0	0
7:45	0	26	4	63	41	0	0	0	0	6	0	0	473	0	37			0	0	0	0
8:00	0	27	7	50	29	0	0	0	0	4	0	0	428	0	38			0	0	0	0
8:15	0	21	8	43	32	0	0	0	0	19	0	0	392	0	35			0	0	0	0
8:30	0	32	11	58	21	0	0	0	0	8	0	0	385	0	21			0	0	0	0
8:45	0	13	6	50	20	0	0	0	0	7	0	0	347	0	18			0	0	0	0
9:00	0	14	3	42	18	0	0	0	0	1	0	0	346	0	16			0	0	0	0
9:15	0	22	3	45	27	0	0	0	0	5	0	0	342	0	23			0	0	0	0
9:30	0	13	4	49	18	0	0	0	0	5	0	0	333	0	22			0	0	0	0
9:45	0	17	6	49	16	0	0	0	0	5	0	0	322	0	24			0	0	0	0
10:00	0	5	6	46	16	0	0	0	0	8	0	0	310	0	27			0	0	0	0
10:15	0	21	10	37	20	0	0	0	0	4	0	0	334	0	24			0	0	0	0
10:30	0	16	4	36	17	0	0	0	0	7	0	0	336	0	24			0	0	0	0
10:45	0	15	11	28	22	0	0	0	0	8	0	0	371	0	25			0	0	0	0
11:00	0	27	9	29	32	0	0	0	0	5	0	0	395	0	21			0	0	0	0
11:15	0	19	8	45	18	0	0	0	0	4	0	0	385	0	22			0	0	0	0
11:30	0	32	7	44	25	0	0	0	0	8	0	0	398	0	26			0	0	0	0
11:45	0	16	9	45	30	0	0	0	0	4	0	0	390	0	28			0	0	0	0
12:00	0	9	8	55	15	0	0	0	0	6	0	0	391	0	31			0	0	0	0
12:15	0	24	7	41	31	0	0	0	0	8	0	0	399	0	34			0	0	0	0
12:30	0	10	7	54	29	0	0	0	0	10	0	0	407	0	29			0	0	0	0
12:45	0	25	9	40	27	0	0	0	0	7	0	0	426	0	23			0	0	0	0
13:00	0	9	8	46	32	0	0	0	0	9	0	0	447	0	24			0	0	0	0
13:15	0	20	20	50	21	0	0	0	0	3	0	0	550	0	18			0	0	0	0
13:30	0	32	7	49	31	0	0	0	0	4	0	0	620	0	24			0	0	0	0
13:45	0	35	9	45	33	0	0	0	0	8	0	0	660	0	24			0	0	0	0
14:00	0	43	6	93	56	0	0	0	0	3	0	0	688	0	22			0	0	0	0
14:15	0	36	7	88	50	0	0	0	0	9	0	0	652	0	30			0	0	0	0
14:30	0	34	18	64	43	0	0	0	0	4	0	0	593	0	28			0	0	0	0
14:45	0	36	19	59	36	0	0	0	0	6	0	0	571	0	31			0	0	0	0
15:00	0	47	11	60	44	0	0	0	0	11	0	0	573	0	30			0	0	0	0
15:15	0	30	9	56	27	0	0	0	0	7	0	0	555	0	28			0	0	0	0
15:30	0	27	21	62	27	0	0	0	0	7	0	0	615	0	29			0	0	0	0
15:45	0	37	17	63	35	0	0	0	0	5	0	0	612	0	32			0	0	0	0
16:00	0	50	13	55	26	0	0	0	0	9	0	0	594	0	30			0	0	0	0
16:15	0	57	26	62	37	0	0	0	0	8	0	0	611	0	29			0	0	0	0
16:30	0	44	10	49	31	0	0	0	0	10	0	0	565	0	25			0	0	0	0
16:45	0	47	17	59	11	0	0	0	0	3	0	0	558	0	19			0	0	0	0
17:00	0	39	25	65	32	0	0	0	0	8	0	0	544	0	29			0	0	0	0
17:15	0	30	19	61	26	0	0	0	0	4	0	0	509	0	27			0	0	0	0
17:30	0	31	17	52	27	0	0	0	0	4	0	0	478	0	25			0	0	0	0
17:45	0	42	11	36	31	0	0	0	0	13	0	0	446	0	24			0	0	0	0
18:00	0	26	21	47	32	0	0	0	0	6	0	0	399	0	17			0	0	0	0
18:15	0	30	17	40	18	0	0	0	0	2	0	0	354	0	18			0	0	0	0
18:30	0	41	7	34	13	0	0	0	0	3	0	0	319	0	18			0	0	0	0
18:45	0	19	4	37	13	0	0	0	0	6	0	0	296	0	20			0	0	0	0
19:00	0	24	11	30	16	0	0	0	0	7	0	0	272	0	16			0	0	0	0
19:15	0	24	8	21	17	0	0	0	0	2	0	0	191	0	9			0	0	0	0
19:30	0	15	14	27	16	0	0	0	0	5	0	0	121	0	7			0	0	0	0
19:45	0	10	8	18	13	0	0	0	0	2	0	0	49	0	2			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	0
Signal Warranted?	No


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
500
400
300
200
100
0
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000
Major Street Volume - Total of Both Approaches - VPH
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
400
300
200
100
0
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000
Major Street Volume - Total of Both Approaches - VPH
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Waiehu Beach Road 8-Hour Signal Warra

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	33	0	4	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	67	0	6	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	130	0	15	-	-	-	-	-	-	0	0	0
5:00	0	1	1	19	12	0	0	0	0	4	0	0	192	0	18	-	-	-	-	-	-	0	0	0
5:15	0	0	0	25	9	0	0	0	0	2	0	0	258	0	15	-	-	-	-	-	-	0	0	0
5:30	0	3	2	40	18	0	0	0	0	9	0	0	344	0	20	-	-	-	-	-	-	0	0	0
5:45	0	4	1	45	12	0	0	0	0	3	0	0	467	0	15	-	-	-	-	-	-	0	0	0
6:00	0	11	5	44	39	0	0	0	0	1	0	0	613	0	17	-	-	-	-	-	-	0	0	0
6:15	0	12	8	66	34	0	0	0	0	7	0	0	789	0	26	-	-	-	-	-	-	0	0	0
6:30	0	25	3	107	51	0	0	0	0	4	0	0	884	0	28	-	-	-	-	-	-	0	0	0
6:45	0	37	2	109	60	0	0	0	0	5	0	0	886	0	34	-	-	-	-	-	-	0	0	0
7:00	0	43	5	130	97	0	0	0	0	10	0	0	812	0	35	-	-	-	-	-	-	0	0	0
7:15	0	57	5	53	100	0	0	0	0	9	0	0	650	0	29	-	-	-	-	-	-	0	0	0
7:30	0	32	4	61	91	0	0	0	0	10	0	0	539	0	39	-	-	-	-	-	-	0	0	0
7:45	0	26	4	63	41	0	0	0	0	6	0	0	473	0	37	-	-	-	-	-	-	0	0	0
8:00	0	27	7	50	29	0	0	0	0	4	0	0	428	0	38	-	-	-	-	-	-	0	0	0
8:15	0	21	8	43	32	0	0	0	0	19	0	0	392	0	35	-	-	-	-	-	-	0	0	0
8:30	0	32	11	58	21	0	0	0	0	8	0	0	385	0	21	-	-	-	-	-	-	0	0	0
8:45	0	13	6	50	20	0	0	0	0	7	0	0	347	0	18	-	-	-	-	-	-	0	0	0
9:00	0	14	3	42	18	0	0	0	0	1	0	0	346	0	16	-	-	-	-	-	-	0	0	0
9:15	0	22	3	45	27	0	0	0	0	5	0	0	342	0	23	-	-	-	-	-	-	0	0	0
9:30	0	13	4	49	18	0	0	0	0	5	0	0	333	0	22	-	-	-	-	-	-	0	0	0
9:45	0	17	6	49	16	0	0	0	0	5	0	0	322	0	24	-	-	-	-	-	-	0	0	0
10:00	0	5	6	46	16	0	0	0	0	8	0	0	310	0	27	-	-	-	-	-	-	0	0	0
10:15	0	21	10	37	20	0	0	0	0	4	0	0	334	0	24	-	-	-	-	-	-	0	0	0
10:30	0	16	4	36	17	0	0	0	0	7	0	0	336	0	24	-	-	-	-	-	-	0	0	0
10:45	0	15	11	28	22	0	0	0	0	8	0	0	371	0	25	-	-	-	-	-	-	0	0	0
11:00	0	27	9	29	32	0	0	0	0	5	0	0	395	0	21	-	-	-	-	-	-	0	0	0
11:15	0	19	8	45	18	0	0	0	0	4	0	0	385	0	22	-	-	-	-	-	-	0	0	0
11:30	0	32	7	44	25	0	0	0	0	8	0	0	398	0	26	-	-	-	-	-	-	0	0	0
11:45	0	16	9	45	30	0	0	0	0	4	0	0	390	0	28	-	-	-	-	-	-	0	0	0
12:00	0	9	8	55	15	0	0	0	0	6	0	0	391	0	31	-	-	-	-	-	-	0	0	0
12:15	0	24	7	41	31	0	0	0	0	8	0	0	399	0	34	-	-	-	-	-	-	0	0	0
12:30	0	10	7	54	29	0	0	0	0	10	0	0	407	0	29	-	-	-	-	-	-	0	0	0
12:45	0	25	9	40	27	0	0	0	0	7	0	0	426	0	23	-	-	-	-	-	-	0	0	0
13:00	0	9	8	46	32	0	0	0	0	9	0	0	447	0	24	-	-	-	-	-	-	0	0	0
13:15	0	20	20	50	21	0	0	0	0	3	0	0	550	0	18	-	-	-	-	-	-	0	0	0
13:30	0	32	7	49	31	0	0	0	0	4	0	0	620	0	24	-	-	-	-	-	-	0	0	0
13:45	0	35	9	45	33	0	0	0	0	8	0	0	660	0	24	-	-	-	-	-	-	0	0	0
14:00	0	43	6	93	56	0	0	0	0	3	0	0	688	0	22	-	-	-	-	-	-	0	0	0
14:15	0	36	7	88	50	0	0	0	0	9	0	0	652	0	30	-	-	-	-	-	-	0	0	0
14:30	0	34	18	64	43	0	0	0	0	4	0	0	593	0	28	-	-	-	-	-	-	0	0	0
14:45	0	36	19	59	36	0	0	0	0	6	0	0	571	0	31	-	-	-	-	-	-	0	0	0
15:00	0	47	11	60	44	0	0	0	0	11	0	0	573	0	30	-	-	-	-	-	-	0	0	0
15:15	0	30	9	56	27	0	0	0	0	7	0	0	555	0	28	-	-	-	-	-	-	0	0	0
15:30	0	27	21	62	27	0	0	0	0	7	0	0	615	0	29	-	-	-	-	-	-	0	0	0
15:45	0	37	17	63	35	0	0	0	0	5	0	0	612	0	32	-	-	-	-	-	-	0	0	0
16:00	0	50	13	55	26	0	0	0	0	9	0	0	594	0	30	-	-	-	-	-	-	0	0	0
16:15	0	57	26	62	37	0	0	0	0	8	0	0	611	0	29	-	-	-	-	-	-	0	0	0
16:30	0	44	10	49	31	0	0	0	0	10	0	0	565	0	25	-	-	-	-	-	-	0	0	0
16:45	0	47	17	59	11	0	0	0	0	3	0	0	558	0	19	-	-	-	-	-	-	0	0	0
17:00	0	39	25	65	32	0	0	0	0	8	0	0	544	0	29	-	-	-	-	-	-	0	0	0
17:15	0	30	19	61	26	0	0	0	0	4	0	0	509	0	27	-	-	-	-	-	-	0	0	0
17:30	0	31	17	52	27	0	0	0	0	4	0	0	478	0	25	-	-	-	-	-	-	0	0	0
17:45	0	42	11	36	31	0	0	0	0	13	0	0	446	0	24	-	-	-	-	-	-	0	0	0
18:00	0	26	21	47	32	0	0	0	0	6	0	0	399	0	17	-	-	-	-	-	-	0	0	0
18:15	0	30	17	40	18	0	0	0	0	2	0	0	354	0	18	-	-	-	-	-	-	0	0	0
18:30	0	41	7	34	13	0	0	0	0	3	0	0	319	0	18	-	-	-	-	-	-	0	0	0
18:45	0	19	4	37	13	0	0	0	0	6	0	0	296	0	20	-	-	-	-	-	-	0	0	0
19:00	0	24	11	30	16	0	0	0	0	7	0	0	272	0	16	-	-	-	-	-	-	0	0	0
19:15	0	24	8	21	17	0	0	0	0	2	0	0	191	0	9	-	-	-	-	-	-	0	0	0
19:30	0	15	14	27	16	0	0	0	0	5	0	0	121	0	7	-	-	-	-	-	-	0	0	0
19:45	0	10	8	18	13	0	0	0	0	2	0	0	49	0	2	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						0	0	0
															Signal Warranted?						No		
															Notes								

Weekday Kahekili Hwy/Waiehu Beach Road 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction: 0%			RT Reduction: 100%												
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	33	0	4			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	67	0	6			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	130	0	15			0	0	0	0
5:00	0	1	1	19	12	0	0	0	0	4	0	0	192	0	18			0	0	0	0
5:15	0	0	0	25	9	0	0	0	0	2	0	0	258	0	15			0	0	0	0
5:30	0	3	2	40	18	0	0	0	0	9	0	0	344	0	20			0	0	0	0
5:45	0	4	1	45	12	0	0	0	0	3	0	0	467	0	15			0	0	0	0
6:00	0	11	5	44	39	0	0	0	0	1	0	0	613	0	17			0	0	0	0
6:15	0	12	8	66	34	0	0	0	0	7	0	0	789	0	26			0	0	0	0
6:30	0	25	3	107	51	0	0	0	0	4	0	0	884	0	28			0	0	0	0
6:45	0	37	2	109	60	0	0	0	0	5	0	0	886	0	34			0	0	0	0
7:00	0	43	5	130	97	0	0	0	0	10	0	0	812	0	35			0	0	0	0
7:15	0	57	5	53	100	0	0	0	0	9	0	0	650	0	29			0	0	0	0
7:30	0	32	4	61	91	0	0	0	0	10	0	0	539	0	39			0	0	0	0
7:45	0	26	4	63	41	0	0	0	0	6	0	0	473	0	37			0	0	0	0
8:00	0	27	7	50	29	0	0	0	0	4	0	0	428	0	38			0	0	0	0
8:15	0	21	8	43	32	0	0	0	0	19	0	0	392	0	35			0	0	0	0
8:30	0	32	11	58	21	0	0	0	0	8	0	0	385	0	21			0	0	0	0
8:45	0	13	6	50	20	0	0	0	0	7	0	0	347	0	18			0	0	0	0
9:00	0	14	3	42	18	0	0	0	0	1	0	0	346	0	16			0	0	0	0
9:15	0	22	3	45	27	0	0	0	0	5	0	0	342	0	23			0	0	0	0
9:30	0	13	4	49	18	0	0	0	0	5	0	0	333	0	22			0	0	0	0
9:45	0	17	6	49	16	0	0	0	0	5	0	0	322	0	24			0	0	0	0
10:00	0	5	6	46	16	0	0	0	0	8	0	0	310	0	27			0	0	0	0
10:15	0	21	10	37	20	0	0	0	0	4	0	0	334	0	24			0	0	0	0
10:30	0	16	4	36	17	0	0	0	0	7	0	0	336	0	24			0	0	0	0
10:45	0	15	11	28	22	0	0	0	0	8	0	0	371	0	25			0	0	0	0
11:00	0	27	9	29	32	0	0	0	0	5	0	0	395	0	21			0	0	0	0
11:15	0	19	8	45	18	0	0	0	0	4	0	0	385	0	22			0	0	0	0
11:30	0	32	7	44	25	0	0	0	0	8	0	0	398	0	26			0	0	0	0
11:45	0	16	9	45	30	0	0	0	0	4	0	0	390	0	28			0	0	0	0
12:00	0	9	8	55	15	0	0	0	0	6	0	0	391	0	31			0	0	0	0
12:15	0	24	7	41	31	0	0	0	0	8	0	0	399	0	34			0	0	0	0
12:30	0	10	7	54	29	0	0	0	0	10	0	0	407	0	29			0	0	0	0
12:45	0	25	9	40	27	0	0	0	0	7	0	0	426	0	23			0	0	0	0
13:00	0	9	8	46	32	0	0	0	0	9	0	0	447	0	24			0	0	0	0
13:15	0	20	20	50	21	0	0	0	0	3	0	0	550	0	18			0	0	0	0
13:30	0	32	7	49	31	0	0	0	0	4	0	0	620	0	24			0	0	0	0
13:45	0	35	9	45	33	0	0	0	0	8	0	0	660	0	24			0	0	0	0
14:00	0	43	6	93	56	0	0	0	0	3	0	0	688	0	22			0	0	0	0
14:15	0	36	7	88	50	0	0	0	0	9	0	0	652	0	30			0	0	0	0
14:30	0	34	18	64	43	0	0	0	0	4	0	0	593	0	28			0	0	0	0
14:45	0	36	19	59	36	0	0	0	0	6	0	0	571	0	31			0	0	0	0
15:00	0	47	11	60	44	0	0	0	0	11	0	0	573	0	30			0	0	0	0
15:15	0	30	9	56	27	0	0	0	0	7	0	0	555	0	28			0	0	0	0
15:30	0	27	21	62	27	0	0	0	0	7	0	0	615	0	29			0	0	0	0
15:45	0	37	17	63	35	0	0	0	0	5	0	0	612	0	32			0	0	0	0
16:00	0	50	13	55	26	0	0	0	0	9	0	0	594	0	30			0	0	0	0
16:15	0	57	26	62	37	0	0	0	0	8	0	0	611	0	29			0	0	0	0
16:30	0	44	10	49	31	0	0	0	0	10	0	0	565	0	25			0	0	0	0
16:45	0	47	17	59	11	0	0	0	0	3	0	0	558	0	19			0	0	0	0
17:00	0	39	25	65	32	0	0	0	0	8	0	0	544	0	29			0	0	0	0
17:15	0	30	19	61	26	0	0	0	0	4	0	0	509	0	27			0	0	0	0
17:30	0	31	17	52	27	0	0	0	0	4	0	0	478	0	25			0	0	0	0
17:45	0	42	11	36	31	0	0	0	0	13	0	0	446	0	24			0	0	0	0
18:00	0	26	21	47	32	0	0	0	0	6	0	0	399	0	17			0	0	0	0
18:15	0	30	17	40	18	0	0	0	0	2	0	0	354	0	18			0	0	0	0
18:30	0	41	7	34	13	0	0	0	0	3	0	0	319	0	18			0	0	0	0
18:45	0	19	4	37	13	0	0	0	0	6	0	0	296	0	20			0	0	0	0
19:00	0	24	11	30	16	0	0	0	0	7	0	0	272	0	16			0	0	0	0
19:15	0	24	8	21	17	0	0	0	0	2	0	0	191	0	9			0	0	0	0
19:30	0	15	14	27	16	0	0	0	0	5	0	0	121	0	7			0	0	0	0
19:45	0	10	8	18	13	0	0	0	0	2	0	0	49	0	2			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	0
Signal Warranted?	No


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
201
60'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Waiehu Beach Road 8-Hour Signal Warra

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction:		0%	RT Reduction:		0%												
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	33	0	9	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	67	0	19	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	130	0	35	-	-	-	-	-	-	0	0	0
5:00	0	1	1	19	12	0	0	0	0	4	0	5	192	0	53	-	-	-	-	-	-	0	0	0
5:15	0	0	0	25	9	0	0	0	0	2	0	8	258	0	60	-	-	-	-	-	-	0	0	0
5:30	0	3	2	40	18	0	0	0	0	9	0	7	344	0	72	-	-	-	-	-	-	0	0	0
5:45	0	4	1	45	12	0	0	0	0	3	0	15	467	0	94	-	-	-	-	-	-	0	0	0
6:00	0	11	5	44	39	0	0	0	0	1	0	15	613	0	150	-	-	-	1	-	1	1	0	1
6:15	0	12	8	66	34	0	0	0	0	7	0	15	789	0	218	-	-	-	1	1	1	2	1	2
6:30	0	25	3	107	51	0	0	0	0	4	0	34	884	0	279	-	-	-	1	1	1	3	2	3
6:45	0	37	2	109	60	0	0	0	0	5	0	69	886	0	320	-	-	-	1	1	1	4	3	4
7:00	0	43	5	130	97	0	0	0	0	10	0	74	812	0	297	-	-	-	1	1	1	1	4	1
7:15	0	57	5	53	100	0	0	0	0	9	0	74	650	0	267	-	-	-	1	-	1	2	0	2
7:30	0	32	4	61	91	0	0	0	0	10	0	69	539	0	232	-	-	-	1	-	-	3	0	3
7:45	0	26	4	63	41	0	0	0	0	6	0	45	473	0	186	-	-	-	-	-	-	4	0	4
8:00	0	27	7	50	29	0	0	0	0	4	0	50	428	0	179	-	-	-	-	-	-	0	0	0
8:15	0	21	8	43	32	0	0	0	0	19	0	29	392	0	163	-	-	-	-	-	-	0	0	0
8:30	0	32	11	58	21	0	0	0	0	8	0	25	385	0	162	-	-	-	-	-	-	0	0	0
8:45	0	13	6	50	20	0	0	0	0	7	0	37	347	0	165	-	-	-	-	-	-	0	0	0
9:00	0	14	3	42	18	0	0	0	0	1	0	37	346	0	155	-	-	-	-	-	-	0	0	0
9:15	0	22	3	45	27	0	0	0	0	5	0	42	342	0	162	-	-	-	-	-	-	0	0	0
9:30	0	13	4	49	18	0	0	0	0	5	0	31	333	0	164	-	-	-	-	-	-	0	0	0
9:45	0	17	6	49	16	0	0	0	0	5	0	29	322	0	164	-	-	-	-	-	-	0	0	0
10:00	0	5	6	46	16	0	0	0	0	8	0	37	310	0	188	-	-	-	-	-	-	0	0	0
10:15	0	21	10	37	20	0	0	0	0	4	0	45	334	0	183	-	-	-	-	-	-	0	0	0
10:30	0	16	4	36	17	0	0	0	0	7	0	29	336	0	183	-	-	-	-	-	-	0	0	0
10:45	0	15	11	28	22	0	0	0	0	8	0	50	371	0	200	-	-	-	-	-	-	0	0	0
11:00	0	27	9	29	32	0	0	0	0	5	0	35	395	0	189	-	-	-	-	-	-	0	0	0
11:15	0	19	8	45	18	0	0	0	0	4	0	45	385	0	198	-	-	-	-	-	-	0	0	0
11:30	0	32	7	44	25	0	0	0	0	8	0	45	398	0	197	-	-	-	-	-	-	0	0	0
11:45	0	16	9	45	30	0	0	0	0	4	0	43	390	0	201	-	-	-	-	-	-	0	0	0
12:00	0	9	8	55	15	0	0	0	0	6	0	43	391	0	211	-	-	-	-	-	-	0	0	0
12:15	0	24	7	41	31	0	0	0	0	8	0	40	399	0	218	-	-	-	-	-	-	0	0	0
12:30	0	10	7	54	29	0	0	0	0	10	0	47	407	0	221	-	-	-	-	-	-	0	0	0
12:45	0	25	9	40	27	0	0	0	0	7	0	50	426	0	234	-	-	-	-	-	-	0	0	0
13:00	0	9	8	46	32	0	0	0	0	9	0	47	447	0	236	-	-	-	-	-	-	0	0	0
13:15	0	20	20	50	21	0	0	0	0	3	0	48	550	0	249	-	-	-	1	-	-	1	0	0
13:30	0	32	7	49	31	0	0	0	0	4	0	66	620	0	260	-	-	-	1	-	1	2	0	1
13:45	0	35	9	45	33	0	0	0	0	8	0	51	660	0	250	-	-	-	1	-	1	3	0	2
14:00	0	43	6	93	56	0	0	0	0	3	0	66	688	0	256	-	-	-	1	-	1	4	0	3
14:15	0	36	7	88	50	0	0	0	0	9	0	53	652	0	265	-	-	-	1	-	1	1	0	4
14:30	0	34	18	64	43	0	0	0	0	4	0	56	593	0	274	-	-	-	1	-	-	2	0	0
14:45	0	36	19	59	36	0	0	0	0	6	0	59	571	0	309	-	-	-	1	-	-	3	0	0
15:00	0	47	11	60	44	0	0	0	0	11	0	67	573	0	313	-	-	-	1	-	-	4	0	0
15:15	0	30	9	56	27	0	0	0	0	7	0	64	555	0	311	-	-	-	1	-	-	1	0	0
15:30	0	27	21	62	27	0	0	0	0	7	0	88	615	0	325	-	-	-	1	-	1	2	0	1
15:45	0	37	17	63	35	0	0	0	0	5	0	64	612	0	324	-	-	-	1	-	1	3	0	2
16:00	0	50	13	55	26	0	0	0	0	9	0	67	594	0	336	-	-	-	1	-	-	4	0	3
16:15	0	57	26	62	37	0	0	0	0	8	0	77	611	0	356	-	-	-	1	-	1	1	0	4
16:30	0	44	10	49	31	0	0	0	0	10	0	84	565	0	347	-	-	-	1	-	-	2	0	0
16:45	0	47	17	59	11	0	0	0	0	3	0	78	558	0	321	-	-	-	1	-	-	3	0	0
17:00	0	39	25	65	32	0	0	0	0	8	0	88	544	0	315	-	-	-	1	-	-	4	0	0
17:15	0	30	19	61	26	0	0	0	0	4	0	72	509	0	280	-	-	-	1	-	-	1	0	0
17:30	0	31	17	52	27	0	0	0	0	4	0	64	478	0	260	-	-	-	-	-	-	2	0	0
17:45	0	42	11	36	31	0	0	0	0	13	0	62	446	0	259	-	-	-	-	-	-	3	0	0
18:00	0	26	21	47	32	0	0	0	0	6	0	55	399	0	254	-	-	-	-	-	-	4	0	0
18:15	0	30	17	40	18	0	0	0	0	2	0	54	354	0	247	-	-	-	-	-	-	0	0	0
18:30	0	41	7	34	13	0	0	0	0	3	0	64	319	0	241	-	-	-	-	-	-	0	0	0
18:45	0	19	4	37	13	0	0	0	0	6	0	64	296	0	217	-	-	-	-	-	-	0	0	0
19:00	0	24	11	30	16	0	0	0	0	7	0	47	272	0	191	-	-	-	-	-	-	0	0	0
19:15	0	24	8	21	17	0	0	0	0	2	0	48	191	0	137	-	-	-	-	-	-	0	0	0
19:30	0	15	14	27	16	0	0	0	0	5	0	38	121	0	87	-	-	-	-	-	-	0	0	0
19:45	0	10	8	18	13	0	0	0	0	2	0	42	49	0	44	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						7	1	4
															Signal Warranted?						No		
															Notes								

Weekday Kahekili Hwy/Waiehu Beach Road 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction:		0%	RT Reduction:		0%										
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	33	0	9			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	67	0	19			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	130	0	35			0	0	0	0
5:00	0	1	1	19	12	0	0	0	0	4	0	5	192	0	53			0	0	0	0
5:15	0	0	0	25	9	0	0	0	0	2	0	8	258	0	60			0	0	0	0
5:30	0	3	2	40	18	0	0	0	0	9	0	7	344	0	72			0	0	0	0
5:45	0	4	1	45	12	0	0	0	0	3	0	15	467	0	94			0	0	0	0
6:00	0	11	5	44	39	0	0	0	0	1	0	15	613	0	150			0	0	0	0
6:15	0	12	8	66	34	0	0	0	0	7	0	15	789	0	218	1		0	1	1	1
6:30	0	25	3	107	51	0	0	0	0	4	0	34	884	0	279	1		0	2	1	2
6:45	0	37	2	109	60	0	0	0	0	5	0	69	886	0	320	1		0	3	1	3
7:00	0	43	5	130	97	0	0	0	0	10	0	74	812	0	297	1		0	4	1	4
7:15	0	57	5	53	100	0	0	0	0	9	0	74	650	0	267	1		0	1	1	1
7:30	0	32	4	61	91	0	0	0	0	10	0	69	539	0	232			0	2	0	2
7:45	0	26	4	63	41	0	0	0	0	6	0	45	473	0	186			0	3	0	3
8:00	0	27	7	50	29	0	0	0	0	4	0	50	428	0	179			0	4	0	4
8:15	0	21	8	43	32	0	0	0	0	19	0	29	392	0	163			0	0	0	0
8:30	0	32	11	58	21	0	0	0	0	8	0	25	385	0	162			0	0	0	0
8:45	0	13	6	50	20	0	0	0	0	7	0	37	347	0	165			0	0	0	0
9:00	0	14	3	42	18	0	0	0	0	1	0	37	346	0	155			0	0	0	0
9:15	0	22	3	45	27	0	0	0	0	5	0	42	342	0	162			0	0	0	0
9:30	0	13	4	49	18	0	0	0	0	5	0	31	333	0	164			0	0	0	0
9:45	0	17	6	49	16	0	0	0	0	5	0	29	322	0	164			0	0	0	0
10:00	0	5	6	46	16	0	0	0	0	8	0	37	310	0	188			0	0	0	0
10:15	0	21	10	37	20	0	0	0	0	4	0	45	334	0	183			0	0	0	0
10:30	0	16	4	36	17	0	0	0	0	7	0	29	336	0	183			0	0	0	0
10:45	0	15	11	28	22	0	0	0	0	8	0	50	371	0	200			0	0	0	0
11:00	0	27	9	29	32	0	0	0	0	5	0	35	395	0	189			0	0	0	0
11:15	0	19	8	45	18	0	0	0	0	4	0	45	385	0	198			0	0	0	0
11:30	0	32	7	44	25	0	0	0	0	8	0	45	398	0	197			0	0	0	0
11:45	0	16	9	45	30	0	0	0	0	4	0	43	390	0	201			0	0	0	0
12:00	0	9	8	55	15	0	0	0	0	6	0	43	391	0	211			0	0	0	0
12:15	0	24	7	41	31	0	0	0	0	8	0	40	399	0	218			0	0	0	0
12:30	0	10	7	54	29	0	0	0	0	10	0	47	407	0	221			0	0	0	0
12:45	0	25	9	40	27	0	0	0	0	7	0	50	426	0	234			0	0	0	0
13:00	0	9	8	46	32	0	0	0	0	9	0	47	447	0	236			0	0	0	0
13:15	0	20	20	50	21	0	0	0	0	3	0	48	550	0	249	1		0	1	1	1
13:30	0	32	7	49	31	0	0	0	0	4	0	66	620	0	260	1		0	2	1	2
13:45	0	35	9	45	33	0	0	0	0	8	0	51	660	0	250	1		0	3	1	3
14:00	0	43	6	93	56	0	0	0	0	3	0	66	688	0	256	1		0	4	1	4
14:15	0	36	7	88	50	0	0	0	0	9	0	53	652	0	265	1		0	1	1	1
14:30	0	34	18	64	43	0	0	0	0	4	0	56	593	0	274	1		0	2	1	2
14:45	0	36	19	59	36	0	0	0	0	6	0	59	571	0	309	1		0	3	1	3
15:00	0	47	11	60	44	0	0	0	0	11	0	67	573	0	313	1		0	4	1	4
15:15	0	30	9	56	27	0	0	0	0	7	0	64	555	0	311	1		0	1	1	1
15:30	0	27	21	62	27	0	0	0	0	7	0	88	615	0	325	1		0	2	1	2
15:45	0	37	17	63	35	0	0	0	0	5	0	64	612	0	324	1		0	3	1	3
16:00	0	50	13	55	26	0	0	0	0	9	0	67	594	0	336	1		0	4	1	4
16:15	0	57	26	62	37	0	0	0	0	8	0	77	611	0	356	1		0	1	1	1
16:30	0	44	10	49	31	0	0	0	0	10	0	84	565	0	347	1		0	2	1	2
16:45	0	47	17	59	11	0	0	0	0	3	0	78	558	0	321	1		0	3	1	3
17:00	0	39	25	65	32	0	0	0	0	8	0	88	544	0	315	1		0	4	1	4
17:15	0	30	19	61	26	0	0	0	0	4	0	72	509	0	280	1		0	1	1	1
17:30	0	31	17	52	27	0	0	0	0	4	0	64	478	0	260			0	2	0	2
17:45	0	42	11	36	31	0	0	0	0	13	0	62	446	0	259			0	3	0	3
18:00	0	26	21	47	32	0	0	0	0	6	0	55	399	0	254			0	4	0	4
18:15	0	30	17	40	18	0	0	0	0	2	0	54	354	0	247			0	0	0	0
18:30	0	41	7	34	13	0	0	0	0	3	0	64	319	0	241			0	0	0	0
18:45	0	19	4	37	13	0	0	0	0	6	0	64	296	0	217			0	0	0	0
19:00	0	24	11	30	16	0	0	0	0	7	0	47	272	0	191			0	0	0	0
19:15	0	24	8	21	17	0	0	0	0	2	0	48	191	0	137			0	0	0	0
19:30	0	15	14	27	16	0	0	0	0	5	0	38	121	0	87			0	0	0	0
19:45	0	10	8	18	13	0	0	0	0	2	0	42	49	0	44			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	7
Signal Warranted?	Yes


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
611, 356
555, 311
509, 280
650, 287
550, 249
789, 218
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
611, 356
555, 311
509, 280
652, 265
550, 249
789, 218
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Waiehu Beach Road 8-Hour Signal Warra

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			600	900	720	600	900	720			
	2						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction:		0%	RT Reduction:		0%												
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	33	0	9	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	67	0	19	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	130	0	35	-	-	-	-	-	-	0	0	0
5:00	0	1	1	19	12	0	0	0	0	4	0	5	192	0	53	-	-	-	-	-	-	0	0	0
5:15	0	0	0	25	9	0	0	0	0	2	0	8	258	0	60	-	-	-	-	-	-	0	0	0
5:30	0	3	2	40	18	0	0	0	0	9	0	7	344	0	72	-	-	-	-	-	-	0	0	0
5:45	0	4	1	45	12	0	0	0	0	3	0	15	467	0	94	-	-	-	-	-	-	0	0	0
6:00	0	11	5	44	39	0	0	0	0	1	0	15	613	0	150	-	-	-	1	-	-	1	0	0
6:15	0	12	8	66	34	0	0	0	0	7	0	15	789	0	218	-	-	-	1	-	1	2	0	1
6:30	0	25	3	107	51	0	0	0	0	4	0	34	884	0	279	-	-	-	1	-	1	3	0	2
6:45	0	37	2	109	60	0	0	0	0	5	0	69	886	0	320	-	-	-	1	-	1	4	0	3
7:00	0	43	5	130	97	0	0	0	0	10	0	74	812	0	297	-	-	-	1	-	1	1	0	4
7:15	0	57	5	53	100	0	0	0	0	9	0	74	650	0	267	-	-	-	1	-	-	2	0	0
7:30	0	32	4	61	91	0	0	0	0	10	0	69	539	0	232	-	-	-	-	-	-	3	0	0
7:45	0	26	4	63	41	0	0	0	0	6	0	45	473	0	186	-	-	-	-	-	-	4	0	0
8:00	0	27	7	50	29	0	0	0	0	4	0	50	428	0	179	-	-	-	-	-	-	0	0	0
8:15	0	21	8	43	32	0	0	0	0	19	0	29	392	0	163	-	-	-	-	-	-	0	0	0
8:30	0	32	11	58	21	0	0	0	0	8	0	25	385	0	162	-	-	-	-	-	-	0	0	0
8:45	0	13	6	50	20	0	0	0	0	7	0	37	347	0	165	-	-	-	-	-	-	0	0	0
9:00	0	14	3	42	18	0	0	0	0	1	0	37	346	0	155	-	-	-	-	-	-	0	0	0
9:15	0	22	3	45	27	0	0	0	0	5	0	42	342	0	162	-	-	-	-	-	-	0	0	0
9:30	0	13	4	49	18	0	0	0	0	5	0	31	333	0	164	-	-	-	-	-	-	0	0	0
9:45	0	17	6	49	16	0	0	0	0	5	0	29	322	0	164	-	-	-	-	-	-	0	0	0
10:00	0	5	6	46	16	0	0	0	0	8	0	37	310	0	188	-	-	-	-	-	-	0	0	0
10:15	0	21	10	37	20	0	0	0	0	4	0	45	334	0	183	-	-	-	-	-	-	0	0	0
10:30	0	16	4	36	17	0	0	0	0	7	0	29	336	0	183	-	-	-	-	-	-	0	0	0
10:45	0	15	11	28	22	0	0	0	0	8	0	50	371	0	200	-	-	-	-	-	-	0	0	0
11:00	0	27	9	29	32	0	0	0	0	5	0	35	395	0	189	-	-	-	-	-	-	0	0	0
11:15	0	19	8	45	18	0	0	0	0	4	0	45	385	0	198	-	-	-	-	-	-	0	0	0
11:30	0	32	7	44	25	0	0	0	0	8	0	45	398	0	197	-	-	-	-	-	-	0	0	0
11:45	0	16	9	45	30	0	0	0	0	4	0	43	390	0	201	-	-	-	-	-	-	0	0	0
12:00	0	9	8	55	15	0	0	0	0	6	0	43	391	0	211	-	-	-	-	-	-	0	0	0
12:15	0	24	7	41	31	0	0	0	0	8	0	40	399	0	218	-	-	-	-	-	-	0	0	0
12:30	0	10	7	54	29	0	0	0	0	10	0	47	407	0	221	-	-	-	-	-	-	0	0	0
12:45	0	25	9	40	27	0	0	0	0	7	0	50	426	0	234	-	-	-	-	-	-	0	0	0
13:00	0	9	8	46	32	0	0	0	0	9	0	47	447	0	236	-	-	-	-	-	-	0	0	0
13:15	0	20	20	50	21	0	0	0	0	3	0	48	550	0	249	-	-	-	-	-	-	0	0	0
13:30	0	32	7	49	31	0	0	0	0	4	0	66	620	0	260	-	-	-	1	-	-	1	0	0
13:45	0	35	9	45	33	0	0	0	0	8	0	51	660	0	250	-	-	-	1	-	-	2	0	0
14:00	0	43	6	93	56	0	0	0	0	3	0	66	688	0	256	-	-	-	1	-	-	3	0	0
14:15	0	36	7	88	50	0	0	0	0	9	0	53	652	0	265	-	-	-	1	-	-	4	0	0
14:30	0	34	18	64	43	0	0	0	0	4	0	56	593	0	274	-	-	-	-	-	-	0	0	0
14:45	0	36	19	59	36	0	0	0	0	6	0	59	571	0	309	-	-	-	-	-	-	0	0	0
15:00	0	47	11	60	44	0	0	0	0	11	0	67	573	0	313	-	-	-	-	-	-	0	0	0
15:15	0	30	9	56	27	0	0	0	0	7	0	64	555	0	311	-	-	-	-	-	-	0	0	0
15:30	0	27	21	62	27	0	0	0	0	7	0	88	615	0	325	-	-	-	1	-	-	1	0	0
15:45	0	37	17	63	35	0	0	0	0	5	0	64	612	0	324	-	-	-	1	-	-	2	0	0
16:00	0	50	13	55	26	0	0	0	0	9	0	67	594	0	336	-	-	-	-	-	-	3	0	0
16:15	0	57	26	62	37	0	0	0	0	8	0	77	611	0	356	-	-	-	1	-	-	4	0	0
16:30	0	44	10	49	31	0	0	0	0	10	0	84	565	0	347	-	-	-	-	-	-	0	0	0
16:45	0	47	17	59	11	0	0	0	0	3	0	78	558	0	321	-	-	-	-	-	-	0	0	0
17:00	0	39	25	65	32	0	0	0	0	8	0	88	544	0	315	-	-	-	-	-	-	0	0	0
17:15	0	30	19	61	26	0	0	0	0	4	0	72	509	0	280	-	-	-	-	-	-	0	0	0
17:30	0	31	17	52	27	0	0	0	0	4	0	64	478	0	260	-	-	-	-	-	-	0	0	0
17:45	0	42	11	36	31	0	0	0	0	13	0	62	446	0	259	-	-	-	-	-	-	0	0	0
18:00	0	26	21	47	32	0	0	0	0	6	0	55	399	0	254	-	-	-	-	-	-	0	0	0
18:15	0	30	17	40	18	0	0	0	0	2	0	54	354	0	247	-	-	-	-	-	-	0	0	0
18:30	0	41	7	34	13	0	0	0	0	3	0	64	319	0	241	-	-	-	-	-	-	0	0	0
18:45	0	19	4	37	13	0	0	0	0	6	0	64	296	0	217	-	-	-	-	-	-	0	0	0
19:00	0	24	11	30	16	0	0	0	0	7	0	47	272	0	191	-	-	-	-	-	-	0	0	0
19:15	0	24	8	21	17	0	0	0	0	2	0	48	191	0	137	-	-	-	-	-	-	0	0	0
19:30	0	15	14	27	16	0	0	0	0	5	0	38	121	0	87	-	-	-	-	-	-	0	0	0
19:45	0	10	8	18	13	0	0	0	0	2	0	42	49	0	44	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						4	0	1
															Signal Warranted?						No		
															Notes								

Weekday Kahekili Hwy/Waiehu Beach Road 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	2						1			1												
							RT Reduction:		0%	RT Reduction:		0%										
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	33	0	9			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	67	0	19			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	130	0	35			0	0	0	0
5:00	0	1	1	19	12	0	0	0	0	4	0	5	192	0	53			0	0	0	0
5:15	0	0	0	25	9	0	0	0	0	2	0	8	258	0	60			0	0	0	0
5:30	0	3	2	40	18	0	0	0	0	9	0	7	344	0	72			0	0	0	0
5:45	0	4	1	45	12	0	0	0	0	3	0	15	467	0	94			0	0	0	0
6:00	0	11	5	44	39	0	0	0	0	1	0	15	613	0	150			0	0	0	0
6:15	0	12	8	66	34	0	0	0	0	7	0	15	789	0	218	1		0	1	1	1
6:30	0	25	3	107	51	0	0	0	0	4	0	34	884	0	279	1		0	2	1	2
6:45	0	37	2	109	60	0	0	0	0	5	0	69	886	0	320	1		0	3	1	3
7:00	0	43	5	130	97	0	0	0	0	10	0	74	812	0	297	1		0	4	1	4
7:15	0	57	5	53	100	0	0	0	0	9	0	74	650	0	267			0	0	0	0
7:30	0	32	4	61	91	0	0	0	0	10	0	69	539	0	232			0	0	0	0
7:45	0	26	4	63	41	0	0	0	0	6	0	45	473	0	186			0	0	0	0
8:00	0	27	7	50	29	0	0	0	0	4	0	50	428	0	179			0	0	0	0
8:15	0	21	8	43	32	0	0	0	0	19	0	29	392	0	163			0	0	0	0
8:30	0	32	11	58	21	0	0	0	0	8	0	25	385	0	162			0	0	0	0
8:45	0	13	6	50	20	0	0	0	0	7	0	37	347	0	165			0	0	0	0
9:00	0	14	3	42	18	0	0	0	0	1	0	37	346	0	155			0	0	0	0
9:15	0	22	3	45	27	0	0	0	0	5	0	42	342	0	162			0	0	0	0
9:30	0	13	4	49	18	0	0	0	0	5	0	31	333	0	164			0	0	0	0
9:45	0	17	6	49	16	0	0	0	0	5	0	29	322	0	164			0	0	0	0
10:00	0	5	6	46	16	0	0	0	0	8	0	37	310	0	188			0	0	0	0
10:15	0	21	10	37	20	0	0	0	0	4	0	45	334	0	183			0	0	0	0
10:30	0	16	4	36	17	0	0	0	0	7	0	29	336	0	183			0	0	0	0
10:45	0	15	11	28	22	0	0	0	0	8	0	50	371	0	200			0	0	0	0
11:00	0	27	9	29	32	0	0	0	0	5	0	35	395	0	189			0	0	0	0
11:15	0	19	8	45	18	0	0	0	0	4	0	45	385	0	198			0	0	0	0
11:30	0	32	7	44	25	0	0	0	0	8	0	45	398	0	197			0	0	0	0
11:45	0	16	9	45	30	0	0	0	0	4	0	43	390	0	201			0	0	0	0
12:00	0	9	8	55	15	0	0	0	0	6	0	43	391	0	211			0	0	0	0
12:15	0	24	7	41	31	0	0	0	0	8	0	40	399	0	218			0	0	0	0
12:30	0	10	7	54	29	0	0	0	0	10	0	47	407	0	221			0	0	0	0
12:45	0	25	9	40	27	0	0	0	0	7	0	50	426	0	234			0	0	0	0
13:00	0	9	8	46	32	0	0	0	0	9	0	47	447	0	236			0	0	0	0
13:15	0	20	20	50	21	0	0	0	0	3	0	48	550	0	249			0	0	0	0
13:30	0	32	7	49	31	0	0	0	0	4	0	66	620	0	260			0	0	0	0
13:45	0	35	9	45	33	0	0	0	0	8	0	51	660	0	250			0	0	0	0
14:00	0	43	6	93	56	0	0	0	0	3	0	66	688	0	256	1		0	1	1	1
14:15	0	36	7	88	50	0	0	0	0	9	0	53	652	0	265			0	2	0	2
14:30	0	34	18	64	43	0	0	0	0	4	0	56	593	0	274			0	3	0	3
14:45	0	36	19	59	36	0	0	0	0	6	0	59	571	0	309	1		0	4	1	4
15:00	0	47	11	60	44	0	0	0	0	11	0	67	573	0	313	1		0	1	1	1
15:15	0	30	9	56	27	0	0	0	0	7	0	64	555	0	311			0	2	0	2
15:30	0	27	21	62	27	0	0	0	0	7	0	88	615	0	325	1		0	3	1	3
15:45	0	37	17	63	35	0	0	0	0	5	0	64	612	0	324	1		0	4	1	4
16:00	0	50	13	55	26	0	0	0	0	9	0	67	594	0	336	1		0	1	1	1
16:15	0	57	26	62	37	0	0	0	0	8	0	77	611	0	356	1		0	2	1	2
16:30	0	44	10	49	31	0	0	0	0	10	0	84	565	0	347	1		0	3	1	3
16:45	0	47	17	59	11	0	0	0	0	3	0	78	558	0	321	1		0	4	1	4
17:00	0	39	25	65	32	0	0	0	0	8	0	88	544	0	315			0	0	0	0
17:15	0	30	19	61	26	0	0	0	0	4	0	72	509	0	280			0	0	0	0
17:30	0	31	17	52	27	0	0	0	0	4	0	64	478	0	260			0	0	0	0
17:45	0	42	11	36	31	0	0	0	0	13	0	62	446	0	259			0	0	0	0
18:00	0	26	21	47	32	0	0	0	0	6	0	55	399	0	254			0	0	0	0
18:15	0	30	17	40	18	0	0	0	0	2	0	54	354	0	247			0	0	0	0
18:30	0	41	7	34	13	0	0	0	0	3	0	64	319	0	241			0	0	0	0
18:45	0	19	4	37	13	0	0	0	0	6	0	64	296	0	217			0	0	0	0
19:00	0	24	11	30	16	0	0	0	0	7	0	47	272	0	191			0	0	0	0
19:15	0	24	8	21	17	0	0	0	0	2	0	48	191	0	137			0	0	0	0
19:30	0	15	14	27	16	0	0	0	0	5	0	38	121	0	87			0	0	0	0
19:45	0	10	8	18	13	0	0	0	0	2	0	42	49	0	44			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	4
Signal Warranted?	Yes


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
594, 336
573, 313
688, 256
789, 218
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
594, 336
573, 313
688, 256
789, 218
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

Kahekili Highway/Waiehu Beach Road
Base Year Without Imi Kala Street Extension

Weekday Kahekili Hwy/Waiehu Beach Road 8-Hour Signal Warra

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						aiehu Beach Ro			0			70 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			350	525	420	350	525	420			
	1						1			1			Minor Threshold			105	53	84	105	53	84			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	39.64091218	0	6.6226	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	79.51037212	0	9.9339	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	154.5063753	0	24.8348	-	-	-	-	-	-	0	0	0
5:00	0	1.2598	1.373	21.41	15.598	0	0	0	0	6.6226	0	0	227.2239931	0	29.8017	-	-	-	-	-	-	0	0	0
5:15	0	0	0	28.171	11.699	0	0	0	0	3.3113	0	0	308.5807951	0	24.8348	-	-	-	-	-	-	0	0	0
5:30	0	3.7793	2.7461	45.073	23.398	0	0	0	0	14.901	0	0	413.3787176	0	33.113	-	-	-	-	-	-	0	0	0
5:45	0	5.039	1.373	50.707	15.598	0	0	0	0	4.967	0	0	560.8592946	0	24.8348	-	-	-	-	-	-	0	0	0
6:00	0	13.857	6.8652	49.58	50.695	0	0	0	0	1.6557	0	0	738.314721	0	28.1461	-	-	-	-	-	-	0	0	0
6:15	0	15.117	10.984	74.37	44.196	0	0	0	0	11.59	0	0	945.9850238	0	39.1618	-	-	-	-	-	-	0	0	0
6:30	0	31.494	4.1191	120.57	66.293	0	0	0	0	6.6226	0	0	1063.845654	0	38.9766	-	-	-	-	-	-	0	0	0
6:45	0	46.611	2.7461	122.82	77.992	0	0	0	0	8.2783	0	0	1069.258661	0	45.0254	-	-	-	-	-	-	0	0	0
7:00	0	52.129	11.928	146.49	118.12	0	0	0	0	12.671	0	0	981.0663596	0	44.35	-	-	-	-	-	-	0	0	0
7:15	0	69.101	11.928	59.722	121.78	0	0	0	0	11.404	0	0	790.0604068	0	38.3012	-	-	-	-	-	-	0	0	0
7:30	0	38.794	9.5422	68.736	110.82	0	0	0	0	12.671	0	0	655.0208242	0	58.3543	-	-	-	-	1	-	0	1	0
7:45	0	31.52	9.5422	70.99	49.929	0	0	0	0	7.6029	0	0	575.1998539	0	58.928	-	-	-	-	1	-	0	2	0
8:00	0	34.013	9.6113	56.341	37.696	0	0	0	0	6.6226	0	0	520.1727789	0	62.9147	-	-	-	-	-	-	0	3	0
8:15	0	26.455	10.984	48.453	41.596	0	0	0	0	31.457	0	0	474.990675	0	57.9478	-	-	-	-	-	-	0	4	0
8:30	0	40.312	15.103	65.356	27.297	0	0	0	0	13.245	0	0	*465.1395272*	0	34.7687	-	-	-	-	-	-	0	0	0
8:45	0	16.377	8.2382	56.341	25.997	0	0	0	0	11.59	0	0	417.5519342	0	29.8017	-	-	-	-	-	-	0	0	0
9:00	0	17.637	4.1191	47.327	23.398	0	0	0	0	1.6557	0	0	416.2646337	0	26.4904	-	-	-	-	-	-	0	0	0
9:15	0	27.715	4.1191	50.707	35.097	0	0	0	0	8.2783	0	0	410.9535468	0	38.08	-	-	-	-	-	-	0	0	0
9:30	0	16.377	5.4922	55.214	23.398	0	0	0	0	8.2783	0	0	401.1913776	0	36.4243	-	-	-	-	-	-	0	0	0
9:45	0	21.416	8.2382	55.214	20.798	0	0	0	0	8.2783	0	0	389.0220366	0	39.7356	-	-	-	-	-	-	0	0	0
10:00	0	6.2988	8.2382	51.834	20.798	0	0	0	0	13.245	0	0	377.5036277	0	44.7026	-	-	-	-	-	-	0	0	0
10:15	0	26.455	13.73	41.693	25.997	0	0	0	0	6.6226	0	0	410.9791831	0	39.7356	-	-	-	-	-	-	0	0	0
10:30	0	20.156	5.4922	40.566	22.098	0	0	0	0	11.59	0	0	412.1284603	0	39.7356	-	-	-	-	-	-	0	0	0
10:45	0	18.896	15.103	31.551	28.597	0	0	0	0	13.245	0	0	455.8171682	0	41.3913	-	-	-	-	-	-	0	0	0
11:00	0	34.013	12.357	32.678	41.596	0	0	0	0	8.2783	0	0	483.8858301	0	34.7687	-	-	-	-	-	-	0	0	0
11:15	0	23.935	10.984	50.707	23.398	0	0	0	0	6.6226	0	0	467.0369148	0	36.4243	-	-	-	-	-	-	0	0	0
11:30	0	40.312	9.6113	49.58	32.497	0	0	0	0	13.245	0	0	484.3536493	0	43.0469	-	-	-	-	-	-	0	0	0
11:45	0	20.156	12.357	50.707	38.996	0	0	0	0	6.6226	0	0	473.1068463	0	46.3582	-	-	-	-	-	-	0	0	0
12:00	0	11.338	10.984	61.975	19.498	0	0	0	0	9.9339	0	0	474.9108741	0	51.3252	-	-	-	-	-	-	0	0	0
12:15	0	30.234	9.6113	46.2	40.296	0	0	0	0	13.245	0	0	486.8672468	0	56.2921	-	-	-	-	-	-	0	0	0
12:30	0	12.598	9.6113	60.849	37.696	0	0	0	0	16.557	0	0	496.8204735	0	48.0139	-	-	-	-	-	-	0	0	0
12:45	0	31.494	12.357	45.073	35.097	0	0	0	0	11.59	0	0	521.5006245	0	38.08	-	-	-	-	-	-	0	0	0
13:00	0	11.338	10.984	51.834	41.596	0	0	0	0	14.901	0	0	547.5314884	0	39.7356	-	-	-	-	-	-	0	0	0
13:15	0	25.195	27.461	56.341	27.297	0	0	0	0	4.967	0	0	671.7746315	0	29.8017	-	-	-	-	-	-	0	0	0
13:30	0	40.312	9.6113	55.214	40.296	0	0	0	0	6.6226	0	0	754.5967393	0	39.7356	-	-	-	-	-	-	0	0	0
13:45	0	44.091	12.357	50.707	42.896	0	0	0	0	13.245	0	0	804.7204972	0	39.7356	-	-	-	-	-	-	0	0	0
14:00	0	54.169	8.2382	104.79	72.793	0	0	0	0	4.967	0	0	839.3858048	0	36.4243	-	-	-	-	-	-	0	0	0
14:15	0	45.351	9.6113	99.161	64.994	0	0	0	0	14.901	0	0	798.5063368	0	49.6695	-	-	-	-	-	-	0	0	0
14:30	0	42.832	24.715	72.117	55.894	0	0	0	0	6.6226	0	0	727.7384844	0	46.3582	-	-	-	-	-	-	0	0	0
14:45	0	45.351	26.088	66.483	46.795	0	0	0	0	9.9339	0	0	699.9877639	0	51.3252	-	-	-	-	-	-	0	0	0
15:00	0	59.208	15.103	67.61	57.194	0	0	0	0	18.212	0	0	701.7088663	0	49.6695	-	-	-	-	-	-	0	0	0
15:15	0	37.793	12.357	63.102	35.097	0	0	0	0	11.59	0	0	679.2024065	0	46.3582	-	-	-	-	-	-	0	0	0
15:30	0	34.013	28.834	69.863	35.097	0	0	0	0	11.59	0	0	756.3170247	0	48.0139	-	-	-	-	-	-	0	0	0
15:45	0	46.611	23.342	70.99	45.495	0	0	0	0	8.2783	0	0	753.1801247	0	52.9808	-	-	-	-	-	-	0	0	0
16:00	0	62.988	17.85	61.975	33.797	0	0	0	0	14.901	0	0	730.0734494	0	49.6695	-	-	-	-	-	-	0	0	0
16:15	0	71.806	35.699	69.863	48.095	0	0	0	0	13.245	0	0	751.760128	0	48.0139	-	-	-	-	-	-	0	0	0
16:30	0	55.429	13.73	55.214	40.296	0	0	0	0	16.557	0	0	692.7101587	0	41.3913	-	-	-	-	-	-	0	0	0
16:45	0	59.208	23.342	66.483	14.299	0	0	0	0	4.967	0	0	684.1256571	0	31.4574	-	-	-	-	-	-	0	0	0
17:00	0	49.13	34.326	73.244	41.596	0	0	0	0	13.245	0	0	669.6690961	0	48.0139	-	-	-	-	-	-	0	0	0
17:15	0	37.793	26.088	68.736	33.797	0	0	0	0	6.6226	0	0	627.5173171	0	44.7026	-	-	-	-	-	-	0	0	0
17:30	0	39.052	23.342	58.595	35.097	0	0	0	0	6.6226	0	0	590.7089489	0	41.3913	-	-	-	-	-	-	0	0	0
17:45	0	52.91	15.103	40.566	40.296	0	0	0	0	21.523	0	0	551.0950336	0	39.7356	-	-	-	-	-	-	0	0	0
18:00	0	32.754	28.834	52.961	41.596	0	0	0	0	9.9339	0	0	490.2386275	0	28.1461	-	-	-	-	-	-	0	0	0
18:15	0	37.793	23.342	45.073	23.398	0	0	0	0	3.3113	0	0	434.0347771	0	29.8017	-	-	-	-	-	-	0	0	0
18:30	0	51.65	9.6113	38.312	16.898	0	0	0	0	4.967	0	0	391.4093666	0	29.8017	-	-	-	-	-	-	0	0	0
18:45	0	23.935	5.4922	41.693	16.898	0	0	0	0	9.9339	0	0	364.2789372	0	33.113	-	-	-	-	-	-	0	0	0
19:00	0	30.234	15.103	33.805	20.798	0	0	0	0	11.59	0	0	337.0236549	0	26.4904	-	-	-	-	-	-	0	0	0
19:15	0	30.234	10.984	23.663	22.098	0	0	0	0	3.3113	0	0	237.0835045	0	14.9009	-	-	-	-	-	-	0	0	0
19:30	0	18.896	19.223	30.424	20.798	0	0	0	0	8.2783	0	0	150.1040272	0	11.5896	-	-	-	-	-	-	0	0	0
19:45	0	12.598	10.984	20.283	16.898	0	0	0	0	3.3113	0	0	60.76299798	0	3.3113	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						0	1	0
															Signal Warranted?						No		
															Notes								

Weekday Kahekili Hwy/Waiehu Beach Road 4-Hour Signal Warrant

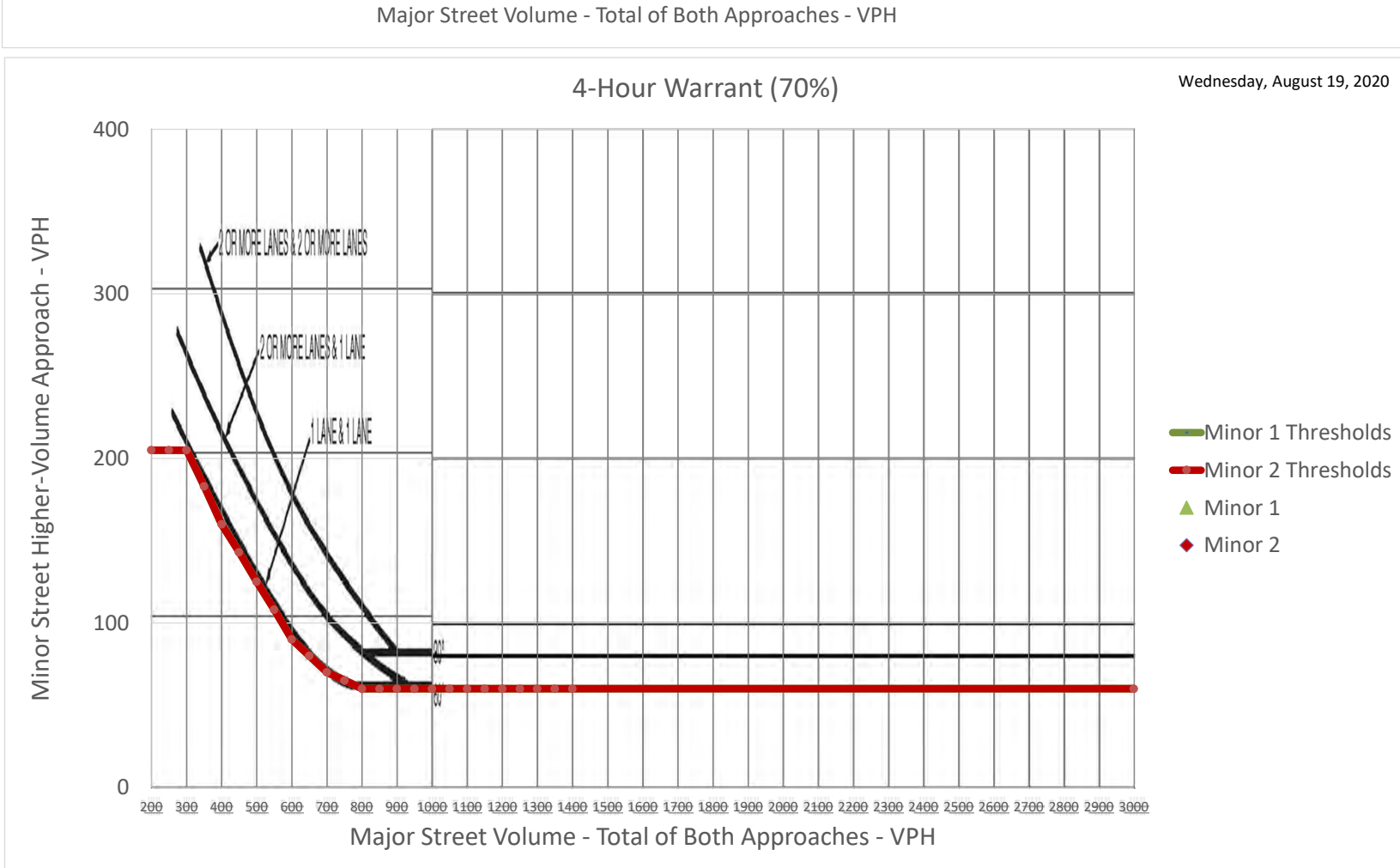
Wednesday, August 19, 2020

	Kahekili Hwy						aiehu Beach Ro			0			70 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction: 0%			RT Reduction: 100%												
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	39.64091218	0	6.6226			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	79.51037212	0	9.9339			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	154.5063753	0	24.8348			0	0	0	0
5:00	0	1.2598	1.373	21.41	15.598	0	0	0	0	6.6226	0	0	227.2239931	0	29.8017			0	0	0	0
5:15	0	0	0	28.171	11.699	0	0	0	0	3.3113	0	0	308.5807951	0	24.8348			0	0	0	0
5:30	0	3.7793	2.7461	45.073	23.398	0	0	0	0	14.901	0	0	413.3787176	0	33.113			0	0	0	0
5:45	0	5.039	1.373	50.707	15.598	0	0	0	0	4.967	0	0	560.8592946	0	24.8348			0	0	0	0
6:00	0	13.857	6.8652	49.58	50.695	0	0	0	0	1.6557	0	0	738.314721	0	28.1461			0	0	0	0
6:15	0	15.117	10.984	74.37	44.196	0	0	0	0	11.59	0	0	945.9850238	0	39.1618			0	0	0	0
6:30	0	31.494	4.1191	120.57	66.293	0	0	0	0	6.6226	0	0	1063.845654	0	38.9766			0	0	0	0
6:45	0	46.611	2.7461	122.82	77.992	0	0	0	0	8.2783	0	0	1069.258661	0	45.0254			0	0	0	0
7:00	0	52.129	11.928	146.49	118.12	0	0	0	0	12.671	0	0	981.0663596	0	44.35			0	0	0	0
7:15	0	69.101	11.928	59.722	121.78	0	0	0	0	11.404	0	0	790.0604068	0	38.3012			0	0	0	0
7:30	0	38.794	9.5422	68.736	110.82	0	0	0	0	12.671	0	0	655.0208242	0	58.3543			0	0	0	0
7:45	0	31.52	9.5422	70.99	49.929	0	0	0	0	7.6029	0	0	575.1998539	0	58.928			0	0	0	0
8:00	0	34.013	9.6113	56.341	37.696	0	0	0	0	6.6226	0	0	520.1727789	0	62.9147			0	0	0	0
8:15	0	26.455	10.984	48.453	41.596	0	0	0	0	31.457	0	0	474.990675	0	57.9478			0	0	0	0
8:30	0	40.312	15.103	65.356	27.297	0	0	0	0	13.245	0	0	*465.1395272*	0	34.7687			0	0	0	0
8:45	0	16.377	8.2382	56.341	25.997	0	0	0	0	11.59	0	0	417.5519342	0	29.8017			0	0	0	0
9:00	0	17.637	4.1191	47.327	23.398	0	0	0	0	1.6557	0	0	416.2646337	0	26.4904			0	0	0	0
9:15	0	27.715	4.1191	50.707	35.097	0	0	0	0	8.2783	0	0	410.9535468	0	38.08			0	0	0	0
9:30	0	16.377	5.4922	55.214	23.398	0	0	0	0	8.2783	0	0	401.1913776	0	36.4243			0	0	0	0
9:45	0	21.416	8.2382	55.214	20.798	0	0	0	0	8.2783	0	0	389.0220366	0	39.7356			0	0	0	0
10:00	0	6.2988	8.2382	51.834	20.798	0	0	0	0	13.245	0	0	377.5036277	0	44.7026			0	0	0	0
10:15	0	26.455	13.73	41.693	25.997	0	0	0	0	6.6226	0	0	410.9791831	0	39.7356			0	0	0	0
10:30	0	20.156	5.4922	40.566	22.098	0	0	0	0	11.59	0	0	412.1284603	0	39.7356			0	0	0	0
10:45	0	18.896	15.103	31.551	28.597	0	0	0	0	13.245	0	0	455.8171682	0	41.3913			0	0	0	0
11:00	0	34.013	12.357	32.678	41.596	0	0	0	0	8.2783	0	0	483.8858301	0	34.7687			0	0	0	0
11:15	0	23.935	10.984	50.707	23.398	0	0	0	0	6.6226	0	0	467.0369148	0	36.4243			0	0	0	0
11:30	0	40.312	9.6113	49.58	32.497	0	0	0	0	13.245	0	0	484.3536493	0	43.0469			0	0	0	0
11:45	0	20.156	12.357	50.707	38.996	0	0	0	0	6.6226	0	0	473.1068463	0	46.3582			0	0	0	0
12:00	0	11.338	10.984	61.975	19.498	0	0	0	0	9.9339	0	0	474.9108741	0	51.3252			0	0	0	0
12:15	0	30.234	9.6113	46.2	40.296	0	0	0	0	13.245	0	0	486.8672468	0	56.2921			0	0	0	0
12:30	0	12.598	9.6113	60.849	37.696	0	0	0	0	16.557	0	0	496.8204735	0	48.0139			0	0	0	0
12:45	0	31.494	12.357	45.073	35.097	0	0	0	0	11.59	0	0	521.5006245	0	38.08			0	0	0	0
13:00	0	11.338	10.984	51.834	41.596	0	0	0	0	14.901	0	0	547.5314884	0	39.7356			0	0	0	0
13:15	0	25.195	27.461	56.341	27.297	0	0	0	0	4.967	0	0	671.7746315	0	29.8017			0	0	0	0
13:30	0	40.312	9.6113	55.214	40.296	0	0	0	0	6.6226	0	0	754.5967393	0	39.7356			0	0	0	0
13:45	0	44.091	12.357	50.707	42.896	0	0	0	0	13.245	0	0	804.7204972	0	39.7356			0	0	0	0
14:00	0	54.169	8.2382	104.79	72.793	0	0	0	0	4.967	0	0	839.3858048	0	36.4243			0	0	0	0
14:15	0	45.351	9.6113	99.161	64.994	0	0	0	0	14.901	0	0	798.5063368	0	49.6695			0	0	0	0
14:30	0	42.832	24.715	72.117	55.894	0	0	0	0	6.6226	0	0	727.7384844	0	46.3582			0	0	0	0
14:45	0	45.351	26.088	66.483	46.795	0	0	0	0	9.9339	0	0	699.9877639	0	51.3252			0	0	0	0
15:00	0	59.208	15.103	67.61	57.194	0	0	0	0	18.212	0	0	701.7088663	0	49.6695			0	0	0	0
15:15	0	37.793	12.357	63.102	35.097	0	0	0	0	11.59	0	0	679.2024065	0	46.3582			0	0	0	0
15:30	0	34.013	28.834	69.863	35.097	0	0	0	0	11.59	0	0	756.3170247	0	48.0139			0	0	0	0
15:45	0	46.611	23.342	70.99	45.495	0	0	0	0	8.2783	0	0	753.1801247	0	52.9808			0	0	0	0
16:00	0	62.988	17.85	61.975	33.797	0	0	0	0	14.901	0	0	730.0734494	0	49.6695			0	0	0	0
16:15	0	71.806	35.699	69.863	48.095	0	0	0	0	13.245	0	0	751.760128	0	48.0139			0	0	0	0
16:30	0	55.429	13.73	55.214	40.296	0	0	0	0	16.557	0	0	692.7101587	0	41.3913			0	0	0	0
16:45	0	59.208	23.342	66.483	14.299	0	0	0	0	4.967	0	0	684.1256571	0	31.4574			0	0	0	0
17:00	0	49.13	34.326	73.244	41.596	0	0	0	0	13.245	0	0	669.6690961	0	48.0139			0	0	0	0
17:15	0	37.793	26.088	68.736	33.797	0	0	0	0	6.6226	0	0	627.5173171	0	44.7026			0	0	0	0
17:30	0	39.052	23.342	58.595	35.097	0	0	0	0	6.6226	0	0	590.7089489	0	41.3913			0	0	0	0
17:45	0	52.91	15.103	40.566	40.296	0	0	0	0	21.523	0	0	551.0950336	0	39.7356			0	0	0	0
18:00	0	32.754	28.834	52.961	41.596	0	0	0	0	9.9339	0	0	490.2386275	0	28.1461			0	0	0	0
18:15	0	37.793	23.342	45.073	23.398	0	0	0	0	3.3113	0	0	434.0347771	0	29.8017			0	0	0	0
18:30	0	51.65	9.6113	38.312	16.898	0	0	0	0	4.967	0	0	391.4093666	0	29.8017			0	0	0	0
18:45	0	23.935	5.4922	41.693	16.898	0	0	0	0	9.9339	0	0	364.2789372	0	33.113			0	0	0	0
19:00	0	30.234	15.103	33.805	20.798	0	0	0	0	11.59	0	0	337.0236549	0	26.4904			0	0	0	0
19:15	0	30.234	10.984	23.663	22.098	0	0	0	0	3.3113	0	0	237.0835045	0	14.9009			0	0	0	0
19:30	0	18.896	19.223	30.424	20.798	0	0	0	0	8.2783	0	0	150.1040272	0	11.5896			0	0	0	0
19:45	0	12.598	10.984	20.283	16.898	0	0	0	0	3.3113	0	0	60.76299798	0	3.3113			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met: 0

Signal Warranted? No


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
500
400
300
200
100
0
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000
Major Street Volume - Total of Both Approaches - VPH
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
400
300
200
100
0
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000
Major Street Volume - Total of Both Approaches - VPH
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Waiehu Beach Road 8-Hour Signal Warra

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	39.64091218	0	6.6226	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	79.51037212	0	9.9339	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	154.5063753	0	24.8348	-	-	-	-	-	-	0	0	0
5:00	0	1.2598	1.373	21.41	15.598	0	0	0	0	6.6226	0	0	227.2239931	0	29.8017	-	-	-	-	-	-	0	0	0
5:15	0	0	0	28.171	11.699	0	0	0	0	3.3113	0	0	308.5807951	0	24.8348	-	-	-	-	-	-	0	0	0
5:30	0	3.7793	2.7461	45.073	23.398	0	0	0	0	14.901	0	0	413.3787176	0	33.113	-	-	-	-	-	-	0	0	0
5:45	0	5.039	1.373	50.707	15.598	0	0	0	0	4.967	0	0	560.8592946	0	24.8348	-	-	-	-	-	-	0	0	0
6:00	0	13.857	6.8652	49.58	50.695	0	0	0	0	1.6557	0	0	738.314721	0	28.1461	-	-	-	-	-	-	0	0	0
6:15	0	15.117	10.984	74.37	44.196	0	0	0	0	11.59	0	0	945.9850238	0	39.1618	-	-	-	-	-	-	0	0	0
6:30	0	31.494	4.1191	120.57	66.293	0	0	0	0	6.6226	0	0	1063.845654	0	38.9766	-	-	-	-	-	-	0	0	0
6:45	0	46.611	2.7461	122.82	77.992	0	0	0	0	8.2783	0	0	1069.258661	0	45.0254	-	-	-	-	-	-	0	0	0
7:00	0	52.129	11.928	146.49	118.12	0	0	0	0	12.671	0	0	981.0663596	0	44.35	-	-	-	-	-	-	0	0	0
7:15	0	69.101	11.928	59.722	121.78	0	0	0	0	11.404	0	0	790.0604068	0	38.3012	-	-	-	-	-	-	0	0	0
7:30	0	38.794	9.5422	68.736	110.82	0	0	0	0	12.671	0	0	655.0208242	0	58.3543	-	-	-	-	-	-	0	0	0
7:45	0	31.52	9.5422	70.99	49.929	0	0	0	0	7.6029	0	0	575.1998539	0	58.928	-	-	-	-	-	-	0	0	0
8:00	0	34.013	9.6113	56.341	37.696	0	0	0	0	6.6226	0	0	520.1727789	0	62.9147	-	-	-	-	-	-	0	0	0
8:15	0	26.455	10.984	48.453	41.596	0	0	0	0	31.457	0	0	474.990675	0	57.9478	-	-	-	-	-	-	0	0	0
8:30	0	40.312	15.103	65.356	27.297	0	0	0	0	13.245	0	0	*465.1395272*	0	34.7687	-	-	-	-	-	-	0	0	0
8:45	0	16.377	8.2382	56.341	25.997	0	0	0	0	11.59	0	0	417.5519342	0	29.8017	-	-	-	-	-	-	0	0	0
9:00	0	17.637	4.1191	47.327	23.398	0	0	0	0	1.6557	0	0	416.2646337	0	26.4904	-	-	-	-	-	-	0	0	0
9:15	0	27.715	4.1191	50.707	35.097	0	0	0	0	8.2783	0	0	410.9535468	0	38.08	-	-	-	-	-	-	0	0	0
9:30	0	16.377	5.4922	55.214	23.398	0	0	0	0	8.2783	0	0	401.1913776	0	36.4243	-	-	-	-	-	-	0	0	0
9:45	0	21.416	8.2382	55.214	20.798	0	0	0	0	8.2783	0	0	389.0220366	0	39.7356	-	-	-	-	-	-	0	0	0
10:00	0	6.2988	8.2382	51.834	20.798	0	0	0	0	13.245	0	0	377.5036277	0	44.7026	-	-	-	-	-	-	0	0	0
10:15	0	26.455	13.73	41.693	25.997	0	0	0	0	6.6226	0	0	410.9791831	0	39.7356	-	-	-	-	-	-	0	0	0
10:30	0	20.156	5.4922	40.566	22.098	0	0	0	0	11.59	0	0	412.1284603	0	39.7356	-	-	-	-	-	-	0	0	0
10:45	0	18.896	15.103	31.551	28.597	0	0	0	0	13.245	0	0	455.8171682	0	41.3913	-	-	-	-	-	-	0	0	0
11:00	0	34.013	12.357	32.678	41.596	0	0	0	0	8.2783	0	0	483.8858301	0	34.7687	-	-	-	-	-	-	0	0	0
11:15	0	23.935	10.984	50.707	23.398	0	0	0	0	6.6226	0	0	467.0369148	0	36.4243	-	-	-	-	-	-	0	0	0
11:30	0	40.312	9.6113	49.58	32.497	0	0	0	0	13.245	0	0	484.3536493	0	43.0469	-	-	-	-	-	-	0	0	0
11:45	0	20.156	12.357	50.707	38.996	0	0	0	0	6.6226	0	0	473.1068463	0	46.3582	-	-	-	-	-	-	0	0	0
12:00	0	11.338	10.984	61.975	19.498	0	0	0	0	9.9339	0	0	474.9108741	0	51.3252	-	-	-	-	-	-	0	0	0
12:15	0	30.234	9.6113	46.2	40.296	0	0	0	0	13.245	0	0	486.8672468	0	56.2921	-	-	-	-	-	-	0	0	0
12:30	0	12.598	9.6113	60.849	37.696	0	0	0	0	16.557	0	0	496.8204735	0	48.0139	-	-	-	-	-	-	0	0	0
12:45	0	31.494	12.357	45.073	35.097	0	0	0	0	11.59	0	0	521.5006245	0	38.08	-	-	-	-	-	-	0	0	0
13:00	0	11.338	10.984	51.834	41.596	0	0	0	0	14.901	0	0	547.5314884	0	39.7356	-	-	-	-	-	-	0	0	0
13:15	0	25.195	27.461	56.341	27.297	0	0	0	0	4.967	0	0	671.7746315	0	29.8017	-	-	-	-	-	-	0	0	0
13:30	0	40.312	9.6113	55.214	40.296	0	0	0	0	6.6226	0	0	754.5967393	0	39.7356	-	-	-	-	-	-	0	0	0
13:45	0	44.091	12.357	50.707	42.896	0	0	0	0	13.245	0	0	804.7204972	0	39.7356	-	-	-	-	-	-	0	0	0
14:00	0	54.169	8.2382	104.79	72.793	0	0	0	0	4.967	0	0	839.3858048	0	36.4243	-	-	-	-	-	-	0	0	0
14:15	0	45.351	9.6113	99.161	64.994	0	0	0	0	14.901	0	0	798.5063368	0	49.6695	-	-	-	-	-	-	0	0	0
14:30	0	42.832	24.715	72.117	55.894	0	0	0	0	6.6226	0	0	727.7384844	0	46.3582	-	-	-	-	-	-	0	0	0
14:45	0	45.351	26.088	66.483	46.795	0	0	0	0	9.9339	0	0	699.9877639	0	51.3252	-	-	-	-	-	-	0	0	0
15:00	0	59.208	15.103	67.61	57.194	0	0	0	0	18.212	0	0	701.7088663	0	49.6695	-	-	-	-	-	-	0	0	0
15:15	0	37.793	12.357	63.102	35.097	0	0	0	0	11.59	0	0	679.2024065	0	46.3582	-	-	-	-	-	-	0	0	0
15:30	0	34.013	28.834	69.863	35.097	0	0	0	0	11.59	0	0	756.3170247	0	48.0139	-	-	-	-	-	-	0	0	0
15:45	0	46.611	23.342	70.99	45.495	0	0	0	0	8.2783	0	0	753.1801247	0	52.9808	-	-	-	-	-	-	0	0	0
16:00	0	62.988	17.85	61.975	33.797	0	0	0	0	14.901	0	0	730.0734494	0	49.6695	-	-	-	-	-	-	0	0	0
16:15	0	71.806	35.699	69.863	48.095	0	0	0	0	13.245	0	0	751.760128	0	48.0139	-	-	-	-	-	-	0	0	0
16:30	0	55.429	13.73	55.214	40.296	0	0	0	0	16.557	0	0	692.7101587	0	41.3913	-	-	-	-	-	-	0	0	0
16:45	0	59.208	23.342	66.483	14.299	0	0	0	0	4.967	0	0	684.1256571	0	31.4574	-	-	-	-	-	-	0	0	0
17:00	0	49.13	34.326	73.244	41.596	0	0	0	0	13.245	0	0	669.6690961	0	48.0139	-	-	-	-	-	-	0	0	0
17:15	0	37.793	26.088	68.736	33.797	0	0	0	0	6.6226	0	0	627.5173171	0	44.7026	-	-	-	-	-	-	0	0	0
17:30	0	39.052	23.342	58.595	35.097	0	0	0	0	6.6226	0	0	590.7089489	0	41.3913	-	-	-	-	-	-	0	0	0
17:45	0	52.91	15.103	40.566	40.296	0	0	0	0	21.523	0	0	551.0950336	0	39.7356	-	-	-	-	-	-	0	0	0
18:00	0	32.754	28.834	52.961	41.596	0	0	0	0	9.9339	0	0	490.2386275	0	28.1461	-	-	-	-	-	-	0	0	0
18:15	0	37.793	23.342	45.073	23.398	0	0	0	0	3.3113	0	0	434.0347771	0	29.8017	-	-	-	-	-	-	0	0	0
18:30	0	51.65	9.6113	38.312	16.898	0	0	0	0	4.967	0	0	391.4093666	0	29.8017	-	-	-	-	-	-	0	0	0
18:45	0	23.935	5.4922	41.693	16.898	0	0	0	0	9.9339	0	0	364.2789372	0	33.113	-	-	-	-	-	-	0	0	0
19:00	0	30.234	15.103	33.805	20.798	0	0	0	0	11.59	0	0	337.0236549	0	26.4904	-	-	-	-	-	-	0	0	0
19:15	0	30.234	10.984	23.663	22.098	0	0	0	0	3.3113	0	0	237.0835045	0	14.9009	-	-	-	-	-	-	0	0	0
19:30	0	18.896	19.223	30.424	20.798	0	0	0	0	8.2783	0	0	150.1040272	0	11.5896	-	-	-	-	-	-	0	0	0
19:45	0	12.598	10.984	20.283	16.898	0	0	0	0	3.3113	0	0	60.76299798	0	3.3113	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						0	0	0
															Signal Warranted?						No		
															Notes								

Weekday Kahekili Hwy/Waiehu Beach Road 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction:		0%	RT Reduction:		100%										
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	39.64091218	0	6.6226			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	79.51037212	0	9.9339			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	154.5063753	0	24.8348			0	0	0	0
5:00	0	1.2598	1.373	21.41	15.598	0	0	0	0	6.6226	0	0	227.2239931	0	29.8017			0	0	0	0
5:15	0	0	0	28.171	11.699	0	0	0	0	3.3113	0	0	308.5807951	0	24.8348			0	0	0	0
5:30	0	3.7793	2.7461	45.073	23.398	0	0	0	0	14.901	0	0	413.3787176	0	33.113			0	0	0	0
5:45	0	5.039	1.373	50.707	15.598	0	0	0	0	4.967	0	0	560.8592946	0	24.8348			0	0	0	0
6:00	0	13.857	6.8652	49.58	50.695	0	0	0	0	1.6557	0	0	738.314721	0	28.1461			0	0	0	0
6:15	0	15.117	10.984	74.37	44.196	0	0	0	0	11.59	0	0	945.9850238	0	39.1618			0	0	0	0
6:30	0	31.494	4.1191	120.57	66.293	0	0	0	0	6.6226	0	0	1063.845654	0	38.9766			0	0	0	0
6:45	0	46.611	2.7461	122.82	77.992	0	0	0	0	8.2783	0	0	1069.258661	0	45.0254			0	0	0	0
7:00	0	52.129	11.928	146.49	118.12	0	0	0	0	12.671	0	0	981.0663596	0	44.35			0	0	0	0
7:15	0	69.101	11.928	59.722	121.78	0	0	0	0	11.404	0	0	790.0604068	0	38.3012			0	0	0	0
7:30	0	38.794	9.5422	68.736	110.82	0	0	0	0	12.671	0	0	655.0208242	0	58.3543			0	0	0	0
7:45	0	31.52	9.5422	70.99	49.929	0	0	0	0	7.6029	0	0	575.1998539	0	58.928			0	0	0	0
8:00	0	34.013	9.6113	56.341	37.696	0	0	0	0	6.6226	0	0	520.1727789	0	62.9147			0	0	0	0
8:15	0	26.455	10.984	48.453	41.596	0	0	0	0	31.457	0	0	474.990675	0	57.9478			0	0	0	0
8:30	0	40.312	15.103	65.356	27.297	0	0	0	0	13.245	0	0	*465.1395272*	0	34.7687			0	0	0	0
8:45	0	16.377	8.2382	56.341	25.997	0	0	0	0	11.59	0	0	417.5519342	0	29.8017			0	0	0	0
9:00	0	17.637	4.1191	47.327	23.398	0	0	0	0	1.6557	0	0	416.2646337	0	26.4904			0	0	0	0
9:15	0	27.715	4.1191	50.707	35.097	0	0	0	0	8.2783	0	0	410.9535468	0	38.08			0	0	0	0
9:30	0	16.377	5.4922	55.214	23.398	0	0	0	0	8.2783	0	0	401.1913776	0	36.4243			0	0	0	0
9:45	0	21.416	8.2382	55.214	20.798	0	0	0	0	8.2783	0	0	389.0220366	0	39.7356			0	0	0	0
10:00	0	6.2988	8.2382	51.834	20.798	0	0	0	0	13.245	0	0	377.5036277	0	44.7026			0	0	0	0
10:15	0	26.455	13.73	41.693	25.997	0	0	0	0	6.6226	0	0	410.9791831	0	39.7356			0	0	0	0
10:30	0	20.156	5.4922	40.566	22.098	0	0	0	0	11.59	0	0	412.1284603	0	39.7356			0	0	0	0
10:45	0	18.896	15.103	31.551	28.597	0	0	0	0	13.245	0	0	455.8171682	0	41.3913			0	0	0	0
11:00	0	34.013	12.357	32.678	41.596	0	0	0	0	8.2783	0	0	483.8858301	0	34.7687			0	0	0	0
11:15	0	23.935	10.984	50.707	23.398	0	0	0	0	6.6226	0	0	467.0369148	0	36.4243			0	0	0	0
11:30	0	40.312	9.6113	49.58	32.497	0	0	0	0	13.245	0	0	484.3536493	0	43.0469			0	0	0	0
11:45	0	20.156	12.357	50.707	38.996	0	0	0	0	6.6226	0	0	473.1068463	0	46.3582			0	0	0	0
12:00	0	11.338	10.984	61.975	19.498	0	0	0	0	9.9339	0	0	474.9108741	0	51.3252			0	0	0	0
12:15	0	30.234	9.6113	46.2	40.296	0	0	0	0	13.245	0	0	486.8672468	0	56.2921			0	0	0	0
12:30	0	12.598	9.6113	60.849	37.696	0	0	0	0	16.557	0	0	496.8204735	0	48.0139			0	0	0	0
12:45	0	31.494	12.357	45.073	35.097	0	0	0	0	11.59	0	0	521.5006245	0	38.08			0	0	0	0
13:00	0	11.338	10.984	51.834	41.596	0	0	0	0	14.901	0	0	547.5314884	0	39.7356			0	0	0	0
13:15	0	25.195	27.461	56.341	27.297	0	0	0	0	4.967	0	0	671.7746315	0	29.8017			0	0	0	0
13:30	0	40.312	9.6113	55.214	40.296	0	0	0	0	6.6226	0	0	754.5967393	0	39.7356			0	0	0	0
13:45	0	44.091	12.357	50.707	42.896	0	0	0	0	13.245	0	0	804.7204972	0	39.7356			0	0	0	0
14:00	0	54.169	8.2382	104.79	72.793	0	0	0	0	4.967	0	0	839.3858048	0	36.4243			0	0	0	0
14:15	0	45.351	9.6113	99.161	64.994	0	0	0	0	14.901	0	0	798.5063368	0	49.6695			0	0	0	0
14:30	0	42.832	24.715	72.117	55.894	0	0	0	0	6.6226	0	0	727.7384844	0	46.3582			0	0	0	0
14:45	0	45.351	26.088	66.483	46.795	0	0	0	0	9.9339	0	0	699.9877639	0	51.3252			0	0	0	0
15:00	0	59.208	15.103	67.61	57.194	0	0	0	0	18.212	0	0	701.7088663	0	49.6695			0	0	0	0
15:15	0	37.793	12.357	63.102	35.097	0	0	0	0	11.59	0	0	679.2024065	0	46.3582			0	0	0	0
15:30	0	34.013	28.834	69.863	35.097	0	0	0	0	11.59	0	0	756.3170247	0	48.0139			0	0	0	0
15:45	0	46.611	23.342	70.99	45.495	0	0	0	0	8.2783	0	0	753.1801247	0	52.9808			0	0	0	0
16:00	0	62.988	17.85	61.975	33.797	0	0	0	0	14.901	0	0	730.0734494	0	49.6695			0	0	0	0
16:15	0	71.806	35.699	69.863	48.095	0	0	0	0	13.245	0	0	751.760128	0	48.0139			0	0	0	0
16:30	0	55.429	13.73	55.214	40.296	0	0	0	0	16.557	0	0	692.7101587	0	41.3913			0	0	0	0
16:45	0	59.208	23.342	66.483	14.299	0	0	0	0	4.967	0	0	684.1256571	0	31.4574			0	0	0	0
17:00	0	49.13	34.326	73.244	41.596	0	0	0	0	13.245	0	0	669.6690961	0	48.0139			0	0	0	0
17:15	0	37.793	26.088	68.736	33.797	0	0	0	0	6.6226	0	0	627.5173171	0	44.7026			0	0	0	0
17:30	0	39.052	23.342	58.595	35.097	0	0	0	0	6.6226	0	0	590.7089489	0	41.3913			0	0	0	0
17:45	0	52.91	15.103	40.566	40.296	0	0	0	0	21.523	0	0	551.0950336	0	39.7356			0	0	0	0
18:00	0	32.754	28.834	52.961	41.596	0	0	0	0	9.9339	0	0	490.2386275	0	28.1461			0	0	0	0
18:15	0	37.793	23.342	45.073	23.398	0	0	0	0	3.3113	0	0	434.0347771	0	29.8017			0	0	0	0
18:30	0	51.65	9.6113	38.312	16.898	0	0	0	0	4.967	0	0	391.4093666	0	29.8017			0	0	0	0
18:45	0	23.935	5.4922	41.693	16.898	0	0	0	0	9.9339	0	0	364.2789372	0	33.113			0	0	0	0
19:00	0	30.234	15.103	33.805	20.798	0	0	0	0	11.59	0	0	337.0236549	0	26.4904			0	0	0	0
19:15	0	30.234	10.984	23.663	22.098	0	0	0	0	3.3113	0	0	237.0835045	0	14.9009			0	0	0	0
19:30	0	18.896	19.223	30.424	20.798	0	0	0	0	8.2783	0	0	150.1040272	0	11.5896			0	0	0	0
19:45	0	12.598	10.984	20.283	16.898	0	0	0	0	3.3113	0	0	60.76299798	0	3.3113			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met: 0

Signal Warranted? No


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
201
60'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

Kahekili Highway/Waiehu Beach Road
Future Year Without Imi Kala Street Extension

Weekday Kahekili Hwy/Waiehu Beach Road 8-Hour Signal Warra

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

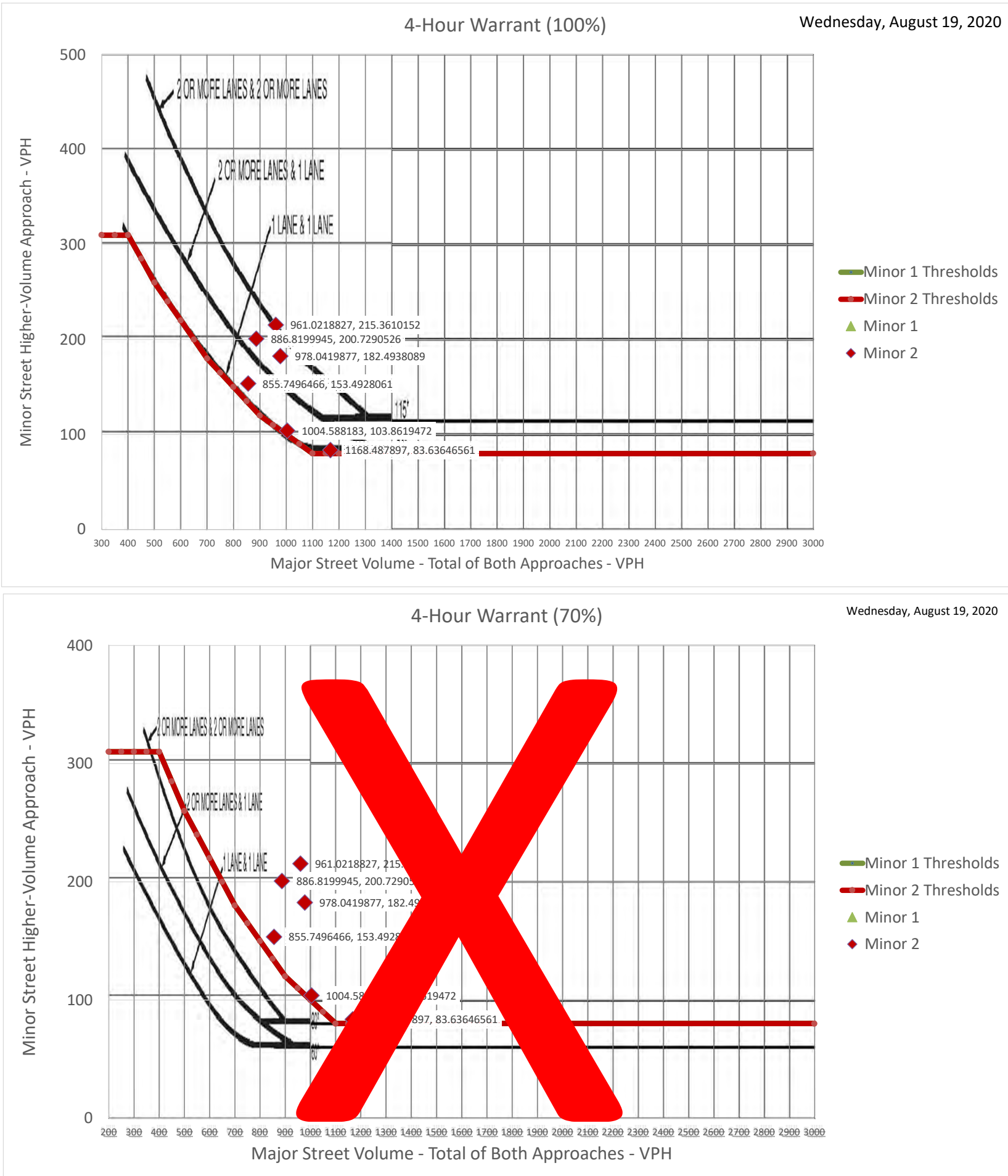
	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	151.1055248	0	6.76599	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	334.9588905	0	24.3054	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	609.6813288	0	38.9767	-	-	-	-	-	-	0	0	0
6:00	0	20.045	28.691	49.58	52.79	0	0	0	0	6.766	0	0	920.5160074	0	65.3782	-	-	-	-	-	-	0	0	0
6:15	0	23.168	39.8	74.37	46.514	0	0	0	0	17.539	0	0	1168.487897	0	83.6365	-	-	-	-	1	-	0	1	0
6:30	0	42.177	42.804	120.57	69.172	0	0	0	0	14.671	0	0	1305.424988	0	95.1211	-	-	-	-	1	-	0	2	0
6:45	0	58.5	45.954	122.82	83.557	0	0	0	0	26.401	0	0	1320.641715	0	109.236	-	-	-	-	1	-	0	3	0
7:00	0	72.5	53.902	146.49	126.19	0	0	0	0	25.024	0	0	1232.04722	0	103.668	-	-	-	-	1	-	0	4	0
7:15	0	85.151	43.819	59.722	132.1	0	0	0	0	29.024	0	0	1004.588183	0	103.862	-	-	-	-	1	-	0	1	0
7:30	0	56.173	44.536	68.736	120.49	0	0	0	0	28.786	0	0	853.6878633	0	125.31	-	-	-	-	1	1	0	2	1
7:45	0	48.733	44.148	70.99	58.369	0	0	0	0	20.834	0	0	745.0242923	0	121.648	-	-	-	-	-	1	0	3	2
8:00	0	40.406	29.759	56.341	45.112	0	0	0	0	25.218	0	0	663.8014121	0	125.543	-	-	-	-	-	1	0	4	3
8:15	0	34.602	37.711	48.453	49.124	0	0	0	0	50.472	0	0	620.9360632	0	118.362	-	-	-	-	-	-	0	0	4
8:30	0	46.924	36.074	65.356	32.922	0	0	0	0	25.124	0	0	*606.1441322*	0	89.1917	-	-	-	-	-	-	0	0	0
8:45	0	23.098	29.62	56.341	31.958	0	0	0	0	24.728	0	0	556.1903436	0	87.8882	-	-	-	-	-	-	0	0	0
9:00	0	24.892	25.056	47.327	31.478	0	0	0	0	18.038	0	0	552.1667973	0	90.7589	-	-	-	-	-	-	0	0	0
9:15	0	35.409	26.701	50.707	42.282	0	0	0	0	21.302	0	0	542.2261653	0	100.685	-	-	-	-	-	-	0	0	0
9:30	0	22.536	22.317	55.214	31.254	0	0	0	0	23.821	0	0	526.3884846	0	103.663	-	-	-	-	-	-	0	0	0
9:45	0	27.465	24.652	55.214	29.662	0	0	0	0	27.599	0	0	517.2218046	0	112.447	-	-	-	-	-	-	0	0	0
10:00	0	13.256	23.928	51.834	29.794	0	0	0	0	27.964	0	0	512.9458705	0	121.208	-	-	-	-	-	-	0	0	0
10:15	0	33.193	28.597	41.693	35.777	0	0	0	0	24.28	0	0	555.4328743	0	126.482	-	-	-	-	-	-	0	0	0
10:30	0	27.223	21.593	40.566	32.773	0	0	0	0	32.605	0	0	556.9539465	0	125.809	-	-	-	-	-	-	0	0	0
10:45	0	26.841	34.494	31.551	39.832	0	0	0	0	36.359	0	0	605.8185737	0	133.089	-	-	-	-	-	1	0	0	1
11:00	0	43.031	31.796	32.678	53.794	0	0	0	0	33.238	0	0	639.4674396	0	125.794	-	-	-	-	-	1	0	0	2
11:15	0	31.528	25.078	50.707	33.469	0	0	0	0	23.607	0	0	623.6494027	0	133.673	-	-	-	-	-	1	0	0	3
11:30	0	48.891	27.405	49.58	45.143	0	0	0	0	39.884	0	0	646.5384108	0	149.877	-	-	-	-	-	1	0	0	4
11:45	0	30.051	35.086	50.707	50.523	0	0	0	0	29.064	0	0	637.2818462	0	149.337	-	-	-	-	-	1	0	0	1
12:00	0	20.41	30.472	61.975	32.624	0	0	0	0	41.117	0	0	639.6301461	0	156.75	-	-	-	1	-	1	1	0	2
12:15	0	38.648	26.632	46.2	52.19	0	0	0	0	39.811	0	0	655.8626206	0	156.064	-	-	-	1	-	1	2	0	3
12:30	0	21.998	30.333	60.849	48.583	0	0	0	0	39.345	0	0	671.8052626	0	144.652	-	-	-	-	-	1	3	0	4
12:45	0	41.553	35.546	45.073	46.543	0	0	0	0	36.477	0	0	699.0962894	0	140.399	-	-	-	-	-	1	4	0	1
13:00	0	21.564	35.259	51.834	53.057	0	0	0	0	40.432	0	0	732.5033015	0	151.934	-	-	-	1	-	1	1	0	2
13:15	0	34.982	50.091	56.341	38.199	0	0	0	0	28.399	0	0	855.7496466	0	153.493	-	-	-	1	1	1	2	1	3
13:30	0	49.88	31.419	55.214	52.541	0	0	0	0	35.092	0	0	942.8953039	0	175.339	-	-	-	1	1	1	3	2	4
13:45	0	55.085	39.51	50.707	56.82	0	0	0	0	48.011	0	0	993.8382805	0	178.017	-	-	-	1	1	1	4	3	1
14:00	0	63.52	29.536	104.79	87.11	0	0	0	0	41.991	0	0	1022.211442	0	170.247	-	-	-	1	1	1	1	4	2
14:15	0	55.359	33.376	99.161	78.863	0	0	0	0	50.246	0	0	978.0419877	0	182.494	-	-	-	1	1	1	2	1	3
14:30	0	52.401	46.835	72.117	68.644	0	0	0	0	37.77	0	0	910.4581176	0	179.023	-	-	-	1	1	1	3	2	4
14:45	0	55.25	49.441	66.483	59.321	0	0	0	0	40.241	0	0	888.1690035	0	194.326	-	-	-	1	1	1	4	3	1
15:00	0	68.007	33.72	67.61	71.454	0	0	0	0	54.237	0	0	896.1306647	0	200.067	-	-	-	1	1	1	1	4	2
15:15	0	48.565	38.375	63.102	49.133	0	0	0	0	46.775	0	0	886.8199945	0	200.729	-	-	-	1	1	1	2	1	3
15:30	0	44.238	52.796	69.863	50.812	0	0	0	0	53.072	0	0	960.7650746	0	211.395	-	-	-	1	1	1	3	2	4
15:45	0	57.493	49.771	70.99	60.203	0	0	0	0	45.983	0	0	966.3556556	0	215.299	-	-	-	1	1	1	4	3	1
16:00	0	74.308	45.923	61.975	49.273	0	0	0	0	54.9	0	0	941.6761994	0	217.22	-	-	-	1	1	1	1	4	2
16:15	0	81.372	57.194	69.863	64.691	0	0	0	0	57.442	0	0	961.0218827	0	215.361	-	-	-	1	1	1	2	1	3
16:30	0	67.517	44.683	55.214	55.884	0	0	0	0	56.975	0	0	895.2699304	0	198.041	-	-	-	1	1	1	3	2	4
16:45	0	69.433	47.304	66.483	30.559	0	0	0	0	47.904	0	0	879.992681	0	189.163	-	-	-	1	1	1	4	3	1
17:00	0	59.856	61.545	73.244	56.181	0	0	0	0	53.04	0	0	870.4480454	0	203.417	-	-	-	1	1	1	1	4	2
17:15	0	46.435	45.494	68.736	46.703	0	0	0	0	40.121	0	0	619.6223028	0	150.376	-	-	-	1	-	1	2	0	3
17:30	0	49.559	49.738	58.595	50.13	0	0	0	0	48.097	0	0	412.2541402	0	110.255	-	-	-	-	-	-	3	0	4
17:45	0	64.183	44.378	40.566	55.105	0	0	0	0	62.158	0	0	204.2327309	0	62.1582	-	-	-	-	-	-	4	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
																						Hours where condition met:	6	6	8
																						Signal Warranted?	Yes		
																						Notes	A+B Warrant requires remedial measures in avance of installation of signal.		

Weekday Kahekili Hwy/Waiehu Beach Road 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction:		0%	RT Reduction:		100%									
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	151.1055248	0	6.76599			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	334.9588905	0	24.3054			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	609.6813288	0	38.9767			0	0	0	0
6:00	0	20.045	28.691	49.58	52.79	0	0	0	0	6.766	0	0	920.5160074	0	65.3782			0	0	0	0
6:15	0	23.168	39.8	74.37	46.514	0	0	0	0	17.539	0	0	1168.487897	0	83.6365		1	0	1	1	1
6:30	0	42.177	42.804	120.57	69.172	0	0	0	0	14.671	0	0	1305.424988	0	95.1211		1	0	2	1	2
6:45	0	58.5	45.954	122.82	83.557	0	0	0	0	26.401	0	0	1320.641715	0	109.236		1	0	3	1	3
7:00	0	72.5	53.902	146.49	126.19	0	0	0	0	25.024	0	0	1232.04722	0	103.668		1	0	4	1	4
7:15	0	85.151	43.819	59.722	132.1	0	0	0	0	29.024	0	0	1004.588183	0	103.862		1	0	1	1	1
7:30	0	56.173	44.536	68.736	120.49	0	0	0	0	28.786	0	0	853.6878633	0	125.31			0	2	0	2
7:45	0	48.733	44.148	70.99	58.369	0	0	0	0	20.834	0	0	745.0242923	0	121.648			0	3	0	3
8:00	0	40.406	29.759	56.341	45.112	0	0	0	0	25.218	0	0	663.8014121	0	125.543			0	4	0	4
8:15	0	34.602	37.711	48.453	49.124	0	0	0	0	50.472	0	0	620.9360632	0	118.362			0	0	0	0
8:30	0	46.924	36.074	65.356	32.922	0	0	0	0	25.124	0	0	*606.1441322*	0	89.1917			0	0	0	0
8:45	0	23.098	29.62	56.341	31.958	0	0	0	0	24.728	0	0	556.1903436	0	87.8882			0	0	0	0
9:00	0	24.892	25.056	47.327	31.478	0	0	0	0	18.038	0	0	552.1667973	0	90.7589			0	0	0	0
9:15	0	35.409	26.701	50.707	42.282	0	0	0	0	21.302	0	0	542.2261653	0	100.685			0	0	0	0
9:30	0	22.536	22.317	55.214	31.254	0	0	0	0	23.821	0	0	526.3884846	0	103.663			0	0	0	0
9:45	0	27.465	24.652	55.214	29.662	0	0	0	0	27.599	0	0	517.2218046	0	112.447			0	0	0	0
10:00	0	13.256	23.928	51.834	29.794	0	0	0	0	27.964	0	0	512.9458705	0	121.208			0	0	0	0
10:15	0	33.193	28.597	41.693	35.777	0	0	0	0	24.28	0	0	555.4328743	0	126.482			0	0	0	0
10:30	0	27.223	21.593	40.566	32.773	0	0	0	0	32.605	0	0	556.9539465	0	125.809			0	0	0	0
10:45	0	26.841	34.494	31.551	39.832	0	0	0	0	36.359	0	0	605.8185737	0	133.089			0	0	0	0
11:00	0	43.031	31.796	32.678	53.794	0	0	0	0	33.238	0	0	639.4674396	0	125.794			0	0	0	0
11:15	0	31.528	25.078	50.707	33.469	0	0	0	0	23.607	0	0	623.6494027	0	133.673			0	0	0	0
11:30	0	48.891	27.405	49.58	45.143	0	0	0	0	39.884	0	0	646.5384108	0	149.877			0	0	0	0
11:45	0	30.051	35.086	50.707	50.523	0	0	0	0	29.064	0	0	637.2818462	0	149.337			0	0	0	0
12:00	0	20.41	30.472	61.975	32.624	0	0	0	0	41.117	0	0	639.6301461	0	156.75			0	0	0	0
12:15	0	38.648	26.632	46.2	52.19	0	0	0	0	39.811	0	0	655.8626206	0	156.064			0	0	0	0
12:30	0	21.998	30.333	60.849	48.583	0	0	0	0	39.345	0	0	671.8052626	0	144.652			0	0	0	0
12:45	0	41.553	35.546	45.073	46.543	0	0	0	0	36.477	0	0	699.0962894	0	140.399			0	0	0	0
13:00	0	21.564	35.259	51.834	53.057	0	0	0	0	40.432	0	0	732.5033015	0	151.934			0	0	0	0
13:15	0	34.982	50.091	56.341	38.199	0	0	0	0	28.399	0	0	855.7496466	0	153.493		1	0	1	1	1
13:30	0	49.88	31.419	55.214	52.541	0	0	0	0	35.092	0	0	942.8953039	0	175.339		1	0	2	1	2
13:45	0	55.085	39.51	50.707	56.82	0	0	0	0	48.011	0	0	993.8382805	0	178.017		1	0	3	1	3
14:00	0	63.52	29.536	104.79	87.11	0	0	0	0	41.991	0	0	1022.211442	0	170.247		1	0	4	1	4
14:15	0	55.359	33.376	99.161	78.863	0	0	0	0	50.246	0	0	978.0419877	0	182.494		1	0	1	1	1
14:30	0	52.401	46.835	72.117	68.644	0	0	0	0	37.77	0	0	910.4581176	0	179.023		1	0	2	1	2
14:45	0	55.25	49.441	66.483	59.321	0	0	0	0	40.241	0	0	888.1690035	0	194.326		1	0	3	1	3
15:00	0	68.007	33.72	67.61	71.454	0	0	0	0	54.237	0	0	896.1306647	0	200.067		1	0	4	1	4
15:15	0	48.565	38.375	63.102	49.133	0	0	0	0	46.775	0	0	886.8199945	0	200.729		1	0	1	1	1
15:30	0	44.238	52.796	69.863	50.812	0	0	0	0	53.072	0	0	960.7650746	0	211.395		1	0	2	1	2
15:45	0	57.493	49.771	70.99	60.203	0	0	0	0	45.983	0	0	966.3556556	0	215.299		1	0	3	1	3
16:00	0	74.308	45.923	61.975	49.273	0	0	0	0	54.9	0	0	941.6761994	0	217.22		1	0	4	1	4
16:15	0	81.372	57.194	69.863	64.691	0	0	0	0	57.442	0	0	961.0218827	0	215.361		1	0	1	1	1
16:30	0	67.517	44.683	55.214	55.884	0	0	0	0	56.975	0	0	895.2699304	0	198.041		1	0	2	1	2
16:45	0	69.433	47.304	66.483	30.559	0	0	0	0	47.904	0	0	879.992681	0	189.163		1	0	3	1	3
17:00	0	59.856	61.545	73.244	56.181	0	0	0	0	53.04	0	0	870.4480454	0	203.417		1	0	4	1	4
17:15	0	46.435	45.494	68.736	46.703	0	0	0	0	40.121	0	0	619.6223028	0	150.376			0	0	0	0
17:30	0	49.559	49.738	58.595	50.13	0	0	0	0	48.097	0	0	412.2541402	0	110.255			0	0	0	0
17:45	0	64.183	44.378	40.566	55.105	0	0	0	0	62.158	0	0	204.2327309	0	62.1582			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	6
Signal Warranted?	Yes


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
961.0218827, 215.3610152
886.8199945, 200.7290526
978.0419877, 182.4938089
855.7496466, 153.4928061
1004.588183, 103.8619472
1168.487897, 83.63646561
115'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2
4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Waiehu Beach Road 8-Hour Signal Warra

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes						Major Threshold	600	900	720	600	900	720			
	2						1			1						Minor Threshold	150	75	120	150	75	120			
							RT Reduction:	0%		RT Reduction:	100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	151.1055248	0	6.76599	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	334.9588905	0	24.3054	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	609.6813288	0	38.9767	-	-	-	-	-	-	0	0	0
6:00	0	20.045	28.691	49.58	52.79	0	0	0	0	6.766	0	0	920.5160074	0	65.3782	-	-	-	-	-	-	0	0	0
6:15	0	23.168	39.8	74.37	46.514	0	0	0	0	17.539	0	0	1168.487897	0	83.6365	-	-	-	-	1	-	0	1	0
6:30	0	42.177	42.804	120.57	69.172	0	0	0	0	14.671	0	0	1305.424988	0	95.1211	-	-	-	-	1	-	0	2	0
6:45	0	58.5	45.954	122.82	83.557	0	0	0	0	26.401	0	0	1320.641715	0	109.236	-	-	-	-	1	-	0	3	0
7:00	0	72.5	53.902	146.49	126.19	0	0	0	0	25.024	0	0	1232.04722	0	103.668	-	-	-	-	1	-	0	4	0
7:15	0	85.151	43.819	59.722	132.1	0	0	0	0	29.024	0	0	1004.588183	0	103.862	-	-	-	-	1	-	0	1	0
7:30	0	56.173	44.536	68.736	120.49	0	0	0	0	28.786	0	0	853.6878633	0	125.31	-	-	-	-	-	1	0	2	1
7:45	0	48.733	44.148	70.99	58.369	0	0	0	0	20.834	0	0	745.0242923	0	121.648	-	-	-	-	-	1	0	3	2
8:00	0	40.406	29.759	56.341	45.112	0	0	0	0	25.218	0	0	663.8014121	0	125.543	-	-	-	-	-	-	0	4	3
8:15	0	34.602	37.711	48.453	49.124	0	0	0	0	50.472	0	0	620.9360632	0	118.362	-	-	-	-	-	-	0	0	4
8:30	0	46.924	36.074	65.356	32.922	0	0	0	0	25.124	0	0	*606.1441322*	0	89.1917	-	-	-	-	-	-	0	0	0
8:45	0	23.098	29.62	56.341	31.958	0	0	0	0	24.728	0	0	556.1903436	0	87.8882	-	-	-	-	-	-	0	0	0
9:00	0	24.892	25.056	47.327	31.478	0	0	0	0	18.038	0	0	552.1667973	0	90.7589	-	-	-	-	-	-	0	0	0
9:15	0	35.409	26.701	50.707	42.282	0	0	0	0	21.302	0	0	542.2261653	0	100.685	-	-	-	-	-	-	0	0	0
9:30	0	22.536	22.317	55.214	31.254	0	0	0	0	23.821	0	0	526.3884846	0	103.663	-	-	-	-	-	-	0	0	0
9:45	0	27.465	24.652	55.214	29.662	0	0	0	0	27.599	0	0	517.2218046	0	112.447	-	-	-	-	-	-	0	0	0
10:00	0	13.256	23.928	51.834	29.794	0	0	0	0	27.964	0	0	512.9458705	0	121.208	-	-	-	-	-	-	0	0	0
10:15	0	33.193	28.597	41.693	35.777	0	0	0	0	24.28	0	0	555.4328743	0	126.482	-	-	-	-	-	-	0	0	0
10:30	0	27.223	21.593	40.566	32.773	0	0	0	0	32.605	0	0	556.9539465	0	125.809	-	-	-	-	-	-	0	0	0
10:45	0	26.841	34.494	31.551	39.832	0	0	0	0	36.359	0	0	605.8185737	0	133.089	-	-	-	-	-	-	0	0	0
11:00	0	43.031	31.796	32.678	53.794	0	0	0	0	33.238	0	0	639.4674396	0	125.794	-	-	-	-	-	-	0	0	0
11:15	0	31.528	25.078	50.707	33.469	0	0	0	0	23.607	0	0	623.6494027	0	133.673	-	-	-	-	-	-	0	0	0
11:30	0	48.891	27.405	49.58	45.143	0	0	0	0	39.884	0	0	646.5384108	0	149.877	-	-	-	-	-	-	0	0	0
11:45	0	30.051	35.086	50.707	50.523	0	0	0	0	29.064	0	0	637.2818462	0	149.337	-	-	-	-	-	-	0	0	0
12:00	0	20.41	30.472	61.975	32.624	0	0	0	0	41.117	0	0	639.6301461	0	156.75	-	-	-	1	-	-	1	0	0
12:15	0	38.648	26.632	46.2	52.19	0	0	0	0	39.811	0	0	655.8626206	0	156.064	-	-	-	1	-	-	2	0	0
12:30	0	21.998	30.333	60.849	48.583	0	0	0	0	39.345	0	0	671.8052626	0	144.652	-	-	-	-	-	-	3	0	0
12:45	0	41.553	35.546	45.073	46.543	0	0	0	0	36.477	0	0	699.0962894	0	140.399	-	-	-	-	-	-	4	0	0
13:00	0	21.564	35.259	51.834	53.057	0	0	0	0	40.432	0	0	732.5033015	0	151.934	-	-	-	1	-	1	1	0	1
13:15	0	34.982	50.091	56.341	38.199	0	0	0	0	28.399	0	0	855.7496466	0	153.493	-	-	-	1	-	1	2	0	2
13:30	0	49.88	31.419	55.214	52.541	0	0	0	0	35.092	0	0	942.8953039	0	175.339	-	-	-	1	1	1	3	1	3
13:45	0	55.085	39.51	50.707	56.82	0	0	0	0	48.011	0	0	993.8382805	0	178.017	-	-	-	1	1	1	4	2	4
14:00	0	63.52	29.536	104.79	87.11	0	0	0	0	41.991	0	0	1022.211442	0	170.247	-	-	-	1	1	1	1	3	1
14:15	0	55.359	33.376	99.161	78.863	0	0	0	0	50.246	0	0	978.0419877	0	182.494	-	-	-	1	1	1	2	4	2
14:30	0	52.401	46.835	72.117	68.644	0	0	0	0	37.77	0	0	910.4581176	0	179.023	-	-	-	1	1	1	3	1	3
14:45	0	55.25	49.441	66.483	59.321	0	0	0	0	40.241	0	0	888.1690035	0	194.326	-	-	-	1	-	1	4	2	4
15:00	0	68.007	33.72	67.61	71.454	0	0	0	0	54.237	0	0	896.1306647	0	200.067	-	-	-	1	-	1	1	3	1
15:15	0	48.565	38.375	63.102	49.133	0	0	0	0	46.775	0	0	886.8199945	0	200.729	-	-	-	1	-	1	2	4	2
15:30	0	44.238	52.796	69.863	50.812	0	0	0	0	53.072	0	0	960.7650746	0	211.395	-	-	-	1	1	1	3	1	3
15:45	0	57.493	49.771	70.99	60.203	0	0	0	0	45.983	0	0	966.3556556	0	215.299	-	-	-	1	1	1	4	2	4
16:00	0	74.308	45.923	61.975	49.273	0	0	0	0	54.9	0	0	941.6761994	0	217.22	-	-	-	1	1	1	1	3	1
16:15	0	81.372	57.194	69.863	64.691	0	0	0	0	57.442	0	0	961.0218827	0	215.361	-	-	-	1	1	1	2	4	2
16:30	0	67.517	44.683	55.214	55.884	0	0	0	0	56.975	0	0	895.2699304	0	198.041	-	-	-	1	-	1	3	0	3
16:45	0	69.433	47.304	66.483	30.559	0	0	0	0	47.904	0	0	879.992681	0	189.163	-	-	-	1	-	1	4	0	4
17:00	0	59.856	61.545	73.244	56.181	0	0	0	0	53.04	0	0	870.4480454	0	203.417	-	-	-	1	-	1	1	0	1
17:15	0	46.435	45.494	68.736	46.703	0	0	0	0	40.121	0	0	619.6223028	0	150.376	-	-	-	1	-	-	2	0	2
17:30	0	49.559	49.738	58.595	50.13	0	0	0	0	48.097	0	0	412.2541402	0	110.255	-	-	-	-	-	-	3	0	3
17:45	0	64.183	44.378	40.566	55.105	0	0	0	0	62.158	0	0	204.2327309	0	62.1582	-	-	-	-	-	-	4	0	4
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
																Hours where condition met:						6	5	6
																Signal Warranted?						No		
																Notes								

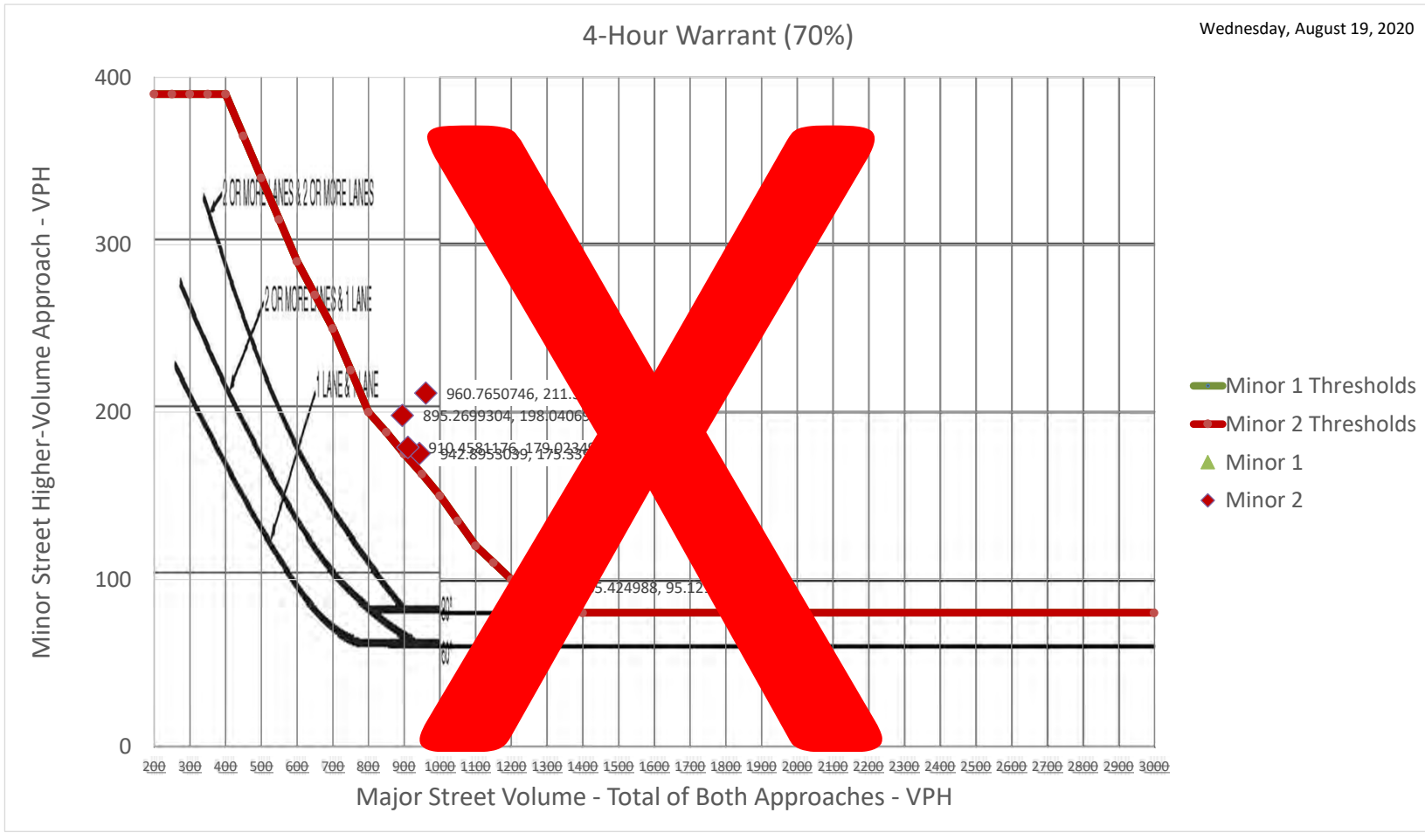
Weekday Kahekili Hwy/Waiehu Beach Road 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	2						1			1												
							RT Reduction:		0%	RT Reduction:		100%										
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	151.1055248	0	6.76599			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	334.9588905	0	24.3054			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	609.6813288	0	38.9767			0	0	0	0
6:00	0	20.045	28.691	49.58	52.79	0	0	0	0	6.766	0	0	920.5160074	0	65.3782			0	0	0	0
6:15	0	23.168	39.8	74.37	46.514	0	0	0	0	17.539	0	0	1168.487897	0	83.6365			0	0	0	0
6:30	0	42.177	42.804	120.57	69.172	0	0	0	0	14.671	0	0	1305.424988	0	95.1211	1		0	1	1	1
6:45	0	58.5	45.954	122.82	83.557	0	0	0	0	26.401	0	0	1320.641715	0	109.236	1		0	2	1	2
7:00	0	72.5	53.902	146.49	126.19	0	0	0	0	25.024	0	0	1232.04722	0	103.668	1		0	3	1	3
7:15	0	85.151	43.819	59.722	132.1	0	0	0	0	29.024	0	0	1004.588183	0	103.862			0	4	0	4
7:30	0	56.173	44.536	68.736	120.49	0	0	0	0	28.786	0	0	853.6878633	0	125.31			0	0	0	0
7:45	0	48.733	44.148	70.99	58.369	0	0	0	0	20.834	0	0	745.0242923	0	121.648			0	0	0	0
8:00	0	40.406	29.759	56.341	45.112	0	0	0	0	25.218	0	0	663.8014121	0	125.543			0	0	0	0
8:15	0	34.602	37.711	48.453	49.124	0	0	0	0	50.472	0	0	620.9360632	0	118.362			0	0	0	0
8:30	0	46.924	36.074	65.356	32.922	0	0	0	0	25.124	0	0	*606.1441322*	0	89.1917			0	0	0	0
8:45	0	23.098	29.62	56.341	31.958	0	0	0	0	24.728	0	0	556.1903436	0	87.8882			0	0	0	0
9:00	0	24.892	25.056	47.327	31.478	0	0	0	0	18.038	0	0	552.1667973	0	90.7589			0	0	0	0
9:15	0	35.409	26.701	50.707	42.282	0	0	0	0	21.302	0	0	542.2261653	0	100.685			0	0	0	0
9:30	0	22.536	22.317	55.214	31.254	0	0	0	0	23.821	0	0	526.3884846	0	103.663			0	0	0	0
9:45	0	27.465	24.652	55.214	29.662	0	0	0	0	27.599	0	0	517.2218046	0	112.447			0	0	0	0
10:00	0	13.256	23.928	51.834	29.794	0	0	0	0	27.964	0	0	512.9458705	0	121.208			0	0	0	0
10:15	0	33.193	28.597	41.693	35.777	0	0	0	0	24.28	0	0	555.4328743	0	126.482			0	0	0	0
10:30	0	27.223	21.593	40.566	32.773	0	0	0	0	32.605	0	0	556.9539465	0	125.809			0	0	0	0
10:45	0	26.841	34.494	31.551	39.832	0	0	0	0	36.359	0	0	605.8185737	0	133.089			0	0	0	0
11:00	0	43.031	31.796	32.678	53.794	0	0	0	0	33.238	0	0	639.4674396	0	125.794			0	0	0	0
11:15	0	31.528	25.078	50.707	33.469	0	0	0	0	23.607	0	0	623.6494027	0	133.673			0	0	0	0
11:30	0	48.891	27.405	49.58	45.143	0	0	0	0	39.884	0	0	646.5384108	0	149.877			0	0	0	0
11:45	0	30.051	35.086	50.707	50.523	0	0	0	0	29.064	0	0	637.2818462	0	149.337			0	0	0	0
12:00	0	20.41	30.472	61.975	32.624	0	0	0	0	41.117	0	0	639.6301461	0	156.75			0	0	0	0
12:15	0	38.648	26.632	46.2	52.19	0	0	0	0	39.811	0	0	655.8626206	0	156.064			0	0	0	0
12:30	0	21.998	30.333	60.849	48.583	0	0	0	0	39.345	0	0	671.8052626	0	144.652			0	0	0	0
12:45	0	41.553	35.546	45.073	46.543	0	0	0	0	36.477	0	0	699.0962894	0	140.399			0	0	0	0
13:00	0	21.564	35.259	51.834	53.057	0	0	0	0	40.432	0	0	732.5033015	0	151.934			0	0	0	0
13:15	0	34.982	50.091	56.341	38.199	0	0	0	0	28.399	0	0	855.7496466	0	153.493			0	0	0	0
13:30	0	49.88	31.419	55.214	52.541	0	0	0	0	35.092	0	0	942.8953039	0	175.339	1		0	1	1	1
13:45	0	55.085	39.51	50.707	56.82	0	0	0	0	48.011	0	0	993.8382805	0	178.017	1		0	2	1	2
14:00	0	63.52	29.536	104.79	87.11	0	0	0	0	41.991	0	0	1022.211442	0	170.247	1		0	3	1	3
14:15	0	55.359	33.376	99.161	78.863	0	0	0	0	50.246	0	0	978.0419877	0	182.494	1		0	4	1	4
14:30	0	52.401	46.835	72.117	68.644	0	0	0	0	37.77	0	0	910.4581176	0	179.023	1		0	1	1	1
14:45	0	55.25	49.441	66.483	59.321	0	0	0	0	40.241	0	0	888.1690035	0	194.326	1		0	2	1	2
15:00	0	68.007	33.72	67.61	71.454	0	0	0	0	54.237	0	0	896.1306647	0	200.067	1		0	3	1	3
15:15	0	48.565	38.375	63.102	49.133	0	0	0	0	46.775	0	0	886.8199945	0	200.729	1		0	4	1	4
15:30	0	44.238	52.796	69.863	50.812	0	0	0	0	53.072	0	0	960.7650746	0	211.395	1		0	1	1	1
15:45	0	57.493	49.771	70.99	60.203	0	0	0	0	45.983	0	0	966.3556556	0	215.299	1		0	2	1	2
16:00	0	74.308	45.923	61.975	49.273	0	0	0	0	54.9	0	0	941.6761994	0	217.22	1		0	3	1	3
16:15	0	81.372	57.194	69.863	64.691	0	0	0	0	57.442	0	0	961.0218827	0	215.361	1		0	4	1	4
16:30	0	67.517	44.683	55.214	55.884	0	0	0	0	56.975	0	0	895.2699304	0	198.041	1		0	1	1	1
16:45	0	69.433	47.304	66.483	30.559	0	0	0	0	47.904	0	0	879.992681	0	189.163	1		0	2	1	2
17:00	0	59.856	61.545	73.244	56.181	0	0	0	0	53.04	0	0	870.4480454	0	203.417	1		0	3	1	3
17:15	0	46.435	45.494	68.736	46.703	0	0	0	0	40.121	0	0	619.6223028	0	150.376			0	4	0	4
17:30	0	49.559	49.738	58.595	50.13	0	0	0	0	48.097	0	0	412.2541402	0	110.255			0	0	0	0
17:45	0	64.183	44.378	40.566	55.105	0	0	0	0	62.158	0	0	204.2327309	0	62.1582			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	5
Signal Warranted?	Yes


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
960.7650746. 211.3954332
895.2699304, 198.0406926
910.4581176, 179.0234921
1305.424988, 95.1211363
115'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

Kahekili Highway/Waiehu Beach Road
Future Year With Imi Kala Street Extension

Weekday Kahekili Hwy/Waiehu Beach Road 8-Hour Signal Warra

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

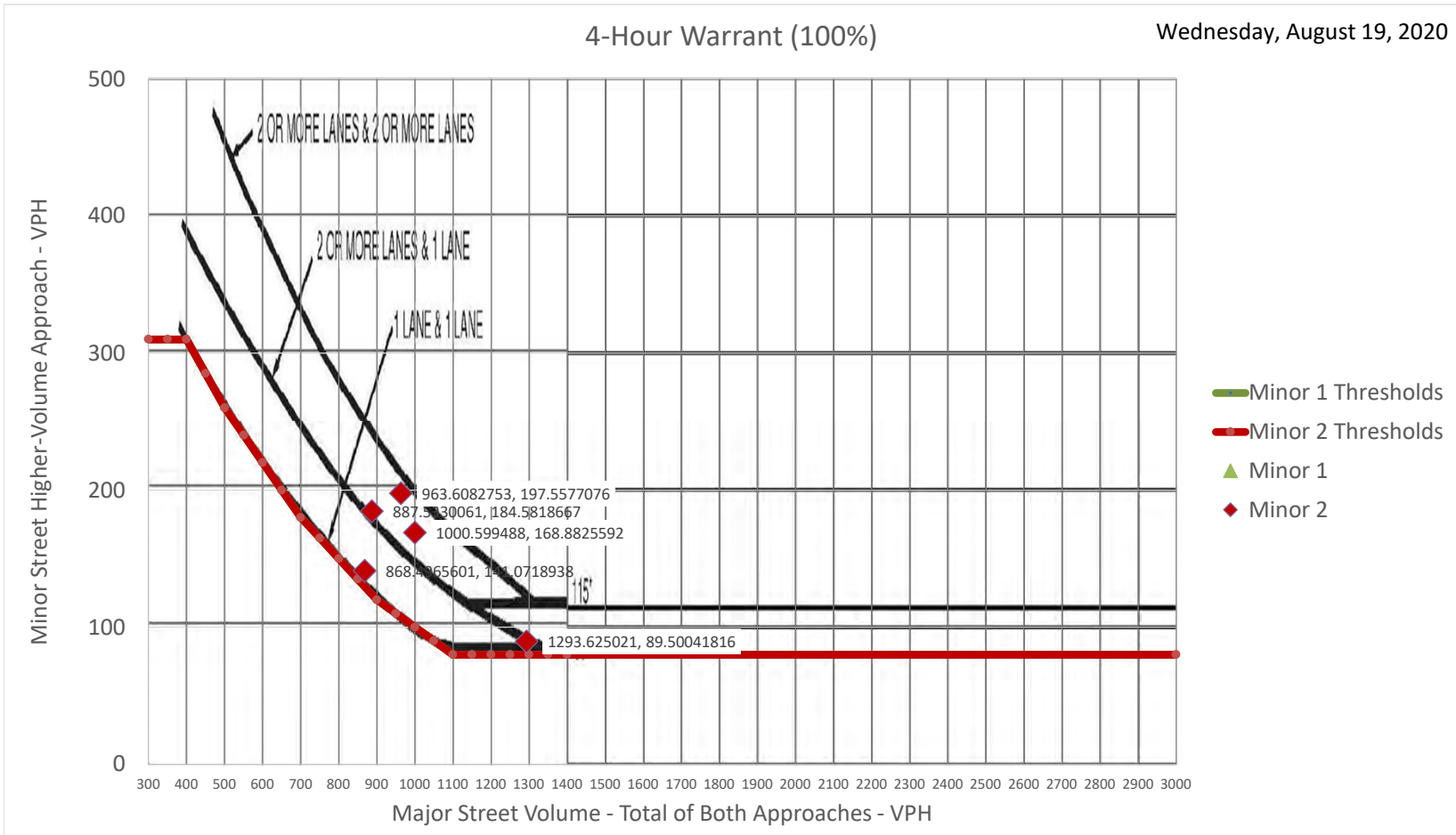
	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	157.077523	0	6.24845	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	339.0721104	0	23.1668	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	610.5276731	0	36.9583	-	-	-	-	-	-	0	0	0
6:00	0	20.914	25.491	40.349	70.323	0	0	0	0	6.2484	0	0	921.9940975	0	61.2379	-	-	-	-	-	-	0	0	0
6:15	0	24.117	35.554	60.523	61.8	0	0	0	0	16.918	0	0	1139.673615	0	79.0277	-	-	-	-	1	-	0	1	0
6:30	0	44.154	37.08	98.121	92.1	0	0	0	0	13.792	0	0	1293.625021	0	89.5004	-	-	-	-	1	-	0	2	0
6:45	0	61.426	39.553	99.955	110.53	0	0	0	0	24.28	0	0	1317.678726	0	103.047	-	-	-	-	1	-	0	3	0
7:00	0	74.909	45.185	87.185	167.48	0	0	0	0	24.038	0	0	1211.578729	0	98.5073	-	-	-	-	1	-	0	4	0
7:15	0	88.345	37.391	35.545	174.67	0	0	0	0	27.391	0	0	1010.291898	0	97.7721	-	-	-	-	1	-	0	1	0
7:30	0	57.966	37.404	40.91	159.23	0	0	0	0	27.338	0	0	847.4461249	0	118.887	-	-	-	-	1	-	0	2	0
7:45	0	50.19	37.104	42.251	75.821	0	0	0	0	19.74	0	0	730.0614764	0	115.586	-	-	-	-	-	-	0	3	0
8:00	0	42.541	26.928	45.851	58.15	0	0	0	0	23.303	0	0	662.2262085	0	119.332	-	-	-	-	-	-	0	4	0
8:15	0	36.262	33.895	39.432	63.511	0	0	0	0	48.506	0	0	615.0658669	0	112.618	-	-	-	-	-	-	0	0	0
8:30	0	49.454	33.12	53.187	42.364	0	0	0	0	24.037	0	0	*598.4239864*	0	84.3786	-	-	-	-	-	-	0	0	0
8:45	0	24.126	26.604	45.851	40.95	0	0	0	0	23.486	0	0	548.2457118	0	82.8163	-	-	-	-	-	-	0	0	0
9:00	0	25.999	22.225	38.515	39.571	0	0	0	0	16.588	0	0	543.8115355	0	85.1177	-	-	-	-	-	-	0	0	0
9:15	0	37.148	23.624	41.266	54.42	0	0	0	0	20.267	0	0	532.4054776	0	95.458	-	-	-	-	-	-	0	0	0
9:30	0	23.564	20.102	44.934	39.347	0	0	0	0	22.475	0	0	516.3739988	0	98.0734	-	-	-	-	-	-	0	0	0
9:45	0	28.81	22.498	44.934	36.855	0	0	0	0	25.787	0	0	510.0301534	0	106.392	-	-	-	-	-	-	0	0	0
10:00	0	13.652	22.081	42.183	36.988	0	0	0	0	26.929	0	0	512.453317	0	114.894	-	-	-	-	-	-	0	0	0
10:15	0	34.854	26.874	33.93	44.769	0	0	0	0	22.882	0	0	567.0708285	0	118.978	-	-	-	-	-	-	0	0	0
10:30	0	28.489	19.685	33.013	40.416	0	0	0	0	30.793	0	0	566.1638402	0	118.46	-	-	-	-	-	-	0	0	0
10:45	0	28.027	32.093	25.677	49.723	0	0	0	0	34.289	0	0	618.1504023	0	125.119	-	-	-	-	-	1	0	0	1
11:00	0	45.166	29.581	26.594	68.181	0	0	0	0	31.013	0	0	651.6006098	0	117.979	-	-	-	-	-	-	0	0	2
11:15	0	33.03	23.662	41.266	41.561	0	0	0	0	22.365	0	0	621.2612926	0	124.978	-	-	-	-	-	1	0	0	3
11:30	0	51.422	25.436	40.349	56.382	0	0	0	0	37.452	0	0	650.7987098	0	139.889	-	-	-	-	-	1	0	0	4
11:45	0	31.317	32.378	41.266	64.01	0	0	0	0	27.149	0	0	639.0719069	0	139.711	-	-	-	-	-	1	0	0	1
12:00	0	21.121	28.257	50.436	39.368	0	0	0	0	38.012	0	0	641.7706474	0	146.71	-	-	-	-	-	1	0	0	2
12:15	0	40.546	24.786	37.598	66.127	0	0	0	0	37.275	0	0	666.7957934	0	146.697	-	-	-	-	-	1	0	0	3
12:30	0	22.789	27.933	49.519	61.621	0	0	0	0	37.274	0	0	675.1764487	0	135.647	-	-	-	-	-	1	0	0	4
12:45	0	43.53	32.777	36.681	58.682	0	0	0	0	34.148	0	0	705.9707691	0	130.67	-	-	-	-	-	1	0	0	1
13:00	0	22.275	32.305	42.183	67.444	0	0	0	0	37.999	0	0	741.2016196	0	140.962	-	-	-	-	-	1	0	0	2
13:15	0	36.564	47.383	45.851	47.64	0	0	0	0	26.225	0	0	868.4965601	0	141.072	-	-	-	-	1	1	0	1	3
13:30	0	52.411	28.834	44.934	66.478	0	0	0	0	32.297	0	0	961.7881543	0	161.418	-	-	-	1	1	1	1	2	4
13:45	0	57.853	36.125	41.266	71.656	0	0	0	0	44.44	0	0	1015.075664	0	163.733	-	-	-	1	1	1	2	3	1
14:00	0	66.92	27.013	85.283	112.29	0	0	0	0	38.109	0	0	1042.493251	0	156.481	-	-	-	1	1	1	3	4	2
14:15	0	58.206	30.483	80.698	101.34	0	0	0	0	46.571	0	0	1000.599488	0	168.883	-	-	-	1	1	1	4	1	3
14:30	0	55.09	44.188	58.689	87.976	0	0	0	0	34.613	0	0	928.6067969	0	165.464	-	-	-	1	1	1	1	2	4
14:45	0	58.097	46.61	54.104	75.506	0	0	0	0	37.188	0	0	898.7442402	0	179.524	-	-	-	1	1	1	2	3	1
15:00	0	71.724	31.627	55.021	91.236	0	0	0	0	50.511	0	0	905.0653805	0	184.385	-	-	-	1	1	1	3	4	2
15:15	0	50.937	35.175	51.353	61.271	0	0	0	0	43.152	0	0	887.5330061	0	184.582	-	-	-	1	1	1	4	1	3
15:30	0	46.373	49.903	56.855	62.95	0	0	0	0	48.673	0	0	967.5271635	0	194.161	-	-	-	1	1	1	1	2	4
15:45	0	60.419	46.509	57.772	75.939	0	0	0	0	42.049	0	0	977.9416738	0	198.22	-	-	-	1	1	1	2	3	1
16:00	0	78.262	42.415	50.436	60.962	0	0	0	0	50.707	0	0	944.471467	0	199.52	-	-	-	1	1	1	3	4	2
16:15	0	85.88	54.671	56.855	81.326	0	0	0	0	52.732	0	0	963.6082753	0	197.558	-	-	-	1	1	1	4	1	3
16:30	0	70.997	40.744	44.934	69.821	0	0	0	0	52.731	0	0	891.231761	0	181.428	-	-	-	1	1	1	1	2	4
16:45	0	73.149	44.411	54.104	35.504	0	0	0	0	43.35	0	0	873.11416	0	172.291	-	-	-	1	1	1	2	3	1
17:00	0	62.94	58.098	59.606	70.568	0	0	0	0	48.745	0	0	876.1297514	0	186.7	-	-	-	1	1	1	3	4	2
17:15	0	48.807	43.217	55.938	58.392	0	0	0	0	36.602	0	0	624.91699	0	137.955	-	-	-	-	-	1	4	0	3
17:30	0	52.01	46.415	47.685	62.269	0	0	0	0	43.594	0	0	418.5624981	0	101.353	-	-	-	-	-	-	0	0	4
17:45	0	67.505	40.624	33.013	69.043	0	0	0	0	57.759	0	0	210.1840572	0	57.7591	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
																						4	6	7
																						Hours where condition met:		
																						Signal Warranted?		
																						Notes		

Weekday Kahekili Hwy/Waiehu Beach Road 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction:		0%	RT Reduction:		100%										
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	157.077523	0	6.24845			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	339.0721104	0	23.1668			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	610.5276731	0	36.9583			0	0	0	0
6:00	0	20.914	25.491	40.349	70.323	0	0	0	0	6.2484	0	0	921.9940975	0	61.2379			0	0	0	0
6:15	0	24.117	35.554	60.523	61.8	0	0	0	0	16.918	0	0	1139.673615	0	79.0277			0	0	0	0
6:30	0	44.154	37.08	98.121	92.1	0	0	0	0	13.792	0	0	1293.625021	0	89.5004	1		0	1	1	1
6:45	0	61.426	39.553	99.955	110.53	0	0	0	0	24.28	0	0	1317.678726	0	103.047	1		0	2	1	2
7:00	0	74.909	45.185	87.185	167.48	0	0	0	0	24.038	0	0	1211.578729	0	98.5073	1		0	3	1	3
7:15	0	88.345	37.391	35.545	174.67	0	0	0	0	27.391	0	0	1010.291898	0	97.7721			0	4	0	4
7:30	0	57.966	37.404	40.91	159.23	0	0	0	0	27.338	0	0	847.4461249	0	118.887			0	0	0	0
7:45	0	50.19	37.104	42.251	75.821	0	0	0	0	19.74	0	0	730.0614764	0	115.586			0	0	0	0
8:00	0	42.541	26.928	45.851	58.15	0	0	0	0	23.303	0	0	662.2262085	0	119.332			0	0	0	0
8:15	0	36.262	33.895	39.432	63.511	0	0	0	0	48.506	0	0	615.0658669	0	112.618			0	0	0	0
8:30	0	49.454	33.12	53.187	42.364	0	0	0	0	24.037	0	0	*598.4239864*	0	84.3786			0	0	0	0
8:45	0	24.126	26.604	45.851	40.95	0	0	0	0	23.486	0	0	548.2457118	0	82.8163			0	0	0	0
9:00	0	25.999	22.225	38.515	39.571	0	0	0	0	16.588	0	0	543.8115355	0	85.1177			0	0	0	0
9:15	0	37.148	23.624	41.266	54.42	0	0	0	0	20.267	0	0	532.4054776	0	95.458			0	0	0	0
9:30	0	23.564	20.102	44.934	39.347	0	0	0	0	22.475	0	0	516.3739988	0	98.0734			0	0	0	0
9:45	0	28.81	22.498	44.934	36.855	0	0	0	0	25.787	0	0	510.0301534	0	106.392			0	0	0	0
10:00	0	13.652	22.081	42.183	36.988	0	0	0	0	26.929	0	0	512.453317	0	114.894			0	0	0	0
10:15	0	34.854	26.874	33.93	44.769	0	0	0	0	22.882	0	0	567.0708285	0	118.978			0	0	0	0
10:30	0	28.489	19.685	33.013	40.416	0	0	0	0	30.793	0	0	566.1638402	0	118.46			0	0	0	0
10:45	0	28.027	32.093	25.677	49.723	0	0	0	0	34.289	0	0	618.1504023	0	125.119			0	0	0	0
11:00	0	45.166	29.581	26.594	68.181	0	0	0	0	31.013	0	0	651.6006098	0	117.979			0	0	0	0
11:15	0	33.03	23.662	41.266	41.561	0	0	0	0	22.365	0	0	621.2612926	0	124.978			0	0	0	0
11:30	0	51.422	25.436	40.349	56.382	0	0	0	0	37.452	0	0	650.7987098	0	139.889			0	0	0	0
11:45	0	31.317	32.378	41.266	64.01	0	0	0	0	27.149	0	0	639.0719069	0	139.711			0	0	0	0
12:00	0	21.121	28.257	50.436	39.368	0	0	0	0	38.012	0	0	641.7706474	0	146.71			0	0	0	0
12:15	0	40.546	24.786	37.598	66.127	0	0	0	0	37.275	0	0	666.7957934	0	146.697			0	0	0	0
12:30	0	22.789	27.933	49.519	61.621	0	0	0	0	37.274	0	0	675.1764487	0	135.647			0	0	0	0
12:45	0	43.53	32.777	36.681	58.682	0	0	0	0	34.148	0	0	705.9707691	0	130.67			0	0	0	0
13:00	0	22.275	32.305	42.183	67.444	0	0	0	0	37.999	0	0	741.2016196	0	140.962			0	0	0	0
13:15	0	36.564	47.383	45.851	47.64	0	0	0	0	26.225	0	0	868.4965601	0	141.072	1		0	1	1	1
13:30	0	52.411	28.834	44.934	66.478	0	0	0	0	32.297	0	0	961.7881543	0	161.418	1		0	2	1	2
13:45	0	57.853	36.125	41.266	71.656	0	0	0	0	44.44	0	0	1015.075664	0	163.733	1		0	3	1	3
14:00	0	66.92	27.013	85.283	112.29	0	0	0	0	38.109	0	0	1042.493251	0	156.481	1		0	4	1	4
14:15	0	58.206	30.483	80.698	101.34	0	0	0	0	46.571	0	0	1000.599488	0	168.883	1		0	1	1	1
14:30	0	55.09	44.188	58.689	87.976	0	0	0	0	34.613	0	0	928.6067969	0	165.464	1		0	2	1	2
14:45	0	58.097	46.61	54.104	75.506	0	0	0	0	37.188	0	0	898.7442402	0	179.524	1		0	3	1	3
15:00	0	71.724	31.627	55.021	91.236	0	0	0	0	50.511	0	0	905.0653805	0	184.385	1		0	4	1	4
15:15	0	50.937	35.175	51.353	61.271	0	0	0	0	43.152	0	0	887.5330061	0	184.582	1		0	1	1	1
15:30	0	46.373	49.903	56.855	62.95	0	0	0	0	48.673	0	0	967.5271635	0	194.161	1		0	2	1	2
15:45	0	60.419	46.509	57.772	75.939	0	0	0	0	42.049	0	0	977.9416738	0	198.22	1		0	3	1	3
16:00	0	78.262	42.415	50.436	60.962	0	0	0	0	50.707	0	0	944.471467	0	199.52	1		0	4	1	4
16:15	0	85.88	54.671	56.855	81.326	0	0	0	0	52.732	0	0	963.6082753	0	197.558	1		0	1	1	1
16:30	0	70.997	40.744	44.934	69.821	0	0	0	0	52.731	0	0	891.231761	0	181.428	1		0	2	1	2
16:45	0	73.149	44.411	54.104	35.504	0	0	0	0	43.35	0	0	873.11416	0	172.291	1		0	3	1	3
17:00	0	62.94	58.098	59.606	70.568	0	0	0	0	48.745	0	0	876.1297514	0	186.7	1		0	4	1	4
17:15	0	48.807	43.217	55.938	58.392	0	0	0	0	36.602	0	0	624.91699	0	137.955			0	0	0	0
17:30	0	52.01	46.415	47.685	62.269	0	0	0	0	43.594	0	0	418.5624981	0	101.353			0	0	0	0
17:45	0	67.505	40.624	33.013	69.043	0	0	0	0	57.759	0	0	210.1840572	0	57.7591			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	5
Signal Warranted?	Yes


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
963.6082753, 197.5577076
887.5330061, 184.5818667
1000.599488, 168.8825592
868.4965601, 141.0718938
1293.625021, 89.50041816
115'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Waiehu Beach Road 8-Hour Signal Warra

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

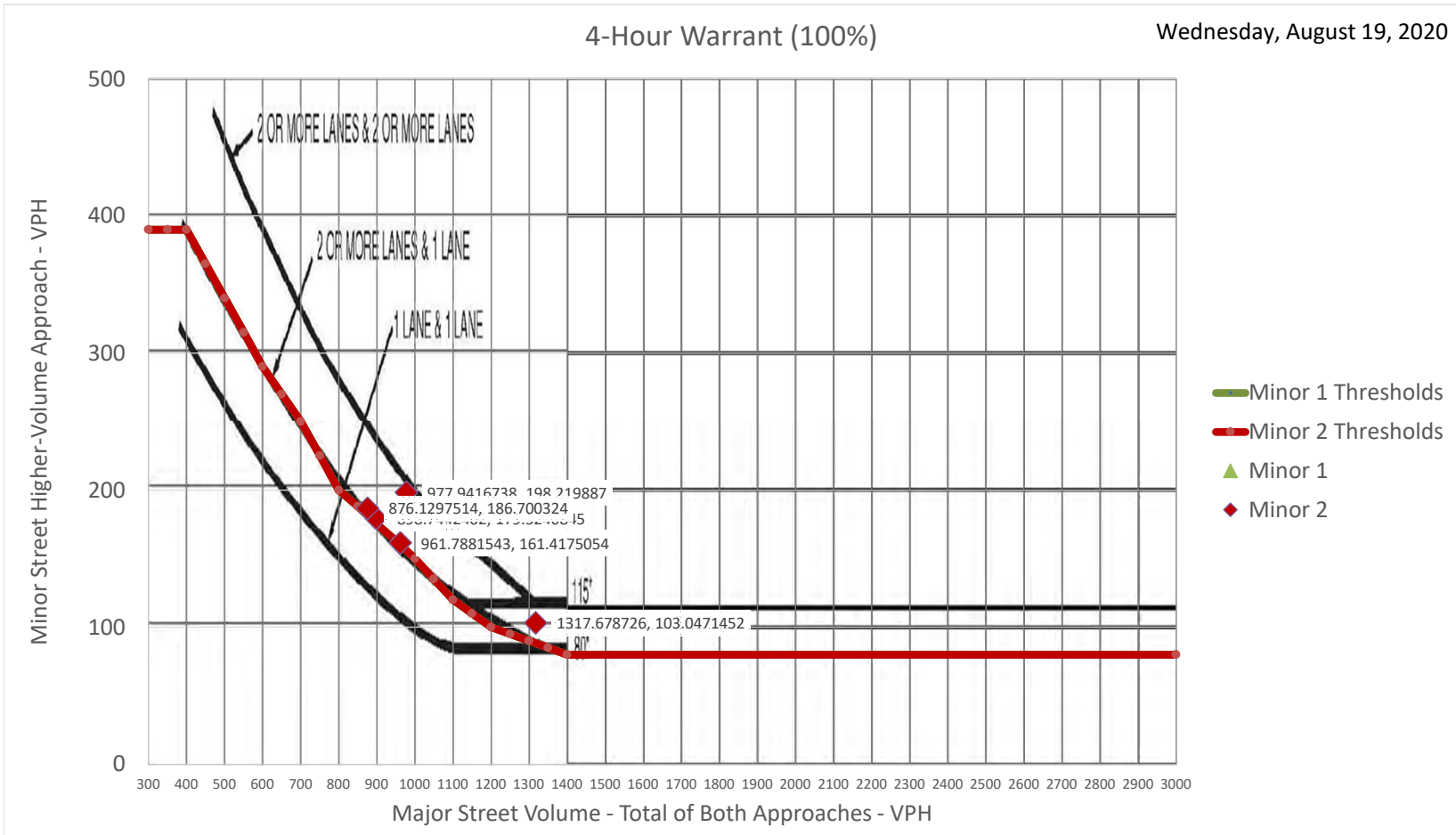
	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes						Major Threshold	600	900	720	600	900	720			
	2						1			1						Minor Threshold	150	75	120	150	75	120			
							RT Reduction:	0%		RT Reduction:	100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	157.077523	0	6.24845	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	339.0721104	0	23.1668	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	610.5276731	0	36.9583	-	-	-	-	-	-	0	0	0
6:00	0	20.914	25.491	40.349	70.323	0	0	0	0	6.2484	0	0	921.9940975	0	61.2379	-	-	-	-	-	-	0	0	0
6:15	0	24.117	35.554	60.523	61.8	0	0	0	0	16.918	0	0	1139.673615	0	79.0277	-	-	-	-	1	-	0	1	0
6:30	0	44.154	37.08	98.121	92.1	0	0	0	0	13.792	0	0	1293.625021	0	89.5004	-	-	-	-	1	-	0	2	0
6:45	0	61.426	39.553	99.955	110.53	0	0	0	0	24.28	0	0	1317.678726	0	103.047	-	-	-	-	1	-	0	3	0
7:00	0	74.909	45.185	87.185	167.48	0	0	0	0	24.038	0	0	1211.578729	0	98.5073	-	-	-	-	1	-	0	4	0
7:15	0	88.345	37.391	35.545	174.67	0	0	0	0	27.391	0	0	1010.291898	0	97.7721	-	-	-	-	1	-	0	1	0
7:30	0	57.966	37.404	40.91	159.23	0	0	0	0	27.338	0	0	847.4461249	0	118.887	-	-	-	-	-	-	0	2	0
7:45	0	50.19	37.104	42.251	75.821	0	0	0	0	19.74	0	0	730.0614764	0	115.586	-	-	-	-	-	-	0	3	0
8:00	0	42.541	26.928	45.851	58.15	0	0	0	0	23.303	0	0	662.2262085	0	119.332	-	-	-	-	-	-	0	4	0
8:15	0	36.262	33.895	39.432	63.511	0	0	0	0	48.506	0	0	615.0658669	0	112.618	-	-	-	-	-	-	0	0	0
8:30	0	49.454	33.12	53.187	42.364	0	0	0	0	24.037	0	0	*598.4239864*	0	84.3786	-	-	-	-	-	-	0	0	0
8:45	0	24.126	26.604	45.851	40.95	0	0	0	0	23.486	0	0	548.2457118	0	82.8163	-	-	-	-	-	-	0	0	0
9:00	0	25.999	22.225	38.515	39.571	0	0	0	0	16.588	0	0	543.8115355	0	85.1177	-	-	-	-	-	-	0	0	0
9:15	0	37.148	23.624	41.266	54.42	0	0	0	0	20.267	0	0	532.4054776	0	95.458	-	-	-	-	-	-	0	0	0
9:30	0	23.564	20.102	44.934	39.347	0	0	0	0	22.475	0	0	516.3739988	0	98.0734	-	-	-	-	-	-	0	0	0
9:45	0	28.81	22.498	44.934	36.855	0	0	0	0	25.787	0	0	510.0301534	0	106.392	-	-	-	-	-	-	0	0	0
10:00	0	13.652	22.081	42.183	36.988	0	0	0	0	26.929	0	0	512.453317	0	114.894	-	-	-	-	-	-	0	0	0
10:15	0	34.854	26.874	33.93	44.769	0	0	0	0	22.882	0	0	567.0708285	0	118.978	-	-	-	-	-	-	0	0	0
10:30	0	28.489	19.685	33.013	40.416	0	0	0	0	30.793	0	0	566.1638402	0	118.46	-	-	-	-	-	-	0	0	0
10:45	0	28.027	32.093	25.677	49.723	0	0	0	0	34.289	0	0	618.1504023	0	125.119	-	-	-	-	-	-	0	0	0
11:00	0	45.166	29.581	26.594	68.181	0	0	0	0	31.013	0	0	651.6006098	0	117.979	-	-	-	-	-	-	0	0	0
11:15	0	33.03	23.662	41.266	41.561	0	0	0	0	22.365	0	0	621.2612926	0	124.978	-	-	-	-	-	-	0	0	0
11:30	0	51.422	25.436	40.349	56.382	0	0	0	0	37.452	0	0	650.7987098	0	139.889	-	-	-	-	-	-	0	0	0
11:45	0	31.317	32.378	41.266	64.01	0	0	0	0	27.149	0	0	639.0719069	0	139.711	-	-	-	-	-	-	0	0	0
12:00	0	21.121	28.257	50.436	39.368	0	0	0	0	38.012	0	0	641.7706474	0	146.71	-	-	-	-	-	-	0	0	0
12:15	0	40.546	24.786	37.598	66.127	0	0	0	0	37.275	0	0	666.7957934	0	146.697	-	-	-	-	-	-	0	0	0
12:30	0	22.789	27.933	49.519	61.621	0	0	0	0	37.274	0	0	675.1764487	0	135.647	-	-	-	-	-	-	0	0	0
12:45	0	43.53	32.777	36.681	58.682	0	0	0	0	34.148	0	0	705.9707691	0	130.67	-	-	-	-	-	-	0	0	0
13:00	0	22.275	32.305	42.183	67.444	0	0	0	0	37.999	0	0	741.2016196	0	140.962	-	-	-	-	-	1	0	0	1
13:15	0	36.564	47.383	45.851	47.64	0	0	0	0	26.225	0	0	868.4965601	0	141.072	-	-	-	-	-	1	0	0	2
13:30	0	52.411	28.834	44.934	66.478	0	0	0	0	32.297	0	0	961.7881543	0	161.418	-	-	-	1	1	1	1	1	3
13:45	0	57.853	36.125	41.266	71.656	0	0	0	0	44.44	0	0	1015.075664	0	163.733	-	-	-	1	1	1	2	2	4
14:00	0	66.92	27.013	85.283	112.29	0	0	0	0	38.109	0	0	1042.493251	0	156.481	-	-	-	1	1	1	3	3	1
14:15	0	58.206	30.483	80.698	101.34	0	0	0	0	46.571	0	0	1000.599488	0	168.883	-	-	-	1	1	1	4	4	2
14:30	0	55.09	44.188	58.689	87.976	0	0	0	0	34.613	0	0	928.6067969	0	165.464	-	-	-	1	1	1	1	1	3
14:45	0	58.097	46.61	54.104	75.506	0	0	0	0	37.188	0	0	898.7442402	0	179.524	-	-	-	1	-	1	2	2	4
15:00	0	71.724	31.627	55.021	91.236	0	0	0	0	50.511	0	0	905.0653805	0	184.385	-	-	-	1	1	1	3	3	1
15:15	0	50.937	35.175	51.353	61.271	0	0	0	0	43.152	0	0	887.5330061	0	184.582	-	-	-	1	-	1	4	4	2
15:30	0	46.373	49.903	56.855	62.95	0	0	0	0	48.673	0	0	967.5271635	0	194.161	-	-	-	1	1	1	1	1	3
15:45	0	60.419	46.509	57.772	75.939	0	0	0	0	42.049	0	0	977.9416738	0	198.22	-	-	-	1	1	1	2	2	4
16:00	0	78.262	42.415	50.436	60.962	0	0	0	0	50.707	0	0	944.471467	0	199.52	-	-	-	1	1	1	3	3	1
16:15	0	85.88	54.671	56.855	81.326	0	0	0	0	52.732	0	0	963.6082753	0	197.558	-	-	-	1	1	1	4	4	2
16:30	0	70.997	40.744	44.934	69.821	0	0	0	0	52.731	0	0	891.231761	0	181.428	-	-	-	1	-	1	1	0	3
16:45	0	73.149	44.411	54.104	35.504	0	0	0	0	43.35	0	0	873.11416	0	172.291	-	-	-	1	-	1	2	0	4
17:00	0	62.94	58.098	59.606	70.568	0	0	0	0	48.745	0	0	876.1297514	0	186.7	-	-	-	1	-	1	3	0	1
17:15	0	48.807	43.217	55.938	58.392	0	0	0	0	36.602	0	0	624.91699	0	137.955	-	-	-	-	-	-	4	0	2
17:30	0	52.01	46.415	47.685	62.269	0	0	0	0	43.594	0	0	418.5624981	0	101.353	-	-	-	-	-	-	0	0	3
17:45	0	67.505	40.624	33.013	69.043	0	0	0	0	57.759	0	0	210.1840572	0	57.7591	-	-	-	-	-	-	0	0	4
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
																Hours where condition met:						4	5	5
																Signal Warranted?						No		
																Notes								

Weekday Kahekili Hwy/Waiehu Beach Road 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						aiehu Beach Ro			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	2						1			1												
							RT Reduction:		0%	RT Reduction:		100%										
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
5:15	0	0	0	0	0	0	0	0	0	0	0	0	157.077523	0	6.24845						
5:30	0	0	0	0	0	0	0	0	0	0	0	0	339.0721104	0	23.1668						
5:45	0	0	0	0	0	0	0	0	0	0	0	0	610.5276731	0	36.9583						
6:00	0	20.914	25.491	40.349	70.323	0	0	0	0	6.2484	0	0	921.9940975	0	61.2379						
6:15	0	24.117	35.554	60.523	61.8	0	0	0	0	16.918	0	0	1139.673615	0	79.0277						
6:30	0	44.154	37.08	98.121	92.1	0	0	0	0	13.792	0	0	1293.625021	0	89.5004						
6:45	0	61.426	39.553	99.955	110.53	0	0	0	0	24.28	0	0	1317.678726	0	103.047	1		0	1	1	1
7:00	0	74.909	45.185	87.185	167.48	0	0	0	0	24.038	0	0	1211.578729	0	98.5073			0	2	0	2
7:15	0	88.345	37.391	35.545	174.67	0	0	0	0	27.391	0	0	1010.291898	0	97.7721			0	3	0	3
7:30	0	57.966	37.404	40.91	159.23	0	0	0	0	27.338	0	0	847.4461249	0	118.887			0	4	0	4
7:45	0	50.19	37.104	42.251	75.821	0	0	0	0	19.74	0	0	730.0614764	0	115.586			0	0	0	0
8:00	0	42.541	26.928	45.851	58.15	0	0	0	0	23.303	0	0	662.2262085	0	119.332			0	0	0	0
8:15	0	36.262	33.895	39.432	63.511	0	0	0	0	48.506	0	0	615.0658669	0	112.618			0	0	0	0
8:30	0	49.454	33.12	53.187	42.364	0	0	0	0	24.037	0	0	*598.4239864*	0	84.3786			0	0	0	0
8:45	0	24.126	26.604	45.851	40.95	0	0	0	0	23.486	0	0	548.2457118	0	82.8163			0	0	0	0
9:00	0	25.999	22.225	38.515	39.571	0	0	0	0	16.588	0	0	543.8115355	0	85.1177			0	0	0	0
9:15	0	37.148	23.624	41.266	54.42	0	0	0	0	20.267	0	0	532.4054776	0	95.458			0	0	0	0
9:30	0	23.564	20.102	44.934	39.347	0	0	0	0	22.475	0	0	516.3739988	0	98.0734			0	0	0	0
9:45	0	28.81	22.498	44.934	36.855	0	0	0	0	25.787	0	0	510.0301534	0	106.392			0	0	0	0
10:00	0	13.652	22.081	42.183	36.988	0	0	0	0	26.929	0	0	512.453317	0	114.894			0	0	0	0
10:15	0	34.854	26.874	33.93	44.769	0	0	0	0	22.882	0	0	567.0708285	0	118.978			0	0	0	0
10:30	0	28.489	19.685	33.013	40.416	0	0	0	0	30.793	0	0	566.1638402	0	118.46			0	0	0	0
10:45	0	28.027	32.093	25.677	49.723	0	0	0	0	34.289	0	0	618.1504023	0	125.119			0	0	0	0
11:00	0	45.166	29.581	26.594	68.181	0	0	0	0	31.013	0	0	651.6006098	0	117.979			0	0	0	0
11:15	0	33.03	23.662	41.266	41.561	0	0	0	0	22.365	0	0	621.2612926	0	124.978			0	0	0	0
11:30	0	51.422	25.436	40.349	56.382	0	0	0	0	37.452	0	0	650.7987098	0	139.889			0	0	0	0
11:45	0	31.317	32.378	41.266	64.01	0	0	0	0	27.149	0	0	639.0719069	0	139.711			0	0	0	0
12:00	0	21.121	28.257	50.436	39.368	0	0	0	0	38.012	0	0	641.7706474	0	146.71			0	0	0	0
12:15	0	40.546	24.786	37.598	66.127	0	0	0	0	37.275	0	0	666.7957934	0	146.697			0	0	0	0
12:30	0	22.789	27.933	49.519	61.621	0	0	0	0	37.274	0	0	675.1764487	0	135.647			0	0	0	0
12:45	0	43.53	32.777	36.681	58.682	0	0	0	0	34.148	0	0	705.9707691	0	130.67			0	0	0	0
13:00	0	22.275	32.305	42.183	67.444	0	0	0	0	37.999	0	0	741.2016196	0	140.962			0	0	0	0
13:15	0	36.564	47.383	45.851	47.64	0	0	0	0	26.225	0	0	868.4965601	0	141.072			0	0	0	0
13:30	0	52.411	28.834	44.934	66.478	0	0	0	0	32.297	0	0	961.7881543	0	161.418	1		0	1	1	1
13:45	0	57.853	36.125	41.266	71.656	0	0	0	0	44.44	0	0	1015.075664	0	163.733	1		0	2	1	2
14:00	0	66.92	27.013	85.283	112.29	0	0	0	0	38.109	0	0	1042.493251	0	156.481	1		0	3	1	3
14:15	0	58.206	30.483	80.698	101.34	0	0	0	0	46.571	0	0	1000.599488	0	168.883	1		0	4	1	4
14:30	0	55.09	44.188	58.689	87.976	0	0	0	0	34.613	0	0	928.6067969	0	165.464			0	0	0	0
14:45	0	58.097	46.61	54.104	75.506	0	0	0	0	37.188	0	0	898.7442402	0	179.524	1		0	1	1	1
15:00	0	71.724	31.627	55.021	91.236	0	0	0	0	50.511	0	0	905.0653805	0	184.385	1		0	2	1	2
15:15	0	50.937	35.175	51.353	61.271	0	0	0	0	43.152	0	0	887.5330061	0	184.582	1		0	3	1	3
15:30	0	46.373	49.903	56.855	62.95	0	0	0	0	48.673	0	0	967.5271635	0	194.161	1		0	4	1	4
15:45	0	60.419	46.509	57.772	75.939	0	0	0	0	42.049	0	0	977.9416738	0	198.22	1		0	1	1	1
16:00	0	78.262	42.415	50.436	60.962	0	0	0	0	50.707	0	0	944.471467	0	199.52	1		0	2	1	2
16:15	0	85.88	54.671	56.855	81.326	0	0	0	0	52.732	0	0	963.6082753	0	197.558	1		0	3	1	3
16:30	0	70.997	40.744	44.934	69.821	0	0	0	0	52.731	0	0	891.231761	0	181.428	1		0	4	1	4
16:45	0	73.149	44.411	54.104	35.504	0	0	0	0	43.35	0	0	873.11416	0	172.291			0	0	0	0
17:00	0	62.94	58.098	59.606	70.568	0	0	0	0	48.745	0	0	876.1297514	0	186.7	1		0	1	1	1
17:15	0	48.807	43.217	55.938	58.392	0	0	0	0	36.602	0	0	624.91699	0	137.955			0	2	0	2
17:30	0	52.01	46.415	47.685	62.269	0	0	0	0	43.594	0	0	418.5624981	0	101.353			0	3	0	3
17:45	0	67.505	40.624	33.013	69.043	0	0	0	0	57.759	0	0	210.1840572	0	57.7591			0	4	0	4
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	5
Signal Warranted?	Yes


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
876.1297514, 186.700324
961.7881543, 161.4175054
1317.678726, 103.0471452
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

Kahekili Highway/Makaala Drive
Existing Conditions

Weekday Kahekili Hwy/Makaala Drive 8-Hour Signal Warrant

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

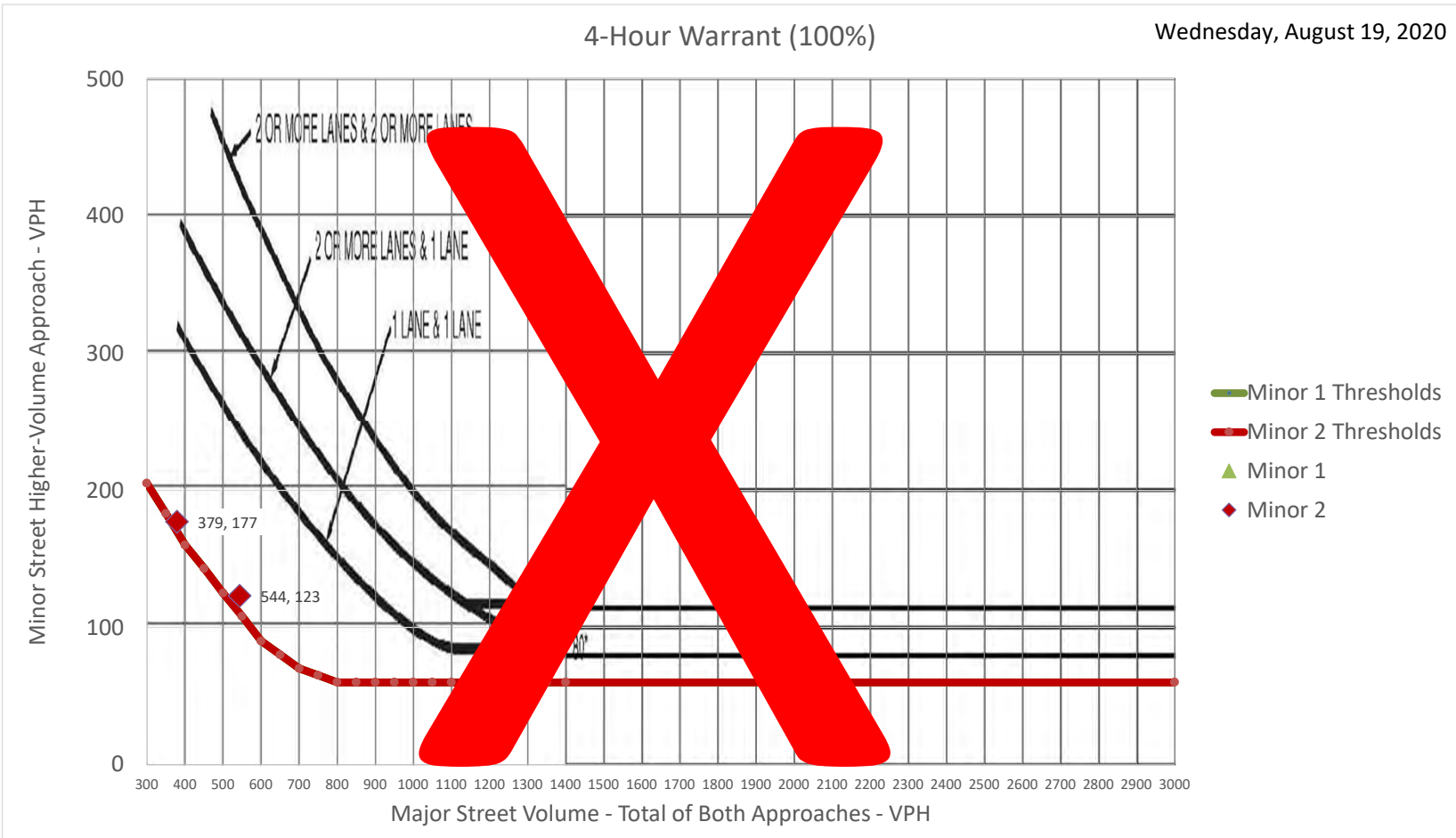
	Kahekili Hwy						Makaala Drive			0			70 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			350	525	420	350	525	420			
	1						1			1			Minor Threshold			105	53	84	105	53	84			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	66	0	34	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	123	0	78	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	212	0	132	-	-	-	-	-	-	0	0	0
6:00	0	17	7	0	42	0	0	0	0	34	0	0	379	0	177	-	-	-	1	-	-	1	0	0
6:15	0	13	5	2	37	0	0	0	0	44	0	0	487	0	180	-	-	-	1	-	1	2	0	1
6:30	0	18	6	1	64	0	0	0	0	54	0	0	591	0	162	-	-	-	1	1	1	3	1	2
6:45	0	43	18	7	99	0	0	0	0	45	0	0	604	0	138	-	-	-	1	1	1	4	2	3
7:00	0	44	6	18	106	0	0	0	0	37	0	0	544	0	123	-	-	-	1	1	1	1	3	4
7:15	0	38	19	36	68	0	0	0	0	26	0	0	456	0	109	-	-	-	1	-	1	2	4	1
7:30	0	14	15	20	53	0	0	0	0	30	0	0	375	0	105	-	-	-	1	-	-	3	0	2
7:45	0	34	24	2	47	0	0	0	0	30	0	0	354	0	90	-	-	-	-	-	-	4	0	3
8:00	0	37	23	3	23	0	0	0	0	23	0	0	330	0	77	-	-	-	-	-	-	0	0	4
8:15	0	24	17	1	38	0	0	0	0	22	0	0	325	0	81	-	-	-	-	-	-	0	0	0
8:30	0	21	12	0	48	0	0	0	0	15	0	0	294	0	83	-	-	-	-	-	-	0	0	0
8:45	0	28	14	0	41	0	0	0	0	17	0	0	279	0	82	-	-	-	-	-	-	0	0	0
9:00	0	29	15	2	35	0	0	0	0	27	0	0	262	0	81	-	-	-	-	-	-	0	0	0
9:15	0	17	11	0	21	0	0	0	0	24	0	0	251	0	71	-	-	-	-	-	-	0	0	0
9:30	0	24	10	4	28	0	0	0	0	14	0	0	273	0	59	-	-	-	-	-	-	0	0	0
9:45	0	27	12	2	25	0	0	0	0	16	0	0	270	0	60	-	-	-	-	-	-	0	0	0
10:00	0	25	12	2	31	0	0	0	0	17	0	0	284	0	60	-	-	-	-	-	-	0	0	0
10:15	0	24	10	2	35	0	0	0	0	12	0	0	301	0	59	-	-	-	-	-	-	0	0	0
10:30	0	24	12	1	26	0	0	0	0	15	0	0	302	0	59	-	-	-	-	-	-	0	0	0
10:45	0	35	20	1	24	0	0	0	0	16	0	0	321	0	64	-	-	-	-	-	-	0	0	0
11:00	0	37	14	2	34	0	0	0	0	16	0	0	311	0	61	-	-	-	-	-	-	0	0	0
11:15	0	36	11	0	25	0	0	0	0	12	0	0	315	0	60	-	-	-	-	-	-	0	0	0
11:30	0	28	23	0	31	0	0	0	0	20	0	0	331	0	68	-	-	-	-	-	-	0	0	0
11:45	0	27	14	0	29	0	0	0	0	13	0	0	315	0	74	-	-	-	-	-	-	0	0	0
12:00	0	39	25	1	26	0	0	0	0	15	0	0	322	0	83	-	-	-	-	-	-	0	0	0
12:15	0	31	20	3	34	0	0	0	0	20	0	0	330	0	94	-	-	-	-	-	-	0	0	0
12:30	0	14	14	1	37	0	0	0	0	26	0	0	350	0	95	-	-	-	-	-	-	0	0	0
12:45	0	25	19	2	31	0	0	0	0	22	0	0	388	0	92	-	-	-	-	-	-	0	0	0
13:00	0	25	22	2	50	0	0	0	0	26	0	0	406	0	99	-	-	-	-	-	-	0	0	0
13:15	0	46	17	1	44	0	0	0	0	21	0	0	432	0	96	-	-	-	-	-	1	0	0	1
13:30	0	37	21	0	46	0	0	0	0	23	0	0	445	0	102	-	-	-	-	-	1	0	0	2
13:45	0	47	28	2	18	0	0	0	0	29	0	0	436	0	99	-	-	-	-	-	1	0	0	3
14:00	0	51	17	12	45	0	0	0	0	23	0	0	441	0	92	-	-	-	-	-	1	0	0	4
14:15	0	44	26	9	42	0	0	0	0	27	0	0	442	0	83	-	-	-	-	-	-	0	0	0
14:30	0	35	27	1	32	0	0	0	0	20	0	0	441	0	85	-	-	-	-	-	1	0	0	1
14:45	0	39	28	2	31	0	0	0	0	22	0	0	463	0	90	-	-	-	-	-	1	0	0	2
15:00	0	37	24	9	56	0	0	0	0	14	0	0	482	0	88	-	-	-	-	-	1	0	0	3
15:15	0	46	30	5	39	0	0	0	0	29	0	0	489	0	100	-	-	-	-	-	1	0	0	4
15:30	0	43	35	3	36	0	0	0	0	25	0	0	501	0	83	-	-	-	-	-	-	0	0	0
15:45	0	56	33	4	26	0	0	0	0	20	0	0	513	0	84	-	-	-	-	-	1	0	0	1
16:00	0	45	43	2	43	0	0	0	0	26	0	0	529	0	88	-	-	-	-	1	1	0	1	2
16:15	0	49	44	3	36	0	0	0	0	12	0	0	534	0	78	-	-	-	-	1	-	0	2	3
16:30	0	59	36	1	33	0	0	0	0	26	0	0	512	0	87	-	-	-	-	-	1	0	3	4
16:45	0	49	41	5	40	0	0	0	0	24	0	0	511	0	88	-	-	-	-	-	1	0	4	1
17:00	0	70	36	0	32	0	0	0	0	16	0	0	504	0	92	-	-	-	-	-	1	0	0	2
17:15	0	50	30	0	30	0	0	0	0	21	0	0	366	0	76	-	-	-	-	-	-	0	0	3
17:30	0	52	39	4	33	0	0	0	0	27	0	0	256	0	55	-	-	-	-	-	-	0	0	4
17:45	0	47	48	1	32	0	0	0	0	28	0	0	128	0	28	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						2	2	6
															Signal Warranted?						No		
															Notes								

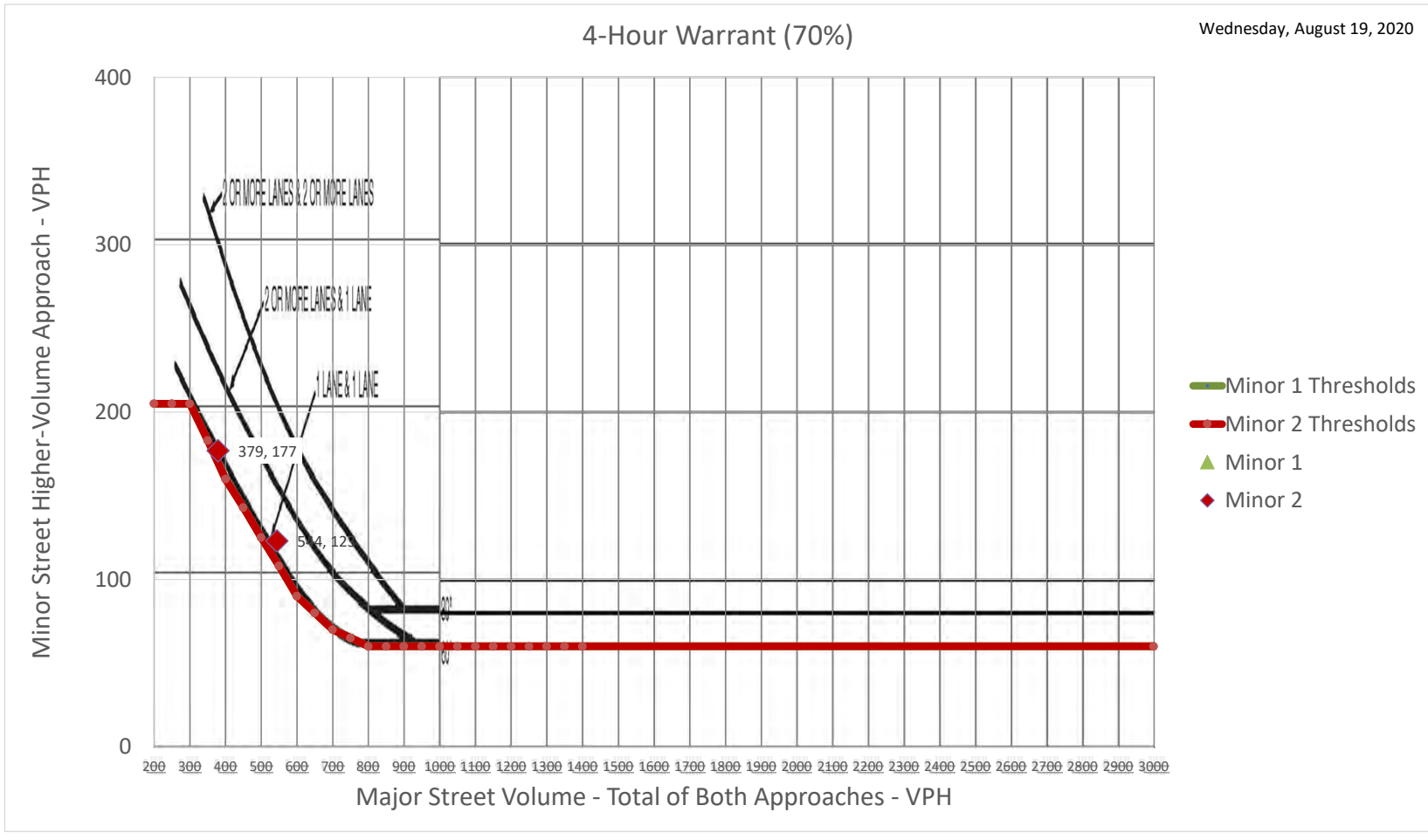
Weekday Kahekili Hwy/Makaala Drive 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						Makaala Drive			0			70 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction: 0%			RT Reduction: 100%											
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	66	0	34			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	123	0	78			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	212	0	132			0	0	0	0
6:00	0	17	7	0	42	0	0	0	0	34	0	0	379	0	177		1	0	1	1	1
6:15	0	13	5	2	37	0	0	0	0	44	0	0	487	0	180		1	0	2	1	2
6:30	0	18	6	1	64	0	0	0	0	54	0	0	591	0	162		1	0	3	1	3
6:45	0	43	18	7	99	0	0	0	0	45	0	0	604	0	138		1	0	4	1	4
7:00	0	44	6	18	106	0	0	0	0	37	0	0	544	0	123		1	0	1	1	1
7:15	0	38	19	36	68	0	0	0	0	26	0	0	456	0	109			0	2	0	2
7:30	0	14	15	20	53	0	0	0	0	30	0	0	375	0	105			0	3	0	3
7:45	0	34	24	2	47	0	0	0	0	30	0	0	354	0	90			0	4	0	4
8:00	0	37	23	3	23	0	0	0	0	23	0	0	330	0	77			0	0	0	0
8:15	0	24	17	1	38	0	0	0	0	22	0	0	325	0	81			0	0	0	0
8:30	0	21	12	0	48	0	0	0	0	15	0	0	294	0	83			0	0	0	0
8:45	0	28	14	0	41	0	0	0	0	17	0	0	279	0	82			0	0	0	0
9:00	0	29	15	2	35	0	0	0	0	27	0	0	262	0	81			0	0	0	0
9:15	0	17	11	0	21	0	0	0	0	24	0	0	251	0	71			0	0	0	0
9:30	0	24	10	4	28	0	0	0	0	14	0	0	273	0	59			0	0	0	0
9:45	0	27	12	2	25	0	0	0	0	16	0	0	270	0	60			0	0	0	0
10:00	0	25	12	2	31	0	0	0	0	17	0	0	284	0	60			0	0	0	0
10:15	0	24	10	2	35	0	0	0	0	12	0	0	301	0	59			0	0	0	0
10:30	0	24	12	1	26	0	0	0	0	15	0	0	302	0	59			0	0	0	0
10:45	0	35	20	1	24	0	0	0	0	16	0	0	321	0	64			0	0	0	0
11:00	0	37	14	2	34	0	0	0	0	16	0	0	311	0	61			0	0	0	0
11:15	0	36	11	0	25	0	0	0	0	12	0	0	315	0	60			0	0	0	0
11:30	0	28	23	0	31	0	0	0	0	20	0	0	331	0	68			0	0	0	0
11:45	0	27	14	0	29	0	0	0	0	13	0	0	315	0	74			0	0	0	0
12:00	0	39	25	1	26	0	0	0	0	15	0	0	322	0	83			0	0	0	0
12:15	0	31	20	3	34	0	0	0	0	20	0	0	330	0	94			0	0	0	0
12:30	0	14	14	1	37	0	0	0	0	26	0	0	350	0	95			0	0	0	0
12:45	0	25	19	2	31	0	0	0	0	22	0	0	388	0	92			0	0	0	0
13:00	0	25	22	2	50	0	0	0	0	26	0	0	406	0	99			0	0	0	0
13:15	0	46	17	1	44	0	0	0	0	21	0	0	432	0	96			0	0	0	0
13:30	0	37	21	0	46	0	0	0	0	23	0	0	445	0	102			0	0	0	0
13:45	0	47	28	2	18	0	0	0	0	29	0	0	436	0	99			0	0	0	0
14:00	0	51	17	12	45	0	0	0	0	23	0	0	441	0	92			0	0	0	0
14:15	0	44	26	9	42	0	0	0	0	27	0	0	442	0	83			0	0	0	0
14:30	0	35	27	1	32	0	0	0	0	20	0	0	441	0	85			0	0	0	0
14:45	0	39	28	2	31	0	0	0	0	22	0	0	463	0	90			0	0	0	0
15:00	0	37	24	9	56	0	0	0	0	14	0	0	482	0	88			0	0	0	0
15:15	0	46	30	5	39	0	0	0	0	29	0	0	489	0	100			0	0	0	0
15:30	0	43	35	3	36	0	0	0	0	25	0	0	501	0	83			0	0	0	0
15:45	0	56	33	4	26	0	0	0	0	20	0	0	513	0	84			0	0	0	0
16:00	0	45	43	2	43	0	0	0	0	26	0	0	529	0	88			0	0	0	0
16:15	0	49	44	3	36	0	0	0	0	12	0	0	534	0	78			0	0	0	0
16:30	0	59	36	1	33	0	0	0	0	26	0	0	512	0	87			0	0	0	0
16:45	0	49	41	5	40	0	0	0	0	24	0	0	511	0	88			0	0	0	0
17:00	0	70	36	0	32	0	0	0	0	16	0	0	504	0	92			0	0	0	0
17:15	0	50	30	0	30	0	0	0	0	21	0	0	366	0	76			0	0	0	0
17:30	0	52	39	4	33	0	0	0	0	27	0	0	256	0	55			0	0	0	0
17:45	0	47	48	1	32	0	0	0	0	28	0	0	128	0	28			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	2
Signal Warranted?	No


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
379, 177
544, 123
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
379, 177
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Makaala Drive 8-Hour Signal Warrant

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						Makaala Drive			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	66	0	34	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	123	0	78	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	212	0	132	-	-	-	-	-	-	0	0	0
6:00	0	17	7	0	42	0	0	0	0	34	0	0	379	0	177	-	-	-	-	-	-	0	0	0
6:15	0	13	5	2	37	0	0	0	0	44	0	0	487	0	180	-	-	-	-	-	-	0	0	0
6:30	0	18	6	1	64	0	0	0	0	54	0	0	591	0	162	-	-	-	1	-	-	1	0	0
6:45	0	43	18	7	99	0	0	0	0	45	0	0	604	0	138	-	-	-	-	-	1	2	0	1
7:00	0	44	6	18	106	0	0	0	0	37	0	0	544	0	123	-	-	-	-	-	-	3	0	2
7:15	0	38	19	36	68	0	0	0	0	26	0	0	456	0	109	-	-	-	-	-	-	4	0	3
7:30	0	14	15	20	53	0	0	0	0	30	0	0	375	0	105	-	-	-	-	-	-	0	0	4
7:45	0	34	24	2	47	0	0	0	0	30	0	0	354	0	90	-	-	-	-	-	-	0	0	0
8:00	0	37	23	3	23	0	0	0	0	23	0	0	330	0	77	-	-	-	-	-	-	0	0	0
8:15	0	24	17	1	38	0	0	0	0	22	0	0	325	0	81	-	-	-	-	-	-	0	0	0
8:30	0	21	12	0	48	0	0	0	0	15	0	0	294	0	83	-	-	-	-	-	-	0	0	0
8:45	0	28	14	0	41	0	0	0	0	17	0	0	279	0	82	-	-	-	-	-	-	0	0	0
9:00	0	29	15	2	35	0	0	0	0	27	0	0	262	0	81	-	-	-	-	-	-	0	0	0
9:15	0	17	11	0	21	0	0	0	0	24	0	0	251	0	71	-	-	-	-	-	-	0	0	0
9:30	0	24	10	4	28	0	0	0	0	14	0	0	273	0	59	-	-	-	-	-	-	0	0	0
9:45	0	27	12	2	25	0	0	0	0	16	0	0	270	0	60	-	-	-	-	-	-	0	0	0
10:00	0	25	12	2	31	0	0	0	0	17	0	0	284	0	60	-	-	-	-	-	-	0	0	0
10:15	0	24	10	2	35	0	0	0	0	12	0	0	301	0	59	-	-	-	-	-	-	0	0	0
10:30	0	24	12	1	26	0	0	0	0	15	0	0	302	0	59	-	-	-	-	-	-	0	0	0
10:45	0	35	20	1	24	0	0	0	0	16	0	0	321	0	64	-	-	-	-	-	-	0	0	0
11:00	0	37	14	2	34	0	0	0	0	16	0	0	311	0	61	-	-	-	-	-	-	0	0	0
11:15	0	36	11	0	25	0	0	0	0	12	0	0	315	0	60	-	-	-	-	-	-	0	0	0
11:30	0	28	23	0	31	0	0	0	0	20	0	0	331	0	68	-	-	-	-	-	-	0	0	0
11:45	0	27	14	0	29	0	0	0	0	13	0	0	315	0	74	-	-	-	-	-	-	0	0	0
12:00	0	39	25	1	26	0	0	0	0	15	0	0	322	0	83	-	-	-	-	-	-	0	0	0
12:15	0	31	20	3	34	0	0	0	0	20	0	0	330	0	94	-	-	-	-	-	-	0	0	0
12:30	0	14	14	1	37	0	0	0	0	26	0	0	350	0	95	-	-	-	-	-	-	0	0	0
12:45	0	25	19	2	31	0	0	0	0	22	0	0	388	0	92	-	-	-	-	-	-	0	0	0
13:00	0	25	22	2	50	0	0	0	0	26	0	0	406	0	99	-	-	-	-	-	-	0	0	0
13:15	0	46	17	1	44	0	0	0	0	21	0	0	432	0	96	-	-	-	-	-	-	0	0	0
13:30	0	37	21	0	46	0	0	0	0	23	0	0	445	0	102	-	-	-	-	-	-	0	0	0
13:45	0	47	28	2	18	0	0	0	0	29	0	0	436	0	99	-	-	-	-	-	-	0	0	0
14:00	0	51	17	12	45	0	0	0	0	23	0	0	441	0	92	-	-	-	-	-	-	0	0	0
14:15	0	44	26	9	42	0	0	0	0	27	0	0	442	0	83	-	-	-	-	-	-	0	0	0
14:30	0	35	27	1	32	0	0	0	0	20	0	0	441	0	85	-	-	-	-	-	-	0	0	0
14:45	0	39	28	2	31	0	0	0	0	22	0	0	463	0	90	-	-	-	-	-	-	0	0	0
15:00	0	37	24	9	56	0	0	0	0	14	0	0	482	0	88	-	-	-	-	-	-	0	0	0
15:15	0	46	30	5	39	0	0	0	0	29	0	0	489	0	100	-	-	-	-	-	-	0	0	0
15:30	0	43	35	3	36	0	0	0	0	25	0	0	501	0	83	-	-	-	-	-	-	0	0	0
15:45	0	56	33	4	26	0	0	0	0	20	0	0	513	0	84	-	-	-	-	-	-	0	0	0
16:00	0	45	43	2	43	0	0	0	0	26	0	0	529	0	88	-	-	-	-	-	-	0	0	0
16:15	0	49	44	3	36	0	0	0	0	12	0	0	534	0	78	-	-	-	-	-	-	0	0	0
16:30	0	59	36	1	33	0	0	0	0	26	0	0	512	0	87	-	-	-	-	-	-	0	0	0
16:45	0	49	41	5	40	0	0	0	0	24	0	0	511	0	88	-	-	-	-	-	-	0	0	0
17:00	0	70	36	0	32	0	0	0	0	16	0	0	504	0	92	-	-	-	-	-	-	0	0	0
17:15	0	50	30	0	30	0	0	0	0	21	0	0	366	0	76	-	-	-	-	-	-	0	0	0
17:30	0	52	39	4	33	0	0	0	0	27	0	0	256	0	55	-	-	-	-	-	-	0	0	0
17:45	0	47	48	1	32	0	0	0	0	28	0	0	128	0	28	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
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19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						1	0	1
															Signal Warranted?						No		
															Notes								

Weekday Kahekili Hwy/Makaala Drive 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						Makaala Drive			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction: 0%			RT Reduction: 100%												
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	66	0	34			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	123	0	78			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	212	0	132			0	0	0	0
6:00	0	17	7	0	42	0	0	0	0	34	0	0	379	0	177			0	0	0	0
6:15	0	13	5	2	37	0	0	0	0	44	0	0	487	0	180			0	0	0	0
6:30	0	18	6	1	64	0	0	0	0	54	0	0	591	0	162			0	0	0	0
6:45	0	43	18	7	99	0	0	0	0	45	0	0	604	0	138			0	0	0	0
7:00	0	44	6	18	106	0	0	0	0	37	0	0	544	0	123			0	0	0	0
7:15	0	38	19	36	68	0	0	0	0	26	0	0	456	0	109			0	0	0	0
7:30	0	14	15	20	53	0	0	0	0	30	0	0	375	0	105			0	0	0	0
7:45	0	34	24	2	47	0	0	0	0	30	0	0	354	0	90			0	0	0	0
8:00	0	37	23	3	23	0	0	0	0	23	0	0	330	0	77			0	0	0	0
8:15	0	24	17	1	38	0	0	0	0	22	0	0	325	0	81			0	0	0	0
8:30	0	21	12	0	48	0	0	0	0	15	0	0	*294*	0	83			0	0	0	0
8:45	0	28	14	0	41	0	0	0	0	17	0	0	279	0	82			0	0	0	0
9:00	0	29	15	2	35	0	0	0	0	27	0	0	262	0	81			0	0	0	0
9:15	0	17	11	0	21	0	0	0	0	24	0	0	251	0	71			0	0	0	0
9:30	0	24	10	4	28	0	0	0	0	14	0	0	273	0	59			0	0	0	0
9:45	0	27	12	2	25	0	0	0	0	16	0	0	270	0	60			0	0	0	0
10:00	0	25	12	2	31	0	0	0	0	17	0	0	284	0	60			0	0	0	0
10:15	0	24	10	2	35	0	0	0	0	12	0	0	301	0	59			0	0	0	0
10:30	0	24	12	1	26	0	0	0	0	15	0	0	302	0	59			0	0	0	0
10:45	0	35	20	1	24	0	0	0	0	16	0	0	321	0	64			0	0	0	0
11:00	0	37	14	2	34	0	0	0	0	16	0	0	311	0	61			0	0	0	0
11:15	0	36	11	0	25	0	0	0	0	12	0	0	315	0	60			0	0	0	0
11:30	0	28	23	0	31	0	0	0	0	20	0	0	331	0	68			0	0	0	0
11:45	0	27	14	0	29	0	0	0	0	13	0	0	315	0	74			0	0	0	0
12:00	0	39	25	1	26	0	0	0	0	15	0	0	322	0	83			0	0	0	0
12:15	0	31	20	3	34	0	0	0	0	20	0	0	330	0	94			0	0	0	0
12:30	0	14	14	1	37	0	0	0	0	26	0	0	350	0	95			0	0	0	0
12:45	0	25	19	2	31	0	0	0	0	22	0	0	388	0	92			0	0	0	0
13:00	0	25	22	2	50	0	0	0	0	26	0	0	406	0	99			0	0	0	0
13:15	0	46	17	1	44	0	0	0	0	21	0	0	432	0	96			0	0	0	0
13:30	0	37	21	0	46	0	0	0	0	23	0	0	445	0	102			0	0	0	0
13:45	0	47	28	2	18	0	0	0	0	29	0	0	436	0	99			0	0	0	0
14:00	0	51	17	12	45	0	0	0	0	23	0	0	441	0	92			0	0	0	0
14:15	0	44	26	9	42	0	0	0	0	27	0	0	442	0	83			0	0	0	0
14:30	0	35	27	1	32	0	0	0	0	20	0	0	441	0	85			0	0	0	0
14:45	0	39	28	2	31	0	0	0	0	22	0	0	463	0	90			0	0	0	0
15:00	0	37	24	9	56	0	0	0	0	14	0	0	482	0	88			0	0	0	0
15:15	0	46	30	5	39	0	0	0	0	29	0	0	489	0	100			0	0	0	0
15:30	0	43	35	3	36	0	0	0	0	25	0	0	501	0	83			0	0	0	0
15:45	0	56	33	4	26	0	0	0	0	20	0	0	513	0	84			0	0	0	0
16:00	0	45	43	2	43	0	0	0	0	26	0	0	529	0	88			0	0	0	0
16:15	0	49	44	3	36	0	0	0	0	12	0	0	534	0	78			0	0	0	0
16:30	0	59	36	1	33	0	0	0	0	26	0	0	512	0	87			0	0	0	0
16:45	0	49	41	5	40	0	0	0	0	24	0	0	511	0	88			0	0	0	0
17:00	0	70	36	0	32	0	0	0	0	16	0	0	504	0	92			0	0	0	0
17:15	0	50	30	0	30	0	0	0	0	21	0	0	366	0	76			0	0	0	0
17:30	0	52	39	4	33	0	0	0	0	27	0	0	256	0	55			0	0	0	0
17:45	0	47	48	1	32	0	0	0	0	28	0	0	128	0	28			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	0
Signal Warranted?	No


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
201
60'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

Kahekili Highway/Makaala Drive
Base Year Without Imi Kala Street Extension

Weekday Kahekili Hwy/Makaala Drive 8-Hour Signal Warrant

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						Makaala Drive			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	78.47667953	0	36.0608	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	147.2489864	0	82.7276	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	252.6802684	0	140.001	-	-	-	-	-	-	0	0	0
6:00	0	23.117	7.8274	0	47.533	0	0	0	0	36.061	0	0	456.0251734	0	187.728	-	-	-	-	-	-	0	0	0
6:15	0	17.677	5.591	3.6299	41.874	0	0	0	0	46.667	0	0	615.6521375	0	195.557	-	-	-	1	-	1	1	0	1
6:30	0	24.476	6.7092	1.8149	72.431	0	0	0	0	57.273	0	0	757.1227563	0	179.732	-	-	-	1	1	1	2	1	2
6:45	0	58.471	20.128	12.705	112.04	0	0	0	0	47.727	0	0	785.3670806	0	158.045	-	-	-	1	1	1	3	2	3
7:00	0	57.578	5.7646	22.195	152.57	0	0	0	0	43.89	0	0	719.6861262	0	145.904	-	-	-	-	-	1	4	3	4
7:15	0	49.726	18.255	44.389	97.873	0	0	0	0	30.842	0	0	589.0883435	0	126.408	-	-	-	-	-	-	0	4	0
7:30	0	18.32	14.411	24.661	76.283	0	0	0	0	35.586	0	0	475.31074	0	118.9	-	-	-	-	-	-	0	0	0
7:45	0	44.492	23.058	2.4661	67.647	0	0	0	0	35.586	0	0	437.9324056	0	99.2231	-	-	-	-	-	-	0	0	0
8:00	0	50.313	25.719	5.4448	26.03	0	0	0	0	24.394	0	0	400.3986177	0	81.667	-	-	-	-	-	-	0	0	0
8:15	0	32.635	19.009	1.8149	43.006	0	0	0	0	23.333	0	0	392.3404221	0	85.9095	-	-	-	-	-	-	0	0	0
8:30	0	28.556	13.418	0	54.323	0	0	0	0	15.909	0	0	*355.0582553*	0	88.0307	-	-	-	-	-	-	0	0	0
8:45	0	38.074	15.655	0	46.401	0	0	0	0	18.03	0	0	341.5264087	0	86.9701	-	-	-	-	-	-	0	0	0
9:00	0	39.434	16.773	3.6299	39.611	0	0	0	0	28.636	0	0	323.4524026	0	85.9095	-	-	-	-	-	-	0	0	0
9:15	0	23.117	12.3	0	23.766	0	0	0	0	25.455	0	0	310.1316758	0	75.3034	-	-	-	-	-	-	0	0	0
9:30	0	32.635	11.182	7.2598	31.688	0	0	0	0	14.849	0	0	338.0061751	0	62.576	-	-	-	-	-	-	0	0	0
9:45	0	36.715	13.418	3.6299	28.293	0	0	0	0	16.97	0	0	332.534297	0	63.6366	-	-	-	-	-	-	0	0	0
10:00	0	33.995	13.418	3.6299	35.084	0	0	0	0	18.03	0	0	349.411643	0	63.6366	-	-	-	-	-	-	0	0	0
10:15	0	32.635	11.182	3.6299	39.611	0	0	0	0	12.727	0	0	371.360834	0	62.576	-	-	-	-	-	-	0	0	0
10:30	0	32.635	13.418	1.8149	29.425	0	0	0	0	15.909	0	0	373.8494479	0	62.576	-	-	-	-	-	-	0	0	0
10:45	0	47.593	22.364	1.8149	27.162	0	0	0	0	16.97	0	0	395.4325843	0	67.8791	-	-	-	-	-	-	0	0	0
11:00	0	50.313	15.655	3.6299	38.479	0	0	0	0	16.97	0	0	381.6886823	0	64.6973	-	-	-	-	-	-	0	0	0
11:15	0	48.953	12.3	0	28.293	0	0	0	0	12.727	0	0	385.8397268	0	63.6366	-	-	-	-	-	-	0	0	0
11:30	0	38.074	25.719	0	35.084	0	0	0	0	21.212	0	0	404.7349461	0	72.1215	-	-	-	-	-	-	0	0	0
11:45	0	36.715	15.655	0	32.82	0	0	0	0	13.788	0	0	384.239251	0	78.4852	-	-	-	-	-	-	0	0	0
12:00	0	53.032	27.955	1.8149	29.425	0	0	0	0	15.909	0	0	393.0040067	0	88.0307	-	-	-	-	-	-	0	0	0
12:15	0	42.154	22.364	5.4448	38.479	0	0	0	0	21.212	0	0	399.5886704	0	99.6974	-	-	-	-	-	-	0	0	0
12:30	0	19.037	15.655	1.8149	41.874	0	0	0	0	27.576	0	0	424.3184771	0	100.758	-	-	-	-	-	-	0	0	0
12:45	0	33.995	21.246	3.6299	35.084	0	0	0	0	23.333	0	0	471.7919166	0	97.5762	-	-	-	-	-	-	0	0	0
13:00	0	33.995	24.6	3.6299	56.587	0	0	0	0	27.576	0	0	497.0588381	0	105	-	-	-	-	-	-	0	0	0
13:15	0	62.551	19.009	1.8149	49.796	0	0	0	0	22.273	0	0	539.3133733	0	101.819	-	-	-	-	-	-	0	0	0
13:30	0	50.313	23.482	0	52.06	0	0	0	0	24.394	0	0	558.9136637	0	108.182	-	-	-	-	-	-	0	0	0
13:45	0	63.911	31.31	3.6299	20.371	0	0	0	0	30.758	0	0	548.8739977	0	105	-	-	-	-	-	-	0	0	0
14:00	0	69.35	19.009	21.779	50.928	0	0	0	0	24.394	0	0	552.7080935	0	97.5762	-	-	-	-	-	-	0	0	0
14:15	0	59.831	29.073	16.334	47.533	0	0	0	0	28.636	0	0	548.5025262	0	88.0307	-	-	-	-	-	-	0	0	0
14:30	0	47.593	30.191	1.8149	36.215	0	0	0	0	21.212	0	0	545.0399813	0	90.1519	-	-	-	-	-	-	0	0	0
14:45	0	53.032	31.31	3.6299	35.084	0	0	0	0	23.333	0	0	573.020801	0	95.455	-	-	-	-	-	-	0	0	0
15:00	0	50.313	26.837	16.334	63.377	0	0	0	0	14.849	0	0	599.6996378	0	93.3337	-	-	-	-	-	-	0	0	0
15:15	0	62.551	33.546	9.0747	44.137	0	0	0	0	30.758	0	0	604.4068037	0	106.061	-	-	-	-	-	-	0	0	0
15:30	0	58.471	39.137	5.4448	40.742	0	0	0	0	26.515	0	0	617.1159655	0	88.0307	-	-	-	-	-	-	0	0	0
15:45	0	76.149	36.901	7.2598	29.425	0	0	0	0	21.212	0	0	632.9658893	0	89.0913	-	-	-	-	-	-	0	0	0
16:00	0	61.191	48.083	3.6299	48.664	0	0	0	0	27.576	0	0	650.052076	0	93.3337	-	-	-	-	-	-	0	0	0
16:15	0	66.63	49.201	5.4448	40.742	0	0	0	0	12.727	0	0	660.1407344	0	82.7276	-	-	-	-	-	-	0	0	0
16:30	0	80.228	40.255	1.8149	37.347	0	0	0	0	27.576	0	0	633.6104947	0	92.2731	-	-	-	-	-	-	0	0	0
16:45	0	66.63	45.846	9.0747	45.269	0	0	0	0	25.455	0	0	632.8913277	0	93.3337	-	-	-	-	-	-	0	0	0
17:00	0	95.186	40.255	0	36.215	0	0	0	0	16.97	0	0	621.685541	0	97.5762	-	-	-	-	-	-	0	0	0
17:15	0	67.99	33.546	0	33.952	0	0	0	0	22.273	0	0	450.028911	0	80.6064	-	-	-	-	-	-	0	0	0
17:30	0	70.71	43.61	7.2598	37.347	0	0	0	0	28.636	0	0	314.5409488	0	58.3336	-	-	-	-	-	-	0	0	0
17:45	0	63.911	53.674	1.8149	36.215	0	0	0	0	29.697	0	0	155.6146103	0	29.6971	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						1	1	1
															Signal Warranted?						No		
															Notes								

Weekday Kahekili Hwy/Makaala Drive 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						Makaala Drive			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction:	0%		RT Reduction:	100%											
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	78.47667953	0	36.0608			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	147.2489864	0	82.7276			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	252.6802684	0	140.001			0	0	0	0
6:00	0	23.117	7.8274	0	47.533	0	0	0	0	36.061	0	0	456.0251734	0	187.728			0	0	0	0
6:15	0	17.677	5.591	3.6299	41.874	0	0	0	0	46.667	0	0	615.6521375	0	195.557			0	0	0	0
6:30	0	24.476	6.7092	1.8149	72.431	0	0	0	0	57.273	0	0	757.1227563	0	179.732	1		0	1	1	1
6:45	0	58.471	20.128	12.705	112.04	0	0	0	0	47.727	0	0	785.3670806	0	158.045	1		0	2	1	2
7:00	0	57.578	5.7646	22.195	152.57	0	0	0	0	43.89	0	0	719.6861262	0	145.904			0	3	0	3
7:15	0	49.726	18.255	44.389	97.873	0	0	0	0	30.842	0	0	589.0883435	0	126.408			0	4	0	4
7:30	0	18.32	14.411	24.661	76.283	0	0	0	0	35.586	0	0	475.31074	0	118.9			0	0	0	0
7:45	0	44.492	23.058	2.4661	67.647	0	0	0	0	35.586	0	0	437.9324056	0	99.2231			0	0	0	0
8:00	0	50.313	25.719	5.4448	26.03	0	0	0	0	24.394	0	0	400.3986177	0	81.667			0	0	0	0
8:15	0	32.635	19.009	1.8149	43.006	0	0	0	0	23.333	0	0	392.3404221	0	85.9095			0	0	0	0
8:30	0	28.556	13.418	0	54.323	0	0	0	0	15.909	0	0	*355.0582553*	0	88.0307			0	0	0	0
8:45	0	38.074	15.655	0	46.401	0	0	0	0	18.03	0	0	341.5264087	0	86.9701			0	0	0	0
9:00	0	39.434	16.773	3.6299	39.611	0	0	0	0	28.636	0	0	323.4524026	0	85.9095			0	0	0	0
9:15	0	23.117	12.3	0	23.766	0	0	0	0	25.455	0	0	310.1316758	0	75.3034			0	0	0	0
9:30	0	32.635	11.182	7.2598	31.688	0	0	0	0	14.849	0	0	338.0061751	0	62.576			0	0	0	0
9:45	0	36.715	13.418	3.6299	28.293	0	0	0	0	16.97	0	0	332.534297	0	63.6366			0	0	0	0
10:00	0	33.995	13.418	3.6299	35.084	0	0	0	0	18.03	0	0	349.411643	0	63.6366			0	0	0	0
10:15	0	32.635	11.182	3.6299	39.611	0	0	0	0	12.727	0	0	371.360834	0	62.576			0	0	0	0
10:30	0	32.635	13.418	1.8149	29.425	0	0	0	0	15.909	0	0	373.8494479	0	62.576			0	0	0	0
10:45	0	47.593	22.364	1.8149	27.162	0	0	0	0	16.97	0	0	395.4325843	0	67.8791			0	0	0	0
11:00	0	50.313	15.655	3.6299	38.479	0	0	0	0	16.97	0	0	381.6886823	0	64.6973			0	0	0	0
11:15	0	48.953	12.3	0	28.293	0	0	0	0	12.727	0	0	385.8397268	0	63.6366			0	0	0	0
11:30	0	38.074	25.719	0	35.084	0	0	0	0	21.212	0	0	404.7349461	0	72.1215			0	0	0	0
11:45	0	36.715	15.655	0	32.82	0	0	0	0	13.788	0	0	384.239251	0	78.4852			0	0	0	0
12:00	0	53.032	27.955	1.8149	29.425	0	0	0	0	15.909	0	0	393.0040067	0	88.0307			0	0	0	0
12:15	0	42.154	22.364	5.4448	38.479	0	0	0	0	21.212	0	0	399.5886704	0	99.6974			0	0	0	0
12:30	0	19.037	15.655	1.8149	41.874	0	0	0	0	27.576	0	0	424.3184771	0	100.758			0	0	0	0
12:45	0	33.995	21.246	3.6299	35.084	0	0	0	0	23.333	0	0	471.7919166	0	97.5762			0	0	0	0
13:00	0	33.995	24.6	3.6299	56.587	0	0	0	0	27.576	0	0	497.0588381	0	105			0	0	0	0
13:15	0	62.551	19.009	1.8149	49.796	0	0	0	0	22.273	0	0	539.3133733	0	101.819			0	0	0	0
13:30	0	50.313	23.482	0	52.06	0	0	0	0	24.394	0	0	558.9136637	0	108.182			0	0	0	0
13:45	0	63.911	31.31	3.6299	20.371	0	0	0	0	30.758	0	0	548.8739977	0	105			0	0	0	0
14:00	0	69.35	19.009	21.779	50.928	0	0	0	0	24.394	0	0	552.7080935	0	97.5762			0	0	0	0
14:15	0	59.831	29.073	16.334	47.533	0	0	0	0	28.636	0	0	548.5025262	0	88.0307			0	0	0	0
14:30	0	47.593	30.191	1.8149	36.215	0	0	0	0	21.212	0	0	545.0399813	0	90.1519			0	0	0	0
14:45	0	53.032	31.31	3.6299	35.084	0	0	0	0	23.333	0	0	573.020801	0	95.455			0	0	0	0
15:00	0	50.313	26.837	16.334	63.377	0	0	0	0	14.849	0	0	599.6996378	0	93.3337			0	0	0	0
15:15	0	62.551	33.546	9.0747	44.137	0	0	0	0	30.758	0	0	604.4068037	0	106.061			0	0	0	0
15:30	0	58.471	39.137	5.4448	40.742	0	0	0	0	26.515	0	0	617.1159655	0	88.0307			0	0	0	0
15:45	0	76.149	36.901	7.2598	29.425	0	0	0	0	21.212	0	0	632.9658893	0	89.0913			0	0	0	0
16:00	0	61.191	48.083	3.6299	48.664	0	0	0	0	27.576	0	0	650.052076	0	93.3337			0	0	0	0
16:15	0	66.63	49.201	5.4448	40.742	0	0	0	0	12.727	0	0	660.1407344	0	82.7276			0	0	0	0
16:30	0	80.228	40.255	1.8149	37.347	0	0	0	0	27.576	0	0	633.6104947	0	92.2731			0	0	0	0
16:45	0	66.63	45.846	9.0747	45.269	0	0	0	0	25.455	0	0	632.8913277	0	93.3337			0	0	0	0
17:00	0	95.186	40.255	0	36.215	0	0	0	0	16.97	0	0	621.685541	0	97.5762			0	0	0	0
17:15	0	67.99	33.546	0	33.952	0	0	0	0	22.273	0	0	450.028911	0	80.6064			0	0	0	0
17:30	0	70.71	43.61	7.2598	37.347	0	0	0	0	28.636	0	0	314.5409488	0	58.3336			0	0	0	0
17:45	0	63.911	53.674	1.8149	36.215	0	0	0	0	29.697	0	0	155.6146103	0	29.6971			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	1
Signal Warranted?	No


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
757.1227563, 179.7319429
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
757.1227563, 179.7319429
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Makaala Drive 8-Hour Signal Warrant

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	**70% ****	**56%**	100% *	80%	**70% ****	**56%**
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	**70% ****	**56%**	100% *	80%	**70% ****	**56%**
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

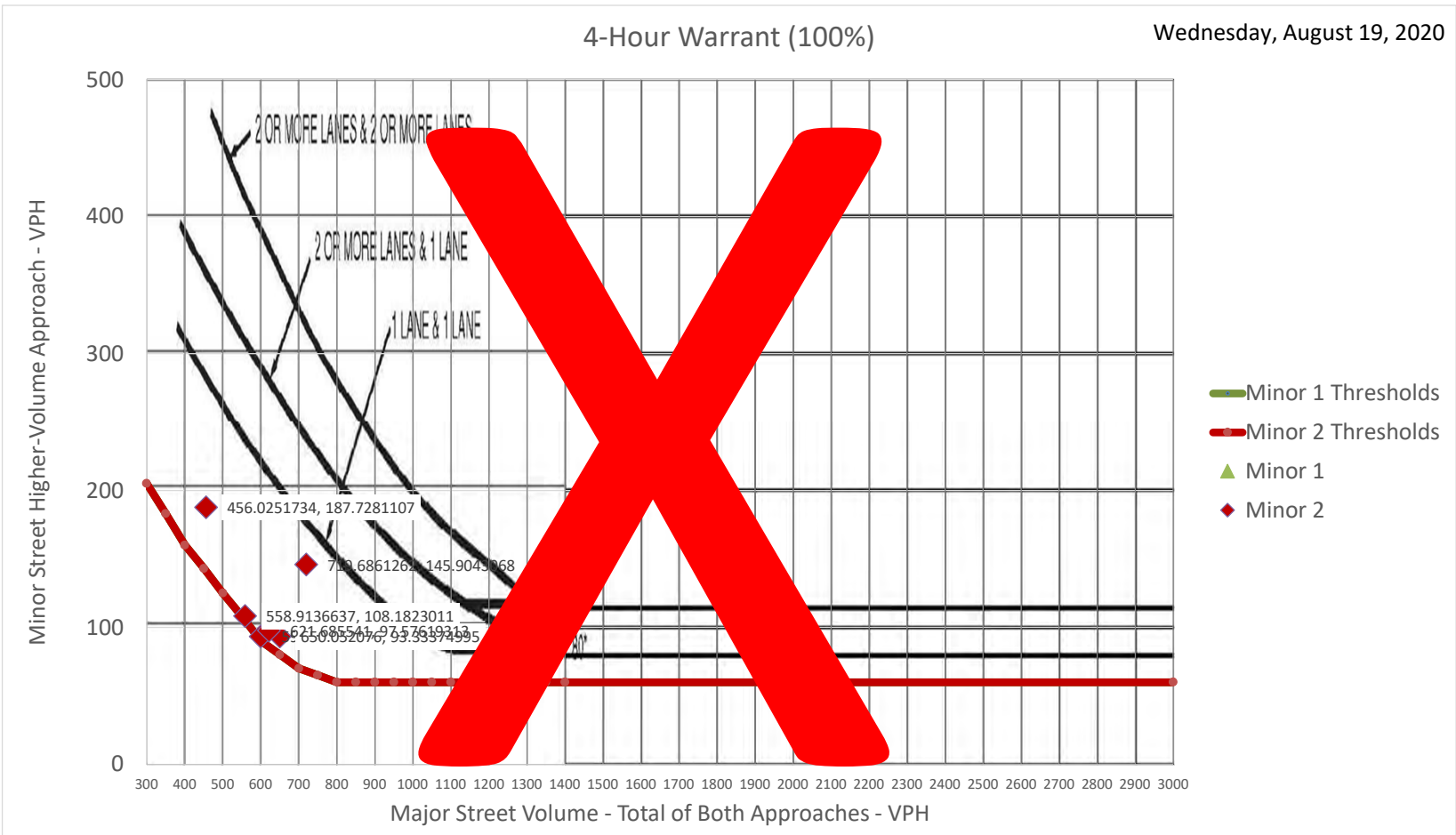
	Kahekili Hwy						Makaala Drive			0			**70 % Warrant**			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			350	525	420	350	525	420			
	1						1			1			Minor Threshold			105	53	84	105	53	84			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	78.47667953	0	36.0608	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	147.2489864	0	82.7276	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	252.6802684	0	140.001	-	-	-	-	-	-	0	0	0
6:00	0	23.117	7.8274	0	47.533	0	0	0	0	36.061	0	0	456.0251734	0	187.728	-	-	-	1	-	1	1	0	1
6:15	0	17.677	5.591	3.6299	41.874	0	0	0	0	46.667	0	0	615.6521375	0	195.557	-	-	-	1	1	1	2	1	2
6:30	0	24.476	6.7092	1.8149	72.431	0	0	0	0	57.273	0	0	757.1227563	0	179.732	-	-	-	1	1	1	3	2	3
6:45	0	58.471	20.128	12.705	112.04	0	0	0	0	47.727	0	0	785.3670806	0	158.045	-	-	-	1	1	1	4	3	4
7:00	0	57.578	5.7646	22.195	152.57	0	0	0	0	43.89	0	0	719.6861262	0	145.904	-	-	-	1	1	1	1	4	1
7:15	0	49.726	18.255	44.389	97.873	0	0	0	0	30.842	0	0	589.0883435	0	126.408	-	-	-	1	1	1	2	1	2
7:30	0	18.32	14.411	24.661	76.283	0	0	0	0	35.586	0	0	475.31074	0	118.9	-	-	-	1	-	1	3	2	3
7:45	0	44.492	23.058	2.4661	67.647	0	0	0	0	35.586	0	0	437.9324056	0	99.2231	-	-	-	-	-	1	4	3	4
8:00	0	50.313	25.719	5.4448	26.03	0	0	0	0	24.394	0	0	400.3986177	0	81.667	-	-	-	-	-	-	0	4	0
8:15	0	32.635	19.009	1.8149	43.006	0	0	0	0	23.333	0	0	392.3404221	0	85.9095	-	-	-	-	-	-	0	0	0
8:30	0	28.556	13.418	0	54.323	0	0	0	0	15.909	0	0	*355.0582553*	0	88.0307	-	-	-	-	-	-	0	0	0
8:45	0	38.074	15.655	0	46.401	0	0	0	0	18.03	0	0	341.5264087	0	86.9701	-	-	-	-	-	-	0	0	0
9:00	0	39.434	16.773	3.6299	39.611	0	0	0	0	28.636	0	0	323.4524026	0	85.9095	-	-	-	-	-	-	0	0	0
9:15	0	23.117	12.3	0	23.766	0	0	0	0	25.455	0	0	310.1316758	0	75.3034	-	-	-	-	-	-	0	0	0
9:30	0	32.635	11.182	7.2598	31.688	0	0	0	0	14.849	0	0	338.0061751	0	62.576	-	-	-	-	-	-	0	0	0
9:45	0	36.715	13.418	3.6299	28.293	0	0	0	0	16.97	0	0	332.534297	0	63.6366	-	-	-	-	-	-	0	0	0
10:00	0	33.995	13.418	3.6299	35.084	0	0	0	0	18.03	0	0	349.411643	0	63.6366	-	-	-	-	-	-	0	0	0
10:15	0	32.635	11.182	3.6299	39.611	0	0	0	0	12.727	0	0	371.360834	0	62.576	-	-	-	-	-	-	0	0	0
10:30	0	32.635	13.418	1.8149	29.425	0	0	0	0	15.909	0	0	373.8494479	0	62.576	-	-	-	-	-	-	0	0	0
10:45	0	47.593	22.364	1.8149	27.162	0	0	0	0	16.97	0	0	395.4325843	0	67.8791	-	-	-	-	-	-	0	0	0
11:00	0	50.313	15.655	3.6299	38.479	0	0	0	0	16.97	0	0	381.6886823	0	64.6973	-	-	-	-	-	-	0	0	0
11:15	0	48.953	12.3	0	28.293	0	0	0	0	12.727	0	0	385.8397268	0	63.6366	-	-	-	-	-	-	0	0	0
11:30	0	38.074	25.719	0	35.084	0	0	0	0	21.212	0	0	404.7349461	0	72.1215	-	-	-	-	-	-	0	0	0
11:45	0	36.715	15.655	0	32.82	0	0	0	0	13.788	0	0	384.239251	0	78.4852	-	-	-	-	-	-	0	0	0
12:00	0	53.032	27.955	1.8149	29.425	0	0	0	0	15.909	0	0	393.0040067	0	88.0307	-	-	-	-	-	-	0	0	0
12:15	0	42.154	22.364	5.4448	38.479	0	0	0	0	21.212	0	0	399.5886704	0	99.6974	-	-	-	-	-	-	0	0	0
12:30	0	19.037	15.655	1.8149	41.874	0	0	0	0	27.576	0	0	424.3184771	0	100.758	-	-	-	-	-	1	0	0	1
12:45	0	33.995	21.246	3.6299	35.084	0	0	0	0	23.333	0	0	471.7919166	0	97.5762	-	-	-	-	-	1	0	0	2
13:00	0	33.995	24.6	3.6299	56.587	0	0	0	0	27.576	0	0	497.0588381	0	105	-	-	-	1	-	1	1	0	3
13:15	0	62.551	19.009	1.8149	49.796	0	0	0	0	22.273	0	0	539.3133733	0	101.819	-	-	-	-	1	1	2	1	4
13:30	0	50.313	23.482	0	52.06	0	0	0	0	24.394	0	0	558.9136637	0	108.182	-	-	-	1	1	1	3	2	1
13:45	0	63.911	31.31	3.6299	20.371	0	0	0	0	30.758	0	0	548.8739977	0	105	-	-	-	1	1	1	4	3	2
14:00	0	69.35	19.009	21.779	50.928	0	0	0	0	24.394	0	0	552.7080935	0	97.5762	-	-	-	-	1	1	0	4	3
14:15	0	59.831	29.073	16.334	47.533	0	0	0	0	28.636	0	0	548.5025262	0	88.0307	-	-	-	-	1	1	0	1	4
14:30	0	47.593	30.191	1.8149	36.215	0	0	0	0	21.212	0	0	545.0399813	0	90.1519	-	-	-	-	1	1	0	2	1
14:45	0	53.032	31.31	3.6299	35.084	0	0	0	0	23.333	0	0	573.020801	0	95.455	-	-	-	-	1	1	0	3	2
15:00	0	50.313	26.837	16.334	63.377	0	0	0	0	14.849	0	0	599.6996378	0	93.3337	-	-	-	-	1	1	0	4	3
15:15	0	62.551	33.546	9.0747	44.137	0	0	0	0	30.758	0	0	604.4068037	0	106.061	-	-	-	1	1	1	1	1	4
15:30	0	58.471	39.137	5.4448	40.742	0	0	0	0	26.515	0	0	617.1159655	0	88.0307	-	-	-	-	1	1	2	2	1
15:45	0	76.149	36.901	7.2598	29.425	0	0	0	0	21.212	0	0	632.9658893	0	89.0913	-	-	-	-	1	1	3	3	2
16:00	0	61.191	48.083	3.6299	48.664	0	0	0	0	27.576	0	0	650.052076	0	93.3337	-	-	-	-	1	1	4	4	3
16:15	0	66.63	49.201	5.4448	40.742	0	0	0	0	12.727	0	0	660.1407344	0	82.7276	-	-	-	-	1	-	0	1	4
16:30	0	80.228	40.255	1.8149	37.347	0	0	0	0	27.576	0	0	633.6104947	0	92.2731	-	-	-	-	1	1	0	2	1
16:45	0	66.63	45.846	9.0747	45.269	0	0	0	0	25.455	0	0	632.8913277	0	93.3337	-	-	-	-	1	1	0	3	2
17:00	0	95.186	40.255	0	36.215	0	0	0	0	16.97	0	0	621.685541	0	97.5762	-	-	-	-	1	1	0	4	3
17:15	0	67.99	33.546	0	33.952	0	0	0	0	22.273	0	0	450.028911	0	80.6064	-	-	-	-	-	-	0	0	4
17:30	0	70.71	43.61	7.2598	37.347	0	0	0	0	28.636	0	0	314.5409488	0	58.3336	-	-	-	-	-	-	0	0	0
17:45	0	63.911	53.674	1.8149	36.215	0	0	0	0	29.697	0	0	155.6146103	0	29.6971	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						4	6	7
															Signal Warranted?						No		
															Notes								

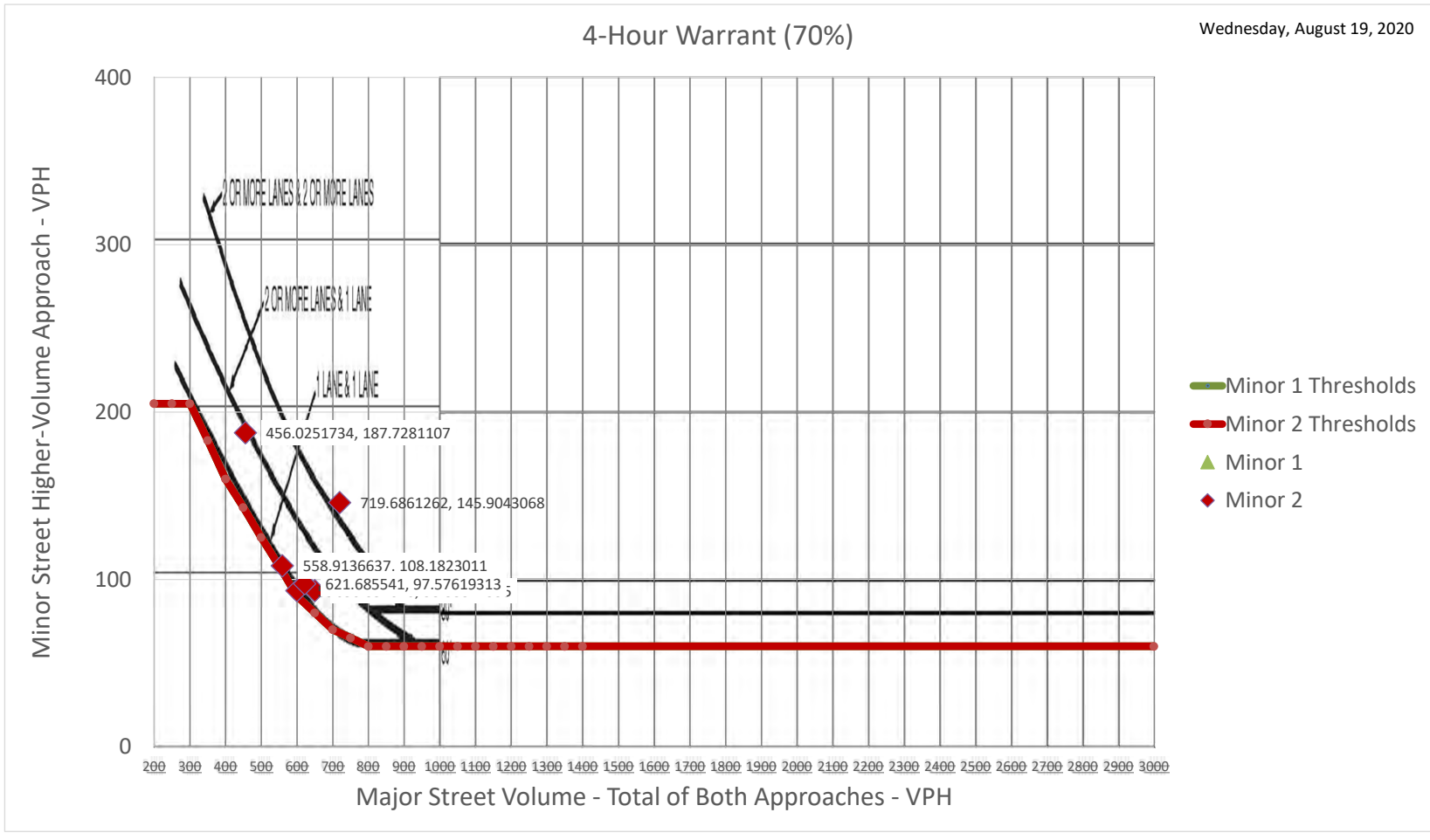
Weekday Kahekili Hwy/Makaala Drive 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						Makaala Drive			0			70 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction:	0%		RT Reduction:	100%										
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	78.47667953	0	36.0608			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	147.2489864	0	82.7276			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	252.6802684	0	140.001			0	0	0	0
6:00	0	23.117	7.8274	0	47.533	0	0	0	0	36.061	0	0	456.0251734	0	187.728		1	0	1	1	1
6:15	0	17.677	5.591	3.6299	41.874	0	0	0	0	46.667	0	0	615.6521375	0	195.557		1	0	2	1	2
6:30	0	24.476	6.7092	1.8149	72.431	0	0	0	0	57.273	0	0	757.1227563	0	179.732		1	0	3	1	3
6:45	0	58.471	20.128	12.705	112.04	0	0	0	0	47.727	0	0	785.3670806	0	158.045		1	0	4	1	4
7:00	0	57.578	5.7646	22.195	152.57	0	0	0	0	43.89	0	0	719.6861262	0	145.904		1	0	1	1	1
7:15	0	49.726	18.255	44.389	97.873	0	0	0	0	30.842	0	0	589.0883435	0	126.408		1	0	2	1	2
7:30	0	18.32	14.411	24.661	76.283	0	0	0	0	35.586	0	0	475.31074	0	118.9			0	3	0	3
7:45	0	44.492	23.058	2.4661	67.647	0	0	0	0	35.586	0	0	437.9324056	0	99.2231			0	4	0	4
8:00	0	50.313	25.719	5.4448	26.03	0	0	0	0	24.394	0	0	400.3986177	0	81.667			0	0	0	0
8:15	0	32.635	19.009	1.8149	43.006	0	0	0	0	23.333	0	0	392.3404221	0	85.9095			0	0	0	0
8:30	0	28.556	13.418	0	54.323	0	0	0	0	15.909	0	0	*355.0582553*	0	88.0307			0	0	0	0
8:45	0	38.074	15.655	0	46.401	0	0	0	0	18.03	0	0	341.5264087	0	86.9701			0	0	0	0
9:00	0	39.434	16.773	3.6299	39.611	0	0	0	0	28.636	0	0	323.4524026	0	85.9095			0	0	0	0
9:15	0	23.117	12.3	0	23.766	0	0	0	0	25.455	0	0	310.1316758	0	75.3034			0	0	0	0
9:30	0	32.635	11.182	7.2598	31.688	0	0	0	0	14.849	0	0	338.0061751	0	62.576			0	0	0	0
9:45	0	36.715	13.418	3.6299	28.293	0	0	0	0	16.97	0	0	332.534297	0	63.6366			0	0	0	0
10:00	0	33.995	13.418	3.6299	35.084	0	0	0	0	18.03	0	0	349.411643	0	63.6366			0	0	0	0
10:15	0	32.635	11.182	3.6299	39.611	0	0	0	0	12.727	0	0	371.360834	0	62.576			0	0	0	0
10:30	0	32.635	13.418	1.8149	29.425	0	0	0	0	15.909	0	0	373.8494479	0	62.576			0	0	0	0
10:45	0	47.593	22.364	1.8149	27.162	0	0	0	0	16.97	0	0	395.4325843	0	67.8791			0	0	0	0
11:00	0	50.313	15.655	3.6299	38.479	0	0	0	0	16.97	0	0	381.6886823	0	64.6973			0	0	0	0
11:15	0	48.953	12.3	0	28.293	0	0	0	0	12.727	0	0	385.8397268	0	63.6366			0	0	0	0
11:30	0	38.074	25.719	0	35.084	0	0	0	0	21.212	0	0	404.7349461	0	72.1215			0	0	0	0
11:45	0	36.715	15.655	0	32.82	0	0	0	0	13.788	0	0	384.239251	0	78.4852			0	0	0	0
12:00	0	53.032	27.955	1.8149	29.425	0	0	0	0	15.909	0	0	393.0040067	0	88.0307			0	0	0	0
12:15	0	42.154	22.364	5.4448	38.479	0	0	0	0	21.212	0	0	399.5886704	0	99.6974			0	0	0	0
12:30	0	19.037	15.655	1.8149	41.874	0	0	0	0	27.576	0	0	424.3184771	0	100.758			0	0	0	0
12:45	0	33.995	21.246	3.6299	35.084	0	0	0	0	23.333	0	0	471.7919166	0	97.5762			0	0	0	0
13:00	0	33.995	24.6	3.6299	56.587	0	0	0	0	27.576	0	0	497.0588381	0	105			0	0	0	0
13:15	0	62.551	19.009	1.8149	49.796	0	0	0	0	22.273	0	0	539.3133733	0	101.819			0	0	0	0
13:30	0	50.313	23.482	0	52.06	0	0	0	0	24.394	0	0	558.9136637	0	108.182		1	0	1	1	1
13:45	0	63.911	31.31	3.6299	20.371	0	0	0	0	30.758	0	0	548.8739977	0	105			0	2	0	2
14:00	0	69.35	19.009	21.779	50.928	0	0	0	0	24.394	0	0	552.7080935	0	97.5762			0	3	0	3
14:15	0	59.831	29.073	16.334	47.533	0	0	0	0	28.636	0	0	548.5025262	0	88.0307			0	4	0	4
14:30	0	47.593	30.191	1.8149	36.215	0	0	0	0	21.212	0	0	545.0399813	0	90.1519			0	0	0	0
14:45	0	53.032	31.31	3.6299	35.084	0	0	0	0	23.333	0	0	573.020801	0	95.455			0	0	0	0
15:00	0	50.313	26.837	16.334	63.377	0	0	0	0	14.849	0	0	599.6996378	0	93.3337		1	0	1	1	1
15:15	0	62.551	33.546	9.0747	44.137	0	0	0	0	30.758	0	0	604.4068037	0	106.061		1	0	2	1	2
15:30	0	58.471	39.137	5.4448	40.742	0	0	0	0	26.515	0	0	617.1159655	0	88.0307		1	0	3	1	3
15:45	0	76.149	36.901	7.2598	29.425	0	0	0	0	21.212	0	0	632.9658893	0	89.0913		1	0	4	1	4
16:00	0	61.191	48.083	3.6299	48.664	0	0	0	0	27.576	0	0	650.052076	0	93.3337		1	0	1	1	1
16:15	0	66.63	49.201	5.4448	40.742	0	0	0	0	12.727	0	0	660.1407344	0	82.7276		1	0	2	1	2
16:30	0	80.228	40.255	1.8149	37.347	0	0	0	0	27.576	0	0	633.6104947	0	92.2731		1	0	3	1	3
16:45	0	66.63	45.846	9.0747	45.269	0	0	0	0	25.455	0	0	632.8913277	0	93.3337		1	0	4	1	4
17:00	0	95.186	40.255	0	36.215	0	0	0	0	16.97	0	0	621.685541	0	97.5762		1	0	1	1	1
17:15	0	67.99	33.546	0	33.952	0	0	0	0	22.273	0	0	450.028911	0	80.6064			0	2	0	2
17:30	0	70.71	43.61	7.2598	37.347	0	0	0	0	28.636	0	0	314.5409488	0	58.3336			0	3	0	3
17:45	0	63.911	53.674	1.8149	36.215	0	0	0	0	29.697	0	0	155.6146103	0	29.6971			0	4	0	4
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	6
Signal Warranted?	Yes


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
456.0251734, 187.7281107
719.6861262, 145.9043068
558.9136637, 108.1823011
621.685541, 97.57619313
650.052076, 93.33574995
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
456.0251734, 187.7281107
719.6861262, 145.9043068
558.9136637. 108.1823011
621.685541, 97.57619313
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

Kahekili Highway/Makaala Drive
Base Year With Imi Kala Street Extension

Weekday Kahekili Hwy/Makaala Drive 8-Hour Signal Warrant

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

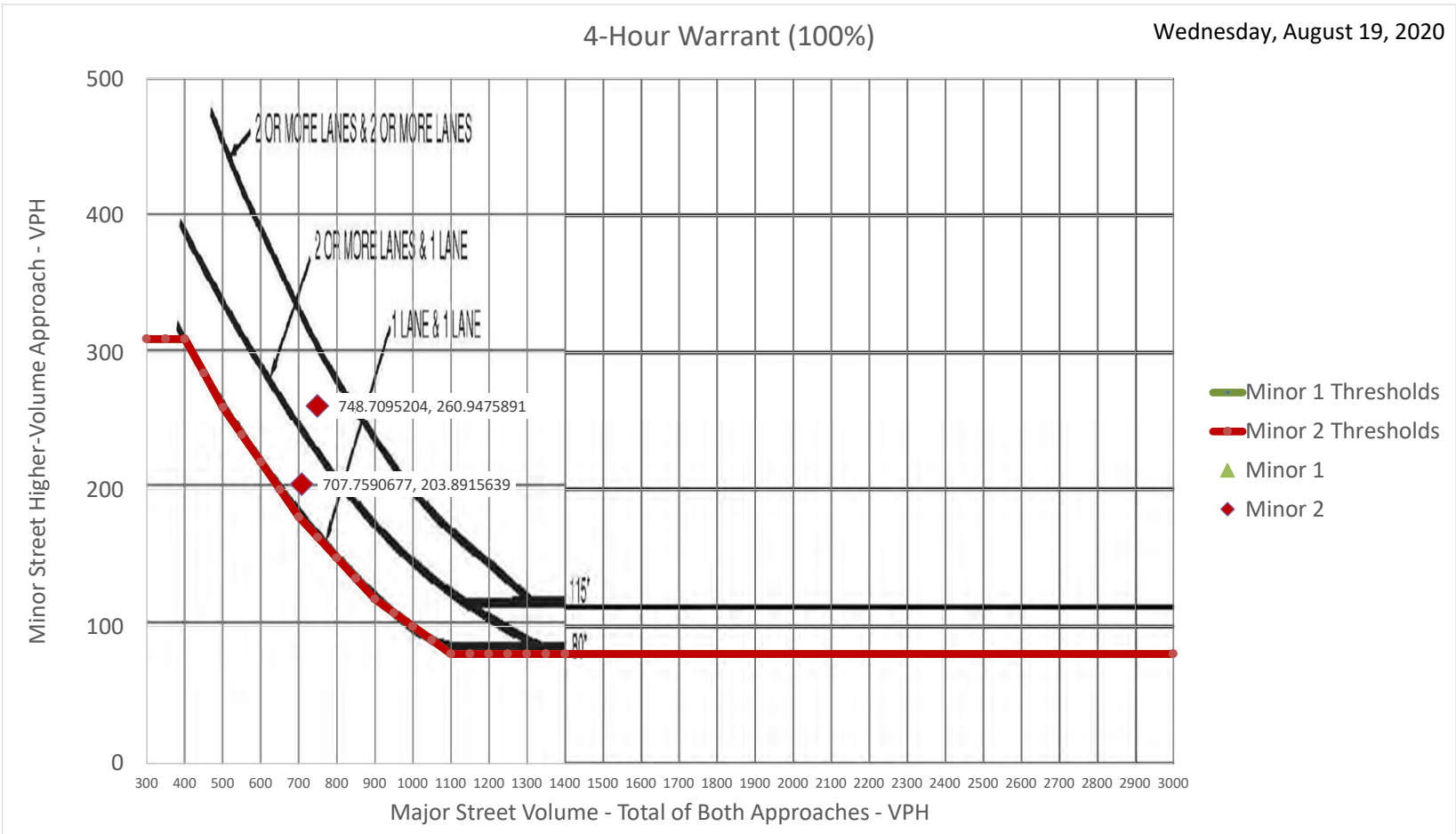
	Kahekili Hwy						Makaala Drive			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	94.49006137	0	44.2487	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	176.9409109	0	101.512	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	305.0595999	0	171.789	-	-	-	-	-	-	0	0	0
6:00	0	24.434	9.4792	0	60.577	0	0	0	0	44.249	0	0	546.7312976	0	230.354	-	-	-	1	-	-	1	0	0
6:15	0	18.685	6.7709	3.6299	53.365	0	0	0	0	57.263	0	0	748.7095204	0	260.948	-	-	-	1	-	1	2	0	1
6:30	0	25.872	8.1251	1.8149	92.307	0	0	0	0	70.277	0	0	917.6150914	0	256.277	-	-	-	1	1	1	3	1	2
6:45	0	61.804	24.375	12.705	142.79	0	0	0	0	58.564	0	0	954.1908355	0	246.683	-	-	-	1	1	1	4	2	3
7:00	0	60.574	6.9552	22.195	206.74	0	0	0	0	74.843	0	0	881.2830363	0	248.801	-	-	-	1	1	1	1	3	4
7:15	0	52.314	22.025	44.389	132.63	0	0	0	0	52.592	0	0	707.7590677	0	203.892	-	-	-	1	-	1	2	4	1
7:30	0	19.274	17.388	24.661	103.37	0	0	0	0	60.683	0	0	570.5414236	0	179.931	-	-	-	1	-	-	3	0	2
7:45	0	46.807	27.821	2.4661	91.67	0	0	0	0	60.683	0	0	521.5109778	0	138.769	-	-	-	-	-	-	4	0	3
8:00	0	53.181	31.146	5.4448	33.173	0	0	0	0	29.933	0	0	471.0845221	0	100.21	-	-	-	-	-	-	0	0	4
8:15	0	34.495	23.021	1.8149	54.807	0	0	0	0	28.632	0	0	464.2452341	0	105.416	-	-	-	-	-	-	0	0	0
8:30	0	30.184	16.25	0	69.23	0	0	0	0	19.521	0	0	*419.7249766*	0	108.019	-	-	-	-	-	-	0	0	0
8:45	0	40.245	18.958	0	59.134	0	0	0	0	22.124	0	0	399.7423629	0	106.718	-	-	-	-	-	-	0	0	0
9:00	0	41.682	20.313	3.6299	50.48	0	0	0	0	35.139	0	0	376.1498108	0	105.416	-	-	-	-	-	-	0	0	0
9:15	0	24.434	14.896	0	30.288	0	0	0	0	31.234	0	0	360.5688368	0	92.4018	-	-	-	-	-	-	0	0	0
9:30	0	34.495	13.542	7.2598	40.384	0	0	0	0	18.22	0	0	393.0978947	0	76.7846	-	-	-	-	-	-	0	0	0
9:45	0	38.807	16.25	3.6299	36.057	0	0	0	0	20.823	0	0	387.4768325	0	78.086	-	-	-	-	-	-	0	0	0
10:00	0	35.933	16.25	3.6299	44.711	0	0	0	0	22.124	0	0	406.5515151	0	78.086	-	-	-	-	-	-	0	0	0
10:15	0	34.495	13.542	3.6299	50.48	0	0	0	0	15.617	0	0	430.8345092	0	76.7846	-	-	-	-	-	-	0	0	0
10:30	0	34.495	16.25	1.8149	37.5	0	0	0	0	19.521	0	0	431.3835713	0	76.7846	-	-	-	-	-	-	0	0	0
10:45	0	50.306	27.084	1.8149	34.615	0	0	0	0	20.823	0	0	457.4253273	0	83.2917	-	-	-	-	-	-	0	0	0
11:00	0	53.181	18.958	3.6299	49.038	0	0	0	0	20.823	0	0	443.1983106	0	79.3874	-	-	-	-	-	-	0	0	0
11:15	0	51.743	14.896	0	36.057	0	0	0	0	15.617	0	0	447.6155704	0	78.086	-	-	-	-	-	-	0	0	0
11:30	0	40.245	31.146	0	44.711	0	0	0	0	26.029	0	0	471.042117	0	88.4975	-	-	-	-	-	-	0	0	0
11:45	0	38.807	18.958	0	41.827	0	0	0	0	16.919	0	0	449.2008734	0	96.3061	-	-	-	-	-	-	0	0	0
12:00	0	56.055	33.854	1.8149	37.5	0	0	0	0	19.521	0	0	459.6116176	0	108.019	-	-	-	-	-	-	0	0	0
12:15	0	44.557	27.084	5.4448	49.038	0	0	0	0	26.029	0	0	471.8568043	0	122.335	-	-	-	-	-	-	0	0	0
12:30	0	20.122	18.958	1.8149	53.365	0	0	0	0	33.837	0	0	500.147047	0	123.636	-	-	-	-	-	-	0	0	0
12:45	0	35.933	25.729	3.6299	44.711	0	0	0	0	28.632	0	0	553.8502103	0	119.732	-	-	-	-	-	-	0	0	0
13:00	0	35.933	29.792	3.6299	72.115	0	0	0	0	33.837	0	0	578.908806	0	128.842	-	-	-	-	-	-	0	0	0
13:15	0	66.116	23.021	1.8149	63.461	0	0	0	0	27.33	0	0	620.4459478	0	124.938	-	-	-	-	-	1	0	0	1
13:30	0	53.181	28.438	0	66.346	0	0	0	0	29.933	0	0	641.3938586	0	132.746	-	-	-	-	-	1	0	0	2
13:45	0	67.554	37.917	3.6299	25.961	0	0	0	0	37.742	0	0	628.2670743	0	128.842	-	-	-	-	-	1	0	0	3
14:00	0	73.303	23.021	21.779	64.903	0	0	0	0	29.933	0	0	635.5184502	0	119.732	-	-	-	-	-	-	0	0	4
14:15	0	63.242	35.209	16.334	60.577	0	0	0	0	35.139	0	0	635.2957825	0	108.019	-	-	-	-	-	-	0	0	0
14:30	0	50.306	36.563	1.8149	46.154	0	0	0	0	26.029	0	0	632.0004619	0	110.622	-	-	-	-	-	-	0	0	0
14:45	0	56.055	37.917	3.6299	44.711	0	0	0	0	28.632	0	0	663.7314565	0	117.129	-	-	-	-	-	-	0	0	0
15:00	0	53.181	32.5	16.334	80.769	0	0	0	0	18.22	0	0	691.3550441	0	114.526	-	-	-	-	-	-	0	0	0
15:15	0	66.116	40.625	9.0747	56.25	0	0	0	0	37.742	0	0	697.1284665	0	130.143	-	-	-	-	-	1	0	0	1
15:30	0	61.804	47.396	5.4448	51.923	0	0	0	0	32.536	0	0	712.4421211	0	108.019	-	-	-	-	-	-	0	0	2
15:45	0	80.489	44.688	7.2598	37.5	0	0	0	0	26.029	0	0	728.8365163	0	109.32	-	-	-	-	-	-	0	0	3
16:00	0	64.679	58.23	3.6299	62.019	0	0	0	0	33.837	0	0	751.6158681	0	114.526	-	-	-	-	1	-	0	1	4
16:15	0	70.428	59.584	5.4448	51.923	0	0	0	0	15.617	0	0	758.5742636	0	101.512	-	-	-	-	1	-	0	2	0
16:30	0	84.801	48.75	1.8149	47.596	0	0	0	0	33.837	0	0	726.9544718	0	113.225	-	-	-	-	-	-	0	3	0
16:45	0	70.428	55.521	9.0747	57.692	0	0	0	0	31.234	0	0	726.4006447	0	114.526	-	-	-	-	-	-	0	4	0
17:00	0	100.61	48.75	0	46.154	0	0	0	0	20.823	0	0	714.2071212	0	119.732	-	-	-	-	-	-	0	0	0
17:15	0	71.866	40.625	0	43.269	0	0	0	0	27.33	0	0	518.691335	0	98.9089	-	-	-	-	-	-	0	0	0
17:30	0	74.74	52.813	7.2598	47.596	0	0	0	0	35.139	0	0	362.9314538	0	71.5788	-	-	-	-	-	-	0	0	0
17:45	0	67.554	65.001	1.8149	46.154	0	0	0	0	36.44	0	0	180.5226882	0	36.4401	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						2	2	4
															Signal Warranted?						No		
															Notes								

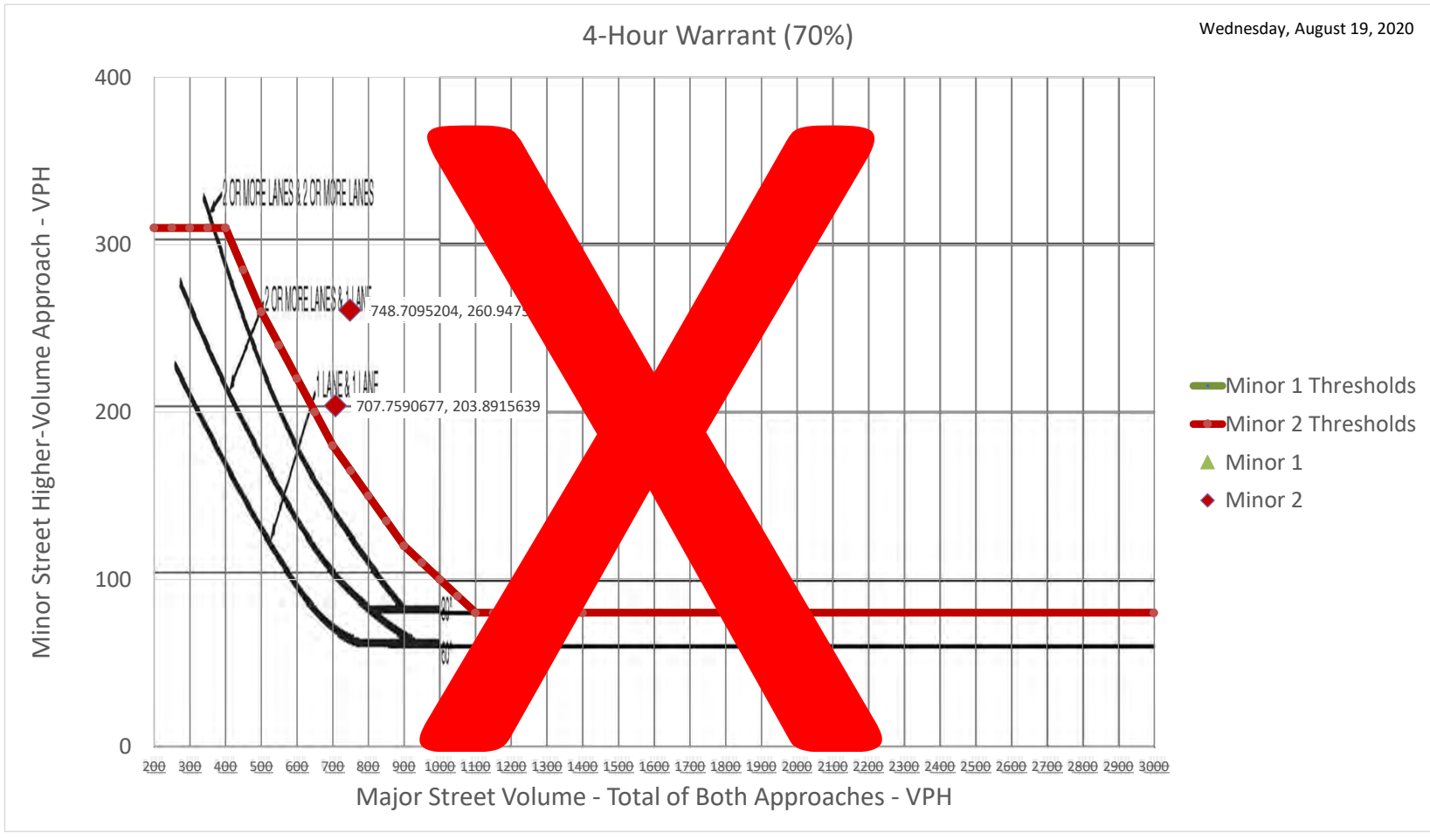
Weekday Kahekili Hwy/Makaala Drive 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						Makaala Drive			0			100 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction:	0%		RT Reduction:	100%										
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	94.49006137	0	44.2487			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	176.9409109	0	101.512			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	305.0595999	0	171.789			0	0	0	0
6:00	0	24.434	9.4792	0	60.577	0	0	0	0	44.249	0	0	546.7312976	0	230.354			0	0	0	0
6:15	0	18.685	6.7709	3.6299	53.365	0	0	0	0	57.263	0	0	748.7095204	0	260.948		1	0	1	1	1
6:30	0	25.872	8.1251	1.8149	92.307	0	0	0	0	70.277	0	0	917.6150914	0	256.277		1	0	2	1	2
6:45	0	61.804	24.375	12.705	142.79	0	0	0	0	58.564	0	0	954.1908355	0	246.683		1	0	3	1	3
7:00	0	60.574	6.9552	22.195	206.74	0	0	0	0	74.843	0	0	881.2830363	0	248.801		1	0	4	1	4
7:15	0	52.314	22.025	44.389	132.63	0	0	0	0	52.592	0	0	707.7590677	0	203.892		1	0	1	1	1
7:30	0	19.274	17.388	24.661	103.37	0	0	0	0	60.683	0	0	570.5414236	0	179.931			0	2	0	2
7:45	0	46.807	27.821	2.4661	91.67	0	0	0	0	60.683	0	0	521.5109778	0	138.769			0	3	0	3
8:00	0	53.181	31.146	5.4448	33.173	0	0	0	0	29.933	0	0	471.0845221	0	100.21			0	4	0	4
8:15	0	34.495	23.021	1.8149	54.807	0	0	0	0	28.632	0	0	464.2452341	0	105.416			0	0	0	0
8:30	0	30.184	16.25	0	69.23	0	0	0	0	19.521	0	0	*419.7249766*	0	108.019			0	0	0	0
8:45	0	40.245	18.958	0	59.134	0	0	0	0	22.124	0	0	399.7423629	0	106.718			0	0	0	0
9:00	0	41.682	20.313	3.6299	50.48	0	0	0	0	35.139	0	0	376.1498108	0	105.416			0	0	0	0
9:15	0	24.434	14.896	0	30.288	0	0	0	0	31.234	0	0	360.5688368	0	92.4018			0	0	0	0
9:30	0	34.495	13.542	7.2598	40.384	0	0	0	0	18.22	0	0	393.0978947	0	76.7846			0	0	0	0
9:45	0	38.807	16.25	3.6299	36.057	0	0	0	0	20.823	0	0	387.4768325	0	78.086			0	0	0	0
10:00	0	35.933	16.25	3.6299	44.711	0	0	0	0	22.124	0	0	406.5515151	0	78.086			0	0	0	0
10:15	0	34.495	13.542	3.6299	50.48	0	0	0	0	15.617	0	0	430.8345092	0	76.7846			0	0	0	0
10:30	0	34.495	16.25	1.8149	37.5	0	0	0	0	19.521	0	0	431.3835713	0	76.7846			0	0	0	0
10:45	0	50.306	27.084	1.8149	34.615	0	0	0	0	20.823	0	0	457.4253273	0	83.2917			0	0	0	0
11:00	0	53.181	18.958	3.6299	49.038	0	0	0	0	20.823	0	0	443.1983106	0	79.3874			0	0	0	0
11:15	0	51.743	14.896	0	36.057	0	0	0	0	15.617	0	0	447.6155704	0	78.086			0	0	0	0
11:30	0	40.245	31.146	0	44.711	0	0	0	0	26.029	0	0	471.042117	0	88.4975			0	0	0	0
11:45	0	38.807	18.958	0	41.827	0	0	0	0	16.919	0	0	449.2008734	0	96.3061			0	0	0	0
12:00	0	56.055	33.854	1.8149	37.5	0	0	0	0	19.521	0	0	459.6116176	0	108.019			0	0	0	0
12:15	0	44.557	27.084	5.4448	49.038	0	0	0	0	26.029	0	0	471.8568043	0	122.335			0	0	0	0
12:30	0	20.122	18.958	1.8149	53.365	0	0	0	0	33.837	0	0	500.147047	0	123.636			0	0	0	0
12:45	0	35.933	25.729	3.6299	44.711	0	0	0	0	28.632	0	0	553.8502103	0	119.732			0	0	0	0
13:00	0	35.933	29.792	3.6299	72.115	0	0	0	0	33.837	0	0	578.908806	0	128.842			0	0	0	0
13:15	0	66.116	23.021	1.8149	63.461	0	0	0	0	27.33	0	0	620.4459478	0	124.938			0	0	0	0
13:30	0	53.181	28.438	0	66.346	0	0	0	0	29.933	0	0	641.3938586	0	132.746			0	0	0	0
13:45	0	67.554	37.917	3.6299	25.961	0	0	0	0	37.742	0	0	628.2670743	0	128.842			0	0	0	0
14:00	0	73.303	23.021	21.779	64.903	0	0	0	0	29.933	0	0	635.5184502	0	119.732			0	0	0	0
14:15	0	63.242	35.209	16.334	60.577	0	0	0	0	35.139	0	0	635.2957825	0	108.019			0	0	0	0
14:30	0	50.306	36.563	1.8149	46.154	0	0	0	0	26.029	0	0	632.0004619	0	110.622			0	0	0	0
14:45	0	56.055	37.917	3.6299	44.711	0	0	0	0	28.632	0	0	663.7314565	0	117.129			0	0	0	0
15:00	0	53.181	32.5	16.334	80.769	0	0	0	0	18.22	0	0	691.3550441	0	114.526			0	0	0	0
15:15	0	66.116	40.625	9.0747	56.25	0	0	0	0	37.742	0	0	697.1284665	0	130.143			0	0	0	0
15:30	0	61.804	47.396	5.4448	51.923	0	0	0	0	32.536	0	0	712.4421211	0	108.019			0	0	0	0
15:45	0	80.489	44.688	7.2598	37.5	0	0	0	0	26.029	0	0	728.8365163	0	109.32			0	0	0	0
16:00	0	64.679	58.23	3.6299	62.019	0	0	0	0	33.837	0	0	751.6158681	0	114.526			0	0	0	0
16:15	0	70.428	59.584	5.4448	51.923	0	0	0	0	15.617	0	0	758.5742636	0	101.512			0	0	0	0
16:30	0	84.801	48.75	1.8149	47.596	0	0	0	0	33.837	0	0	726.9544718	0	113.225			0	0	0	0
16:45	0	70.428	55.521	9.0747	57.692	0	0	0	0	31.234	0	0	726.4006447	0	114.526			0	0	0	0
17:00	0	100.61	48.75	0	46.154	0	0	0	0	20.823	0	0	714.2071212	0	119.732			0	0	0	0
17:15	0	71.866	40.625	0	43.269	0	0	0	0	27.33	0	0	518.691335	0	98.9089			0	0	0	0
17:30	0	74.74	52.813	7.2598	47.596	0	0	0	0	35.139	0	0	362.9314538	0	71.5788			0	0	0	0
17:45	0	67.554	65.001	1.8149	46.154	0	0	0	0	36.44	0	0	180.5226882	0	36.4401			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	2
Signal Warranted?	No


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
748.7095204, 260.9475891
707.7590677, 203.8915639
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
748.7095204, 260.9475
707.7590677, 203.8915639
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Makaala Drive 8-Hour Signal Warrant

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						Makaala Drive			0			70 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			350	525	420	350	525	420			
	1						1			1			Minor Threshold			105	53	84	105	53	84			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	94.49006137	0	44.2487	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	176.9409109	0	101.512	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	305.0595999	0	171.789	-	-	-	-	-	-	0	0	0
6:00	0	24.434	9.4792	0	60.577	0	0	0	0	44.249	0	0	546.7312976	0	230.354	-	-	-	1	1	1	1	1	1
6:15	0	18.685	6.7709	3.6299	53.365	0	0	0	0	57.263	0	0	748.7095204	0	260.948	-	-	-	1	1	1	2	2	2
6:30	0	25.872	8.1251	1.8149	92.307	0	0	0	0	70.277	0	0	917.6150914	0	256.277	-	-	-	1	1	1	3	3	3
6:45	0	61.804	24.375	12.705	142.79	0	0	0	0	58.564	0	0	954.1908355	0	246.683	-	-	-	1	1	1	4	4	4
7:00	0	60.574	6.9552	22.195	206.74	0	0	0	0	74.843	0	0	881.2830363	0	248.801	-	-	-	1	1	1	1	1	1
7:15	0	52.314	22.025	44.389	132.63	0	0	0	0	52.592	0	0	707.7590677	0	203.892	-	-	-	1	1	1	2	2	2
7:30	0	19.274	17.388	24.661	103.37	0	0	0	0	60.683	0	0	570.5414236	0	179.931	-	-	-	1	1	1	3	3	3
7:45	0	46.807	27.821	2.4661	91.67	0	0	0	0	60.683	0	0	521.5109778	0	138.769	-	-	-	1	-	1	4	4	4
8:00	0	53.181	31.146	5.4448	33.173	0	0	0	0	29.933	0	0	471.0845221	0	100.21	-	-	-	-	-	1	0	0	1
8:15	0	34.495	23.021	1.8149	54.807	0	0	0	0	28.632	0	0	464.2452341	0	105.416	-	-	-	1	-	1	1	0	2
8:30	0	30.184	16.25	0	69.23	0	0	0	0	19.521	0	0	*419.7249766*	0	108.019	-	-	-	1	-	-	2	0	3
8:45	0	40.245	18.958	0	59.134	0	0	0	0	22.124	0	0	399.7423629	0	106.718	-	-	-	1	-	-	3	0	4
9:00	0	41.682	20.313	3.6299	50.48	0	0	0	0	35.139	0	0	376.1498108	0	105.416	-	-	-	1	-	-	4	0	0
9:15	0	24.434	14.896	0	30.288	0	0	0	0	31.234	0	0	360.5688368	0	92.4018	-	-	-	-	-	-	0	0	0
9:30	0	34.495	13.542	7.2598	40.384	0	0	0	0	18.22	0	0	393.0978947	0	76.7846	-	-	-	-	-	-	0	0	0
9:45	0	38.807	16.25	3.6299	36.057	0	0	0	0	20.823	0	0	387.4768325	0	78.086	-	-	-	-	-	-	0	0	0
10:00	0	35.933	16.25	3.6299	44.711	0	0	0	0	22.124	0	0	406.5515151	0	78.086	-	-	-	-	-	-	0	0	0
10:15	0	34.495	13.542	3.6299	50.48	0	0	0	0	15.617	0	0	430.8345092	0	76.7846	-	-	-	-	-	-	0	0	0
10:30	0	34.495	16.25	1.8149	37.5	0	0	0	0	19.521	0	0	431.3835713	0	76.7846	-	-	-	-	-	-	0	0	0
10:45	0	50.306	27.084	1.8149	34.615	0	0	0	0	20.823	0	0	457.4253273	0	83.2917	-	-	-	-	-	-	0	0	0
11:00	0	53.181	18.958	3.6299	49.038	0	0	0	0	20.823	0	0	443.1983106	0	79.3874	-	-	-	-	-	-	0	0	0
11:15	0	51.743	14.896	0	36.057	0	0	0	0	15.617	0	0	447.6155704	0	78.086	-	-	-	-	-	-	0	0	0
11:30	0	40.245	31.146	0	44.711	0	0	0	0	26.029	0	0	471.042117	0	88.4975	-	-	-	-	-	1	0	0	1
11:45	0	38.807	18.958	0	41.827	0	0	0	0	16.919	0	0	449.2008734	0	96.3061	-	-	-	-	-	1	0	0	2
12:00	0	56.055	33.854	1.8149	37.5	0	0	0	0	19.521	0	0	459.6116176	0	108.019	-	-	-	1	-	1	1	0	3
12:15	0	44.557	27.084	5.4448	49.038	0	0	0	0	26.029	0	0	471.8568043	0	122.335	-	-	-	1	-	1	2	0	4
12:30	0	20.122	18.958	1.8149	53.365	0	0	0	0	33.837	0	0	500.147047	0	123.636	-	-	-	1	-	1	3	0	1
12:45	0	35.933	25.729	3.6299	44.711	0	0	0	0	28.632	0	0	553.8502103	0	119.732	-	-	-	1	1	1	4	1	2
13:00	0	35.933	29.792	3.6299	72.115	0	0	0	0	33.837	0	0	578.908806	0	128.842	-	-	-	1	1	1	1	2	3
13:15	0	66.116	23.021	1.8149	63.461	0	0	0	0	27.33	0	0	620.4459478	0	124.938	-	-	-	1	1	1	2	3	4
13:30	0	53.181	28.438	0	66.346	0	0	0	0	29.933	0	0	641.3938586	0	132.746	-	-	-	1	1	1	3	4	1
13:45	0	67.554	37.917	3.6299	25.961	0	0	0	0	37.742	0	0	628.2670743	0	128.842	-	-	-	1	1	1	4	1	2
14:00	0	73.303	23.021	21.779	64.903	0	0	0	0	29.933	0	0	635.5184502	0	119.732	-	-	-	1	1	1	1	2	3
14:15	0	63.242	35.209	16.334	60.577	0	0	0	0	35.139	0	0	635.2957825	0	108.019	-	-	-	1	1	1	2	3	4
14:30	0	50.306	36.563	1.8149	46.154	0	0	0	0	26.029	0	0	632.0004619	0	110.622	-	-	-	1	1	1	3	4	1
14:45	0	56.055	37.917	3.6299	44.711	0	0	0	0	28.632	0	0	663.7314565	0	117.129	-	-	-	1	1	1	4	1	2
15:00	0	53.181	32.5	16.334	80.769	0	0	0	0	18.22	0	0	691.3550441	0	114.526	-	-	-	1	1	1	1	2	3
15:15	0	66.116	40.625	9.0747	56.25	0	0	0	0	37.742	0	0	697.1284665	0	130.143	-	-	-	1	1	1	2	3	4
15:30	0	61.804	47.396	5.4448	51.923	0	0	0	0	32.536	0	0	712.4421211	0	108.019	-	-	-	1	1	1	3	4	1
15:45	0	80.489	44.688	7.2598	37.5	0	0	0	0	26.029	0	0	728.8365163	0	109.32	-	-	-	1	1	1	4	1	2
16:00	0	64.679	58.23	3.6299	62.019	0	0	0	0	33.837	0	0	751.6158681	0	114.526	-	-	-	1	1	1	1	2	3
16:15	0	70.428	59.584	5.4448	51.923	0	0	0	0	15.617	0	0	758.5742636	0	101.512	-	-	-	-	1	1	2	3	4
16:30	0	84.801	48.75	1.8149	47.596	0	0	0	0	33.837	0	0	726.9544718	0	113.225	-	-	-	1	1	1	3	4	1
16:45	0	70.428	55.521	9.0747	57.692	0	0	0	0	31.234	0	0	726.4006447	0	114.526	-	-	-	1	1	1	4	1	2
17:00	0	100.61	48.75	0	46.154	0	0	0	0	20.823	0	0	714.2071212	0	119.732	-	-	-	1	1	1	1	2	3
17:15	0	71.866	40.625	0	43.269	0	0	0	0	27.33	0	0	518.691335	0	98.9089	-	-	-	-	-	1	2	3	4
17:30	0	74.74	52.813	7.2598	47.596	0	0	0	0	35.139	0	0	362.9314538	0	71.5788	-	-	-	-	-	-	3	4	0
17:45	0	67.554	65.001	1.8149	46.154	0	0	0	0	36.44	0	0	180.5226882	0	36.4401	-	-	-	-	-	-	4	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						9	7	9
															Signal Warranted?						Yes		
															Notes								

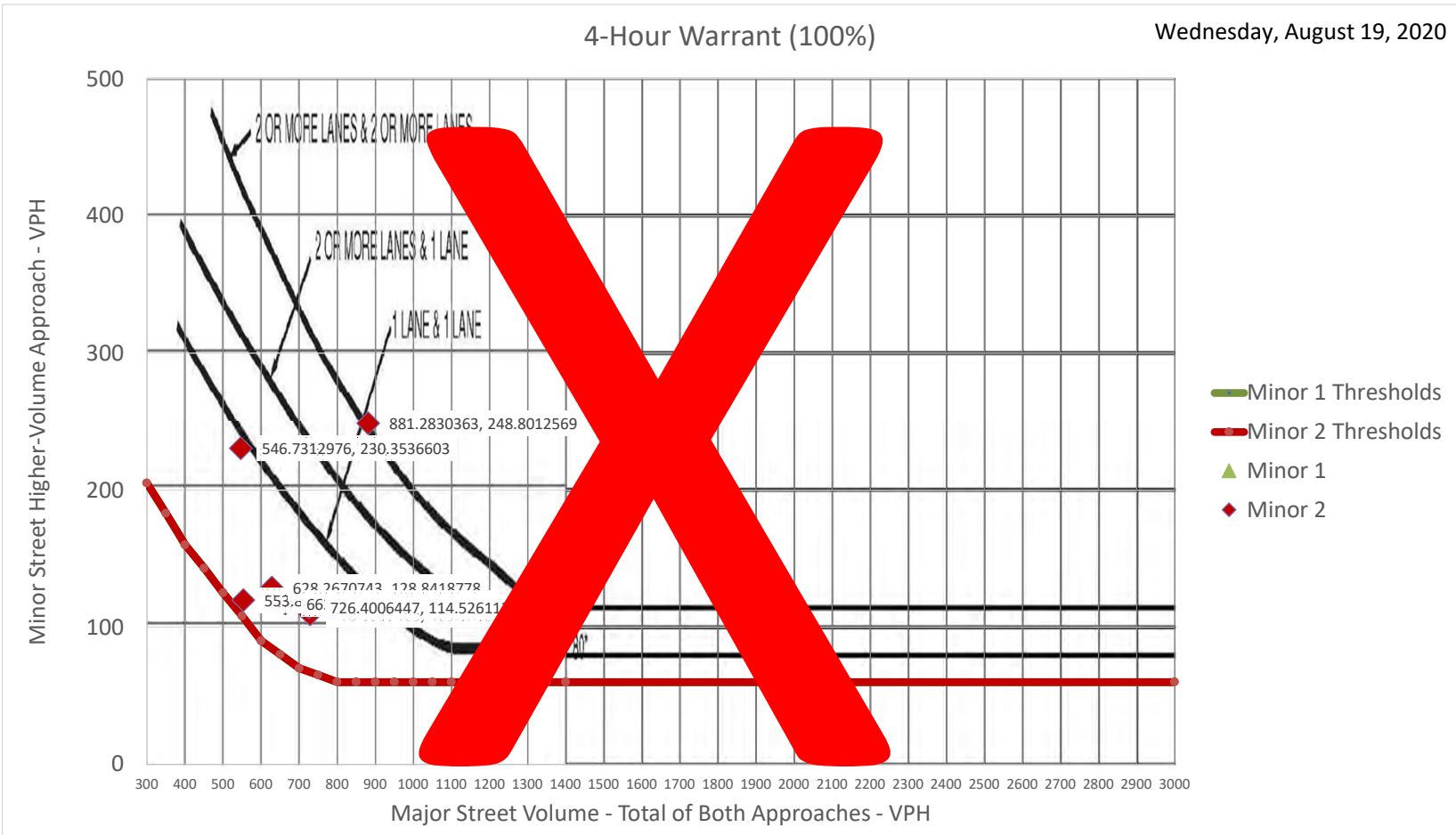
Weekday Kahekili Hwy/Makaala Drive 4-Hour Signal Warrant

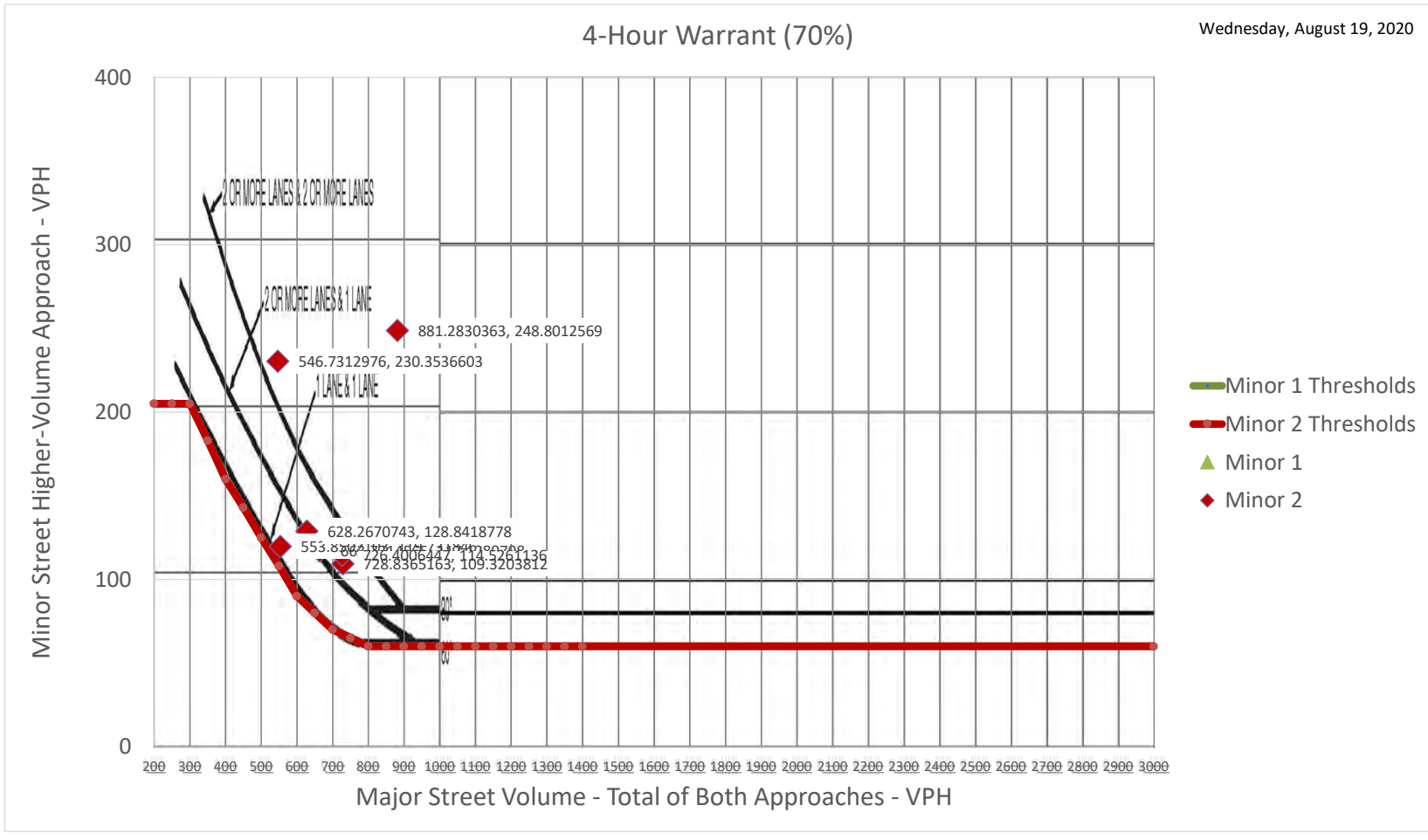
Wednesday, August 19, 2020

	Kahekili Hwy						Makaala Drive			0			70 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction: 0%			RT Reduction: 100%											
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	94.49006137	0	44.2487			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	176.9409109	0	101.512			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	305.0595999	0	171.789			0	0	0	0
6:00	0	24.434	9.4792	0	60.577	0	0	0	0	44.249	0	0	546.7312976	0	230.354		1	0	1	1	1
6:15	0	18.685	6.7709	3.6299	53.365	0	0	0	0	57.263	0	0	748.7095204	0	260.948		1	0	2	1	2
6:30	0	25.872	8.1251	1.8149	92.307	0	0	0	0	70.277	0	0	917.6150914	0	256.277		1	0	3	1	3
6:45	0	61.804	24.375	12.705	142.79	0	0	0	0	58.564	0	0	954.1908355	0	246.683		1	0	4	1	4
7:00	0	60.574	6.9552	22.195	206.74	0	0	0	0	74.843	0	0	881.2830363	0	248.801		1	0	1	1	1
7:15	0	52.314	22.025	44.389	132.63	0	0	0	0	52.592	0	0	707.7590677	0	203.892		1	0	2	1	2
7:30	0	19.274	17.388	24.661	103.37	0	0	0	0	60.683	0	0	570.5414236	0	179.931		1	0	3	1	3
7:45	0	46.807	27.821	2.4661	91.67	0	0	0	0	60.683	0	0	521.5109778	0	138.769		1	0	4	1	4
8:00	0	53.181	31.146	5.4448	33.173	0	0	0	0	29.933	0	0	471.0845221	0	100.21			0	0	0	0
8:15	0	34.495	23.021	1.8149	54.807	0	0	0	0	28.632	0	0	464.2452341	0	105.416			0	0	0	0
8:30	0	30.184	16.25	0	69.23	0	0	0	0	19.521	0	0	*419.7249766*	0	108.019			0	0	0	0
8:45	0	40.245	18.958	0	59.134	0	0	0	0	22.124	0	0	399.7423629	0	106.718			0	0	0	0
9:00	0	41.682	20.313	3.6299	50.48	0	0	0	0	35.139	0	0	376.1498108	0	105.416			0	0	0	0
9:15	0	24.434	14.896	0	30.288	0	0	0	0	31.234	0	0	360.5688368	0	92.4018			0	0	0	0
9:30	0	34.495	13.542	7.2598	40.384	0	0	0	0	18.22	0	0	393.0978947	0	76.7846			0	0	0	0
9:45	0	38.807	16.25	3.6299	36.057	0	0	0	0	20.823	0	0	387.4768325	0	78.086			0	0	0	0
10:00	0	35.933	16.25	3.6299	44.711	0	0	0	0	22.124	0	0	406.5515151	0	78.086			0	0	0	0
10:15	0	34.495	13.542	3.6299	50.48	0	0	0	0	15.617	0	0	430.8345092	0	76.7846			0	0	0	0
10:30	0	34.495	16.25	1.8149	37.5	0	0	0	0	19.521	0	0	431.3835713	0	76.7846			0	0	0	0
10:45	0	50.306	27.084	1.8149	34.615	0	0	0	0	20.823	0	0	457.4253273	0	83.2917			0	0	0	0
11:00	0	53.181	18.958	3.6299	49.038	0	0	0	0	20.823	0	0	443.1983106	0	79.3874			0	0	0	0
11:15	0	51.743	14.896	0	36.057	0	0	0	0	15.617	0	0	447.6155704	0	78.086			0	0	0	0
11:30	0	40.245	31.146	0	44.711	0	0	0	0	26.029	0	0	471.042117	0	88.4975			0	0	0	0
11:45	0	38.807	18.958	0	41.827	0	0	0	0	16.919	0	0	449.2008734	0	96.3061			0	0	0	0
12:00	0	56.055	33.854	1.8149	37.5	0	0	0	0	19.521	0	0	459.6116176	0	108.019			0	0	0	0
12:15	0	44.557	27.084	5.4448	49.038	0	0	0	0	26.029	0	0	471.8568043	0	122.335			0	0	0	0
12:30	0	20.122	18.958	1.8149	53.365	0	0	0	0	33.837	0	0	500.147047	0	123.636			0	0	0	0
12:45	0	35.933	25.729	3.6299	44.711	0	0	0	0	28.632	0	0	553.8502103	0	119.732		1	0	1	1	1
13:00	0	35.933	29.792	3.6299	72.115	0	0	0	0	33.837	0	0	578.908806	0	128.842		1	0	2	1	2
13:15	0	66.116	23.021	1.8149	63.461	0	0	0	0	27.33	0	0	620.4459478	0	124.938		1	0	3	1	3
13:30	0	53.181	28.438	0	66.346	0	0	0	0	29.933	0	0	641.3938586	0	132.746		1	0	4	1	4
13:45	0	67.554	37.917	3.6299	25.961	0	0	0	0	37.742	0	0	628.2670743	0	128.842		1	0	1	1	1
14:00	0	73.303	23.021	21.779	64.903	0	0	0	0	29.933	0	0	635.5184502	0	119.732		1	0	2	1	2
14:15	0	63.242	35.209	16.334	60.577	0	0	0	0	35.139	0	0	635.2957825	0	108.019		1	0	3	1	3
14:30	0	50.306	36.563	1.8149	46.154	0	0	0	0	26.029	0	0	632.0004619	0	110.622		1	0	4	1	4
14:45	0	56.055	37.917	3.6299	44.711	0	0	0	0	28.632	0	0	663.7314565	0	117.129		1	0	1	1	1
15:00	0	53.181	32.5	16.334	80.769	0	0	0	0	18.22	0	0	691.3550441	0	114.526		1	0	2	1	2
15:15	0	66.116	40.625	9.0747	56.25	0	0	0	0	37.742	0	0	697.1284665	0	130.143		1	0	3	1	3
15:30	0	61.804	47.396	5.4448	51.923	0	0	0	0	32.536	0	0	712.4421211	0	108.019		1	0	4	1	4
15:45	0	80.489	44.688	7.2598	37.5	0	0	0	0	26.029	0	0	728.8365163	0	109.32		1	0	1	1	1
16:00	0	64.679	58.23	3.6299	62.019	0	0	0	0	33.837	0	0	751.6158681	0	114.526		1	0	2	1	2
16:15	0	70.428	59.584	5.4448	51.923	0	0	0	0	15.617	0	0	758.5742636	0	101.512		1	0	3	1	3
16:30	0	84.801	48.75	1.8149	47.596	0	0	0	0	33.837	0	0	726.9544718	0	113.225		1	0	4	1	4
16:45	0	70.428	55.521	9.0747	57.692	0	0	0	0	31.234	0	0	726.4006447	0	114.526		1	0	1	1	1
17:00	0	100.61	48.75	0	46.154	0	0	0	0	20.823	0	0	714.2071212	0	119.732		1	0	2	1	2
17:15	0	71.866	40.625	0	43.269	0	0	0	0	27.33	0	0	518.691335	0	98.9089			0	3	0	3
17:30	0	74.74	52.813	7.2598	47.596	0	0	0	0	35.139	0	0	362.9314538	0	71.5788			0	4	0	4
17:45	0	67.554	65.001	1.8149	46.154	0	0	0	0	36.44	0	0	180.5226882	0	36.4401			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met: 7

Signal Warranted? Yes


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
881.2830363, 248.8012569
546.7312976, 230.3536603
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
881.2830363, 248.8012569
546.7312976, 230.3536603
628.2670743, 128.8418778
728.8365163, 109.3203812
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

Kahekili Highway/Makaala Drive
Base Year With Imi Kala Street Extension
With Median Refuge Lane

Weekday Kahekili Hwy/Makaala Drive 8-Hour Signal Warrant

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						Makaala Drive			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	33.91355141	0	44.2487	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	62.99938026	0	101.512	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	98.81100647	0	171.789	-	-	-	-	-	-	0	0	0
6:00	0	24.434	9.4792	0	0	0	0	0	0	44.249	0	0	197.6952165	0	230.354	-	-	-	-	-	-	0	0	0
6:15	0	18.685	6.7709	3.6299	0	0	0	0	0	57.263	0	0	253.5055088	0	260.948	-	-	-	-	-	-	0	0	0
6:30	0	25.872	8.1251	1.8149	0	0	0	0	0	70.277	0	0	343.1475917	0	256.277	-	-	-	-	-	-	0	0	0
6:45	0	61.804	24.375	12.705	0	0	0	0	0	58.564	0	0	368.6581784	0	246.683	-	-	-	-	-	-	0	0	0
7:00	0	60.574	6.9552	22.195	0	0	0	0	0	74.843	0	0	346.8681622	0	248.801	-	-	-	-	-	-	0	0	0
7:15	0	52.314	22.025	44.389	0	0	0	0	0	52.592	0	0	346.9157833	0	203.892	-	-	-	-	-	-	0	0	0
7:30	0	19.274	17.388	24.661	0	0	0	0	0	60.683	0	0	287.5193295	0	179.931	-	-	-	-	-	-	0	0	0
7:45	0	46.807	27.821	2.4661	0	0	0	0	0	60.683	0	0	272.6308068	0	138.769	-	-	-	-	-	-	0	0	0
8:00	0	53.181	31.146	5.4448	0	0	0	0	0	29.933	0	0	254.7398437	0	100.21	-	-	-	-	-	-	0	0	0
8:15	0	34.495	23.021	1.8149	0	0	0	0	0	28.632	0	0	230.5929814	0	105.416	-	-	-	-	-	-	0	0	0
8:30	0	30.184	16.25	0	0	0	0	0	0	19.521	0	0	*210.5917875*	0	108.019	-	-	-	-	-	-	0	0	0
8:45	0	40.245	18.958	0	0	0	0	0	0	22.124	0	0	219.4551309	0	106.718	-	-	-	-	-	-	0	0	0
9:00	0	41.682	20.313	3.6299	0	0	0	0	0	35.139	0	0	218.9393445	0	105.416	-	-	-	-	-	-	0	0	0
9:15	0	24.434	14.896	0	0	0	0	0	0	31.234	0	0	209.1275619	0	92.4018	-	-	-	-	-	-	0	0	0
9:30	0	34.495	13.542	7.2598	0	0	0	0	0	18.22	0	0	221.4644498	0	76.7846	-	-	-	-	-	-	0	0	0
9:45	0	38.807	16.25	3.6299	0	0	0	0	0	20.823	0	0	218.7279833	0	78.086	-	-	-	-	-	-	0	0	0
10:00	0	35.933	16.25	3.6299	0	0	0	0	0	22.124	0	0	239.2449638	0	78.086	-	-	-	-	-	-	0	0	0
10:15	0	34.495	13.542	3.6299	0	0	0	0	0	15.617	0	0	259.2010643	0	76.7846	-	-	-	-	-	-	0	0	0
10:30	0	34.495	16.25	1.8149	0	0	0	0	0	19.521	0	0	274.173105	0	76.7846	-	-	-	-	-	-	0	0	0
10:45	0	50.306	27.084	1.8149	0	0	0	0	0	20.823	0	0	293.0033717	0	83.2917	-	-	-	-	-	-	0	0	0
11:00	0	53.181	18.958	3.6299	0	0	0	0	0	20.823	0	0	271.5648657	0	79.3874	-	-	-	-	-	-	0	0	0
11:15	0	51.743	14.896	0	0	0	0	0	0	15.617	0	0	287.5205084	0	78.086	-	-	-	-	-	-	0	0	0
11:30	0	40.245	31.146	0	0	0	0	0	0	26.029	0	0	297.9663743	0	88.4975	-	-	-	-	-	-	0	0	0
11:45	0	38.807	18.958	0	0	0	0	0	0	16.919	0	0	267.4713436	0	96.3061	-	-	-	-	-	-	0	0	0
12:00	0	56.055	33.854	1.8149	0	0	0	0	0	19.521	0	0	274.997492	0	108.019	-	-	-	-	-	-	0	0	0
12:15	0	44.557	27.084	5.4448	0	0	0	0	0	26.029	0	0	252.6275301	0	122.335	-	-	-	-	-	-	0	0	0
12:30	0	20.122	18.958	1.8149	0	0	0	0	0	33.837	0	0	266.4947943	0	123.636	-	-	-	-	-	-	0	0	0
12:45	0	35.933	25.729	3.6299	0	0	0	0	0	28.632	0	0	307.217277	0	119.732	-	-	-	-	-	-	0	0	0
13:00	0	35.933	29.792	3.6299	0	0	0	0	0	33.837	0	0	351.0257448	0	128.842	-	-	-	-	-	-	0	0	0
13:15	0	66.116	23.021	1.8149	0	0	0	0	0	27.33	0	0	399.7743759	0	124.938	-	-	-	-	-	-	0	0	0
13:30	0	53.181	28.438	0	0	0	0	0	0	29.933	0	0	423.60688 23	0	132.746	-	-	-	-	-	-	0	0	0
13:45	0	67.554	37.917	3.6299	0	0	0	0	0	37.742	0	0	430.672268	0	128.842	-	-	-	-	-	-	0	0	0
14:00	0	73.303	23.021	21.779	0	0	0	0	0	29.933	0	0	419.1737718	0	119.732	-	-	-	-	-	-	0	0	0
14:15	0	63.242	35.209	16.334	0	0	0	0	0	35.139	0	0	403.0858277	0	108.019	-	-	-	-	-	-	0	0	0
14:30	0	50.306	36.563	1.8149	0	0	0	0	0	26.029	0	0	404.1174007	0	110.622	-	-	-	-	-	-	0	0	0
14:45	0	56.055	37.917	3.6299	0	0	0	0	0	28.632	0	0	430.0792038	0	117.129	-	-	-	-	-	-	0	0	0
15:00	0	53.181	32.5	16.334	0	0	0	0	0	18.22	0	0	464.9142807	0	114.526	-	-	-	-	-	-	0	0	0
15:15	0	66.116	40.625	9.0747	0	0	0	0	0	37.742	0	0	489.4375752	0	130.143	-	-	-	-	-	-	0	0	0
15:30	0	61.804	47.396	5.4448	0	0	0	0	0	32.536	0	0	509.0781234	0	108.019	-	-	-	-	-	-	0	0	0
15:45	0	80.489	44.688	7.2598	0	0	0	0	0	26.029	0	0	529.7994122	0	109.32	-	-	-	-	-	-	0	0	0
16:00	0	64.679	58.23	3.6299	0	0	0	0	0	33.837	0	0	532.386594	0	114.526	-	-	-	-	-	-	0	0	0
16:15	0	70.428	59.584	5.4448	0	0	0	0	0	15.617	0	0	555.2102659	0	101.512	-	-	-	-	-	-	0	0	0
16:30	0	84.801	48.75	1.8149	0	0	0	0	0	33.837	0	0	532.2442612	0	113.225	-	-	-	-	-	-	0	0	0
16:45	0	70.428	55.521	9.0747	0	0	0	0	0	31.234	0	0	531.6904342	0	114.526	-	-	-	-	-	-	0	0	0
17:00	0	100.61	48.75	0	0	0	0	0	0	20.823	0	0	531.0352935	0	119.732	-	-	-	-	-	-	0	0	0
17:15	0	71.866	40.625	0	0	0	0	0	0	27.33	0	0	381.6730386	0	98.9089	-	-	-	-	-	-	0	0	0
17:30	0	74.74	52.813	7.2598	0	0	0	0	0	35.139	0	0	269.1820932	0	71.5788	-	-	-	-	-	-	0	0	0
17:45	0	67.554	65.001	1.8149	0	0	0	0	0	36.44	0	0	134.3691568	0	36.4401	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						0	0	0
															Signal Warranted?						No		
															Notes								

Weekday Kahekili Hwy/Makaala Drive 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						Makaala Drive			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction:	0%		RT Reduction:	100%											
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	33.91355141	0	44.2487			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	62.99938026	0	101.512			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	98.81100647	0	171.789			0	0	0	0
6:00	0	24.434	9.4792	0	0	0	0	0	0	44.249	0	0	197.6952165	0	230.354			0	0	0	0
6:15	0	18.685	6.7709	3.6299	0	0	0	0	0	57.263	0	0	253.5055088	0	260.948			0	0	0	0
6:30	0	25.872	8.1251	1.8149	0	0	0	0	0	70.277	0	0	343.1475917	0	256.277			0	0	0	0
6:45	0	61.804	24.375	12.705	0	0	0	0	0	58.564	0	0	368.6581784	0	246.683			0	0	0	0
7:00	0	60.574	6.9552	22.195	0	0	0	0	0	74.843	0	0	346.8681622	0	248.801			0	0	0	0
7:15	0	52.314	22.025	44.389	0	0	0	0	0	52.592	0	0	346.9157833	0	203.892			0	0	0	0
7:30	0	19.274	17.388	24.661	0	0	0	0	0	60.683	0	0	287.5193295	0	179.931			0	0	0	0
7:45	0	46.807	27.821	2.4661	0	0	0	0	0	60.683	0	0	272.6308068	0	138.769			0	0	0	0
8:00	0	53.181	31.146	5.4448	0	0	0	0	0	29.933	0	0	254.7398437	0	100.21			0	0	0	0
8:15	0	34.495	23.021	1.8149	0	0	0	0	0	28.632	0	0	230.5929814	0	105.416			0	0	0	0
8:30	0	30.184	16.25	0	0	0	0	0	0	19.521	0	0	*210.5917875*	0	108.019			0	0	0	0
8:45	0	40.245	18.958	0	0	0	0	0	0	22.124	0	0	219.4551309	0	106.718			0	0	0	0
9:00	0	41.682	20.313	3.6299	0	0	0	0	0	35.139	0	0	218.9393445	0	105.416			0	0	0	0
9:15	0	24.434	14.896	0	0	0	0	0	0	31.234	0	0	209.1275619	0	92.4018			0	0	0	0
9:30	0	34.495	13.542	7.2598	0	0	0	0	0	18.22	0	0	221.4644498	0	76.7846			0	0	0	0
9:45	0	38.807	16.25	3.6299	0	0	0	0	0	20.823	0	0	218.7279833	0	78.086			0	0	0	0
10:00	0	35.933	16.25	3.6299	0	0	0	0	0	22.124	0	0	239.2449638	0	78.086			0	0	0	0
10:15	0	34.495	13.542	3.6299	0	0	0	0	0	15.617	0	0	259.2010643	0	76.7846			0	0	0	0
10:30	0	34.495	16.25	1.8149	0	0	0	0	0	19.521	0	0	274.173105	0	76.7846			0	0	0	0
10:45	0	50.306	27.084	1.8149	0	0	0	0	0	20.823	0	0	293.0033717	0	83.2917			0	0	0	0
11:00	0	53.181	18.958	3.6299	0	0	0	0	0	20.823	0	0	271.5648657	0	79.3874			0	0	0	0
11:15	0	51.743	14.896	0	0	0	0	0	0	15.617	0	0	287.5205084	0	78.086			0	0	0	0
11:30	0	40.245	31.146	0	0	0	0	0	0	26.029	0	0	297.9663743	0	88.4975			0	0	0	0
11:45	0	38.807	18.958	0	0	0	0	0	0	16.919	0	0	267.4713436	0	96.3061			0	0	0	0
12:00	0	56.055	33.854	1.8149	0	0	0	0	0	19.521	0	0	274.997492	0	108.019			0	0	0	0
12:15	0	44.557	27.084	5.4448	0	0	0	0	0	26.029	0	0	252.6275301	0	122.335			0	0	0	0
12:30	0	20.122	18.958	1.8149	0	0	0	0	0	33.837	0	0	266.4947943	0	123.636			0	0	0	0
12:45	0	35.933	25.729	3.6299	0	0	0	0	0	28.632	0	0	307.217277	0	119.732			0	0	0	0
13:00	0	35.933	29.792	3.6299	0	0	0	0	0	33.837	0	0	351.0257448	0	128.842			0	0	0	0
13:15	0	66.116	23.021	1.8149	0	0	0	0	0	27.33	0	0	399.7743759	0	124.938			0	0	0	0
13:30	0	53.181	28.438	0	0	0	0	0	0	29.933	0	0	423.6068823	0	132.746			0	0	0	0
13:45	0	67.554	37.917	3.6299	0	0	0	0	0	37.742	0	0	430.672268	0	128.842			0	0	0	0
14:00	0	73.303	23.021	21.779	0	0	0	0	0	29.933	0	0	419.1737718	0	119.732			0	0	0	0
14:15	0	63.242	35.209	16.334	0	0	0	0	0	35.139	0	0	403.0858277	0	108.019			0	0	0	0
14:30	0	50.306	36.563	1.8149	0	0	0	0	0	26.029	0	0	404.1174007	0	110.622			0	0	0	0
14:45	0	56.055	37.917	3.6299	0	0	0	0	0	28.632	0	0	430.0792038	0	117.129			0	0	0	0
15:00	0	53.181	32.5	16.334	0	0	0	0	0	18.22	0	0	464.9142807	0	114.526			0	0	0	0
15:15	0	66.116	40.625	9.0747	0	0	0	0	0	37.742	0	0	489.4375752	0	130.143			0	0	0	0
15:30	0	61.804	47.396	5.4448	0	0	0	0	0	32.536	0	0	509.0781234	0	108.019			0	0	0	0
15:45	0	80.489	44.688	7.2598	0	0	0	0	0	26.029	0	0	529.7994122	0	109.32			0	0	0	0
16:00	0	64.679	58.23	3.6299	0	0	0	0	0	33.837	0	0	532.386594	0	114.526			0	0	0	0
16:15	0	70.428	59.584	5.4448	0	0	0	0	0	15.617	0	0	555.2102659	0	101.512			0	0	0	0
16:30	0	84.801	48.75	1.8149	0	0	0	0	0	33.837	0	0	532.2442612	0	113.225			0	0	0	0
16:45	0	70.428	55.521	9.0747	0	0	0	0	0	31.234	0	0	531.6904342	0	114.526			0	0	0	0
17:00	0	100.61	48.75	0	0	0	0	0	0	20.823	0	0	531.0352935	0	119.732			0	0	0	0
17:15	0	71.866	40.625	0	0	0	0	0	0	27.33	0	0	381.6730386	0	98.9089			0	0	0	0
17:30	0	74.74	52.813	7.2598	0	0	0	0	0	35.139	0	0	269.1820932	0	71.5788			0	0	0	0
17:45	0	67.554	65.001	1.8149	0	0	0	0	0	36.44	0	0	134.3691568	0	36.4401			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	0
Signal Warranted?	No


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
201
60'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Makaala Drive 8-Hour Signal Warrant

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

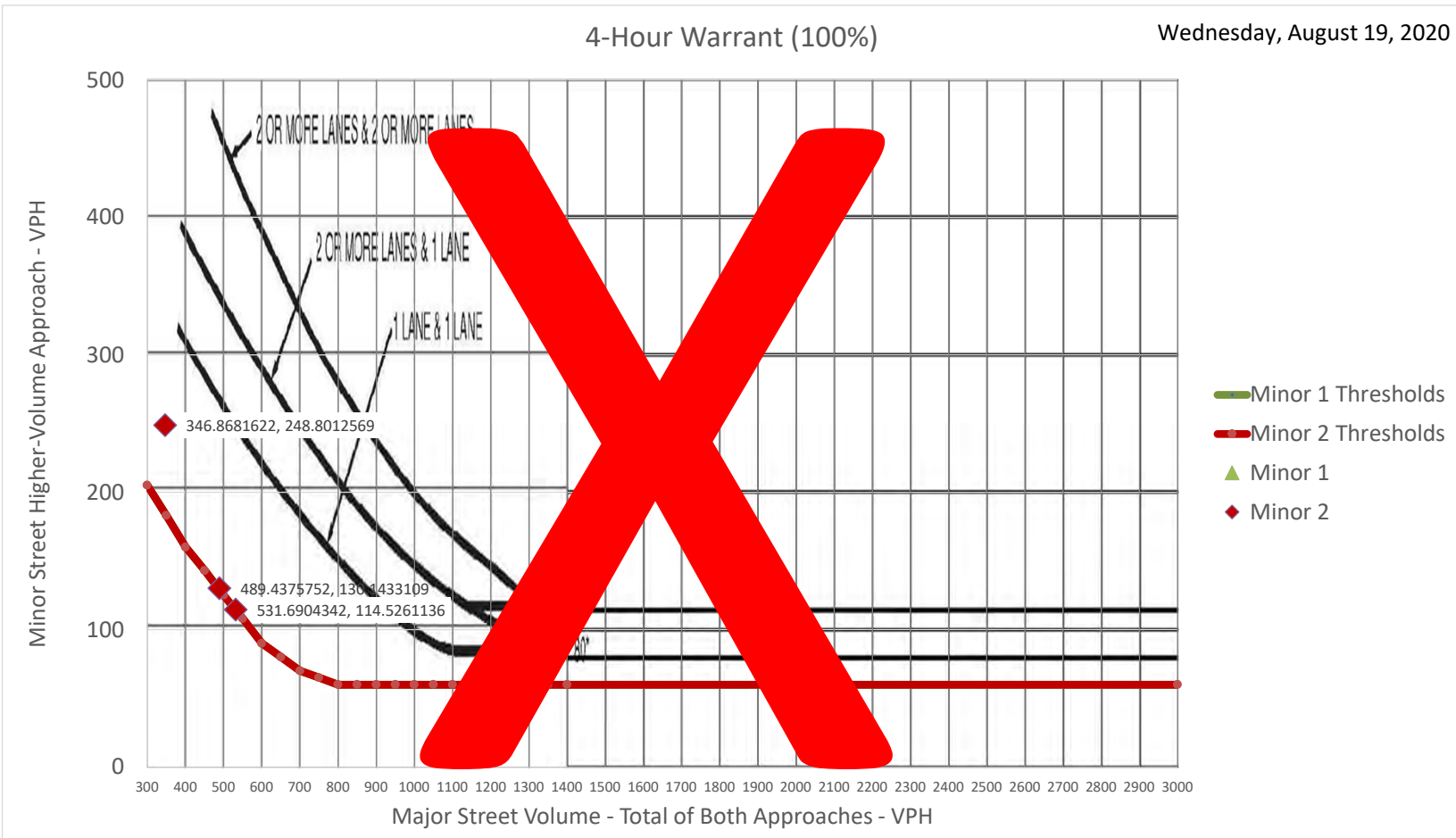
	Kahekili Hwy						Makaala Drive			0			70 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			350	525	420	350	525	420			
	1						1			1			Minor Threshold			105	53	84	105	53	84			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	33.91355141	0	44.2487	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	62.99938026	0	101.512	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	98.81100647	0	171.789	-	-	-	-	-	-	0	0	0
6:00	0	24.434	9.4792	0	0	0	0	0	0	44.249	0	0	197.6952165	0	230.354	-	-	-	-	-	-	0	0	0
6:15	0	18.685	6.7709	3.6299	0	0	0	0	0	57.263	0	0	253.5055088	0	260.948	-	-	-	-	-	-	0	0	0
6:30	0	25.872	8.1251	1.8149	0	0	0	0	0	70.277	0	0	343.1475917	0	256.277	-	-	-	-	-	-	0	0	0
6:45	0	61.804	24.375	12.705	0	0	0	0	0	58.564	0	0	368.6581784	0	246.683	-	-	-	1	-	-	1	0	0
7:00	0	60.574	6.9552	22.195	0	0	0	0	0	74.843	0	0	346.8681622	0	248.801	-	-	-	-	-	-	2	0	0
7:15	0	52.314	22.025	44.389	0	0	0	0	0	52.592	0	0	346.9157833	0	203.892	-	-	-	-	-	-	3	0	0
7:30	0	19.274	17.388	24.661	0	0	0	0	0	60.683	0	0	287.5193295	0	179.931	-	-	-	-	-	-	4	0	0
7:45	0	46.807	27.821	2.4661	0	0	0	0	0	60.683	0	0	272.6308068	0	138.769	-	-	-	-	-	-	0	0	0
8:00	0	53.181	31.146	5.4448	0	0	0	0	0	29.933	0	0	254.7398437	0	100.21	-	-	-	-	-	-	0	0	0
8:15	0	34.495	23.021	1.8149	0	0	0	0	0	28.632	0	0	230.5929814	0	105.416	-	-	-	-	-	-	0	0	0
8:30	0	30.184	16.25	0	0	0	0	0	0	19.521	0	0	*210.5917875*	0	108.019	-	-	-	-	-	-	0	0	0
8:45	0	40.245	18.958	0	0	0	0	0	0	22.124	0	0	219.4551309	0	106.718	-	-	-	-	-	-	0	0	0
9:00	0	41.682	20.313	3.6299	0	0	0	0	0	35.139	0	0	218.9393445	0	105.416	-	-	-	-	-	-	0	0	0
9:15	0	24.434	14.896	0	0	0	0	0	0	31.234	0	0	209.1275619	0	92.4018	-	-	-	-	-	-	0	0	0
9:30	0	34.495	13.542	7.2598	0	0	0	0	0	18.22	0	0	221.4644498	0	76.7846	-	-	-	-	-	-	0	0	0
9:45	0	38.807	16.25	3.6299	0	0	0	0	0	20.823	0	0	218.7279833	0	78.086	-	-	-	-	-	-	0	0	0
10:00	0	35.933	16.25	3.6299	0	0	0	0	0	22.124	0	0	239.2449638	0	78.086	-	-	-	-	-	-	0	0	0
10:15	0	34.495	13.542	3.6299	0	0	0	0	0	15.617	0	0	259.2010643	0	76.7846	-	-	-	-	-	-	0	0	0
10:30	0	34.495	16.25	1.8149	0	0	0	0	0	19.521	0	0	274.173105	0	76.7846	-	-	-	-	-	-	0	0	0
10:45	0	50.306	27.084	1.8149	0	0	0	0	0	20.823	0	0	293.0033717	0	83.2917	-	-	-	-	-	-	0	0	0
11:00	0	53.181	18.958	3.6299	0	0	0	0	0	20.823	0	0	271.5648657	0	79.3874	-	-	-	-	-	-	0	0	0
11:15	0	51.743	14.896	0	0	0	0	0	0	15.617	0	0	287.5205084	0	78.086	-	-	-	-	-	-	0	0	0
11:30	0	40.245	31.146	0	0	0	0	0	0	26.029	0	0	297.9663743	0	88.4975	-	-	-	-	-	-	0	0	0
11:45	0	38.807	18.958	0	0	0	0	0	0	16.919	0	0	267.4713436	0	96.3061	-	-	-	-	-	-	0	0	0
12:00	0	56.055	33.854	1.8149	0	0	0	0	0	19.521	0	0	274.997492	0	108.019	-	-	-	-	-	-	0	0	0
12:15	0	44.557	27.084	5.4448	0	0	0	0	0	26.029	0	0	252.6275301	0	122.335	-	-	-	-	-	-	0	0	0
12:30	0	20.122	18.958	1.8149	0	0	0	0	0	33.837	0	0	266.4947943	0	123.636	-	-	-	-	-	-	0	0	0
12:45	0	35.933	25.729	3.6299	0	0	0	0	0	28.632	0	0	307.217277	0	119.732	-	-	-	-	-	-	0	0	0
13:00	0	35.933	29.792	3.6299	0	0	0	0	0	33.837	0	0	351.0257448	0	128.842	-	-	-	1	-	-	1	0	0
13:15	0	66.116	23.021	1.8149	0	0	0	0	0	27.33	0	0	399.7743759	0	124.938	-	-	-	1	-	-	2	0	0
13:30	0	53.181	28.438	0	0	0	0	0	0	29.933	0	0	423.6068823	0	132.746	-	-	-	1	-	1	3	0	1
13:45	0	67.554	37.917	3.6299	0	0	0	0	0	37.742	0	0	430.672268	0	128.842	-	-	-	1	-	1	4	0	2
14:00	0	73.303	23.021	21.779	0	0	0	0	0	29.933	0	0	419.1737718	0	119.732	-	-	-	1	-	-	1	0	3
14:15	0	63.242	35.209	16.334	0	0	0	0	0	35.139	0	0	403.0858277	0	108.019	-	-	-	1	-	-	2	0	4
14:30	0	50.306	36.563	1.8149	0	0	0	0	0	26.029	0	0	404.1174007	0	110.622	-	-	-	1	-	-	3	0	0
14:45	0	56.055	37.917	3.6299	0	0	0	0	0	28.632	0	0	430.0792038	0	117.129	-	-	-	1	-	1	4	0	1
15:00	0	53.181	32.5	16.334	0	0	0	0	0	18.22	0	0	464.9142807	0	114.526	-	-	-	1	-	1	1	0	2
15:15	0	66.116	40.625	9.0747	0	0	0	0	0	37.742	0	0	489.4375752	0	130.143	-	-	-	1	-	1	2	0	3
15:30	0	61.804	47.396	5.4448	0	0	0	0	0	32.536	0	0	509.0781234	0	108.019	-	-	-	1	-	1	3	0	4
15:45	0	80.489	44.688	7.2598	0	0	0	0	0	26.029	0	0	529.7994122	0	109.32	-	-	-	1	1	1	4	1	1
16:00	0	64.679	58.23	3.6299	0	0	0	0	0	33.837	0	0	532.386594	0	114.526	-	-	-	1	1	1	1	2	2
16:15	0	70.428	59.584	5.4448	0	0	0	0	0	15.617	0	0	555.2102659	0	101.512	-	-	-	-	1	1	2	3	3
16:30	0	84.801	48.75	1.8149	0	0	0	0	0	33.837	0	0	532.2442612	0	113.225	-	-	-	1	1	1	3	4	4
16:45	0	70.428	55.521	9.0747	0	0	0	0	0	31.234	0	0	531.6904342	0	114.526	-	-	-	1	1	1	4	1	1
17:00	0	100.61	48.75	0	0	0	0	0	0	20.823	0	0	531.0352935	0	119.732	-	-	-	1	1	1	1	2	2
17:15	0	71.866	40.625	0	0	0	0	0	0	27.33	0	0	381.6730386	0	98.9089	-	-	-	-	-	-	2	3	3
17:30	0	74.74	52.813	7.2598	0	0	0	0	0	35.139	0	0	269.1820932	0	71.5788	-	-	-	-	-	-	3	4	4
17:45	0	67.554	65.001	1.8149	0	0	0	0	0	36.44	0	0	134.3691568	0	36.4401	-	-	-	-	-	-	4	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:							6	2	4
															Signal Warranted?							No		
															Notes									

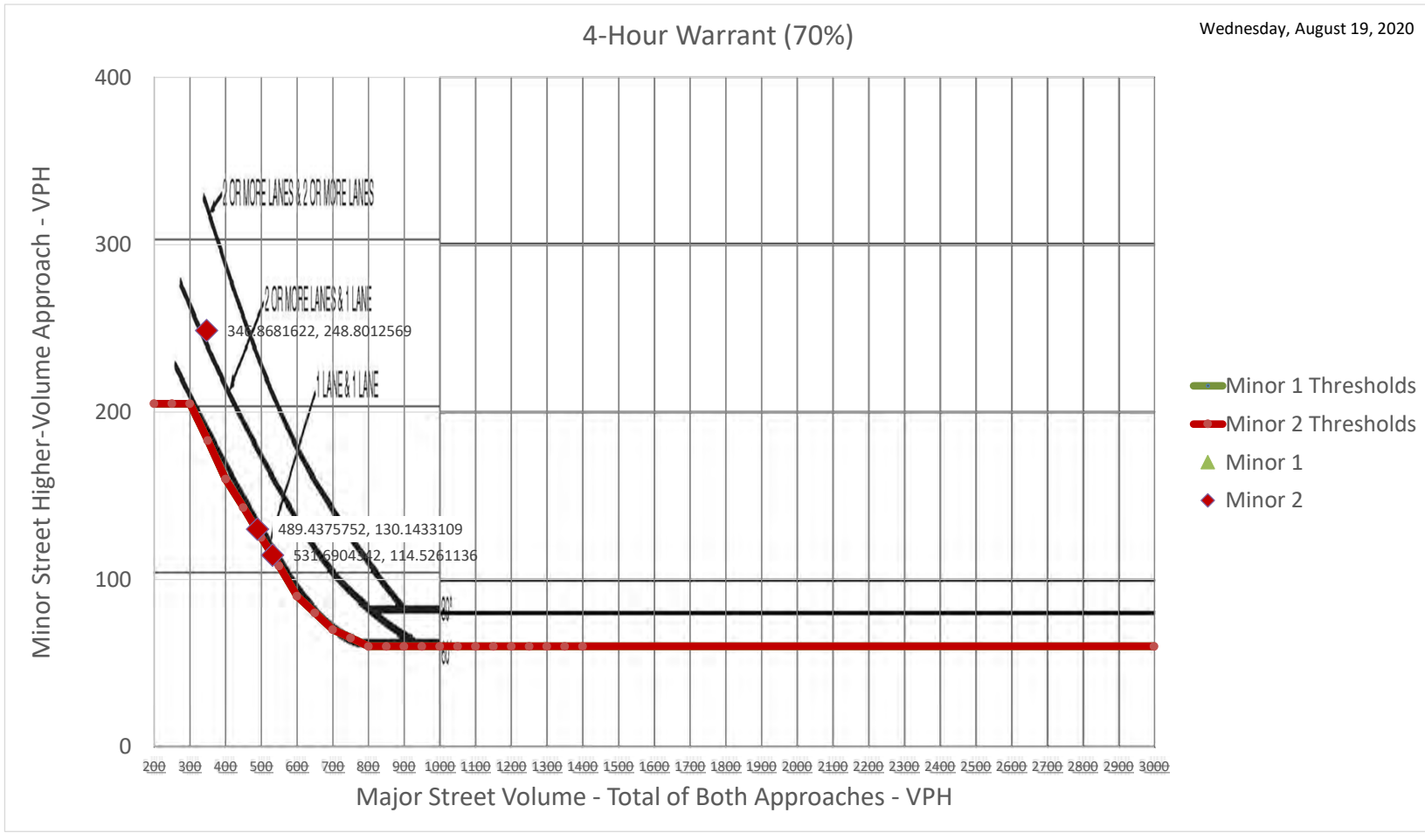
Weekday Kahekili Hwy/Makaala Drive 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						Makaala Drive			0			70 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction: 0%			RT Reduction: 100%											
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	33.91355141	0	44.2487			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	62.99938026	0	101.512			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	98.81100647	0	171.789			0	0	0	0
6:00	0	24.434	9.4792	0	0	0	0	0	0	44.249	0	0	197.6952165	0	230.354		1	0	1	1	1
6:15	0	18.685	6.7709	3.6299	0	0	0	0	0	57.263	0	0	253.5055088	0	260.948		1	0	2	1	2
6:30	0	25.872	8.1251	1.8149	0	0	0	0	0	70.277	0	0	343.1475917	0	256.277		1	0	3	1	3
6:45	0	61.804	24.375	12.705	0	0	0	0	0	58.564	0	0	368.6581784	0	246.683		1	0	4	1	4
7:00	0	60.574	6.9552	22.195	0	0	0	0	0	74.843	0	0	346.8681622	0	248.801		1	0	1	1	1
7:15	0	52.314	22.025	44.389	0	0	0	0	0	52.592	0	0	346.9157833	0	203.892		1	0	2	1	2
7:30	0	19.274	17.388	24.661	0	0	0	0	0	60.683	0	0	287.5193295	0	179.931			0	3	0	3
7:45	0	46.807	27.821	2.4661	0	0	0	0	0	60.683	0	0	272.6308068	0	138.769			0	4	0	4
8:00	0	53.181	31.146	5.4448	0	0	0	0	0	29.933	0	0	254.7398437	0	100.21			0	0	0	0
8:15	0	34.495	23.021	1.8149	0	0	0	0	0	28.632	0	0	230.5929814	0	105.416			0	0	0	0
8:30	0	30.184	16.25	0	0	0	0	0	0	19.521	0	0	*210.5917875*	0	108.019			0	0	0	0
8:45	0	40.245	18.958	0	0	0	0	0	0	22.124	0	0	219.4551309	0	106.718			0	0	0	0
9:00	0	41.682	20.313	3.6299	0	0	0	0	0	35.139	0	0	218.9393445	0	105.416			0	0	0	0
9:15	0	24.434	14.896	0	0	0	0	0	0	31.234	0	0	209.1275619	0	92.4018			0	0	0	0
9:30	0	34.495	13.542	7.2598	0	0	0	0	0	18.22	0	0	221.4644498	0	76.7846			0	0	0	0
9:45	0	38.807	16.25	3.6299	0	0	0	0	0	20.823	0	0	218.7279833	0	78.086			0	0	0	0
10:00	0	35.933	16.25	3.6299	0	0	0	0	0	22.124	0	0	239.2449638	0	78.086			0	0	0	0
10:15	0	34.495	13.542	3.6299	0	0	0	0	0	15.617	0	0	259.2010643	0	76.7846			0	0	0	0
10:30	0	34.495	16.25	1.8149	0	0	0	0	0	19.521	0	0	274.173105	0	76.7846			0	0	0	0
10:45	0	50.306	27.084	1.8149	0	0	0	0	0	20.823	0	0	293.0033717	0	83.2917			0	0	0	0
11:00	0	53.181	18.958	3.6299	0	0	0	0	0	20.823	0	0	271.5648657	0	79.3874			0	0	0	0
11:15	0	51.743	14.896	0	0	0	0	0	0	15.617	0	0	287.5205084	0	78.086			0	0	0	0
11:30	0	40.245	31.146	0	0	0	0	0	0	26.029	0	0	297.9663743	0	88.4975			0	0	0	0
11:45	0	38.807	18.958	0	0	0	0	0	0	16.919	0	0	267.4713436	0	96.3061			0	0	0	0
12:00	0	56.055	33.854	1.8149	0	0	0	0	0	19.521	0	0	274.997492	0	108.019			0	0	0	0
12:15	0	44.557	27.084	5.4448	0	0	0	0	0	26.029	0	0	252.6275301	0	122.335			0	0	0	0
12:30	0	20.122	18.958	1.8149	0	0	0	0	0	33.837	0	0	266.4947943	0	123.636			0	0	0	0
12:45	0	35.933	25.729	3.6299	0	0	0	0	0	28.632	0	0	307.217277	0	119.732			0	0	0	0
13:00	0	35.933	29.792	3.6299	0	0	0	0	0	33.837	0	0	351.0257448	0	128.842			0	0	0	0
13:15	0	66.116	23.021	1.8149	0	0	0	0	0	27.33	0	0	399.7743759	0	124.938			0	0	0	0
13:30	0	53.181	28.438	0	0	0	0	0	0	29.933	0	0	423.6068823	0	132.746			0	0	0	0
13:45	0	67.554	37.917	3.6299	0	0	0	0	0	37.742	0	0	430.672268	0	128.842			0	0	0	0
14:00	0	73.303	23.021	21.779	0	0	0	0	0	29.933	0	0	419.1737718	0	119.732			0	0	0	0
14:15	0	63.242	35.209	16.334	0	0	0	0	0	35.139	0	0	403.0858277	0	108.019			0	0	0	0
14:30	0	50.306	36.563	1.8149	0	0	0	0	0	26.029	0	0	404.1174007	0	110.622			0	0	0	0
14:45	0	56.055	37.917	3.6299	0	0	0	0	0	28.632	0	0	430.0792038	0	117.129			0	0	0	0
15:00	0	53.181	32.5	16.334	0	0	0	0	0	18.22	0	0	464.9142807	0	114.526			0	0	0	0
15:15	0	66.116	40.625	9.0747	0	0	0	0	0	37.742	0	0	489.4375752	0	130.143		1	0	1	1	1
15:30	0	61.804	47.396	5.4448	0	0	0	0	0	32.536	0	0	509.0781234	0	108.019			0	2	0	2
15:45	0	80.489	44.688	7.2598	0	0	0	0	0	26.029	0	0	529.7994122	0	109.32			0	3	0	3
16:00	0	64.679	58.23	3.6299	0	0	0	0	0	33.837	0	0	532.386594	0	114.526		1	0	4	1	4
16:15	0	70.428	59.584	5.4448	0	0	0	0	0	15.617	0	0	555.2102659	0	101.512			0	0	0	0
16:30	0	84.801	48.75	1.8149	0	0	0	0	0	33.837	0	0	532.2442612	0	113.225			0	0	0	0
16:45	0	70.428	55.521	9.0747	0	0	0	0	0	31.234	0	0	531.6904342	0	114.526		1	0	1	1	1
17:00	0	100.61	48.75	0	0	0	0	0	0	20.823	0	0	531.0352935	0	119.732		1	0	2	1	2
17:15	0	71.866	40.625	0	0	0	0	0	0	27.33	0	0	381.6730386	0	98.9089			0	3	0	3
17:30	0	74.74	52.813	7.2598	0	0	0	0	0	35.139	0	0	269.1820932	0	71.5788			0	4	0	4
17:45	0	67.554	65.001	1.8149	0	0	0	0	0	36.44	0	0	134.3691568	0	36.4401			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	4
Signal Warranted?	Yes


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
346.8681622, 248.8012569
489.4375752, 130.1433109
531.6904342, 114.5261136
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
489.4375752, 130.1433109
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

Kahekili Highway/Makaala Drive
Future Year Without Imi Kala Street Extension

Weekday Kahekili Hwy/Makaala Drive 8-Hour Signal Warrant

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	**70% ****	**56%**	100% *	80%	**70% ****	**56%**
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	**70% ****	**56%**	100% *	80%	**70% ****	**56%**
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

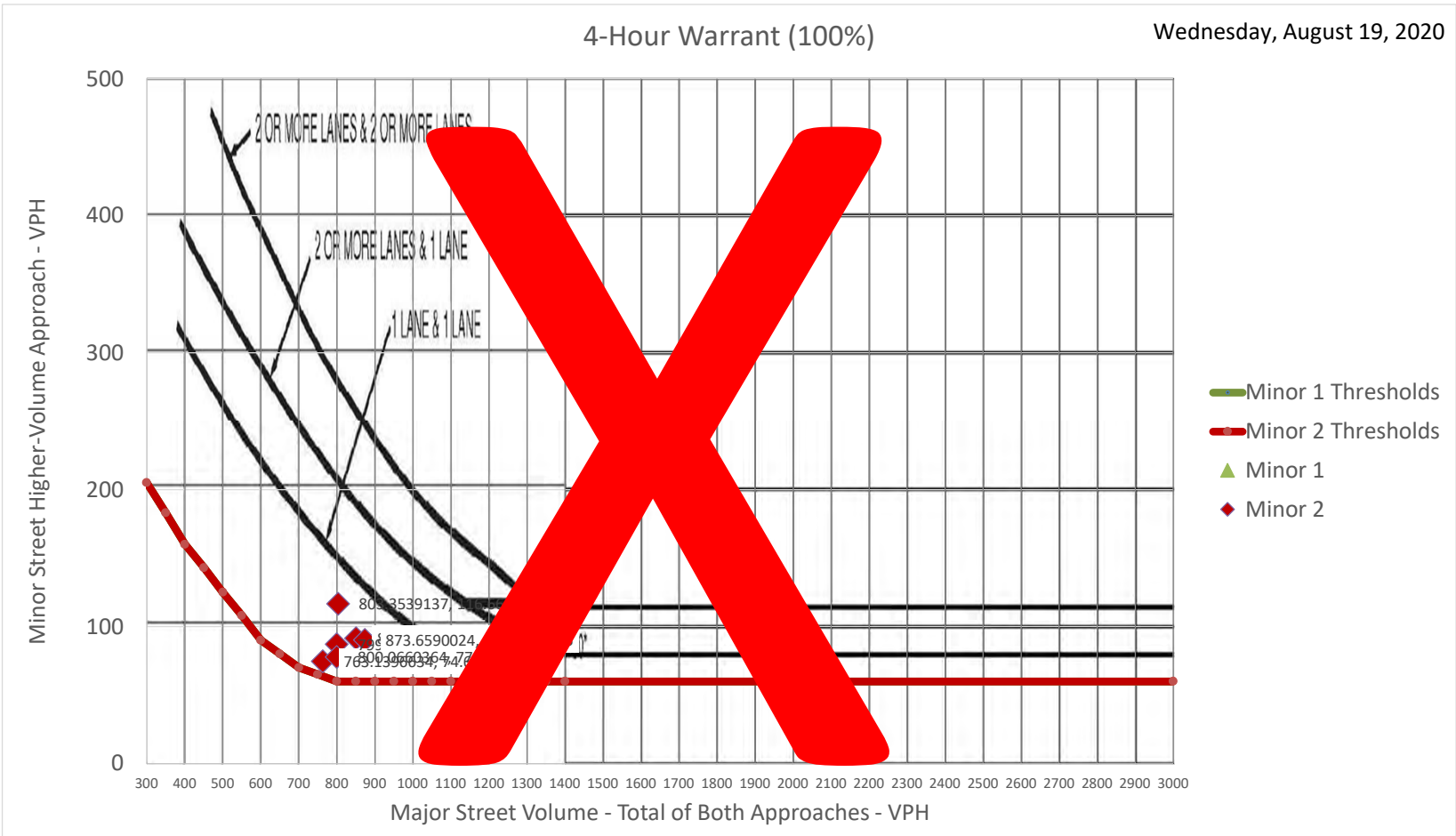
	Kahekili Hwy						Makaala Drive			0			**70 % Warrant**			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			350	525	420	350	525	420			
	1						1			1			Minor Threshold			105	53	84	105	53	84			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	129.3013227	0	3.11112	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	272.2082483	0	24.889	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	465.4016882	0	37.3335	-	-	-	-	-	-	0	0	0
6:00	0	17.218	13.893	25.605	72.586	0	0	0	0	3.1111	0	0	697.748215	0	52.8891	-	-	-	-	-	-	0	0	0
6:15	0	18.941	22.229	34.547	67.19	0	0	0	0	21.778	0	0	851.0810036	0	91.4649	-	-	-	-	1	1	0	1	1
6:30	0	37.815	8.3357	48.054	98.989	0	0	0	0	12.444	0	0	973.8270894	0	107.205	-	-	-	1	1	1	1	2	2
6:45	0	58.492	5.5571	52.754	115.54	0	0	0	0	15.556	0	0	1011.394241	0	136.448	-	-	-	1	1	1	2	3	3
7:00	0	51.058	17.08	80.649	133.85	0	0	0	0	41.687	0	0	942.2338662	0	145.904	-	-	-	1	1	1	3	4	4
7:15	0	68.389	17.08	47.062	133.12	0	0	0	0	37.518	0	0	803.3539137	0	116.662	-	-	-	1	1	1	4	1	1
7:30	0	40.827	13.664	52.606	123.66	0	0	0	0	41.687	0	0	689.5824008	0	138.255	-	-	-	1	1	1	1	2	2
7:45	0	33.131	13.664	52.829	63.562	0	0	0	0	25.012	0	0	606.6947116	0	121.457	-	-	-	1	1	1	2	3	3
8:00	0	44.604	19.45	24.237	55.462	0	0	0	0	12.444	0	0	549.8617386	0	118.223	-	-	-	1	1	1	3	4	4
8:15	0	36.449	22.229	30.195	63.009	0	0	0	0	59.111	0	0	501.7619817	0	108.889	-	-	-	1	-	1	4	0	1
8:30	0	48.854	30.564	25.77	42.685	0	0	0	0	24.889	0	0	*472.6034687*	0	65.3336	-	-	-	-	-	-	0	0	2
8:45	0	23	16.671	25.471	41.211	0	0	0	0	21.778	0	0	416.3048969	0	56.0002	-	-	-	-	-	-	0	0	3
9:00	0	25.536	8.3357	24.095	37.687	0	0	0	0	3.1111	0	0	410.2911333	0	49.778	-	-	-	-	-	-	0	0	4
9:15	0	35.291	8.3357	26.006	53.09	0	0	0	0	15.556	0	0	394.5565193	0	71.5559	-	-	-	-	-	-	0	0	0
9:30	0	23.813	11.114	20.604	36.043	0	0	0	0	15.556	0	0	390.8426076	0	68.4447	-	-	-	-	-	-	0	0	0
9:45	0	30.874	16.671	20.193	32.602	0	0	0	0	15.556	0	0	392.7362055	0	74.667	-	-	-	-	-	-	0	0	0
10:00	0	12.225	16.671	18.828	32.195	0	0	0	0	24.889	0	0	416.8539918	0	84.0004	-	-	-	-	-	-	0	0	0
10:15	0	35.597	27.786	17.207	38.42	0	0	0	0	12.444	0	0	489.2316326	0	74.667	-	-	-	-	-	-	0	0	0
10:30	0	30.004	11.114	18.352	33.998	0	0	0	0	21.778	0	0	476.4526381	0	74.667	-	-	-	-	-	-	0	0	0
10:45	0	29.456	30.564	20.931	43.506	0	0	0	0	24.889	0	0	524.8930865	0	77.7781	-	-	-	-	-	-	0	0	0
11:00	0	46.786	25.007	20.708	59.796	0	0	0	0	15.556	0	0	539.2142815	0	65.3336	-	-	-	-	1	-	0	1	0
11:15	0	32.498	22.229	16.782	34.721	0	0	0	0	12.444	0	0	488.5471285	0	68.4447	-	-	-	-	-	-	0	2	0
11:30	0	54.394	19.45	20.394	47.67	0	0	0	0	24.889	0	0	521.6476321	0	80.8892	-	-	-	-	-	-	0	3	0
11:45	0	30.519	25.007	25.417	57.835	0	0	0	0	12.444	0	0	501.1947471	0	87.1115	-	-	-	-	-	1	0	4	1
12:00	0	24.391	22.229	23.051	31.96	0	0	0	0	18.667	0	0	510.0127064	0	96.4449	-	-	-	-	-	1	0	0	2
12:15	0	43.353	19.45	19.341	57.186	0	0	0	0	24.889	0	0	541.5783705	0	105.778	-	-	-	1	1	1	1	1	3
12:30	0	22.42	19.45	24.195	55.39	0	0	0	0	31.111	0	0	563.2377282	0	90.2226	-	-	-	-	1	1	2	2	4
12:45	0	44.069	25.007	25.42	53.1	0	0	0	0	21.778	0	0	600.4560646	0	71.5559	-	-	-	-	1	-	3	3	0
13:00	0	22.149	22.229	27.08	61.739	0	0	0	0	28	0	0	634.1764615	0	74.667	-	-	-	-	1	-	4	4	0
13:15	0	36.569	55.571	25.79	43.059	0	0	0	0	9.3334	0	0	719.7668126	0	56.0002	-	-	-	-	1	-	0	1	0
13:30	0	55.231	19.45	24.879	59.114	0	0	0	0	12.444	0	0	763.1396634	0	74.667	-	-	-	-	1	-	0	2	0
13:45	0	61.912	25.007	29.87	64.528	0	0	0	0	24.889	0	0	819.0388148	0	74.667	-	-	-	-	1	-	0	3	0
14:00	0	73.938	16.671	28.301	99.876	0	0	0	0	9.3334	0	0	847.3274768	0	68.4447	-	-	-	-	1	-	0	4	0
14:15	0	63.555	19.45	30.325	91.033	0	0	0	0	28	0	0	839.9311758	0	93.3337	-	-	-	-	1	1	0	1	1
14:30	0	59.101	50.014	26.55	78.907	0	0	0	0	12.444	0	0	799.6375654	0	87.1115	-	-	-	-	1	1	0	2	2
14:45	0	61.54	52.793	27.34	67.932	0	0	0	0	18.667	0	0	778.4873924	0	96.4449	-	-	-	-	1	1	0	3	3
15:00	0	79.063	30.564	22.636	79.127	0	0	0	0	34.222	0	0	780.2013017	0	93.3337	-	-	-	-	1	1	0	4	4
15:15	0	55.143	25.007	29.683	54.236	0	0	0	0	21.778	0	0	774.7981424	0	87.1115	-	-	-	-	1	1	0	1	1
15:30	0	53.5	58.35	28.159	53.414	0	0	0	0	21.778	0	0	873.6590024	0	90.2226	-	-	-	-	1	1	0	2	2
15:45	0	65.862	47.236	30.715	67.507	0	0	0	0	15.556	0	0	881.4204737	0	99.556	-	-	-	-	1	1	0	3	3
16:00	0	84.795	36.121	31.65	53.42	0	0	0	0	28	0	0	854.239326	0	93.3337	-	-	-	-	1	1	0	4	4
16:15	0	96.185	72.243	25.692	68.81	0	0	0	0	24.889	0	0	882.0232365	0	90.2226	-	-	-	-	1	1	0	1	1
16:30	0	76.64	27.786	33.996	62.763	0	0	0	0	31.111	0	0	800.0660364	0	77.7781	-	-	-	-	1	-	0	2	2
16:45	0	81.809	47.236	27.893	27.201	0	0	0	0	9.3334	0	0	789.5010591	0	59.1114	-	-	-	-	1	-	0	3	3
17:00	0	69.553	69.464	31.807	62.947	0	0	0	0	24.889	0	0	803.3981907	0	90.2226	-	-	-	-	1	1	0	4	4
17:15	0	54.549	52.793	23.64	49.992	0	0	0	0	12.444	0	0	569.6274494	0	65.3336	-	-	-	-	1	-	0	1	0
17:30	0	59.126	47.236	29.831	54.426	0	0	0	0	12.444	0	0	388.6546085	0	52.8891	-	-	-	-	-	-	0	2	0
17:45	0	74.05	30.564	31.29	62.131	0	0	0	0	40.445	0	0	198.0353082	0	40.4446	-	-	-	-	-	-	0	3	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	4	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						3	9	7
															Signal Warranted?						Yes		
															Notes								

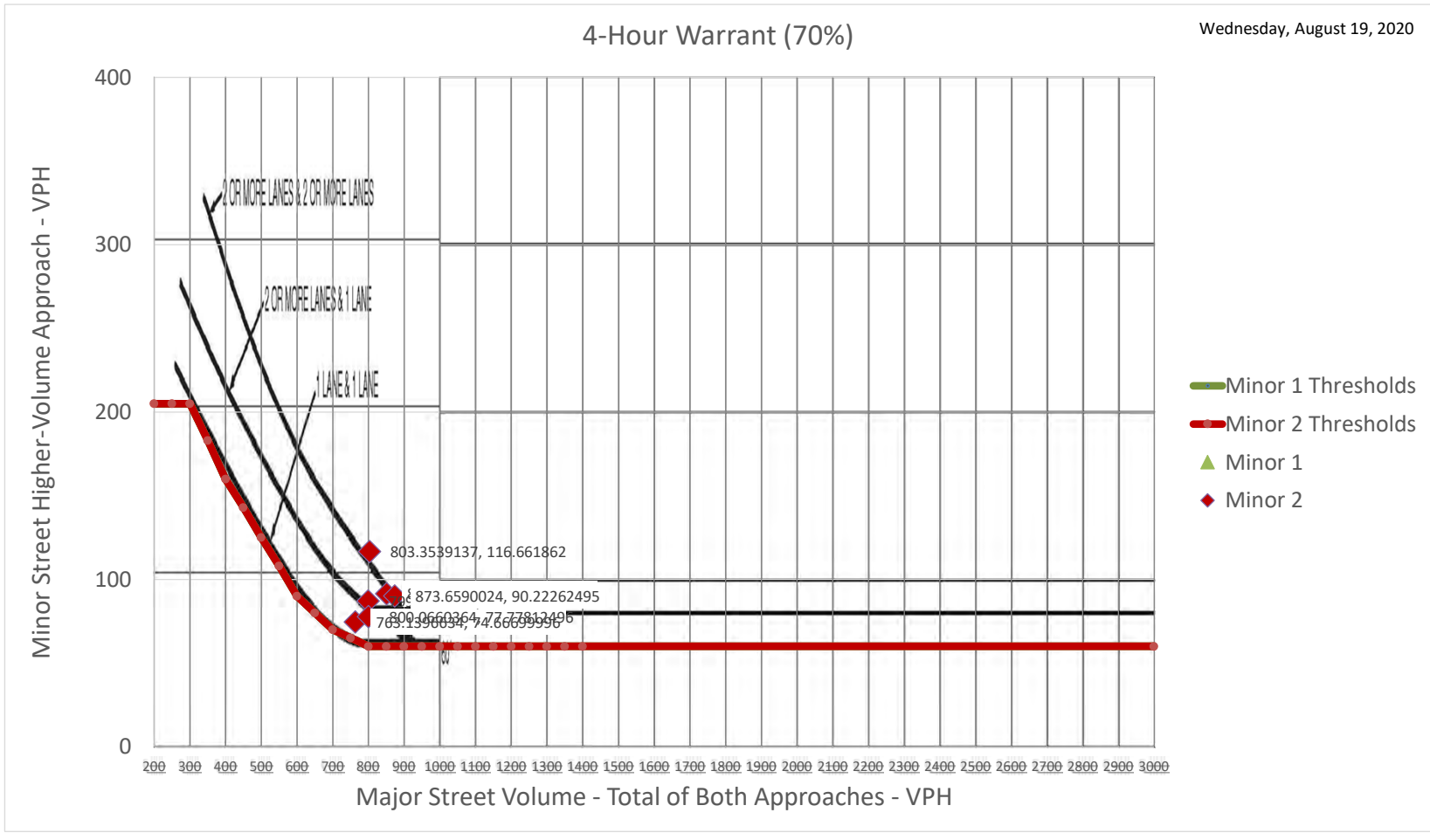
Weekday Kahekili Hwy/Makaala Drive 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						Makaala Drive			0			70 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction:		0%	RT Reduction:		100%										
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	129.3013227	0	3.11112			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	272.2082483	0	24.889			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	465.4016882	0	37.3335			0	0	0	0
6:00	0	17.218	13.893	25.605	72.586	0	0	0	0	3.1111	0	0	697.748215	0	52.8891			0	0	0	0
6:15	0	18.941	22.229	34.547	67.19	0	0	0	0	21.778	0	0	851.0810036	0	91.4649		1	0	1	1	1
6:30	0	37.815	8.3357	48.054	98.989	0	0	0	0	12.444	0	0	973.8270894	0	107.205		1	0	2	1	2
6:45	0	58.492	5.5571	52.754	115.54	0	0	0	0	15.556	0	0	1011.394241	0	136.448		1	0	3	1	3
7:00	0	51.058	17.08	80.649	133.85	0	0	0	0	41.687	0	0	942.2338662	0	145.904		1	0	4	1	4
7:15	0	68.389	17.08	47.062	133.12	0	0	0	0	37.518	0	0	803.3539137	0	116.662		1	0	1	1	1
7:30	0	40.827	13.664	52.606	123.66	0	0	0	0	41.687	0	0	689.5824008	0	138.255		1	0	2	1	2
7:45	0	33.131	13.664	52.829	63.562	0	0	0	0	25.012	0	0	606.6947116	0	121.457		1	0	3	1	3
8:00	0	44.604	19.45	24.237	55.462	0	0	0	0	12.444	0	0	549.8617386	0	118.223		1	0	4	1	4
8:15	0	36.449	22.229	30.195	63.009	0	0	0	0	59.111	0	0	501.7619817	0	108.889			0	0	0	0
8:30	0	48.854	30.564	25.77	42.685	0	0	0	0	24.889	0	0	*472.6034687*	0	65.3336			0	0	0	0
8:45	0	23	16.671	25.471	41.211	0	0	0	0	21.778	0	0	416.3048969	0	56.0002			0	0	0	0
9:00	0	25.536	8.3357	24.095	37.687	0	0	0	0	3.1111	0	0	410.2911333	0	49.778			0	0	0	0
9:15	0	35.291	8.3357	26.006	53.09	0	0	0	0	15.556	0	0	394.5565193	0	71.5559			0	0	0	0
9:30	0	23.813	11.114	20.604	36.043	0	0	0	0	15.556	0	0	390.8426076	0	68.4447			0	0	0	0
9:45	0	30.874	16.671	20.193	32.602	0	0	0	0	15.556	0	0	392.7362055	0	74.667			0	0	0	0
10:00	0	12.225	16.671	18.828	32.195	0	0	0	0	24.889	0	0	416.8539918	0	84.0004			0	0	0	0
10:15	0	35.597	27.786	17.207	38.42	0	0	0	0	12.444	0	0	489.2316326	0	74.667			0	0	0	0
10:30	0	30.004	11.114	18.352	33.998	0	0	0	0	21.778	0	0	476.4526381	0	74.667			0	0	0	0
10:45	0	29.456	30.564	20.931	43.506	0	0	0	0	24.889	0	0	524.8930865	0	77.7781			0	0	0	0
11:00	0	46.786	25.007	20.708	59.796	0	0	0	0	15.556	0	0	539.2142815	0	65.3336			0	0	0	0
11:15	0	32.498	22.229	16.782	34.721	0	0	0	0	12.444	0	0	488.5471285	0	68.4447			0	0	0	0
11:30	0	54.394	19.45	20.394	47.67	0	0	0	0	24.889	0	0	521.6476321	0	80.8892			0	0	0	0
11:45	0	30.519	25.007	25.417	57.835	0	0	0	0	12.444	0	0	501.1947471	0	87.1115			0	0	0	0
12:00	0	24.391	22.229	23.051	31.96	0	0	0	0	18.667	0	0	510.0127064	0	96.4449			0	0	0	0
12:15	0	43.353	19.45	19.341	57.186	0	0	0	0	24.889	0	0	541.5783705	0	105.778			0	0	0	0
12:30	0	22.42	19.45	24.195	55.39	0	0	0	0	31.111	0	0	563.2377282	0	90.2226			0	0	0	0
12:45	0	44.069	25.007	25.42	53.1	0	0	0	0	21.778	0	0	600.4560646	0	71.5559			0	0	0	0
13:00	0	22.149	22.229	27.08	61.739	0	0	0	0	28	0	0	634.1764615	0	74.667			0	0	0	0
13:15	0	36.569	55.571	25.79	43.059	0	0	0	0	9.3334	0	0	719.7668126	0	56.0002			0	0	0	0
13:30	0	55.231	19.45	24.879	59.114	0	0	0	0	12.444	0	0	763.1396634	0	74.667		1	0	1	1	1
13:45	0	61.912	25.007	29.87	64.528	0	0	0	0	24.889	0	0	819.0388148	0	74.667		1	0	2	1	2
14:00	0	73.938	16.671	28.301	99.876	0	0	0	0	9.3334	0	0	847.3274768	0	68.4447		1	0	3	1	3
14:15	0	63.555	19.45	30.325	91.033	0	0	0	0	28	0	0	839.9311758	0	93.3337		1	0	4	1	4
14:30	0	59.101	50.014	26.55	78.907	0	0	0	0	12.444	0	0	799.6375654	0	87.1115		1	0	1	1	1
14:45	0	61.54	52.793	27.34	67.932	0	0	0	0	18.667	0	0	778.4873924	0	96.4449		1	0	2	1	2
15:00	0	79.063	30.564	22.636	79.127	0	0	0	0	34.222	0	0	780.2013017	0	93.3337		1	0	3	1	3
15:15	0	55.143	25.007	29.683	54.236	0	0	0	0	21.778	0	0	774.7981424	0	87.1115		1	0	4	1	4
15:30	0	53.5	58.35	28.159	53.414	0	0	0	0	21.778	0	0	873.6590024	0	90.2226		1	0	1	1	1
15:45	0	65.862	47.236	30.715	67.507	0	0	0	0	15.556	0	0	881.4204737	0	99.556		1	0	2	1	2
16:00	0	84.795	36.121	31.65	53.42	0	0	0	0	28	0	0	854.239326	0	93.3337		1	0	3	1	3
16:15	0	96.185	72.243	25.692	68.81	0	0	0	0	24.889	0	0	882.0232365	0	90.2226		1	0	4	1	4
16:30	0	76.64	27.786	33.996	62.763	0	0	0	0	31.111	0	0	800.0660364	0	77.7781		1	0	1	1	1
16:45	0	81.809	47.236	27.893	27.201	0	0	0	0	9.3334	0	0	789.5010591	0	59.1114			0	2	0	2
17:00	0	69.553	69.464	31.807	62.947	0	0	0	0	24.889	0	0	803.3981907	0	90.2226		1	0	3	1	3
17:15	0	54.549	52.793	23.64	49.992	0	0	0	0	12.444	0	0	569.6274494	0	65.3336			0	4	0	4
17:30	0	59.126	47.236	29.831	54.426	0	0	0	0	12.444	0	0	388.6546085	0	52.8891			0	0	0	0
17:45	0	74.05	30.564	31.29	62.131	0	0	0	0	40.445	0	0	198.0353082	0	40.4446			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	6
Signal Warranted?	Yes


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
803.3539137, 116.661862
873.6590024, 90.22262495
800.0660364, 77.77813495
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Makaala Drive 8-Hour Signal Warrant

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						Makaala Drive			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	129.3013227	0	3.11112	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	272.2082483	0	24.889	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	465.4016882	0	37.3335	-	-	-	-	-	-	0	0	0
6:00	0	17.218	13.893	25.605	72.586	0	0	0	0	3.1111	0	0	697.748215	0	52.8891	-	-	-	-	-	-	0	0	0
6:15	0	18.941	22.229	34.547	67.19	0	0	0	0	21.778	0	0	851.0810036	0	91.4649	-	-	-	-	1	-	0	1	0
6:30	0	37.815	8.3357	48.054	98.989	0	0	0	0	12.444	0	0	973.8270894	0	107.205	-	-	-	-	1	-	0	2	0
6:45	0	58.492	5.5571	52.754	115.54	0	0	0	0	15.556	0	0	1011.394241	0	136.448	-	-	-	-	1	1	0	3	1
7:00	0	51.058	17.08	80.649	133.85	0	0	0	0	41.687	0	0	942.2338662	0	145.904	-	-	-	-	1	1	0	4	2
7:15	0	68.389	17.08	47.062	133.12	0	0	0	0	37.518	0	0	803.3539137	0	116.662	-	-	-	-	1	-	0	1	3
7:30	0	40.827	13.664	52.606	123.66	0	0	0	0	41.687	0	0	689.5824008	0	138.255	-	-	-	-	-	1	0	2	4
7:45	0	33.131	13.664	52.829	63.562	0	0	0	0	25.012	0	0	606.6947116	0	121.457	-	-	-	-	-	1	0	3	1
8:00	0	44.604	19.45	24.237	55.462	0	0	0	0	12.444	0	0	549.8617386	0	118.223	-	-	-	-	-	-	0	4	2
8:15	0	36.449	22.229	30.195	63.009	0	0	0	0	59.111	0	0	501.7619817	0	108.889	-	-	-	-	-	-	0	0	3
8:30	0	48.854	30.564	25.77	42.685	0	0	0	0	24.889	0	0	*472.6034687*	0	65.3336	-	-	-	-	-	-	0	0	4
8:45	0	23	16.671	25.471	41.211	0	0	0	0	21.778	0	0	416.3048969	0	56.0002	-	-	-	-	-	-	0	0	0
9:00	0	25.536	8.3357	24.095	37.687	0	0	0	0	3.1111	0	0	410.2911333	0	49.778	-	-	-	-	-	-	0	0	0
9:15	0	35.291	8.3357	26.006	53.09	0	0	0	0	15.556	0	0	394.5565193	0	71.5559	-	-	-	-	-	-	0	0	0
9:30	0	23.813	11.114	20.604	36.043	0	0	0	0	15.556	0	0	390.8426076	0	68.4447	-	-	-	-	-	-	0	0	0
9:45	0	30.874	16.671	20.193	32.602	0	0	0	0	15.556	0	0	392.7362055	0	74.667	-	-	-	-	-	-	0	0	0
10:00	0	12.225	16.671	18.828	32.195	0	0	0	0	24.889	0	0	416.8539918	0	84.0004	-	-	-	-	-	-	0	0	0
10:15	0	35.597	27.786	17.207	38.42	0	0	0	0	12.444	0	0	489.2316326	0	74.667	-	-	-	-	-	-	0	0	0
10:30	0	30.004	11.114	18.352	33.998	0	0	0	0	21.778	0	0	476.4526381	0	74.667	-	-	-	-	-	-	0	0	0
10:45	0	29.456	30.564	20.931	43.506	0	0	0	0	24.889	0	0	524.8930865	0	77.7781	-	-	-	-	-	-	0	0	0
11:00	0	46.786	25.007	20.708	59.796	0	0	0	0	15.556	0	0	539.2142815	0	65.3336	-	-	-	-	-	-	0	0	0
11:15	0	32.498	22.229	16.782	34.721	0	0	0	0	12.444	0	0	488.5471285	0	68.4447	-	-	-	-	-	-	0	0	0
11:30	0	54.394	19.45	20.394	47.67	0	0	0	0	24.889	0	0	521.6476321	0	80.8892	-	-	-	-	-	-	0	0	0
11:45	0	30.519	25.007	25.417	57.835	0	0	0	0	12.444	0	0	501.1947471	0	87.1115	-	-	-	-	-	-	0	0	0
12:00	0	24.391	22.229	23.051	31.96	0	0	0	0	18.667	0	0	510.0127064	0	96.4449	-	-	-	-	-	-	0	0	0
12:15	0	43.353	19.45	19.341	57.186	0	0	0	0	24.889	0	0	541.5783705	0	105.778	-	-	-	-	-	-	0	0	0
12:30	0	22.42	19.45	24.195	55.39	0	0	0	0	31.111	0	0	563.2377282	0	90.2226	-	-	-	-	-	-	0	0	0
12:45	0	44.069	25.007	25.42	53.1	0	0	0	0	21.778	0	0	600.4560646	0	71.5559	-	-	-	-	-	-	0	0	0
13:00	0	22.149	22.229	27.08	61.739	0	0	0	0	28	0	0	634.1764615	0	74.667	-	-	-	-	-	-	0	0	0
13:15	0	36.569	55.571	25.79	43.059	0	0	0	0	9.3334	0	0	719.7668126	0	56.0002	-	-	-	-	-	-	0	0	0
13:30	0	55.231	19.45	24.879	59.114	0	0	0	0	12.444	0	0	763.1396634	0	74.667	-	-	-	-	-	-	0	0	0
13:45	0	61.912	25.007	29.87	64.528	0	0	0	0	24.889	0	0	819.0388148	0	74.667	-	-	-	-	-	-	0	0	0
14:00	0	73.938	16.671	28.301	99.876	0	0	0	0	9.3334	0	0	847.3274768	0	68.4447	-	-	-	-	-	-	0	0	0
14:15	0	63.555	19.45	30.325	91.033	0	0	0	0	28	0	0	839.9311758	0	93.3337	-	-	-	-	1	-	0	1	0
14:30	0	59.101	50.014	26.55	78.907	0	0	0	0	12.444	0	0	799.6375654	0	87.1115	-	-	-	-	1	-	0	2	0
14:45	0	61.54	52.793	27.34	67.932	0	0	0	0	18.667	0	0	778.4873924	0	96.4449	-	-	-	-	1	-	0	3	0
15:00	0	79.063	30.564	22.636	79.127	0	0	0	0	34.222	0	0	780.2013017	0	93.3337	-	-	-	-	1	-	0	4	0
15:15	0	55.143	25.007	29.683	54.236	0	0	0	0	21.778	0	0	774.7981424	0	87.1115	-	-	-	-	1	-	0	1	0
15:30	0	53.5	58.35	28.159	53.414	0	0	0	0	21.778	0	0	873.6590024	0	90.2226	-	-	-	-	1	-	0	2	0
15:45	0	65.862	47.236	30.715	67.507	0	0	0	0	15.556	0	0	881.4204737	0	99.556	-	-	-	-	1	-	0	3	0
16:00	0	84.795	36.121	31.65	53.42	0	0	0	0	28	0	0	854.239326	0	93.3337	-	-	-	-	1	-	0	4	0
16:15	0	96.185	72.243	25.692	68.81	0	0	0	0	24.889	0	0	882.0232365	0	90.2226	-	-	-	-	1	-	0	1	0
16:30	0	76.64	27.786	33.996	62.763	0	0	0	0	31.111	0	0	800.0660364	0	77.7781	-	-	-	-	1	-	0	2	0
16:45	0	81.809	47.236	27.893	27.201	0	0	0	0	9.3334	0	0	789.5010591	0	59.1114	-	-	-	-	-	-	0	3	0
17:00	0	69.553	69.464	31.807	62.947	0	0	0	0	24.889	0	0	803.3981907	0	90.2226	-	-	-	-	1	-	0	4	0
17:15	0	54.549	52.793	23.64	49.992	0	0	0	0	12.444	0	0	569.6274494	0	65.3336	-	-	-	-	-	-	0	0	0
17:30	0	59.126	47.236	29.831	54.426	0	0	0	0	12.444	0	0	388.6546085	0	52.8891	-	-	-	-	-	-	0	0	0
17:45	0	74.05	30.564	31.29	62.131	0	0	0	0	40.445	0	0	198.0353082	0	40.4446	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
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20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						0	5	2
															Signal Warranted?						No		
															Notes								

Weekday Kahekili Hwy/Makaala Drive 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						Makaala Drive			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction:	0%		RT Reduction:	100%											
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	129.3013227	0	3.11112			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	272.2082483	0	24.889			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	465.4016882	0	37.3335			0	0	0	0
6:00	0	17.218	13.893	25.605	72.586	0	0	0	0	3.1111	0	0	697.748215	0	52.8891			0	0	0	0
6:15	0	18.941	22.229	34.547	67.19	0	0	0	0	21.778	0	0	851.0810036	0	91.4649			0	0	0	0
6:30	0	37.815	8.3357	48.054	98.989	0	0	0	0	12.444	0	0	973.8270894	0	107.205	1		0	1	1	1
6:45	0	58.492	5.5571	52.754	115.54	0	0	0	0	15.556	0	0	1011.394241	0	136.448	1		0	2	1	2
7:00	0	51.058	17.08	80.649	133.85	0	0	0	0	41.687	0	0	942.2338662	0	145.904	1		0	3	1	3
7:15	0	68.389	17.08	47.062	133.12	0	0	0	0	37.518	0	0	803.3539137	0	116.662			0	4	0	4
7:30	0	40.827	13.664	52.606	123.66	0	0	0	0	41.687	0	0	689.5824008	0	138.255			0	0	0	0
7:45	0	33.131	13.664	52.829	63.562	0	0	0	0	25.012	0	0	606.6947116	0	121.457			0	0	0	0
8:00	0	44.604	19.45	24.237	55.462	0	0	0	0	12.444	0	0	549.8617386	0	118.223			0	0	0	0
8:15	0	36.449	22.229	30.195	63.009	0	0	0	0	59.111	0	0	501.7619817	0	108.889			0	0	0	0
8:30	0	48.854	30.564	25.77	42.685	0	0	0	0	24.889	0	0	*472.6034687*	0	65.3336			0	0	0	0
8:45	0	23	16.671	25.471	41.211	0	0	0	0	21.778	0	0	416.3048969	0	56.0002			0	0	0	0
9:00	0	25.536	8.3357	24.095	37.687	0	0	0	0	3.1111	0	0	410.2911333	0	49.778			0	0	0	0
9:15	0	35.291	8.3357	26.006	53.09	0	0	0	0	15.556	0	0	394.5565193	0	71.5559			0	0	0	0
9:30	0	23.813	11.114	20.604	36.043	0	0	0	0	15.556	0	0	390.8426076	0	68.4447			0	0	0	0
9:45	0	30.874	16.671	20.193	32.602	0	0	0	0	15.556	0	0	392.7362055	0	74.667			0	0	0	0
10:00	0	12.225	16.671	18.828	32.195	0	0	0	0	24.889	0	0	416.8539918	0	84.0004			0	0	0	0
10:15	0	35.597	27.786	17.207	38.42	0	0	0	0	12.444	0	0	489.2316326	0	74.667			0	0	0	0
10:30	0	30.004	11.114	18.352	33.998	0	0	0	0	21.778	0	0	476.4526381	0	74.667			0	0	0	0
10:45	0	29.456	30.564	20.931	43.506	0	0	0	0	24.889	0	0	524.8930865	0	77.7781			0	0	0	0
11:00	0	46.786	25.007	20.708	59.796	0	0	0	0	15.556	0	0	539.2142815	0	65.3336			0	0	0	0
11:15	0	32.498	22.229	16.782	34.721	0	0	0	0	12.444	0	0	488.5471285	0	68.4447			0	0	0	0
11:30	0	54.394	19.45	20.394	47.67	0	0	0	0	24.889	0	0	521.6476321	0	80.8892			0	0	0	0
11:45	0	30.519	25.007	25.417	57.835	0	0	0	0	12.444	0	0	501.1947471	0	87.1115			0	0	0	0
12:00	0	24.391	22.229	23.051	31.96	0	0	0	0	18.667	0	0	510.0127064	0	96.4449			0	0	0	0
12:15	0	43.353	19.45	19.341	57.186	0	0	0	0	24.889	0	0	541.5783705	0	105.778			0	0	0	0
12:30	0	22.42	19.45	24.195	55.39	0	0	0	0	31.111	0	0	563.2377282	0	90.2226			0	0	0	0
12:45	0	44.069	25.007	25.42	53.1	0	0	0	0	21.778	0	0	600.4560646	0	71.5559			0	0	0	0
13:00	0	22.149	22.229	27.08	61.739	0	0	0	0	28	0	0	634.1764615	0	74.667			0	0	0	0
13:15	0	36.569	55.571	25.79	43.059	0	0	0	0	9.3334	0	0	719.7668126	0	56.0002			0	0	0	0
13:30	0	55.231	19.45	24.879	59.114	0	0	0	0	12.444	0	0	763.1396634	0	74.667			0	0	0	0
13:45	0	61.912	25.007	29.87	64.528	0	0	0	0	24.889	0	0	819.0388148	0	74.667			0	0	0	0
14:00	0	73.938	16.671	28.301	99.876	0	0	0	0	9.3334	0	0	847.3274768	0	68.4447			0	0	0	0
14:15	0	63.555	19.45	30.325	91.033	0	0	0	0	28	0	0	839.9311758	0	93.3337			0	0	0	0
14:30	0	59.101	50.014	26.55	78.907	0	0	0	0	12.444	0	0	799.6375654	0	87.1115			0	0	0	0
14:45	0	61.54	52.793	27.34	67.932	0	0	0	0	18.667	0	0	778.4873924	0	96.4449			0	0	0	0
15:00	0	79.063	30.564	22.636	79.127	0	0	0	0	34.222	0	0	780.2013017	0	93.3337			0	0	0	0
15:15	0	55.143	25.007	29.683	54.236	0	0	0	0	21.778	0	0	774.7981424	0	87.1115			0	0	0	0
15:30	0	53.5	58.35	28.159	53.414	0	0	0	0	21.778	0	0	873.6590024	0	90.2226			0	0	0	0
15:45	0	65.862	47.236	30.715	67.507	0	0	0	0	15.556	0	0	881.4204737	0	99.556			0	0	0	0
16:00	0	84.795	36.121	31.65	53.42	0	0	0	0	28	0	0	854.239326	0	93.3337			0	0	0	0
16:15	0	96.185	72.243	25.692	68.81	0	0	0	0	24.889	0	0	882.0232365	0	90.2226			0	0	0	0
16:30	0	76.64	27.786	33.996	62.763	0	0	0	0	31.111	0	0	800.0660364	0	77.7781			0	0	0	0
16:45	0	81.809	47.236	27.893	27.201	0	0	0	0	9.3334	0	0	789.5010591	0	59.1114			0	0	0	0
17:00	0	69.553	69.464	31.807	62.947	0	0	0	0	24.889	0	0	803.3981907	0	90.2226			0	0	0	0
17:15	0	54.549	52.793	23.64	49.992	0	0	0	0	12.444	0	0	569.6274494	0	65.3336			0	0	0	0
17:30	0	59.126	47.236	29.831	54.426	0	0	0	0	12.444	0	0	388.6546085	0	52.8891			0	0	0	0
17:45	0	74.05	30.564	31.29	62.131	0	0	0	0	40.445	0	0	198.0353082	0	40.4446			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met: 1

Signal Warranted? No


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
115'
80'
973.8270894, 107.2053201
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

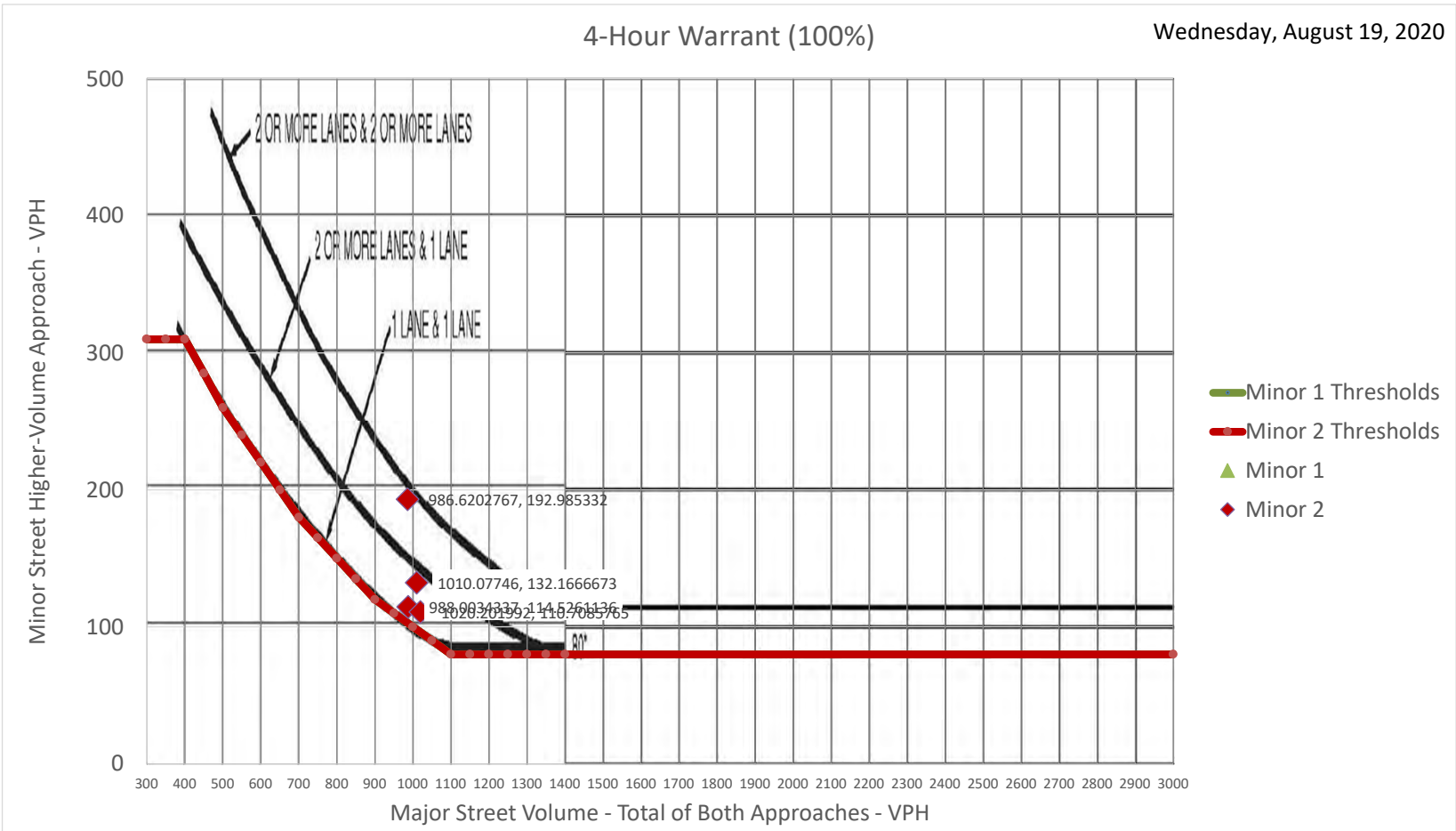
Kahekili Highway/Makaala Drive
Future Year With Imi Kala Street Extension

Weekday Kahekili Hwy/Makaala Drive 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						Makaala Drive			0			100 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction:	0%		RT Reduction:	100%										
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	154.7341252	0	3.81754			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	323.9344623	0	30.5403			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	551.0724838	0	45.8104			0	0	0	0
6:00	0	21.64	16.825	25.605	90.664	0	0	0	0	3.8175	0	0	823.8317222	0	64.8981			0	0	0	0
6:15	0	24.604	26.919	34.547	83.13	0	0	0	0	26.723	0	0	1010.07746	0	132.167		1	0	1	1	1
6:30	0	46.145	10.095	48.054	122.84	0	0	0	0	15.27	0	0	1172.946035	0	169.421		1	0	2	1	2
6:45	0	68.523	6.7299	52.754	144.75	0	0	0	0	19.088	0	0	1235.338587	0	225.237		1	0	3	1	3
7:00	0	54.869	20.608	80.649	184.85	0	0	0	0	71.086	0	0	1159.409628	0	248.801		1	0	4	1	4
7:15	0	72.617	20.608	47.062	191.78	0	0	0	0	63.977	0	0	986.6202767	0	192.985		1	0	1	1	1
7:30	0	43.767	16.486	52.606	176.67	0	0	0	0	71.086	0	0	833.4774098	0	201.541		1	0	2	1	2
7:45	0	35.72	16.486	52.829	91.794	0	0	0	0	42.652	0	0	714.6650175	0	160.995			0	3	0	3
8:00	0	49.882	23.554	24.237	70.516	0	0	0	0	15.27	0	0	642.3811004	0	145.066			0	4	0	4
8:15	0	42.345	26.919	30.195	79.466	0	0	0	0	72.533	0	0	585.4720164	0	133.614			0	0	0	0
8:30	0	54.664	37.014	25.77	53.27	0	0	0	0	30.54	0	0	*549.4121844*	0	80.1683			0	0	0	0
8:45	0	27.375	20.19	25.471	51.51	0	0	0	0	26.723	0	0	485.6104991	0	68.7157			0	0	0	0
9:00	0	29.786	10.095	24.095	47.306	0	0	0	0	3.8175	0	0	477.7577094	0	61.0806			0	0	0	0
9:15	0	40.447	10.095	26.006	66.319	0	0	0	0	19.088	0	0	460.6423161	0	87.8034			0	0	0	0
9:30	0	27.301	13.46	20.604	45.552	0	0	0	0	19.088	0	0	456.6852823	0	83.9858			0	0	0	0
9:45	0	34.609	20.19	20.193	41.702	0	0	0	0	19.088	0	0	458.5153855	0	91.6209			0	0	0	0
10:00	0	14.67	20.19	18.828	40.479	0	0	0	0	30.54	0	0	488.6500628	0	103.074			0	0	0	0
10:15	0	39.17	33.649	17.207	48.883	0	0	0	0	15.27	0	0	573.3830842	0	91.6209			0	0	0	0
10:30	0	33.387	13.46	18.352	43.548	0	0	0	0	26.723	0	0	557.8689803	0	91.6209			0	0	0	0
10:45	0	33.307	37.014	20.931	55.576	0	0	0	0	30.54	0	0	613.6526702	0	95.4384			0	0	0	0
11:00	0	51.381	30.284	20.708	76.526	0	0	0	0	19.088	0	0	630.6549877	0	80.1683			0	0	0	0
11:15	0	35.572	26.919	16.782	44.122	0	0	0	0	15.27	0	0	571.2615147	0	83.9858			0	0	0	0
11:30	0	59.111	23.554	20.394	61.471	0	0	0	0	30.54	0	0	611.8561633	0	99.256			0	0	0	0
11:45	0	34.79	30.284	25.417	73.339	0	0	0	0	15.27	0	0	591.5586531	0	106.891			0	0	0	0
12:00	0	27.562	26.919	23.051	41.973	0	0	0	0	22.905	0	0	600.2438239	0	118.344			0	0	0	0
12:15	0	47.301	23.554	19.341	73.793	0	0	0	0	30.54	0	0	639.5637974	0	129.796			0	0	0	0
12:30	0	25.875	23.554	24.195	70.607	0	0	0	0	38.175	0	0	664.6087081	0	110.709			0	0	0	0
12:45	0	49.12	30.284	25.42	67.691	0	0	0	0	26.723	0	0	705.4337808	0	87.8034			0	0	0	0
13:00	0	26.14	26.919	27.08	78.687	0	0	0	0	34.358	0	0	744.6334477	0	91.6209			0	0	0	0
13:15	0	41.157	67.299	25.79	54.789	0	0	0	0	11.453	0	0	843.5773254	0	68.7157			0	0	0	0
13:30	0	60.631	23.554	24.879	75.993	0	0	0	0	15.27	0	0	895.4158642	0	91.6209			0	0	0	0
13:45	0	68.437	30.284	29.87	83.125	0	0	0	0	30.54	0	0	963.7679408	0	91.6209			0	0	0	0
14:00	0	80.139	20.19	28.301	129.14	0	0	0	0	11.453	0	0	998.1882973	0	83.9858			0	0	0	0
14:15	0	69.613	23.554	30.325	117.38	0	0	0	0	34.358	0	0	988.0034337	0	114.526		1	0	1	1	1
14:30	0	64.728	60.569	26.55	101.56	0	0	0	0	15.27	0	0	938.3547441	0	106.891			0	2	0	2
14:45	0	67.53	63.934	27.34	87.332	0	0	0	0	22.905	0	0	912.797864	0	118.344		1	0	3	1	3
15:00	0	85.102	37.014	22.636	102.83	0	0	0	0	41.993	0	0	914.3731286	0	114.526			0	4	0	4
15:15	0	61.068	30.284	29.683	70.189	0	0	0	0	26.723	0	0	904.3491288	0	106.891			0	0	0	0
15:30	0	58.846	70.663	28.159	70.184	0	0	0	0	26.723	0	0	1020.201992	0	110.709		1	0	1	1	1
15:45	0	72.408	57.204	30.715	87.384	0	0	0	0	19.088	0	0	1025.654024	0	122.161		1	0	2	1	2
16:00	0	92.643	43.744	31.65	69.523	0	0	0	0	34.358	0	0	988.7176681	0	114.526		1	0	3	1	3
16:15	0	103.49	87.488	25.692	90.403	0	0	0	0	30.54	0	0	1025.406252	0	110.709		1	0	4	1	4
16:30	0	84.491	33.649	33.996	81.168	0	0	0	0	38.175	0	0	930.7373753	0	95.4384			0	0	0	0
16:45	0	88.736	57.204	27.893	36.941	0	0	0	0	11.453	0	0	921.0398939	0	72.5332			0	0	0	0
17:00	0	76.462	84.123	31.807	81.856	0	0	0	0	30.54	0	0	940.8080713	0	110.709			0	0	0	0
17:15	0	59.449	63.934	23.64	65.387	0	0	0	0	15.27	0	0	666.5589166	0	80.1683			0	0	0	0
17:30	0	65.267	57.204	29.831	71.306	0	0	0	0	15.27	0	0	454.1504459	0	64.8981			0	0	0	0
17:45	0	81.539	37.014	31.29	80.7	0	0	0	0	49.628	0	0	230.5428475	0	49.628			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	4
Signal Warranted?	Yes


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
986.6202767, 192.985332
1010.07746, 132.1666673
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Makaala Drive 8-Hour Signal Warrant

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						Makaala Drive			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	154.7341252	0	3.81754	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	323.9344623	0	30.5403	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	551.0724838	0	45.8104	-	-	-	-	-	-	0	0	0
6:00	0	21.64	16.825	25.605	90.664	0	0	0	0	3.8175	0	0	823.8317222	0	64.8981	-	-	-	-	-	-	0	0	0
6:15	0	24.604	26.919	34.547	83.13	0	0	0	0	26.723	0	0	1010.07746	0	132.167	-	-	-	-	1	1	0	1	1
6:30	0	46.145	10.095	48.054	122.84	0	0	0	0	15.27	0	0	1172.946035	0	169.421	-	-	-	1	1	1	1	2	2
6:45	0	68.523	6.7299	52.754	144.75	0	0	0	0	19.088	0	0	1235.338587	0	225.237	-	-	-	1	1	1	2	3	3
7:00	0	54.869	20.608	80.649	184.85	0	0	0	0	71.086	0	0	1159.409628	0	248.801	-	-	-	1	1	1	3	4	4
7:15	0	72.617	20.608	47.062	191.78	0	0	0	0	63.977	0	0	986.6202767	0	192.985	-	-	-	1	1	1	4	1	1
7:30	0	43.767	16.486	52.606	176.67	0	0	0	0	71.086	0	0	833.4774098	0	201.541	-	-	-	1	1	1	1	2	2
7:45	0	35.72	16.486	52.829	91.794	0	0	0	0	42.652	0	0	714.6650175	0	160.995	-	-	-	1	-	1	2	3	3
8:00	0	49.882	23.554	24.237	70.516	0	0	0	0	15.27	0	0	642.3811004	0	145.066	-	-	-	-	-	1	3	4	4
8:15	0	42.345	26.919	30.195	79.466	0	0	0	0	72.533	0	0	585.4720164	0	133.614	-	-	-	-	-	-	4	0	0
8:30	0	54.664	37.014	25.77	53.27	0	0	0	0	30.54	0	0	*549.4121844*	0	80.1683	-	-	-	-	-	-	0	0	0
8:45	0	27.375	20.19	25.471	51.51	0	0	0	0	26.723	0	0	485.6104991	0	68.7157	-	-	-	-	-	-	0	0	0
9:00	0	29.786	10.095	24.095	47.306	0	0	0	0	3.8175	0	0	477.7577094	0	61.0806	-	-	-	-	-	-	0	0	0
9:15	0	40.447	10.095	26.006	66.319	0	0	0	0	19.088	0	0	460.6423161	0	87.8034	-	-	-	-	-	-	0	0	0
9:30	0	27.301	13.46	20.604	45.552	0	0	0	0	19.088	0	0	456.6852823	0	83.9858	-	-	-	-	-	-	0	0	0
9:45	0	34.609	20.19	20.193	41.702	0	0	0	0	19.088	0	0	458.5153855	0	91.6209	-	-	-	-	-	-	0	0	0
10:00	0	14.67	20.19	18.828	40.479	0	0	0	0	30.54	0	0	488.6500628	0	103.074	-	-	-	-	-	-	0	0	0
10:15	0	39.17	33.649	17.207	48.883	0	0	0	0	15.27	0	0	573.3830842	0	91.6209	-	-	-	-	-	-	0	0	0
10:30	0	33.387	13.46	18.352	43.548	0	0	0	0	26.723	0	0	557.8689803	0	91.6209	-	-	-	-	-	-	0	0	0
10:45	0	33.307	37.014	20.931	55.576	0	0	0	0	30.54	0	0	613.6526702	0	95.4384	-	-	-	-	-	-	0	0	0
11:00	0	51.381	30.284	20.708	76.526	0	0	0	0	19.088	0	0	630.6549877	0	80.1683	-	-	-	-	-	-	0	0	0
11:15	0	35.572	26.919	16.782	44.122	0	0	0	0	15.27	0	0	571.2615147	0	83.9858	-	-	-	-	-	-	0	0	0
11:30	0	59.111	23.554	20.394	61.471	0	0	0	0	30.54	0	0	611.8561633	0	99.256	-	-	-	-	-	-	0	0	0
11:45	0	34.79	30.284	25.417	73.339	0	0	0	0	15.27	0	0	591.5586531	0	106.891	-	-	-	-	-	-	0	0	0
12:00	0	27.562	26.919	23.051	41.973	0	0	0	0	22.905	0	0	600.2438239	0	118.344	-	-	-	-	-	-	0	0	0
12:15	0	47.301	23.554	19.341	73.793	0	0	0	0	30.54	0	0	639.5637974	0	129.796	-	-	-	-	-	1	0	0	1
12:30	0	25.875	23.554	24.195	70.607	0	0	0	0	38.175	0	0	664.6087081	0	110.709	-	-	-	-	-	-	0	0	2
12:45	0	49.12	30.284	25.42	67.691	0	0	0	0	26.723	0	0	705.4337808	0	87.8034	-	-	-	-	-	-	0	0	3
13:00	0	26.14	26.919	27.08	78.687	0	0	0	0	34.358	0	0	744.6334477	0	91.6209	-	-	-	-	-	-	0	0	4
13:15	0	41.157	67.299	25.79	54.789	0	0	0	0	11.453	0	0	843.5773254	0	68.7157	-	-	-	-	-	-	0	0	0
13:30	0	60.631	23.554	24.879	75.993	0	0	0	0	15.27	0	0	895.4158642	0	91.6209	-	-	-	-	1	-	0	1	0
13:45	0	68.437	30.284	29.87	83.125	0	0	0	0	30.54	0	0	963.7679408	0	91.6209	-	-	-	-	1	-	0	2	0
14:00	0	80.139	20.19	28.301	129.14	0	0	0	0	11.453	0	0	998.1882973	0	83.9858	-	-	-	-	1	-	0	3	0
14:15	0	69.613	23.554	30.325	117.38	0	0	0	0	34.358	0	0	988.0034337	0	114.526	-	-	-	-	1	-	0	4	0
14:30	0	64.728	60.569	26.55	101.56	0	0	0	0	15.27	0	0	938.3547441	0	106.891	-	-	-	-	1	-	0	1	0
14:45	0	67.53	63.934	27.34	87.332	0	0	0	0	22.905	0	0	912.797864	0	118.344	-	-	-	-	1	-	0	2	0
15:00	0	85.102	37.014	22.636	102.83	0	0	0	0	41.993	0	0	914.3731286	0	114.526	-	-	-	-	1	-	0	3	0
15:15	0	61.068	30.284	29.683	70.189	0	0	0	0	26.723	0	0	904.3491288	0	106.891	-	-	-	-	1	-	0	4	0
15:30	0	58.846	70.663	28.159	70.184	0	0	0	0	26.723	0	0	1020.201992	0	110.709	-	-	-	-	1	-	0	1	0
15:45	0	72.408	57.204	30.715	87.384	0	0	0	0	19.088	0	0	1025.654024	0	122.161	-	-	-	-	1	1	0	2	1
16:00	0	92.643	43.744	31.65	69.523	0	0	0	0	34.358	0	0	988.7176681	0	114.526	-	-	-	-	1	-	0	3	2
16:15	0	103.49	87.488	25.692	90.403	0	0	0	0	30.54	0	0	1025.406252	0	110.709	-	-	-	-	1	-	0	4	3
16:30	0	84.491	33.649	33.996	81.168	0	0	0	0	38.175	0	0	930.7373753	0	95.4384	-	-	-	-	1	-	0	1	4
16:45	0	88.736	57.204	27.893	36.941	0	0	0	0	11.453	0	0	921.0398939	0	72.5332	-	-	-	-	-	-	0	2	0
17:00	0	76.462	84.123	31.807	81.856	0	0	0	0	30.54	0	0	940.8080713	0	110.709	-	-	-	-	1	-	0	3	0
17:15	0	59.449	63.934	23.64	65.387	0	0	0	0	15.27	0	0	666.5589166	0	80.1683	-	-	-	-	-	-	0	4	0
17:30	0	65.267	57.204	29.831	71.306	0	0	0	0	15.27	0	0	454.1504459	0	64.8981	-	-	-	-	-	-	0	0	0
17:45	0	81.539	37.014	31.29	80.7	0	0	0	0	49.628	0	0	230.5428475	0	49.628	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						2	6	4
															Signal Warranted?						No		
															Notes								

APPENDIX D

SIGNAL WARRANT ANALYSIS

Kahekili Highway/Makaala Drive
Future Year With Imi Kala Street Extension
With Median Refuge Lane

Weekday Kahekili Hwy/Makaala Drive 8-Hour Signal Warrant

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						Makaala Drive			0			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	64.06971611	0	3.81754	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	150.1400546	0	30.5403	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	254.4339249	0	45.8104	-	-	-	-	-	-	0	0	0
6:00	0	21.64	16.825	25.605	0	0	0	0	0	3.8175	0	0	382.4408701	0	64.8981	-	-	-	-	-	-	0	0	0
6:15	0	24.604	26.919	34.547	0	0	0	0	0	26.723	0	0	474.497466	0	132.167	-	-	-	-	-	-	0	0	0
6:30	0	46.145	10.095	48.054	0	0	0	0	0	15.27	0	0	528.7137387	0	169.421	-	-	-	1	-	-	1	0	0
6:45	0	68.523	6.7299	52.754	0	0	0	0	0	19.088	0	0	537.2797528	0	225.237	-	-	-	1	-	-	2	0	0
7:00	0	54.869	20.608	80.649	0	0	0	0	0	71.086	0	0	514.3087982	0	248.801	-	-	-	1	-	-	3	0	0
7:15	0	72.617	20.608	47.062	0	0	0	0	0	63.977	0	0	455.8565256	0	192.985	-	-	-	-	-	-	4	0	0
7:30	0	43.767	16.486	52.606	0	0	0	0	0	71.086	0	0	415.0296836	0	201.541	-	-	-	-	-	-	0	0	0
7:45	0	35.72	16.486	52.829	0	0	0	0	0	42.652	0	0	419.6176214	0	160.995	-	-	-	-	-	-	0	0	0
8:00	0	49.882	23.554	24.237	0	0	0	0	0	15.27	0	0	387.6175779	0	145.066	-	-	-	-	-	-	0	0	0
8:15	0	42.345	26.919	30.195	0	0	0	0	0	72.533	0	0	353.9192087	0	133.614	-	-	-	-	-	-	0	0	0
8:30	0	54.664	37.014	25.77	0	0	0	0	0	30.54	0	0	*331.0068516*	0	80.1683	-	-	-	-	-	-	0	0	0
8:45	0	27.375	20.19	25.471	0	0	0	0	0	26.723	0	0	274.9235136	0	68.7157	-	-	-	-	-	-	0	0	0
9:00	0	29.786	10.095	24.095	0	0	0	0	0	3.8175	0	0	276.878965	0	61.0806	-	-	-	-	-	-	0	0	0
9:15	0	40.447	10.095	26.006	0	0	0	0	0	19.088	0	0	266.5907958	0	87.8034	-	-	-	-	-	-	0	0	0
9:30	0	27.301	13.46	20.604	0	0	0	0	0	19.088	0	0	280.0699414	0	83.9858	-	-	-	-	-	-	0	0	0
9:45	0	34.609	20.19	20.193	0	0	0	0	0	19.088	0	0	283.9037584	0	91.6209	-	-	-	-	-	-	0	0	0
10:00	0	14.67	20.19	18.828	0	0	0	0	0	30.54	0	0	300.1645505	0	103.074	-	-	-	-	-	-	0	0	0
10:15	0	39.17	33.649	17.207	0	0	0	0	0	15.27	0	0	348.8502999	0	91.6209	-	-	-	-	-	-	0	0	0
10:30	0	33.387	13.46	18.352	0	0	0	0	0	26.723	0	0	338.097132	0	91.6209	-	-	-	-	-	-	0	0	0
10:45	0	33.307	37.014	20.931	0	0	0	0	0	30.54	0	0	375.9585328	0	95.4384	-	-	-	-	-	-	0	0	0
11:00	0	51.381	30.284	20.708	0	0	0	0	0	19.088	0	0	375.198047	0	80.1683	-	-	-	-	-	-	0	0	0
11:15	0	35.572	26.919	16.782	0	0	0	0	0	15.27	0	0	350.3570496	0	83.9858	-	-	-	-	-	-	0	0	0
11:30	0	59.111	23.554	20.394	0	0	0	0	0	30.54	0	0	361.279964	0	99.256	-	-	-	-	-	-	0	0	0
11:45	0	34.79	30.284	25.417	0	0	0	0	0	15.27	0	0	331.8455665	0	106.891	-	-	-	-	-	-	0	0	0
12:00	0	27.562	26.919	23.051	0	0	0	0	0	22.905	0	0	346.178601	0	118.344	-	-	-	-	-	-	0	0	0
12:15	0	47.301	23.554	19.341	0	0	0	0	0	30.54	0	0	348.7852399	0	129.796	-	-	-	-	-	-	0	0	0
12:30	0	25.875	23.554	24.195	0	0	0	0	0	38.175	0	0	392.8341496	0	110.709	-	-	-	-	-	-	0	0	0
12:45	0	49.12	30.284	25.42	0	0	0	0	0	26.723	0	0	428.2733373	0	87.8034	-	-	-	-	-	-	0	0	0
13:00	0	26.14	26.919	27.08	0	0	0	0	0	34.358	0	0	452.0392685	0	91.6209	-	-	-	-	-	-	0	0	0
13:15	0	41.157	67.299	25.79	0	0	0	0	0	11.453	0	0	500.5299596	0	68.7157	-	-	-	-	-	-	0	0	0
13:30	0	60.631	23.554	24.879	0	0	0	0	0	15.27	0	0	489.7765689	0	91.6209	-	-	-	-	-	-	0	0	0
13:45	0	68.437	30.284	29.87	0	0	0	0	0	30.54	0	0	532.5587709	0	91.6209	-	-	-	-	-	-	0	0	0
14:00	0	80.139	20.19	28.301	0	0	0	0	0	11.453	0	0	562.77147	0	83.9858	-	-	-	-	-	-	0	0	0
14:15	0	69.613	23.554	30.325	0	0	0	0	0	34.358	0	0	578.8945422	0	114.526	-	-	-	-	-	-	0	0	0
14:30	0	64.728	60.569	26.55	0	0	0	0	0	15.27	0	0	576.4379665	0	106.891	-	-	-	-	-	-	0	0	0
14:45	0	67.53	63.934	27.34	0	0	0	0	0	22.905	0	0	582.2600741	0	118.344	-	-	-	-	-	-	0	0	0
15:00	0	85.102	37.014	22.636	0	0	0	0	0	41.993	0	0	583.7838794	0	114.526	-	-	-	-	-	-	0	0	0
15:15	0	61.068	30.284	29.683	0	0	0	0	0	26.723	0	0	607.0686569	0	106.891	-	-	-	-	-	-	0	0	0
15:30	0	58.846	70.663	28.159	0	0	0	0	0	26.723	0	0	702.7074321	0	110.709	-	-	-	-	-	-	0	0	0
15:45	0	72.408	57.204	30.715	0	0	0	0	0	19.088	0	0	697.1752574	0	122.161	-	-	-	-	-	1	0	0	1
16:00	0	92.643	43.744	31.65	0	0	0	0	0	34.358	0	0	710.681394	0	114.526	-	-	-	-	-	-	0	0	2
16:15	0	103.49	87.488	25.692	0	0	0	0	0	30.54	0	0	735.0367915	0	110.709	-	-	-	-	-	-	0	0	3
16:30	0	84.491	33.649	33.996	0	0	0	0	0	38.175	0	0	665.3847375	0	95.4384	-	-	-	-	-	-	0	0	4
16:45	0	88.736	57.204	27.893	0	0	0	0	0	11.453	0	0	665.5498549	0	72.5332	-	-	-	-	-	-	0	0	0
17:00	0	76.462	84.123	31.807	0	0	0	0	0	30.54	0	0	641.5595984	0	110.709	-	-	-	-	-	-	0	0	0
17:15	0	59.449	63.934	23.64	0	0	0	0	0	15.27	0	0	449.1667684	0	80.1683	-	-	-	-	-	-	0	0	0
17:30	0	65.267	57.204	29.831	0	0	0	0	0	15.27	0	0	302.1447994	0	64.8981	-	-	-	-	-	-	0	0	0
17:45	0	81.539	37.014	31.29	0	0	0	0	0	49.628	0	0	149.843055	0	49.628	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						1	0	1
															Signal Warranted?						No		
															Notes								

Weekday Kahekili Hwy/Makaala Drive 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						Makaala Drive			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction:	0%		RT Reduction:	100%											
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	64.06971611	0	3.81754			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	150.1400546	0	30.5403			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	254.4339249	0	45.8104			0	0	0	0
6:00	0	21.64	16.825	25.605	0	0	0	0	0	3.8175	0	0	382.4408701	0	64.8981			0	0	0	0
6:15	0	24.604	26.919	34.547	0	0	0	0	0	26.723	0	0	474.497466	0	132.167			0	0	0	0
6:30	0	46.145	10.095	48.054	0	0	0	0	0	15.27	0	0	528.7137387	0	169.421			0	0	0	0
6:45	0	68.523	6.7299	52.754	0	0	0	0	0	19.088	0	0	537.2797528	0	225.237			0	0	0	0
7:00	0	54.869	20.608	80.649	0	0	0	0	0	71.086	0	0	514.3087982	0	248.801			0	0	0	0
7:15	0	72.617	20.608	47.062	0	0	0	0	0	63.977	0	0	455.8565256	0	192.985			0	0	0	0
7:30	0	43.767	16.486	52.606	0	0	0	0	0	71.086	0	0	415.0296836	0	201.541			0	0	0	0
7:45	0	35.72	16.486	52.829	0	0	0	0	0	42.652	0	0	419.6176214	0	160.995			0	0	0	0
8:00	0	49.882	23.554	24.237	0	0	0	0	0	15.27	0	0	387.6175779	0	145.066			0	0	0	0
8:15	0	42.345	26.919	30.195	0	0	0	0	0	72.533	0	0	353.9192087	0	133.614			0	0	0	0
8:30	0	54.664	37.014	25.77	0	0	0	0	0	30.54	0	0	*331.0068516*	0	80.1683			0	0	0	0
8:45	0	27.375	20.19	25.471	0	0	0	0	0	26.723	0	0	274.9235136	0	68.7157			0	0	0	0
9:00	0	29.786	10.095	24.095	0	0	0	0	0	3.8175	0	0	276.878965	0	61.0806			0	0	0	0
9:15	0	40.447	10.095	26.006	0	0	0	0	0	19.088	0	0	266.5907958	0	87.8034			0	0	0	0
9:30	0	27.301	13.46	20.604	0	0	0	0	0	19.088	0	0	280.0699414	0	83.9858			0	0	0	0
9:45	0	34.609	20.19	20.193	0	0	0	0	0	19.088	0	0	283.9037584	0	91.6209			0	0	0	0
10:00	0	14.67	20.19	18.828	0	0	0	0	0	30.54	0	0	300.1645505	0	103.074			0	0	0	0
10:15	0	39.17	33.649	17.207	0	0	0	0	0	15.27	0	0	348.8502999	0	91.6209			0	0	0	0
10:30	0	33.387	13.46	18.352	0	0	0	0	0	26.723	0	0	338.097132	0	91.6209			0	0	0	0
10:45	0	33.307	37.014	20.931	0	0	0	0	0	30.54	0	0	375.9585328	0	95.4384			0	0	0	0
11:00	0	51.381	30.284	20.708	0	0	0	0	0	19.088	0	0	375.198047	0	80.1683			0	0	0	0
11:15	0	35.572	26.919	16.782	0	0	0	0	0	15.27	0	0	350.3570496	0	83.9858			0	0	0	0
11:30	0	59.111	23.554	20.394	0	0	0	0	0	30.54	0	0	361.279964	0	99.256			0	0	0	0
11:45	0	34.79	30.284	25.417	0	0	0	0	0	15.27	0	0	331.8455665	0	106.891			0	0	0	0
12:00	0	27.562	26.919	23.051	0	0	0	0	0	22.905	0	0	346.178601	0	118.344			0	0	0	0
12:15	0	47.301	23.554	19.341	0	0	0	0	0	30.54	0	0	348.7852399	0	129.796			0	0	0	0
12:30	0	25.875	23.554	24.195	0	0	0	0	0	38.175	0	0	392.8341496	0	110.709			0	0	0	0
12:45	0	49.12	30.284	25.42	0	0	0	0	0	26.723	0	0	428.2733373	0	87.8034			0	0	0	0
13:00	0	26.14	26.919	27.08	0	0	0	0	0	34.358	0	0	452.0392685	0	91.6209			0	0	0	0
13:15	0	41.157	67.299	25.79	0	0	0	0	0	11.453	0	0	500.5299596	0	68.7157			0	0	0	0
13:30	0	60.631	23.554	24.879	0	0	0	0	0	15.27	0	0	489.7765689	0	91.6209			0	0	0	0
13:45	0	68.437	30.284	29.87	0	0	0	0	0	30.54	0	0	532.5587709	0	91.6209			0	0	0	0
14:00	0	80.139	20.19	28.301	0	0	0	0	0	11.453	0	0	562.77147	0	83.9858			0	0	0	0
14:15	0	69.613	23.554	30.325	0	0	0	0	0	34.358	0	0	578.8945422	0	114.526			0	0	0	0
14:30	0	64.728	60.569	26.55	0	0	0	0	0	15.27	0	0	576.4379665	0	106.891			0	0	0	0
14:45	0	67.53	63.934	27.34	0	0	0	0	0	22.905	0	0	582.2600741	0	118.344			0	0	0	0
15:00	0	85.102	37.014	22.636	0	0	0	0	0	41.993	0	0	583.7838794	0	114.526			0	0	0	0
15:15	0	61.068	30.284	29.683	0	0	0	0	0	26.723	0	0	607.0686569	0	106.891			0	0	0	0
15:30	0	58.846	70.663	28.159	0	0	0	0	0	26.723	0	0	702.7074321	0	110.709			0	0	0	0
15:45	0	72.408	57.204	30.715	0	0	0	0	0	19.088	0	0	697.1752574	0	122.161			0	0	0	0
16:00	0	92.643	43.744	31.65	0	0	0	0	0	34.358	0	0	710.681394	0	114.526			0	0	0	0
16:15	0	103.49	87.488	25.692	0	0	0	0	0	30.54	0	0	735.0367915	0	110.709			0	0	0	0
16:30	0	84.491	33.649	33.996	0	0	0	0	0	38.175	0	0	665.3847375	0	95.4384			0	0	0	0
16:45	0	88.736	57.204	27.893	0	0	0	0	0	11.453	0	0	665.5498549	0	72.5332			0	0	0	0
17:00	0	76.462	84.123	31.807	0	0	0	0	0	30.54	0	0	641.5595984	0	110.709			0	0	0	0
17:15	0	59.449	63.934	23.64	0	0	0	0	0	15.27	0	0	449.1667684	0	80.1683			0	0	0	0
17:30	0	65.267	57.204	29.831	0	0	0	0	0	15.27	0	0	302.1447994	0	64.8981			0	0	0	0
17:45	0	81.539	37.014	31.29	0	0	0	0	0	49.628	0	0	149.843055	0	49.628			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	0
Signal Warranted?	No


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
201
60'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Makaala Drive 8-Hour Signal Warrant

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	**70% ****	**56%**	100% *	80%	**70% ****	**56%**
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	**70% ****	**56%**	100% *	80%	**70% ****	**56%**
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

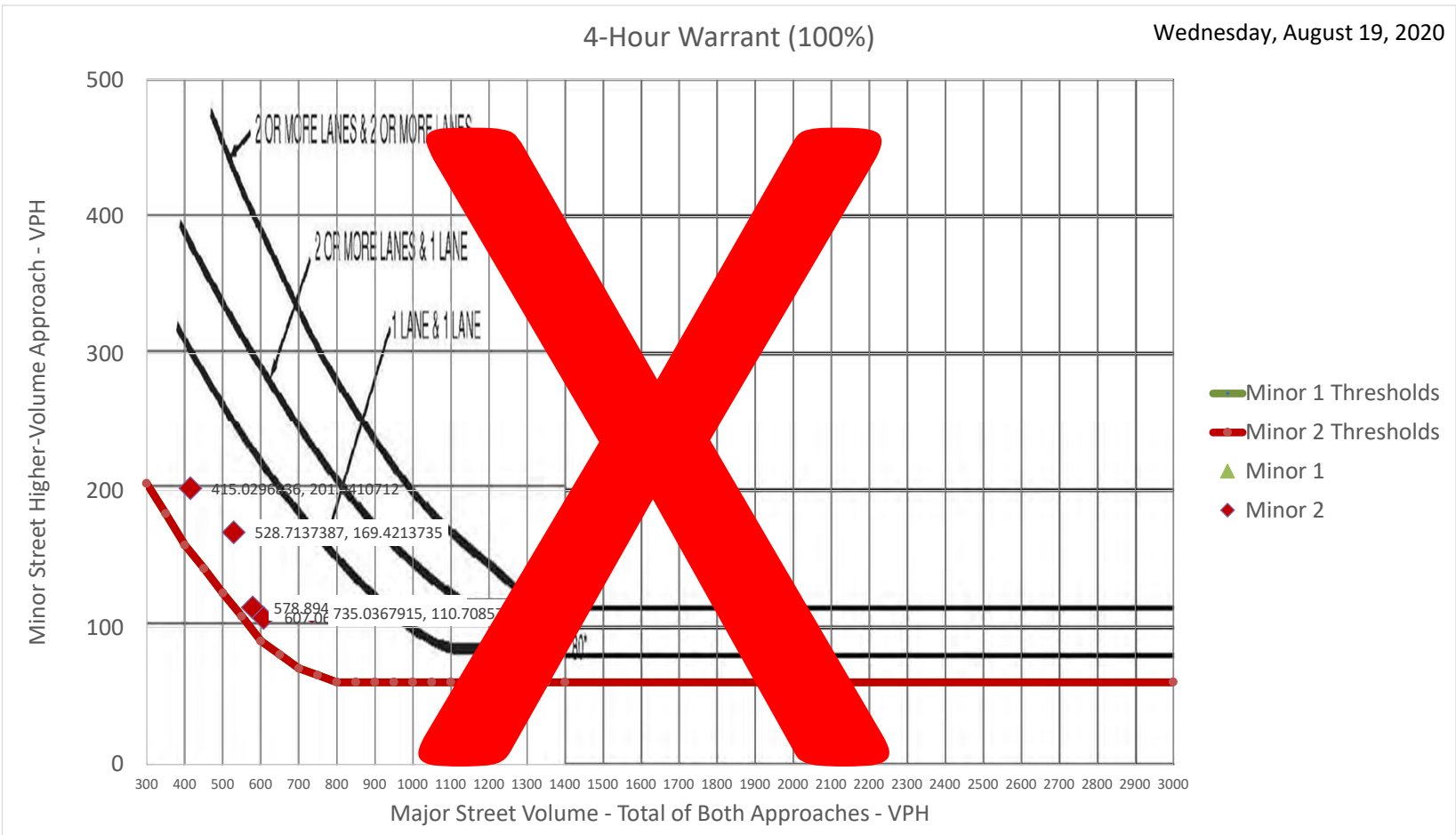
	Kahekili Hwy						Makaala Drive			0			**70 % Warrant**			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			350	525	420	350	525	420			
	1						1			1			Minor Threshold			105	53	84	105	53	84			
							RT Reduction: 0%			RT Reduction: 100%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	64.06971611	0	3.81754	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	150.1400546	0	30.5403	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	254.4339249	0	45.8104	-	-	-	-	-	-	0	0	0
6:00	0	21.64	16.825	25.605	0	0	0	0	0	3.8175	0	0	382.4408701	0	64.8981	-	-	-	-	-	-	0	0	0
6:15	0	24.604	26.919	34.547	0	0	0	0	0	26.723	0	0	474.497466	0	132.167	-	-	-	1	-	1	1	0	1
6:30	0	46.145	10.095	48.054	0	0	0	0	0	15.27	0	0	528.7137387	0	169.421	-	-	-	1	1	1	2	1	2
6:45	0	68.523	6.7299	52.754	0	0	0	0	0	19.088	0	0	537.2797528	0	225.237	-	-	-	1	1	1	3	2	3
7:00	0	54.869	20.608	80.649	0	0	0	0	0	71.086	0	0	514.3087982	0	248.801	-	-	-	1	-	1	4	3	4
7:15	0	72.617	20.608	47.062	0	0	0	0	0	63.977	0	0	455.8565256	0	192.985	-	-	-	1	-	1	1	4	1
7:30	0	43.767	16.486	52.606	0	0	0	0	0	71.086	0	0	415.0296836	0	201.541	-	-	-	1	-	-	2	0	2
7:45	0	35.72	16.486	52.829	0	0	0	0	0	42.652	0	0	419.6176214	0	160.995	-	-	-	1	-	-	3	0	3
8:00	0	49.882	23.554	24.237	0	0	0	0	0	15.27	0	0	387.6175779	0	145.066	-	-	-	1	-	-	4	0	4
8:15	0	42.345	26.919	30.195	0	0	0	0	0	72.533	0	0	353.9192087	0	133.614	-	-	-	1	-	-	1	0	0
8:30	0	54.664	37.014	25.77	0	0	0	0	0	30.54	0	0	*331.0068516*	0	80.1683	-	-	-	-	-	-	2	0	0
8:45	0	27.375	20.19	25.471	0	0	0	0	0	26.723	0	0	274.9235136	0	68.7157	-	-	-	-	-	-	3	0	0
9:00	0	29.786	10.095	24.095	0	0	0	0	0	3.8175	0	0	276.878965	0	61.0806	-	-	-	-	-	-	4	0	0
9:15	0	40.447	10.095	26.006	0	0	0	0	0	19.088	0	0	266.5907958	0	87.8034	-	-	-	-	-	-	0	0	0
9:30	0	27.301	13.46	20.604	0	0	0	0	0	19.088	0	0	280.0699414	0	83.9858	-	-	-	-	-	-	0	0	0
9:45	0	34.609	20.19	20.193	0	0	0	0	0	19.088	0	0	283.9037584	0	91.6209	-	-	-	-	-	-	0	0	0
10:00	0	14.67	20.19	18.828	0	0	0	0	0	30.54	0	0	300.1645505	0	103.074	-	-	-	-	-	-	0	0	0
10:15	0	39.17	33.649	17.207	0	0	0	0	0	15.27	0	0	348.8502999	0	91.6209	-	-	-	-	-	-	0	0	0
10:30	0	33.387	13.46	18.352	0	0	0	0	0	26.723	0	0	338.097132	0	91.6209	-	-	-	-	-	-	0	0	0
10:45	0	33.307	37.014	20.931	0	0	0	0	0	30.54	0	0	375.9585328	0	95.4384	-	-	-	-	-	-	0	0	0
11:00	0	51.381	30.284	20.708	0	0	0	0	0	19.088	0	0	375.198047	0	80.1683	-	-	-	-	-	-	0	0	0
11:15	0	35.572	26.919	16.782	0	0	0	0	0	15.27	0	0	350.3570496	0	83.9858	-	-	-	-	-	-	0	0	0
11:30	0	59.111	23.554	20.394	0	0	0	0	0	30.54	0	0	361.279964	0	99.256	-	-	-	-	-	-	0	0	0
11:45	0	34.79	30.284	25.417	0	0	0	0	0	15.27	0	0	331.8455665	0	106.891	-	-	-	-	-	-	0	0	0
12:00	0	27.562	26.919	23.051	0	0	0	0	0	22.905	0	0	346.178601	0	118.344	-	-	-	-	-	-	0	0	0
12:15	0	47.301	23.554	19.341	0	0	0	0	0	30.54	0	0	348.7852399	0	129.796	-	-	-	-	-	-	0	0	0
12:30	0	25.875	23.554	24.195	0	0	0	0	0	38.175	0	0	392.8341496	0	110.709	-	-	-	1	-	-	1	0	0
12:45	0	49.12	30.284	25.42	0	0	0	0	0	26.723	0	0	428.2733373	0	87.8034	-	-	-	-	-	1	2	0	1
13:00	0	26.14	26.919	27.08	0	0	0	0	0	34.358	0	0	452.0392685	0	91.6209	-	-	-	-	-	1	3	0	2
13:15	0	41.157	67.299	25.79	0	0	0	0	0	11.453	0	0	500.5299596	0	68.7157	-	-	-	-	-	-	4	0	3
13:30	0	60.631	23.554	24.879	0	0	0	0	0	15.27	0	0	489.7765689	0	91.6209	-	-	-	-	-	1	0	0	4
13:45	0	68.437	30.284	29.87	0	0	0	0	0	30.54	0	0	532.5587709	0	91.6209	-	-	-	-	1	1	0	1	1
14:00	0	80.139	20.19	28.301	0	0	0	0	0	11.453	0	0	562.77147	0	83.9858	-	-	-	-	1	-	0	2	2
14:15	0	69.613	23.554	30.325	0	0	0	0	0	34.358	0	0	578.8945422	0	114.526	-	-	-	1	1	1	1	3	3
14:30	0	64.728	60.569	26.55	0	0	0	0	0	15.27	0	0	576.4379665	0	106.891	-	-	-	1	1	1	2	4	4
14:45	0	67.53	63.934	27.34	0	0	0	0	0	22.905	0	0	582.2600741	0	118.344	-	-	-	1	1	1	3	1	1
15:00	0	85.102	37.014	22.636	0	0	0	0	0	41.993	0	0	583.7838794	0	114.526	-	-	-	1	1	1	4	2	2
15:15	0	61.068	30.284	29.683	0	0	0	0	0	26.723	0	0	607.0686569	0	106.891	-	-	-	1	1	1	1	3	3
15:30	0	58.846	70.663	28.159	0	0	0	0	0	26.723	0	0	702.7074321	0	110.709	-	-	-	1	1	1	2	4	4
15:45	0	72.408	57.204	30.715	0	0	0	0	0	19.088	0	0	697.1752574	0	122.161	-	-	-	1	1	1	3	1	1
16:00	0	92.643	43.744	31.65	0	0	0	0	0	34.358	0	0	710.681394	0	114.526	-	-	-	1	1	1	4	2	2
16:15	0	103.49	87.488	25.692	0	0	0	0	0	30.54	0	0	735.0367915	0	110.709	-	-	-	1	1	1	1	3	3
16:30	0	84.491	33.649	33.996	0	0	0	0	0	38.175	0	0	665.3847375	0	95.4384	-	-	-	-	1	1	2	4	4
16:45	0	88.736	57.204	27.893	0	0	0	0	0	11.453	0	0	665.5498549	0	72.5332	-	-	-	-	1	-	3	1	0
17:00	0	76.462	84.123	31.807	0	0	0	0	0	30.54	0	0	641.5595984	0	110.709	-	-	-	1	1	1	4	2	1
17:15	0	59.449	63.934	23.64	0	0	0	0	0	15.27	0	0	449.1667684	0	80.1683	-	-	-	-	-	-	0	3	2
17:30	0	65.267	57.204	29.831	0	0	0	0	0	15.27	0	0	302.1447994	0	64.8981	-	-	-	-	-	-	0	4	3
17:45	0	81.539	37.014	31.29	0	0	0	0	0	49.628	0	0	149.843055	0	49.628	-	-	-	-	-	-	0	0	4
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						7	5	7
															Signal Warranted?						No		
															Notes								

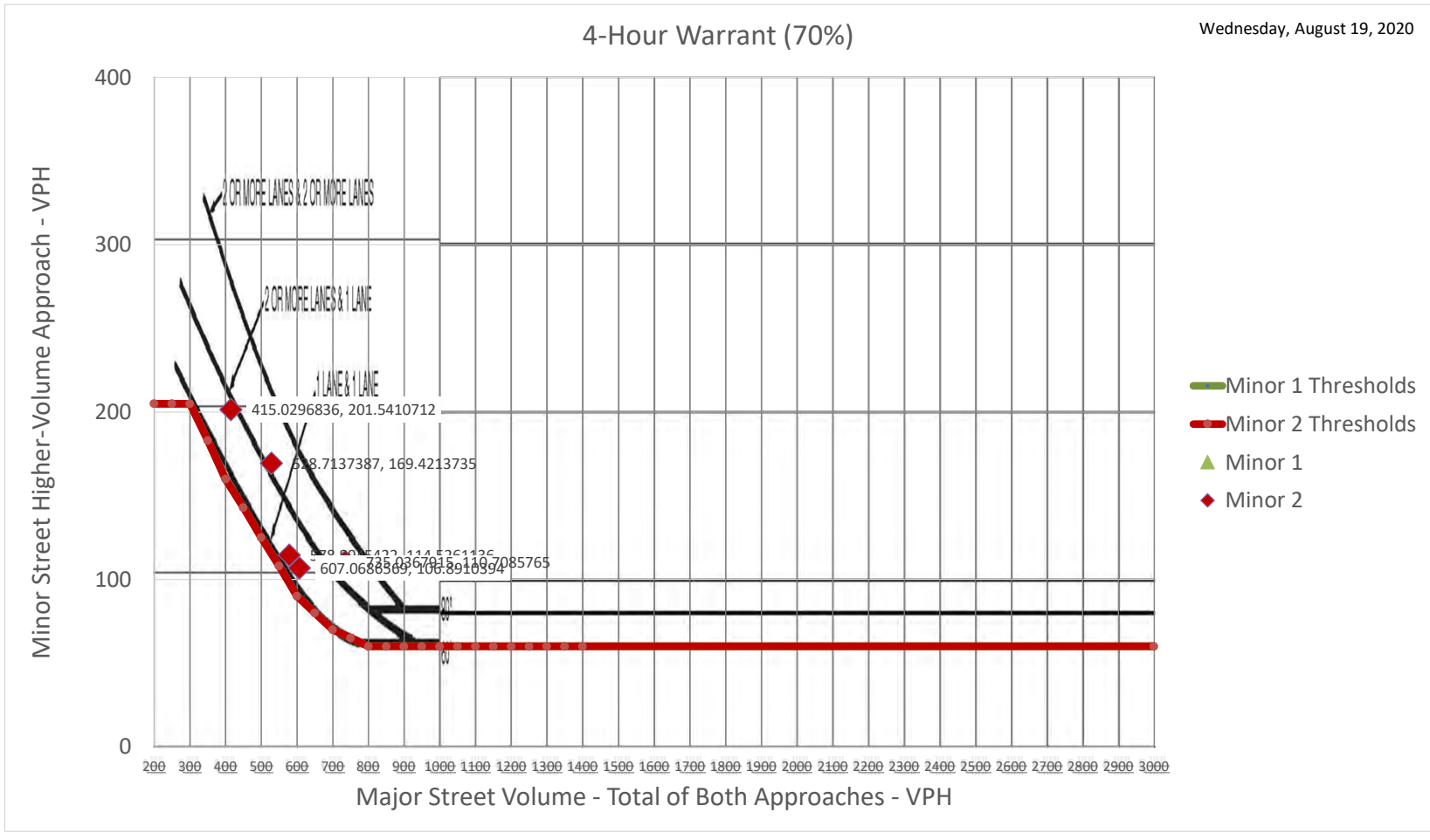
Weekday Kahekili Hwy/Makaala Drive 4-Hour Signal Warrant

Wednesday, August 19, 2020

	Kahekili Hwy						Makaala Drive			0			70 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction: 0%			RT Reduction: 100%												
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	64.06971611	0	3.81754			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	150.1400546	0	30.5403			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	254.4339249	0	45.8104			0	0	0	0
6:00	0	21.64	16.825	25.605	0	0	0	0	0	3.8175	0	0	382.4408701	0	64.8981			0	0	0	0
6:15	0	24.604	26.919	34.547	0	0	0	0	0	26.723	0	0	474.497466	0	132.167			0	0	0	0
6:30	0	46.145	10.095	48.054	0	0	0	0	0	15.27	0	0	528.7137387	0	169.421	1		0	1	1	1
6:45	0	68.523	6.7299	52.754	0	0	0	0	0	19.088	0	0	537.2797528	0	225.237	1		0	2	1	2
7:00	0	54.869	20.608	80.649	0	0	0	0	0	71.086	0	0	514.3087982	0	248.801	1		0	3	1	3
7:15	0	72.617	20.608	47.062	0	0	0	0	0	63.977	0	0	455.8565256	0	192.985	1		0	4	1	4
7:30	0	43.767	16.486	52.606	0	0	0	0	0	71.086	0	0	415.0296836	0	201.541	1		0	1	1	1
7:45	0	35.72	16.486	52.829	0	0	0	0	0	42.652	0	0	419.6176214	0	160.995	1		0	2	1	2
8:00	0	49.882	23.554	24.237	0	0	0	0	0	15.27	0	0	387.6175779	0	145.066			0	3	0	3
8:15	0	42.345	26.919	30.195	0	0	0	0	0	72.533	0	0	353.9192087	0	133.614			0	4	0	4
8:30	0	54.664	37.014	25.77	0	0	0	0	0	30.54	0	0	*331.0068516*	0	80.1683			0	0	0	0
8:45	0	27.375	20.19	25.471	0	0	0	0	0	26.723	0	0	274.9235136	0	68.7157			0	0	0	0
9:00	0	29.786	10.095	24.095	0	0	0	0	0	3.8175	0	0	276.878965	0	61.0806			0	0	0	0
9:15	0	40.447	10.095	26.006	0	0	0	0	0	19.088	0	0	266.5907958	0	87.8034			0	0	0	0
9:30	0	27.301	13.46	20.604	0	0	0	0	0	19.088	0	0	280.0699414	0	83.9858			0	0	0	0
9:45	0	34.609	20.19	20.193	0	0	0	0	0	19.088	0	0	283.9037584	0	91.6209			0	0	0	0
10:00	0	14.67	20.19	18.828	0	0	0	0	0	30.54	0	0	300.1645505	0	103.074			0	0	0	0
10:15	0	39.17	33.649	17.207	0	0	0	0	0	15.27	0	0	348.8502999	0	91.6209			0	0	0	0
10:30	0	33.387	13.46	18.352	0	0	0	0	0	26.723	0	0	338.097132	0	91.6209			0	0	0	0
10:45	0	33.307	37.014	20.931	0	0	0	0	0	30.54	0	0	375.9585328	0	95.4384			0	0	0	0
11:00	0	51.381	30.284	20.708	0	0	0	0	0	19.088	0	0	375.198047	0	80.1683			0	0	0	0
11:15	0	35.572	26.919	16.782	0	0	0	0	0	15.27	0	0	350.3570496	0	83.9858			0	0	0	0
11:30	0	59.111	23.554	20.394	0	0	0	0	0	30.54	0	0	361.279964	0	99.256			0	0	0	0
11:45	0	34.79	30.284	25.417	0	0	0	0	0	15.27	0	0	331.8455665	0	106.891			0	0	0	0
12:00	0	27.562	26.919	23.051	0	0	0	0	0	22.905	0	0	346.178601	0	118.344			0	0	0	0
12:15	0	47.301	23.554	19.341	0	0	0	0	0	30.54	0	0	348.7852399	0	129.796			0	0	0	0
12:30	0	25.875	23.554	24.195	0	0	0	0	0	38.175	0	0	392.8341496	0	110.709			0	0	0	0
12:45	0	49.12	30.284	25.42	0	0	0	0	0	26.723	0	0	428.2733373	0	87.8034			0	0	0	0
13:00	0	26.14	26.919	27.08	0	0	0	0	0	34.358	0	0	452.0392685	0	91.6209			0	0	0	0
13:15	0	41.157	67.299	25.79	0	0	0	0	0	11.453	0	0	500.5299596	0	68.7157			0	0	0	0
13:30	0	60.631	23.554	24.879	0	0	0	0	0	15.27	0	0	489.7765689	0	91.6209			0	0	0	0
13:45	0	68.437	30.284	29.87	0	0	0	0	0	30.54	0	0	532.5587709	0	91.6209			0	0	0	0
14:00	0	80.139	20.19	28.301	0	0	0	0	0	11.453	0	0	562.77147	0	83.9858			0	0	0	0
14:15	0	69.613	23.554	30.325	0	0	0	0	0	34.358	0	0	578.8945422	0	114.526	1		0	1	1	1
14:30	0	64.728	60.569	26.55	0	0	0	0	0	15.27	0	0	576.4379665	0	106.891	1		0	2	1	2
14:45	0	67.53	63.934	27.34	0	0	0	0	0	22.905	0	0	582.2600741	0	118.344	1		0	3	1	3
15:00	0	85.102	37.014	22.636	0	0	0	0	0	41.993	0	0	583.7838794	0	114.526	1		0	4	1	4
15:15	0	61.068	30.284	29.683	0	0	0	0	0	26.723	0	0	607.0686569	0	106.891	1		0	1	1	1
15:30	0	58.846	70.663	28.159	0	0	0	0	0	26.723	0	0	702.7074321	0	110.709	1		0	2	1	2
15:45	0	72.408	57.204	30.715	0	0	0	0	0	19.088	0	0	697.1752574	0	122.161	1		0	3	1	3
16:00	0	92.643	43.744	31.65	0	0	0	0	0	34.358	0	0	710.681394	0	114.526	1		0	4	1	4
16:15	0	103.49	87.488	25.692	0	0	0	0	0	30.54	0	0	735.0367915	0	110.709	1		0	1	1	1
16:30	0	84.491	33.649	33.996	0	0	0	0	0	38.175	0	0	665.3847375	0	95.4384	1		0	2	1	2
16:45	0	88.736	57.204	27.893	0	0	0	0	0	11.453	0	0	665.5498549	0	72.5332			0	3	0	3
17:00	0	76.462	84.123	31.807	0	0	0	0	0	30.54	0	0	641.5595984	0	110.709	1		0	4	1	4
17:15	0	59.449	63.934	23.64	0	0	0	0	0	15.27	0	0	449.1667684	0	80.1683			0	0	0	0
17:30	0	65.267	57.204	29.831	0	0	0	0	0	15.27	0	0	302.1447994	0	64.8981			0	0	0	0
17:45	0	81.539	37.014	31.29	0	0	0	0	0	49.628	0	0	149.843055	0	49.628			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	5
Signal Warranted?	Yes


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
415.0296836, 201.5410712
528.7137387, 169.4213735
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
415.0296836, 201.5410712
528.7137387, 169.4213735
607.0686569, 106.8910594
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

Kahekili Highway/North Project Driveway
Future Year Without Imi Kala Bridge

Weekday Kahekili Hwy/Waiehu MP DW 8-Hour Signal Warrant

Thursday, October 5, 2017

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						Waiehu MP DW			ehu Aff Housing			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 100%			RT Reduction: 0%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	99.63545718	14.6428	5.07116	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	193.8884943	33.7127	11.1464	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	338.1903527	59.0327	19.639	-	-	-	-	-	-	0	0	0
5:00	4.1098	37.49	0.3092	0.5985	52.402	4.7266	14.643	0	0	3.0712	0	2	584.5695873	87.2174	28.7813	-	-	-	-	-	-	0	0	0
5:15	4.6974	36.218	0.371	0.7182	46.99	5.2583	19.07	0	0	4.0752	0	2	809.200353	108.39	31.9424	-	1	-	-	-	-	0	1	0
5:30	6.1666	49.592	0.5256	1.0175	80.413	6.5876	25.32	0	0	5.4927	0	3	968.0159881	117.933	31.7253	-	1	-	-	-	-	0	2	0
5:45	13.219	88.075	1.2677	2.4539	128.4	12.968	28.185	0	0	6.1423	0	3	1006.154801	123.442	29.5135	-	1	1	-	-	-	0	3	1
6:00	10.887	105.23	0.5965	2.113	188.85	16.589	35.815	0	0	5.2322	0	3	960.0865536	125.81	26.5992	-	1	1	-	-	-	0	4	2
6:15	14.649	87.3	0.988	3.4996	126.28	20.351	28.613	0	0	3.8581	0	2	771.1129895	105.032	22.0838	-	1	-	-	-	-	0	1	3
6:30	13.574	46.586	0.8761	3.1034	99.025	19.276	30.829	0	0	4.2809	0	2	657.7280531	95.6231	21.8875	-	-	-	-	-	-	0	2	4
6:45	11.514	82.084	0.6618	2.3441	86.492	17.216	30.552	0	0	4.228	0	2	603.3600922	80.3521	20.4415	-	-	-	-	-	-	0	3	0
7:00	14.804	63.779	1.144	2.2145	36.571	16.779	15.037	0	0	2.7168	0	1	535.7838598	65.6185	19.1075	-	-	-	-	-	-	0	4	0
7:15	15.098	49.425	1.1749	2.2743	54.667	17.045	19.204	0	0	3.6618	0	2	535.18	67.5757	19.1075	-	-	-	-	-	-	0	0	0
7:30	10.103	41.504	0.6493	1.2569	62.033	12.526	15.558	0	0	2.8349	0	2	490.1582647	66.4079	18.3987	-	-	-	-	-	-	0	0	0
7:45	10.985	51.738	0.742	1.4364	54.511	13.323	15.819	0	0	2.894	0	2	476.8932835	65.24	16.69	-	-	-	-	-	-	0	0	0
8:00	14.168	51.914	0.8657	1.6758	48.133	17.932	16.995	0	0	2.7168	0	1	467.6609698	63.5513	14.8632	-	-	-	-	-	-	0	0	0
8:15	11.817	35.859	0.6184	1.197	29.366	15.805	18.036	0	0	2.953	0	2	450.8854333	62.6873	13.9182	-	-	-	-	-	-	0	0	0
8:30	13.58	42.186	0.8039	1.5561	39.281	17.4	14.39	0	0	2.1262	0	1	*483.3599063*	60.2608	11.6188	-	-	-	-	-	-	0	0	0
8:45	16.225	46.2	1.0821	2.0948	38.108	19.793	14.13	0	0	2.0671	0	1	493.1026272	62.2614	11.3235	-	-	-	-	-	-	0	0	0
9:00	13.993	41.542	0.6184	1.197	40.918	19.646	16.131	0	0	1.7718	0	1	514.1104552	66.6058	11.5598	-	-	-	-	-	-	0	0	0
9:15	16.05	39.596	0.8348	1.616	47.533	21.507	15.61	0	0	1.6537	0	1	559.2025326	71.3488	11.9141	-	-	-	-	-	-	0	0	0
9:30	18.4	40.378	1.0821	2.0948	38.962	23.633	16.391	0	0	1.8309	0	1	562.1533755	73.2271	11.6188	-	-	-	-	-	-	0	0	0
9:45	19.869	58.133	1.2367	2.394	37.914	24.963	18.474	0	0	2.3034	0	1	586.8432267	76.6679	11.6779	-	-	-	-	-	-	0	0	0
10:00	21.504	60.026	1.3295	2.5736	50.482	27.09	20.874	0	0	2.1262	0	1	581.7331099	81.1504	11.9732	-	-	-	-	-	-	0	0	0
10:15	15.921	55.216	0.742	1.4364	34.733	22.038	17.488	0	0	1.3584	0	1	587.8641139	81.2727	11.9732	-	-	-	-	-	-	0	0	0
10:30	22.679	46.162	1.4532	2.813	47.98	28.153	19.832	0	0	1.8899	0	1	613.3823694	83.218	12.3866	-	-	-	-	-	-	0	0	0
10:45	19.741	47.862	1.144	2.2145	42.944	25.495	22.957	0	0	2.5987	0	1	593.1898953	85.1633	12.8001	-	-	-	-	-	-	0	0	0
11:00	25.328	63.148	1.8551	3.591	45.673	29.541	20.996	0	0	2.1262	0	1	597.5219646	85.546	12.8591	-	-	-	-	-	-	0	0	0
11:15	22.096	50.188	1.515	2.9327	52.258	26.617	19.433	0	0	1.7718	0	1	596.7188606	88.3041	14.5679	-	-	-	-	-	-	0	0	0
11:30	19.451	28.311	1.2367	2.394	53.431	24.224	21.777	0	0	2.3034	0	1	626.6109864	91.583	15.3947	-	-	-	-	-	-	0	0	0
11:45	20.92	45.546	1.3913	2.6933	47.628	25.553	23.34	0	0	2.6577	0	1	683.090416	91.9973	15.5719	-	-	-	-	-	-	0	0	0
12:00	21.257	46.385	1.4532	2.813	70.783	25.642	23.754	0	0	2.8349	0	2	722.9809965	94.2345	17.1625	-	-	-	-	-	-	0	0	0
12:15	19.788	75.263	1.2986	2.5137	62.322	24.313	22.712	0	0	2.5987	0	1	777.1187812	92.1669	15.7491	-	1	-	-	-	-	0	1	0
12:30	23.314	61.92	1.6696	3.2319	67.889	27.503	22.191	0	0	2.4806	0	1	798.4502312	92.7035	15.9263	-	1	-	-	-	-	0	2	0
12:45	27.721	79.553	2.1334	4.1297	38.595	31.491	25.577	0	0	3.2483	0	2	784.8381402	92.7193	15.9853	-	1	-	-	-	-	0	3	0
13:00	29.15	81.684	2.3189	4.4888	72.335	32.495	21.686	0	0	2.4215	0	1	776.5894567	90.1309	14.4538	-	1	-	-	-	-	0	4	0
13:15	27.974	73.273	2.1952	4.2494	67.706	31.432	23.249	0	0	2.7759	0	1	765.9424695	88.7972	14.0403	-	1	-	-	-	-	0	1	0
13:30	25.036	59.409	1.886	3.6509	53.161	28.773	22.207	0	0	2.5396	0	1	766.4079991	90.5886	15.3356	-	1	-	-	-	-	0	2	0
13:45	24.448	65.889	1.8242	3.5312	51.44	28.241	22.988	0	0	2.7168	0	1	806.3899824	92.1196	15.5719	-	1	-	-	-	-	0	3	0
14:00	28.603	59.836	2.2261	4.3092	84.561	32.288	20.353	0	0	2.0081	0	1	842.8638865	94.4319	16.9853	-	1	-	-	-	-	0	4	0
14:15	28.015	77.347	2.1643	4.1895	63.822	31.757	25.04	0	0	3.0712	0	2	853.6430915	100.422	19.3437	-	1	-	-	-	-	0	1	0
14:30	32.423	71.77	2.6281	5.0873	64.244	35.744	23.738	0	0	2.7759	0	1	871.3265375	97.5569	17.694	-	1	-	-	-	-	0	2	0
14:45	29.778	91.855	2.3498	4.5486	49.965	33.352	25.301	0	0	3.1302	0	2	892.8318282	101.984	19.6981	-	1	-	-	-	-	0	3	0
15:00	31.499	77.166	2.5044	4.8479	71.463	35.124	26.342	0	0	3.3665	0	2	909.5300867	100.422	18.3437	-	1	-	-	-	-	0	4	0
15:15	34.437	78.698	2.8136	5.4464	65.801	37.783	22.176	0	0	2.4215	0	1	930.4609761	99.0602	18.2846	-	1	-	-	-	-	0	1	0
15:30	31.792	98.935	2.5353	4.9077	59.842	35.39	28.165	0	0	3.7799	0	2	899.4521134	96.9176	18.0484	-	1	-	-	-	-	0	2	0
15:45	33.555	80.26	2.7208	5.2668	69.758	36.985	23.738	0	0	2.7759	0	1	888.2715076	93.2125	17.4578	-	1	-	-	-	-	0	3	0
16:00	30.747	112.84	2.5662	4.9676	59.125	33.292	24.981	0	0	3.3074	0	2	873.6250117	95.7575	19.2846	-	1	-	-	-	-	0	4	0
16:15	26.34	79.393	2.1025	4.0698	52.76	29.305	20.033	0	0	2.1853	0	1	630.0908801	70.7764	13.9772	-	-	-	-	-	-	0	0	0
16:30	31.923	86.669	2.6899	5.207	61.377	34.356	24.46	0	0	3.1893	0	2	436.1216193	50.7434	10.792	-	-	-	-	-	-	0	0	0
16:45	31.335	81.368	2.6281	5.0873	59.657	33.824	26.283	0	0	3.6027	0	2	213.8997859	26.2831	5.60271	-	-	-	-	-	-	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	RE YEAR	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	ekili Hwy	0	0	ekili Hwy	0	0	f Housin	0	0	u MP D\	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:							0	6	1
															Signal Warranted?							No		
															Notes									

Weekday Kahekili Hwy/Waiehu MP DW 4-Hour Signal Warrant

Thursday, October 5, 2017

	Kahekili Hwy						Waiehu MP DW			ehu Aff Housing			100 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction: 100%			RT Reduction: 0%											
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	99.63545718	14.6428	5.07116			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	193.8884943	33.7127	11.1464			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	338.1903527	59.0327	19.639			0	0	0	0
5:00	4.1098	37.49	0.3092	0.5985	52.402	4.7266	14.643	0	0	3.0712	0	2	584.5695873	87.2174	28.7813			0	0	0	0
5:15	4.6974	36.218	0.371	0.7182	46.99	5.2583	19.07	0	0	4.0752	0	2	809.200353	108.39	31.9424			0	0	0	0
5:30	6.1666	49.592	0.5256	1.0175	80.413	6.5876	25.32	0	0	5.4927	0	3	968.0159881	117.933	31.7253	1		1	0	1	1
5:45	13.219	88.075	1.2677	2.4539	128.4	12.968	28.185	0	0	6.1423	0	3	1006.154801	123.442	29.5135	1		2	0	1	2
6:00	10.887	105.23	0.5965	2.113	188.85	16.589	35.815	0	0	5.2322	0	3	960.0865536	125.81	26.5992	1		3	0	1	3
6:15	14.649	87.3	0.988	3.4996	126.28	20.351	28.613	0	0	3.8581	0	2	771.1129895	105.032	22.0838			4	0	0	4
6:30	13.574	46.586	0.8761	3.1034	99.025	19.276	30.829	0	0	4.2809	0	2	657.7280531	95.6231	21.8875			0	0	0	0
6:45	11.514	82.084	0.6618	2.3441	86.492	17.216	30.552	0	0	4.228	0	2	603.3600922	80.3521	20.4415			0	0	0	0
7:00	14.804	63.779	1.144	2.2145	36.571	16.779	15.037	0	0	2.7168	0	1	535.7838598	65.6185	19.1075			0	0	0	0
7:15	15.098	49.425	1.1749	2.2743	54.667	17.045	19.204	0	0	3.6618	0	2	535.18	67.5757	19.1075			0	0	0	0
7:30	10.103	41.504	0.6493	1.2569	62.033	12.526	15.558	0	0	2.8349	0	2	490.1582647	66.4079	18.3987			0	0	0	0
7:45	10.985	51.738	0.742	1.4364	54.511	13.323	15.819	0	0	2.894	0	2	476.8932835	65.24	16.69			0	0	0	0
8:00	14.168	51.914	0.8657	1.6758	48.133	17.932	16.995	0	0	2.7168	0	1	467.6609698	63.5513	14.8632			0	0	0	0
8:15	11.817	35.859	0.6184	1.197	29.366	15.805	18.036	0	0	2.953	0	2	450.8854333	62.6873	13.9182			0	0	0	0
8:30	13.58	42.186	0.8039	1.5561	39.281	17.4	14.39	0	0	2.1262	0	1	*483.3599063*	60.2608	11.6188			0	0	0	0
8:45	16.225	46.2	1.0821	2.0948	38.108	19.793	14.13	0	0	2.0671	0	1	493.1026272	62.2614	11.3235			0	0	0	0
9:00	13.993	41.542	0.6184	1.197	40.918	19.646	16.131	0	0	1.7718	0	1	514.1104552	66.6058	11.5598			0	0	0	0
9:15	16.05	39.596	0.8348	1.616	47.533	21.507	15.61	0	0	1.6537	0	1	559.2025326	71.3488	11.9141			0	0	0	0
9:30	18.4	40.378	1.0821	2.0948	38.962	23.633	16.391	0	0	1.8309	0	1	562.1533755	73.2271	11.6188			0	0	0	0
9:45	19.869	58.133	1.2367	2.394	37.914	24.963	18.474	0	0	2.3034	0	1	586.8432267	76.6679	11.6779			0	0	0	0
10:00	21.504	60.026	1.3295	2.5736	50.482	27.09	20.874	0	0	2.1262	0	1	581.7331099	81.1504	11.9732			0	0	0	0
10:15	15.921	55.216	0.742	1.4364	34.733	22.038	17.488	0	0	1.3584	0	1	587.8641139	81.2727	11.9732			0	0	0	0
10:30	22.679	46.162	1.4532	2.813	47.98	28.153	19.832	0	0	1.8899	0	1	613.3823694	83.218	12.3866			0	0	0	0
10:45	19.741	47.862	1.144	2.2145	42.944	25.495	22.957	0	0	2.5987	0	1	593.1898953	85.1633	12.8001			0	0	0	0
11:00	25.328	63.148	1.8551	3.591	45.673	29.541	20.996	0	0	2.1262	0	1	597.5219646	85.546	12.8591			0	0	0	0
11:15	22.096	50.188	1.515	2.9327	52.258	26.617	19.433	0	0	1.7718	0	1	596.7188606	88.3041	14.5679			0	0	0	0
11:30	19.451	28.311	1.2367	2.394	53.431	24.224	21.777	0	0	2.3034	0	1	626.6109864	91.583	15.3947			0	0	0	0
11:45	20.92	45.546	1.3913	2.6933	47.628	25.553	23.34	0	0	2.6577	0	1	683.090416	91.9973	15.5719			0	0	0	0
12:00	21.257	46.385	1.4532	2.813	70.783	25.642	23.754	0	0	2.8349	0	2	722.9809965	94.2345	17.1625			0	0	0	0
12:15	19.788	75.263	1.2986	2.5137	62.322	24.313	22.712	0	0	2.5987	0	1	777.1187812	92.1669	15.7491			0	0	0	0
12:30	23.314	61.92	1.6696	3.2319	67.889	27.503	22.191	0	0	2.4806	0	1	798.4502312	92.7035	15.9263			0	0	0	0
12:45	27.721	79.553	2.1334	4.1297	38.595	31.491	25.577	0	0	3.2483	0	2	784.8381402	92.7193	15.9853			0	0	0	0
13:00	29.15	81.684	2.3189	4.4888	72.335	32.495	21.686	0	0	2.4215	0	1	776.5894567	90.1309	14.4538			0	0	0	0
13:15	27.974	73.273	2.1952	4.2494	67.706	31.432	23.249	0	0	2.7759	0	1	765.9424695	88.7972	14.0403			0	0	0	0
13:30	25.036	59.409	1.886	3.6509	53.161	28.773	22.207	0	0	2.5396	0	1	766.4079991	90.5886	15.3356			0	0	0	0
13:45	24.448	65.889	1.8242	3.5312	51.44	28.241	22.988	0	0	2.7168	0	1	806.3899824	92.1196	15.5719			0	0	0	0
14:00	28.603	59.836	2.2261	4.3092	84.561	32.288	20.353	0	0	2.0081	0	1	842.8638865	94.4319	16.9853			0	0	0	0
14:15	28.015	77.347	2.1643	4.1895	63.822	31.757	25.04	0	0	3.0712	0	2	853.6430915	100.422	19.3437			0	0	0	0
14:30	32.423	71.77	2.6281	5.0873	64.244	35.744	23.738	0	0	2.7759	0	1	871.3265375	97.5569	17.694			0	0	0	0
14:45	29.778	91.855	2.3498	4.5486	49.965	33.352	25.301	0	0	3.1302	0	2	892.8318282	101.984	19.6981			0	0	0	0
15:00	31.499	77.166	2.5044	4.8479	71.463	35.124	26.342	0	0	3.3665	0	2	909.5300867	100.422	18.3437			0	0	0	0
15:15	34.437	78.698	2.8136	5.4464	65.801	37.783	22.176	0	0	2.4215	0	1	930.4609761	99.0602	18.2846			0	0	0	0
15:30	31.792	98.935	2.5353	4.9077	59.842	35.39	28.165	0	0	3.7799	0	2	899.4521134	96.9176	18.0484			0	0	0	0
15:45	33.555	80.26	2.7208	5.2668	69.758	36.985	23.738	0	0	2.7759	0	1	888.2715076	93.2125	17.4578			0	0	0	0
16:00	30.747	112.84	2.5662	4.9676	59.125	33.292	24.981	0	0	3.3074	0	2	873.6250117	95.7575	19.2846			0	0	0	0
16:15	26.34	79.393	2.1025	4.0698	52.76	29.305	20.033	0	0	2.1853	0	1	630.0908801	70.7764	13.9772			0	0	0	0
16:30	31.923	86.669	2.6899	5.207	61.377	34.356	24.46	0	0	3.1893	0	2	436.1216193	50.7434	10.792			0	0	0	0
16:45	31.335	81.368	2.6281	5.0873	59.657	33.824	26.283	0	0	3.6027	0	2	213.8997859	26.2831	5.60271			0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	RE YEAR	0	0	0	0	0	0	0			0	0	0	0
19:45	0	ekili Hwy	0	0	ekili Hwy	0	0	f Housin	0	0	u MP D\	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	1
Signal Warranted?	No


4-Hour Warrant (100%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
968.0159881, 117.9331897
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Waiehu MP DW 8-Hour Signal Warrant

Thursday, October 5, 2017

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	**70% ****	**56%**	100% *	80%	**70% ****	**56%**
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	**70% ****	**56%**	100% *	80%	**70% ****	**56%**
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						Waiehu MP DW			ehu Aff Housing			**70 % Warrant**			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			350	525	420	350	525	420			
	1						1			1			Minor Threshold			105	53	84	105	53	84			
							RT Reduction: 100%			RT Reduction: 0%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	99.63545718	14.6428	5.07116	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	193.8884943	33.7127	11.1464	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	338.1903527	59.0327	19.639	-	-	-	-	-	-	0	0	0
5:00	4.1098	37.49	0.3092	0.5985	52.402	4.7266	14.643	0	0	3.0712	0	2	584.5695873	87.2174	28.7813	-	1	1	-	-	-	0	1	1
5:15	4.6974	36.218	0.371	0.7182	46.99	5.2583	19.07	0	0	4.0752	0	2	809.200353	108.39	31.9424	1	1	1	-	-	-	1	2	2
5:30	6.1666	49.592	0.5256	1.0175	80.413	6.5876	25.32	0	0	5.4927	0	3	968.0159881	117.933	31.7253	1	1	1	-	-	-	2	3	3
5:45	13.219	88.075	1.2677	2.4539	128.4	12.968	28.185	0	0	6.1423	0	3	1006.154801	123.442	29.5135	1	1	1	-	-	-	3	4	4
6:00	10.887	105.23	0.5965	2.113	188.85	16.589	35.815	0	0	5.2322	0	3	960.0865536	125.81	26.5992	1	1	1	-	-	-	4	1	1
6:15	14.649	87.3	0.988	3.4996	126.28	20.351	28.613	0	0	3.8581	0	2	771.1129895	105.032	22.0838	1	1	1	-	-	-	1	2	2
6:30	13.574	46.586	0.8761	3.1034	99.025	19.276	30.829	0	0	4.2809	0	2	657.7280531	95.6231	21.8875	-	1	1	-	-	-	2	3	3
6:45	11.514	82.084	0.6618	2.3441	86.492	17.216	30.552	0	0	4.228	0	2	603.3600922	80.3521	20.4415	-	1	-	-	-	-	3	4	4
7:00	14.804	63.779	1.144	2.2145	36.571	16.779	15.037	0	0	2.7168	0	1	535.7838598	65.6185	19.1075	-	1	-	-	-	-	4	1	0
7:15	15.098	49.425	1.1749	2.2743	54.667	17.045	19.204	0	0	3.6618	0	2	535.18	67.5757	19.1075	-	1	-	-	-	-	0	2	0
7:30	10.103	41.504	0.6493	1.2569	62.033	12.526	15.558	0	0	2.8349	0	2	490.1582647	66.4079	18.3987	-	-	-	-	-	-	0	3	0
7:45	10.985	51.738	0.742	1.4364	54.511	13.323	15.819	0	0	2.894	0	2	476.8932835	65.24	16.69	-	-	-	-	-	-	0	4	0
8:00	14.168	51.914	0.8657	1.6758	48.133	17.932	16.995	0	0	2.7168	0	1	467.6609698	63.5513	14.8632	-	-	-	-	-	-	0	0	0
8:15	11.817	35.859	0.6184	1.197	29.366	15.805	18.036	0	0	2.953	0	2	450.8854333	62.6873	13.9182	-	-	-	-	-	-	0	0	0
8:30	13.58	42.186	0.8039	1.5561	39.281	17.4	14.39	0	0	2.1262	0	1	*483.3599063*	60.2608	11.6188	-	-	-	-	-	-	0	0	0
8:45	16.225	46.2	1.0821	2.0948	38.108	19.793	14.13	0	0	2.0671	0	1	493.1026272	62.2614	11.3235	-	-	-	-	-	-	0	0	0
9:00	13.993	41.542	0.6184	1.197	40.918	19.646	16.131	0	0	1.7718	0	1	514.1104552	66.6058	11.5598	-	-	-	-	-	-	0	0	0
9:15	16.05	39.596	0.8348	1.616	47.533	21.507	15.61	0	0	1.6537	0	1	559.2025326	71.3488	11.9141	-	1	-	-	-	-	0	1	0
9:30	18.4	40.378	1.0821	2.0948	38.962	23.633	16.391	0	0	1.8309	0	1	562.1533755	73.2271	11.6188	-	1	-	-	-	-	0	2	0
9:45	19.869	58.133	1.2367	2.394	37.914	24.963	18.474	0	0	2.3034	0	1	586.8432267	76.6679	11.6779	-	1	-	-	-	-	0	3	0
10:00	21.504	60.026	1.3295	2.5736	50.482	27.09	20.874	0	0	2.1262	0	1	581.7331099	81.1504	11.9732	-	1	-	-	-	-	0	4	0
10:15	15.921	55.216	0.742	1.4364	34.733	22.038	17.488	0	0	1.3584	0	1	587.8641139	81.2727	11.9732	-	1	-	-	-	-	0	1	0
10:30	22.679	46.162	1.4532	2.813	47.98	28.153	19.832	0	0	1.8899	0	1	613.3823694	83.218	12.3866	-	1	-	-	-	-	0	2	0
10:45	19.741	47.862	1.144	2.2145	42.944	25.495	22.957	0	0	2.5987	0	1	593.1898953	85.1633	12.8001	-	1	1	-	-	-	0	3	1
11:00	25.328	63.148	1.8551	3.591	45.673	29.541	20.996	0	0	2.1262	0	1	597.5219646	85.546	12.8591	-	1	1	-	-	-	0	4	2
11:15	22.096	50.188	1.515	2.9327	52.258	26.617	19.433	0	0	1.7718	0	1	596.7188606	88.3041	14.5679	-	1	1	-	-	-	0	1	3
11:30	19.451	28.311	1.2367	2.394	53.431	24.224	21.777	0	0	2.3034	0	1	626.6109864	91.583	15.3947	-	1	1	-	-	-	0	2	4
11:45	20.92	45.546	1.3913	2.6933	47.628	25.553	23.34	0	0	2.6577	0	1	683.090416	91.9973	15.5719	-	1	1	-	-	-	0	3	1
12:00	21.257	46.385	1.4532	2.813	70.783	25.642	23.754	0	0	2.8349	0	2	722.9809965	94.2345	17.1625	-	1	1	-	-	-	0	4	2
12:15	19.788	75.263	1.2986	2.5137	62.322	24.313	22.712	0	0	2.5987	0	1	777.1187812	92.1669	15.7491	-	1	1	-	-	-	0	1	3
12:30	23.314	61.92	1.6696	3.2319	67.889	27.503	22.191	0	0	2.4806	0	1	798.4502312	92.7035	15.9263	-	1	1	-	-	-	0	2	4
12:45	27.721	79.553	2.1334	4.1297	38.595	31.491	25.577	0	0	3.2483	0	2	784.8381402	92.7193	15.9853	-	1	1	-	-	-	0	3	1
13:00	29.15	81.684	2.3189	4.4888	72.335	32.495	21.686	0	0	2.4215	0	1	776.5894567	90.1309	14.4538	-	1	1	-	-	-	0	4	2
13:15	27.974	73.273	2.1952	4.2494	67.706	31.432	23.249	0	0	2.7759	0	1	765.9424695	88.7972	14.0403	-	1	1	-	-	-	0	1	3
13:30	25.036	59.409	1.886	3.6509	53.161	28.773	22.207	0	0	2.5396	0	1	766.4079991	90.5886	15.3356	-	1	1	-	-	-	0	2	4
13:45	24.448	65.889	1.8242	3.5312	51.44	28.241	22.988	0	0	2.7168	0	1	806.3899824	92.1196	15.5719	-	1	1	-	-	-	0	3	1
14:00	28.603	59.836	2.2261	4.3092	84.561	32.288	20.353	0	0	2.0081	0	1	842.8638865	94.4319	16.9853	-	1	1	-	-	-	0	4	2
14:15	28.015	77.347	2.1643	4.1895	63.822	31.757	25.04	0	0	3.0712	0	2	853.6430915	100.422	19.3437	-	1	1	-	-	-	0	1	3
14:30	32.423	71.77	2.6281	5.0873	64.244	35.744	23.738	0	0	2.7759	0	1	871.3265375	97.5569	17.694	-	1	1	-	-	-	0	2	4
14:45	29.778	91.855	2.3498	4.5486	49.965	33.352	25.301	0	0	3.1302	0	2	892.8318282	101.984	19.6981	-	1	1	-	-	-	0	3	1
15:00	31.499	77.166	2.5044	4.8479	71.463	35.124	26.342	0	0	3.3665	0	2	909.5300867	100.422	18.3437	-	1	1	-	-	-	0	4	2
15:15	34.437	78.698	2.8136	5.4464	65.801	37.783	22.176	0	0	2.4215	0	1	930.4609761	99.0602	18.2846	-	1	1	-	-	-	0	1	3
15:30	31.792	98.935	2.5353	4.9077	59.842	35.39	28.165	0	0	3.7799	0	2	899.4521134	96.9176	18.0484	-	1	1	-	-	-	0	2	4
15:45	33.555	80.26	2.7208	5.2668	69.758	36.985	23.738	0	0	2.7759	0	1	888.2715076	93.2125	17.4578	-	1	1	-	-	-	0	3	1
16:00	30.747	112.84	2.5662	4.9676	59.125	33.292	24.981	0	0	3.3074	0	2	873.6250117	95.7575	19.2846	-	1	1	-	-	-	0	4	2
16:15	26.34	79.393	2.1025	4.0698	52.76	29.305	20.033	0	0	2.1853	0	1	630.0908801	70.7764	13.9772	-	1	-	-	-	-	0	1	3
16:30	31.923	86.669	2.6899	5.207	61.377	34.356	24.46	0	0	3.1893	0	2	436.1216193	50.7434	10.792	-	-	-	-	-	-	0	2	4
16:45	31.335	81.368	2.6281	5.0873	59.657	33.824	26.283	0	0	3.6027	0	2	213.8997859	26.2831	5.60271	-	-	-	-	-	-	0	3	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	4	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	RE YEAR	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	ekili Hwy	0	0	ekili Hwy	0	0	f Housin	0	0	u MP D\	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						2	11	8
															Signal Warranted?						Yes		
															Notes								

Weekday Kahekili Hwy/Waiehu MP DW 4-Hour Signal Warrant

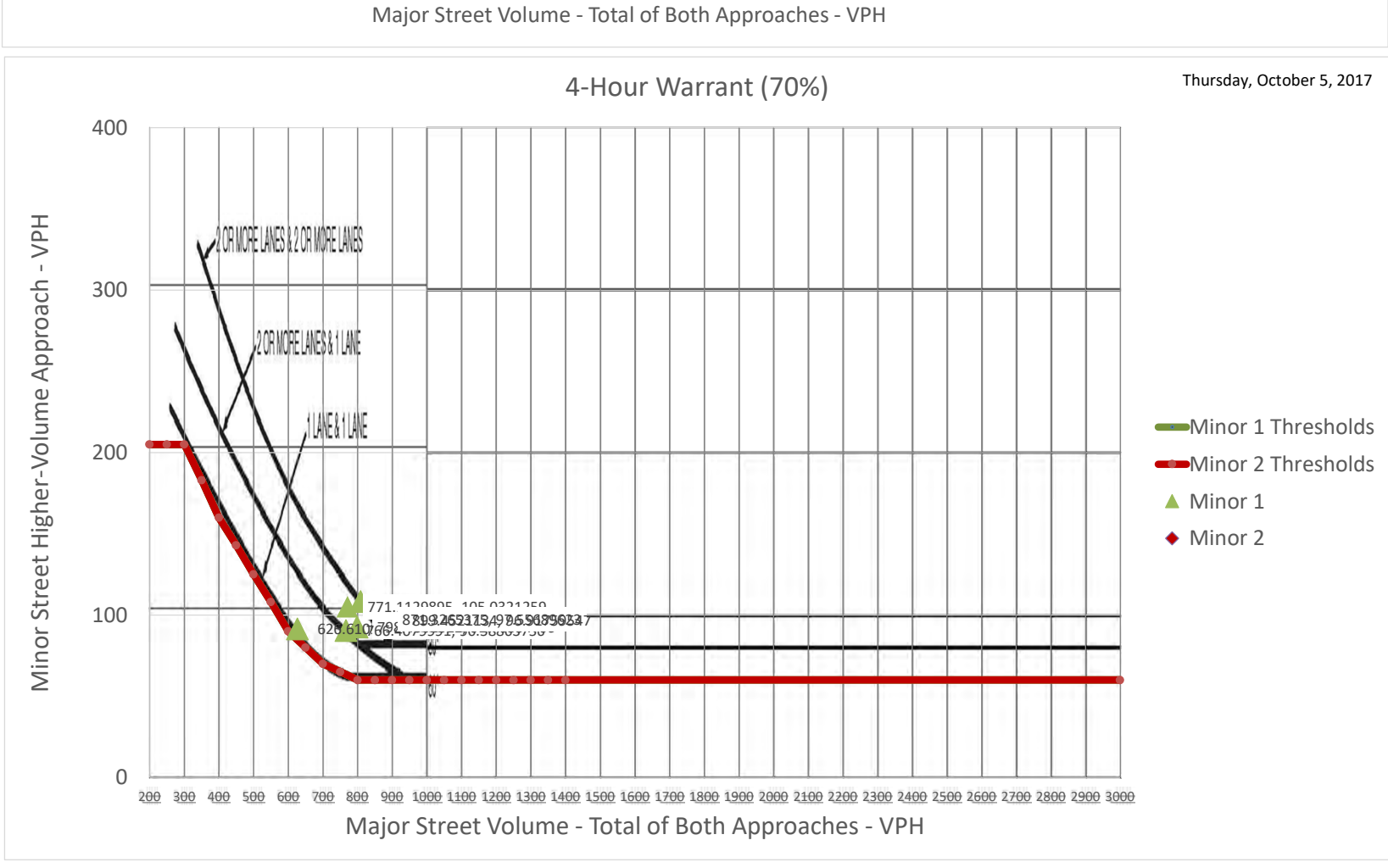
Thursday, October 5, 2017

	Kahekili Hwy						Waiehu MP DW			ehu Aff Housing			70 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction: 100%			RT Reduction: 0%											
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	99.63545718	14.6428	5.07116			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	193.8884943	33.7127	11.1464			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	338.1903527	59.0327	19.639			0	0	0	0
5:00	4.1098	37.49	0.3092	0.5985	52.402	4.7266	14.643	0	0	3.0712	0	2	584.5695873	87.2174	28.7813			0	0	0	0
5:15	4.6974	36.218	0.371	0.7182	46.99	5.2583	19.07	0	0	4.0752	0	2	809.200353	108.39	31.9424	1		1	0	1	1
5:30	6.1666	49.592	0.5256	1.0175	80.413	6.5876	25.32	0	0	5.4927	0	3	968.0159881	117.933	31.7253	1		2	0	1	2
5:45	13.219	88.075	1.2677	2.4539	128.4	12.968	28.185	0	0	6.1423	0	3	1006.154801	123.442	29.5135	1		3	0	1	3
6:00	10.887	105.23	0.5965	2.113	188.85	16.589	35.815	0	0	5.2322	0	3	960.0865536	125.81	26.5992	1		4	0	1	4
6:15	14.649	87.3	0.988	3.4996	126.28	20.351	28.613	0	0	3.8581	0	2	771.1129895	105.032	22.0838	1		1	0	1	1
6:30	13.574	46.586	0.8761	3.1034	99.025	19.276	30.829	0	0	4.2809	0	2	657.7280531	95.6231	21.8875	1		2	0	1	2
6:45	11.514	82.084	0.6618	2.3441	86.492	17.216	30.552	0	0	4.228	0	2	603.3600922	80.3521	20.4415			3	0	0	3
7:00	14.804	63.779	1.144	2.2145	36.571	16.779	15.037	0	0	2.7168	0	1	535.7838598	65.6185	19.1075			4	0	0	4
7:15	15.098	49.425	1.1749	2.2743	54.667	17.045	19.204	0	0	3.6618	0	2	535.18	67.5757	19.1075			0	0	0	0
7:30	10.103	41.504	0.6493	1.2569	62.033	12.526	15.558	0	0	2.8349	0	2	490.1582647	66.4079	18.3987			0	0	0	0
7:45	10.985	51.738	0.742	1.4364	54.511	13.323	15.819	0	0	2.894	0	2	476.8932835	65.24	16.69			0	0	0	0
8:00	14.168	51.914	0.8657	1.6758	48.133	17.932	16.995	0	0	2.7168	0	1	467.6609698	63.5513	14.8632			0	0	0	0
8:15	11.817	35.859	0.6184	1.197	29.366	15.805	18.036	0	0	2.953	0	2	450.8854333	62.6873	13.9182			0	0	0	0
8:30	13.58	42.186	0.8039	1.5561	39.281	17.4	14.39	0	0	2.1262	0	1	*483.3599063*	60.2608	11.6188			0	0	0	0
8:45	16.225	46.2	1.0821	2.0948	38.108	19.793	14.13	0	0	2.0671	0	1	493.1026272	62.2614	11.3235			0	0	0	0
9:00	13.993	41.542	0.6184	1.197	40.918	19.646	16.131	0	0	1.7718	0	1	514.1104552	66.6058	11.5598			0	0	0	0
9:15	16.05	39.596	0.8348	1.616	47.533	21.507	15.61	0	0	1.6537	0	1	559.2025326	71.3488	11.9141			0	0	0	0
9:30	18.4	40.378	1.0821	2.0948	38.962	23.633	16.391	0	0	1.8309	0	1	562.1533755	73.2271	11.6188			0	0	0	0
9:45	19.869	58.133	1.2367	2.394	37.914	24.963	18.474	0	0	2.3034	0	1	586.8432267	76.6679	11.6779			0	0	0	0
10:00	21.504	60.026	1.3295	2.5736	50.482	27.09	20.874	0	0	2.1262	0	1	581.7331099	81.1504	11.9732			0	0	0	0
10:15	15.921	55.216	0.742	1.4364	34.733	22.038	17.488	0	0	1.3584	0	1	587.8641139	81.2727	11.9732			0	0	0	0
10:30	22.679	46.162	1.4532	2.813	47.98	28.153	19.832	0	0	1.8899	0	1	613.3823694	83.218	12.3866			0	0	0	0
10:45	19.741	47.862	1.144	2.2145	42.944	25.495	22.957	0	0	2.5987	0	1	593.1898953	85.1633	12.8001			0	0	0	0
11:00	25.328	63.148	1.8551	3.591	45.673	29.541	20.996	0	0	2.1262	0	1	597.5219646	85.546	12.8591			0	0	0	0
11:15	22.096	50.188	1.515	2.9327	52.258	26.617	19.433	0	0	1.7718	0	1	596.7188606	88.3041	14.5679			0	0	0	0
11:30	19.451	28.311	1.2367	2.394	53.431	24.224	21.777	0	0	2.3034	0	1	626.6109864	91.583	15.3947	1		1	0	1	1
11:45	20.92	45.546	1.3913	2.6933	47.628	25.553	23.34	0	0	2.6577	0	1	683.090416	91.9973	15.5719	1		2	0	1	2
12:00	21.257	46.385	1.4532	2.813	70.783	25.642	23.754	0	0	2.8349	0	2	722.9809965	94.2345	17.1625	1		3	0	1	3
12:15	19.788	75.263	1.2986	2.5137	62.322	24.313	22.712	0	0	2.5987	0	1	777.1187812	92.1669	15.7491	1		4	0	1	4
12:30	23.314	61.92	1.6696	3.2319	67.889	27.503	22.191	0	0	2.4806	0	1	798.4502312	92.7035	15.9263	1		1	0	1	1
12:45	27.721	79.553	2.1334	4.1297	38.595	31.491	25.577	0	0	3.2483	0	2	784.8381402	92.7193	15.9853	1		2	0	1	2
13:00	29.15	81.684	2.3189	4.4888	72.335	32.495	21.686	0	0	2.4215	0	1	776.5894567	90.1309	14.4538	1		3	0	1	3
13:15	27.974	73.273	2.1952	4.2494	67.706	31.432	23.249	0	0	2.7759	0	1	765.9424695	88.7972	14.0403	1		4	0	1	4
13:30	25.036	59.409	1.886	3.6509	53.161	28.773	22.207	0	0	2.5396	0	1	766.4079991	90.5886	15.3356	1		1	0	1	1
13:45	24.448	65.889	1.8242	3.5312	51.44	28.241	22.988	0	0	2.7168	0	1	806.3899824	92.1196	15.5719	1		2	0	1	2
14:00	28.603	59.836	2.2261	4.3092	84.561	32.288	20.353	0	0	2.0081	0	1	842.8638865	94.4319	16.9853	1		3	0	1	3
14:15	28.015	77.347	2.1643	4.1895	63.822	31.757	25.04	0	0	3.0712	0	2	853.6430915	100.422	19.3437	1		4	0	1	4
14:30	32.423	71.77	2.6281	5.0873	64.244	35.744	23.738	0	0	2.7759	0	1	871.3265375	97.5569	17.694	1		1	0	1	1
14:45	29.778	91.855	2.3498	4.5486	49.965	33.352	25.301	0	0	3.1302	0	2	892.8318282	101.984	19.6981	1		2	0	1	2
15:00	31.499	77.166	2.5044	4.8479	71.463	35.124	26.342	0	0	3.3665	0	2	909.5300867	100.422	18.3437	1		3	0	1	3
15:15	34.437	78.698	2.8136	5.4464	65.801	37.783	22.176	0	0	2.4215	0	1	930.4609761	99.0602	18.2846	1		4	0	1	4
15:30	31.792	98.935	2.5353	4.9077	59.842	35.39	28.165	0	0	3.7799	0	2	899.4521134	96.9176	18.0484	1		1	0	1	1
15:45	33.555	80.26	2.7208	5.2668	69.758	36.985	23.738	0	0	2.7759	0	1	888.2715076	93.2125	17.4578	1		2	0	1	2
16:00	30.747	112.84	2.5662	4.9676	59.125	33.292	24.981	0	0	3.3074	0	2	873.6250117	95.7575	19.2846	1		3	0	1	3
16:15	26.34	79.393	2.1025	4.0698	52.76	29.305	20.033	0	0	2.1853	0	1	630.0908801	70.7764	13.9772			4	0	0	4
16:30	31.923	86.669	2.6899	5.207	61.377	34.356	24.46	0	0	3.1893	0	2	436.1216193	50.7434	10.792			0	0	0	0
16:45	31.335	81.368	2.6281	5.0873	59.657	33.824	26.283	0	0	3.6027	0	2	213.8997859	26.2831	5.60271			0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	RE YEAR	0	0	0	0	0	0	0			0	0	0	0
19:45	0	ekili Hwy	0	0	ekili Hwy	0	0	f Housin	0	0	u MP D\	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met: 7

Signal Warranted? Yes


4-Hour Warrant (100%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

Kahekili Highway/North Project Driveway
Future Year With Imi Kala Street Extension

Weekday Kahekili Hwy/Waiehu MP DW 8-Hour Signal Warrant

Thursday, October 5, 2017

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						Waiehu MP DW			ehu Aff Housing			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 100%			RT Reduction: 0%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	99.02040018	12.5674	5.07116	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	192.4636998	28.8835	11.1464	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	335.6700101	50.4919	19.639	-	-	-	-	-	-	0	0	0
5:00	4.1756	36.925	0.3092	0.5985	52.357	4.6551	12.567	0	0	3.0712	0	2	580.7133088	74.5258	28.7813	-	-	-	-	-	-	0	0	0
5:15	4.7764	35.469	0.371	0.7182	46.936	5.1725	16.316	0	0	4.0752	0	2	802.4086679	92.7443	31.9424	-	1	-	-	-	-	0	0	1
5:30	6.2785	48.582	0.5256	1.0175	80.337	6.466	21.608	0	0	5.4927	0	3	959.3385418	101.333	31.7253	-	1	-	-	-	-	0	0	2
5:45	13.489	86.946	1.2677	2.4539	128.21	12.675	24.034	0	0	6.1423	0	3	995.6131213	106.439	29.5135	-	1	-	-	-	-	0	0	3
6:00	11.029	101.77	0.5965	2.113	188.78	16.428	30.786	0	0	5.2322	0	3	947.9863434	108.893	26.5992	-	1	-	-	-	-	0	0	4
6:15	14.885	84.744	0.988	3.4996	126.17	20.084	24.905	0	0	3.8581	0	2	761.877283	91.3085	22.0838	-	1	-	-	-	-	0	0	1
6:30	13.783	43.75	0.8761	3.1034	98.928	19.04	26.714	0	0	4.2809	0	2	650.3231031	83.1336	21.8875	-	-	-	-	-	-	0	0	2
6:45	11.672	79.283	0.6618	2.3441	86.419	17.037	26.488	0	0	4.228	0	2	598.2878715	70.0619	20.4415	-	-	-	-	-	-	0	0	3
7:00	15.048	63.28	1.144	2.2145	36.405	16.515	13.202	0	0	2.7168	0	1	532.9530779	57.4369	19.1075	-	-	-	-	-	-	0	0	4
7:15	15.348	48.751	1.1749	2.2743	54.497	16.773	16.73	0	0	3.6618	0	2	532.3945703	59.3941	19.1075	-	-	-	-	-	-	0	0	0
7:30	10.241	40.983	0.6493	1.2569	61.94	12.376	13.643	0	0	2.8349	0	2	487.5938469	58.7051	18.3987	-	-	-	-	-	-	0	0	0
7:45	11.143	51.206	0.742	1.4364	54.403	13.152	13.863	0	0	2.894	0	2	474.4339775	58.0162	16.69	-	-	-	-	-	-	0	0	0
8:00	14.352	51.415	0.8657	1.6758	48.008	17.732	15.159	0	0	2.7168	0	1	465.2982587	56.8862	14.8632	-	-	-	-	-	-	0	0	0
8:15	11.949	35.316	0.6184	1.197	29.276	15.662	16.041	0	0	2.953	0	2	448.7367785	56.6608	13.9182	-	-	-	-	-	-	0	0	0
8:30	13.751	41.795	0.8039	1.5561	39.165	17.214	12.954	0	0	2.1262	0	1	*481.4148746*	55.1123	11.6188	-	-	-	-	-	-	0	0	0
8:45	16.455	45.82	1.0821	2.0948	37.951	19.543	12.733	0	0	2.0671	0	1	491.1665381	57.3125	11.3235	-	-	-	-	-	-	0	0	0
9:00	14.124	41.216	0.6184	1.197	40.828	19.503	14.933	0	0	1.7718	0	1	512.1057346	61.4973	11.5598	-	-	-	-	-	-	0	0	0
9:15	16.227	39.292	0.8348	1.616	47.412	21.314	14.492	0	0	1.6537	0	1	557.0167582	66.0007	11.9141	-	-	-	-	-	-	0	0	0
9:30	18.631	40.041	1.0821	2.0948	38.806	23.383	15.154	0	0	1.8309	0	1	560.0370133	68.0786	11.6188	-	-	-	-	-	-	0	0	0
9:45	20.133	57.71	1.2367	2.394	37.735	24.677	16.918	0	0	2.3034	0	1	584.6555358	71.4795	11.6779	-	-	-	-	-	-	0	0	0
10:00	21.787	59.635	1.3295	2.5736	50.29	26.782	19.437	0	0	2.1262	0	1	579.5062417	75.7625	11.9732	-	-	-	-	-	-	0	0	0
10:15	16.079	54.966	0.742	1.4364	34.626	21.867	16.57	0	0	1.3584	0	1	585.5515804	75.8848	11.9732	-	-	-	-	-	-	0	0	0
10:30	22.989	45.814	1.4532	2.813	47.77	27.817	18.555	0	0	1.8899	0	1	610.8678449	77.5507	12.3866	-	-	-	-	-	-	0	0	0
10:45	19.985	47.384	1.144	2.2145	42.779	25.23	21.201	0	0	2.5987	0	1	590.634632	79.2166	12.8001	-	-	-	-	-	-	0	0	0
11:00	25.723	62.757	1.8551	3.591	45.404	29.112	19.559	0	0	2.1262	0	1	594.9155293	79.5594	12.8591	-	-	-	-	-	-	0	0	0
11:15	22.418	49.862	1.515	2.9327	52.038	26.267	18.236	0	0	1.7718	0	1	594.0476266	81.8386	14.5679	-	-	-	-	-	-	0	0	0
11:30	19.714	27.888	1.2367	2.394	53.252	23.938	20.221	0	0	2.3034	0	1	623.8230009	84.5587	15.3947	-	-	-	-	-	-	0	0	0
11:45	21.217	45.057	1.3913	2.6933	47.427	25.232	21.544	0	0	2.6577	0	1	680.1993058	84.8533	15.5719	-	-	-	-	-	-	0	0	0
12:00	21.566	45.864	1.4532	2.813	70.573	25.306	21.838	0	0	2.8349	0	2	719.8603576	86.6914	17.1625	-	-	-	-	-	-	0	0	0
12:15	20.064	74.786	1.2986	2.5137	62.134	24.012	20.956	0	0	2.5987	0	1	773.9330592	84.9032	15.7491	-	1	-	-	-	-	0	0	1
12:30	23.669	61.464	1.6696	3.2319	67.648	27.117	20.515	0	0	2.4806	0	1	795.0857974	85.3201	15.9263	-	1	-	-	-	-	0	0	2
12:45	28.176	78.955	2.1334	4.1297	38.286	30.997	23.382	0	0	3.2483	0	2	781.4275735	85.296	15.9853	-	1	-	-	-	-	0	0	3
13:00	29.644	81.238	2.3189	4.4888	71.999	31.959	20.05	0	0	2.4215	0	1	773.327012	83.0667	14.4538	-	1	-	-	-	-	0	0	4
13:15	28.442	72.763	2.1952	4.2494	67.388	30.924	21.373	0	0	2.7759	0	1	762.7711548	82.0124	14.0403	-	1	-	-	-	-	0	0	1
13:30	25.438	58.942	1.886	3.6509	52.888	28.337	20.491	0	0	2.5396	0	1	763.1874288	83.6043	15.3356	-	1	-	-	-	-	0	0	2
13:45	24.837	65.389	1.8242	3.5312	51.176	27.82	21.153	0	0	2.7168	0	1	803.005037	84.9756	15.5719	-	1	-	-	-	-	0	0	3
14:00	29.077	59.467	2.2261	4.3092	84.239	31.774	18.996	0	0	2.0081	0	1	839.3172631	87.0085	16.9853	-	1	-	-	-	-	0	0	4
14:15	28.476	76.782	2.1643	4.1895	63.509	31.256	22.965	0	0	3.0712	0	2	849.80136	92.0802	19.3437	-	1	-	-	-	-	0	0	1
14:30	32.982	71.26	2.6281	5.0873	63.864	35.137	21.862	0	0	2.7759	0	1	867.4984326	89.6546	17.694	-	1	-	-	-	-	0	0	2
14:45	30.279	91.279	2.3498	4.5486	49.625	32.808	23.185	0	0	3.1302	0	2	888.8342386	93.4033	19.6981	-	1	-	-	-	-	0	0	3
15:00	32.032	76.547	2.5044	4.8479	71.1	34.545	24.067	0	0	3.3665	0	2	905.5371812	92.0802	18.3437	-	1	-	-	-	-	0	0	4
15:15	35.036	78.253	2.8136	5.4464	65.394	37.132	20.539	0	0	2.4215	0	1	926.4688512	90.7588	18.2846	-	1	-	-	-	-	0	0	1
15:30	32.332	98.24	2.5353	4.9077	59.475	34.804	25.611	0	0	3.7799	0	2	895.6193245	88.7758	18.0484	-	1	-	-	-	-	0	0	2
15:45	34.135	79.75	2.7208	5.2668	69.364	36.356	21.862	0	0	2.7759	0	1	884.5221125	85.4698	17.4578	-	1	-	-	-	-	0	0	3
16:00	31.294	112.23	2.5662	4.9676	58.754	32.699	22.746	0	0	3.3074	0	2	869.7387086	87.4561	19.2846	-	1	-	-	-	-	0	0	4
16:15	26.788	78.991	2.1025	4.0698	52.456	28.818	18.556	0	0	2.1853	0	1	627.2309267	64.71	13.9772	-	-	-	-	-	-	0	0	0
16:30	32.496	86.083	2.6899	5.207	60.988	33.734	22.305	0	0	3.1893	0	2	434.0061084	46.1536	10.792	-	-	-	-	-	-	0	0	0
16:45	31.895	80.706	2.6281	5.0873	59.277	33.216	23.849	0	0	3.6027	0	2	212.8090633	23.8486	5.60271	-	-	-	-	-	-	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	RE YEAR	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	ekili Hwy	0	0	ekili Hwy	0	0	f Housin	0	0	u MP D\	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						0	6	0
															Signal Warranted?						No		
															Notes								

Weekday Kahekili Hwy/Waiehu MP DW 4-Hour Signal Warrant

Thursday, October 5, 2017

	Kahekili Hwy						Waiehu MP DW			ehu Aff Housing			100 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction: 100%			RT Reduction: 0%											
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	99.02040018	12.5674	5.07116			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	192.4636998	28.8835	11.1464			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	335.6700101	50.4919	19.639			0	0	0	0
5:00	4.1756	36.925	0.3092	0.5985	52.357	4.6551	12.567	0	0	3.0712	0	2	580.7133088	74.5258	28.7813			0	0	0	0
5:15	4.7764	35.469	0.371	0.7182	46.936	5.1725	16.316	0	0	4.0752	0	2	802.4086679	92.7443	31.9424			0	0	0	0
5:30	6.2785	48.582	0.5256	1.0175	80.337	6.466	21.608	0	0	5.4927	0	3	959.3385418	101.333	31.7253			0	0	0	0
5:45	13.489	86.946	1.2677	2.4539	128.21	12.675	24.034	0	0	6.1423	0	3	995.6131213	106.439	29.5135	1		1	0	1	1
6:00	11.029	101.77	0.5965	2.113	188.78	16.428	30.786	0	0	5.2322	0	3	947.9863434	108.893	26.5992			2	0	0	2
6:15	14.885	84.744	0.988	3.4996	126.17	20.084	24.905	0	0	3.8581	0	2	761.877283	91.3085	22.0838			3	0	0	3
6:30	13.783	43.75	0.8761	3.1034	98.928	19.04	26.714	0	0	4.2809	0	2	650.3231031	83.1336	21.8875			4	0	0	4
6:45	11.672	79.283	0.6618	2.3441	86.419	17.037	26.488	0	0	4.228	0	2	598.2878715	70.0619	20.4415			0	0	0	0
7:00	15.048	63.28	1.144	2.2145	36.405	16.515	13.202	0	0	2.7168	0	1	532.9530779	57.4369	19.1075			0	0	0	0
7:15	15.348	48.751	1.1749	2.2743	54.497	16.773	16.73	0	0	3.6618	0	2	532.3945703	59.3941	19.1075			0	0	0	0
7:30	10.241	40.983	0.6493	1.2569	61.94	12.376	13.643	0	0	2.8349	0	2	487.5938469	58.7051	18.3987			0	0	0	0
7:45	11.143	51.206	0.742	1.4364	54.403	13.152	13.863	0	0	2.894	0	2	474.4339775	58.0162	16.69			0	0	0	0
8:00	14.352	51.415	0.8657	1.6758	48.008	17.732	15.159	0	0	2.7168	0	1	465.2982587	56.8862	14.8632			0	0	0	0
8:15	11.949	35.316	0.6184	1.197	29.276	15.662	16.041	0	0	2.953	0	2	448.7367785	56.6608	13.9182			0	0	0	0
8:30	13.751	41.795	0.8039	1.5561	39.165	17.214	12.954	0	0	2.1262	0	1	*481.4148746*	55.1123	11.6188			0	0	0	0
8:45	16.455	45.82	1.0821	2.0948	37.951	19.543	12.733	0	0	2.0671	0	1	491.1665381	57.3125	11.3235			0	0	0	0
9:00	14.124	41.216	0.6184	1.197	40.828	19.503	14.933	0	0	1.7718	0	1	512.1057346	61.4973	11.5598			0	0	0	0
9:15	16.227	39.292	0.8348	1.616	47.412	21.314	14.492	0	0	1.6537	0	1	557.0167582	66.0007	11.9141			0	0	0	0
9:30	18.631	40.041	1.0821	2.0948	38.806	23.383	15.154	0	0	1.8309	0	1	560.0370133	68.0786	11.6188			0	0	0	0
9:45	20.133	57.71	1.2367	2.394	37.735	24.677	16.918	0	0	2.3034	0	1	584.6555358	71.4795	11.6779			0	0	0	0
10:00	21.787	59.635	1.3295	2.5736	50.29	26.782	19.437	0	0	2.1262	0	1	579.5062417	75.7625	11.9732			0	0	0	0
10:15	16.079	54.966	0.742	1.4364	34.626	21.867	16.57	0	0	1.3584	0	1	585.5515804	75.8848	11.9732			0	0	0	0
10:30	22.989	45.814	1.4532	2.813	47.77	27.817	18.555	0	0	1.8899	0	1	610.8678449	77.5507	12.3866			0	0	0	0
10:45	19.985	47.384	1.144	2.2145	42.779	25.23	21.201	0	0	2.5987	0	1	590.634632	79.2166	12.8001			0	0	0	0
11:00	25.723	62.757	1.8551	3.591	45.404	29.112	19.559	0	0	2.1262	0	1	594.9155293	79.5594	12.8591			0	0	0	0
11:15	22.418	49.862	1.515	2.9327	52.038	26.267	18.236	0	0	1.7718	0	1	594.0476266	81.8386	14.5679			0	0	0	0
11:30	19.714	27.888	1.2367	2.394	53.252	23.938	20.221	0	0	2.3034	0	1	623.8230009	84.5587	15.3947			0	0	0	0
11:45	21.217	45.057	1.3913	2.6933	47.427	25.232	21.544	0	0	2.6577	0	1	680.1993058	84.8533	15.5719			0	0	0	0
12:00	21.566	45.864	1.4532	2.813	70.573	25.306	21.838	0	0	2.8349	0	2	719.8603576	86.6914	17.1625			0	0	0	0
12:15	20.064	74.786	1.2986	2.5137	62.134	24.012	20.956	0	0	2.5987	0	1	773.9330592	84.9032	15.7491			0	0	0	0
12:30	23.669	61.464	1.6696	3.2319	67.648	27.117	20.515	0	0	2.4806	0	1	795.0857974	85.3201	15.9263			0	0	0	0
12:45	28.176	78.955	2.1334	4.1297	38.286	30.997	23.382	0	0	3.2483	0	2	781.4275735	85.296	15.9853			0	0	0	0
13:00	29.644	81.238	2.3189	4.4888	71.999	31.959	20.05	0	0	2.4215	0	1	773.327012	83.0667	14.4538			0	0	0	0
13:15	28.442	72.763	2.1952	4.2494	67.388	30.924	21.373	0	0	2.7759	0	1	762.7711548	82.0124	14.0403			0	0	0	0
13:30	25.438	58.942	1.886	3.6509	52.888	28.337	20.491	0	0	2.5396	0	1	763.1874288	83.6043	15.3356			0	0	0	0
13:45	24.837	65.389	1.8242	3.5312	51.176	27.82	21.153	0	0	2.7168	0	1	803.005037	84.9756	15.5719			0	0	0	0
14:00	29.077	59.467	2.2261	4.3092	84.239	31.774	18.996	0	0	2.0081	0	1	839.3172631	87.0085	16.9853			0	0	0	0
14:15	28.476	76.782	2.1643	4.1895	63.509	31.256	22.965	0	0	3.0712	0	2	849.80136	92.0802	19.3437			0	0	0	0
14:30	32.982	71.26	2.6281	5.0873	63.864	35.137	21.862	0	0	2.7759	0	1	867.4984326	89.6546	17.694			0	0	0	0
14:45	30.279	91.279	2.3498	4.5486	49.625	32.808	23.185	0	0	3.1302	0	2	888.8342386	93.4033	19.6981			0	0	0	0
15:00	32.032	76.547	2.5044	4.8479	71.1	34.545	24.067	0	0	3.3665	0	2	905.5371812	92.0802	18.3437			0	0	0	0
15:15	35.036	78.253	2.8136	5.4464	65.394	37.132	20.539	0	0	2.4215	0	1	926.4688512	90.7588	18.2846			0	0	0	0
15:30	32.332	98.24	2.5353	4.9077	59.475	34.804	25.611	0	0	3.7799	0	2	895.6193245	88.7758	18.0484			0	0	0	0
15:45	34.135	79.75	2.7208	5.2668	69.364	36.356	21.862	0	0	2.7759	0	1	884.5221125	85.4698	17.4578			0	0	0	0
16:00	31.294	112.23	2.5662	4.9676	58.754	32.699	22.746	0	0	3.3074	0	2	869.7387086	87.4561	19.2846			0	0	0	0
16:15	26.788	78.991	2.1025	4.0698	52.456	28.818	18.556	0	0	2.1853	0	1	627.2309267	64.71	13.9772			0	0	0	0
16:30	32.496	86.083	2.6899	5.207	60.988	33.734	22.305	0	0	3.1893	0	2	434.0061084	46.1536	10.792			0	0	0	0
16:45	31.895	80.706	2.6281	5.0873	59.277	33.216	23.849	0	0	3.6027	0	2	212.8090633	23.8486	5.60271			0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	RE YEAR	0	0	0	0	0	0	0			0	0	0	0
19:45	0	ekili Hwy	0	0	ekili Hwy	0	0	f Housin	0	0	u MP D\	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	1
Signal Warranted?	No


4-Hour Warrant (100%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
115'
80'
995.6131213, 106.4387738
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Waiehu MP DW 8-Hour Signal Warrant

Thursday, October 5, 2017

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	**70% ****	**56%**	100% *	80%	**70% ****	**56%**
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	**70% ****	**56%**	100% *	80%	**70% ****	**56%**
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						Waiehu MP DW			ehu Aff Housing			**70 % Warrant**			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			350	525	420	350	525	420			
	1						1			1			Minor Threshold			105	53	84	105	53	84			
							RT Reduction: 100%			RT Reduction: 0%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	99.02040018	12.5674	5.07116	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	192.4636998	28.8835	11.1464	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	335.6700101	50.4919	19.639	-	-	-	-	-	-	0	0	0
5:00	4.1756	36.925	0.3092	0.5985	52.357	4.6551	12.567	0	0	3.0712	0	2	580.7133088	74.5258	28.7813	-	1	-	-	-	-	0	1	0
5:15	4.7764	35.469	0.371	0.7182	46.936	5.1725	16.316	0	0	4.0752	0	2	802.4086679	92.7443	31.9424	-	1	1	-	-	-	0	2	1
5:30	6.2785	48.582	0.5256	1.0175	80.337	6.466	21.608	0	0	5.4927	0	3	959.3385418	101.333	31.7253	-	1	1	-	-	-	0	3	2
5:45	13.489	86.946	1.2677	2.4539	128.21	12.675	24.034	0	0	6.1423	0	3	995.6131213	106.439	29.5135	1	1	1	-	-	-	1	4	3
6:00	11.029	101.77	0.5965	2.113	188.78	16.428	30.786	0	0	5.2322	0	3	947.9863434	108.893	26.5992	1	1	1	-	-	-	2	1	4
6:15	14.885	84.744	0.988	3.4996	126.17	20.084	24.905	0	0	3.8581	0	2	761.877283	91.3085	22.0838	-	1	1	-	-	-	3	2	1
6:30	13.783	43.75	0.8761	3.1034	98.928	19.04	26.714	0	0	4.2809	0	2	650.3231031	83.1336	21.8875	-	1	-	-	-	-	4	3	2
6:45	11.672	79.283	0.6618	2.3441	86.419	17.037	26.488	0	0	4.228	0	2	598.2878715	70.0619	20.4415	-	1	-	-	-	-	0	4	3
7:00	15.048	63.28	1.144	2.2145	36.405	16.515	13.202	0	0	2.7168	0	1	532.9530779	57.4369	19.1075	-	1	-	-	-	-	0	1	4
7:15	15.348	48.751	1.1749	2.2743	54.497	16.773	16.73	0	0	3.6618	0	2	532.3945703	59.3941	19.1075	-	1	-	-	-	-	0	2	0
7:30	10.241	40.983	0.6493	1.2569	61.94	12.376	13.643	0	0	2.8349	0	2	487.5938469	58.7051	18.3987	-	-	-	-	-	-	0	3	0
7:45	11.143	51.206	0.742	1.4364	54.403	13.152	13.863	0	0	2.894	0	2	474.4339775	58.0162	16.69	-	-	-	-	-	-	0	4	0
8:00	14.352	51.415	0.8657	1.6758	48.008	17.732	15.159	0	0	2.7168	0	1	465.2982587	56.8862	14.8632	-	-	-	-	-	-	0	0	0
8:15	11.949	35.316	0.6184	1.197	29.276	15.662	16.041	0	0	2.953	0	2	448.7367785	56.6608	13.9182	-	-	-	-	-	-	0	0	0
8:30	13.751	41.795	0.8039	1.5561	39.165	17.214	12.954	0	0	2.1262	0	1	*481.4148746*	55.1123	11.6188	-	-	-	-	-	-	0	0	0
8:45	16.455	45.82	1.0821	2.0948	37.951	19.543	12.733	0	0	2.0671	0	1	491.1665381	57.3125	11.3235	-	-	-	-	-	-	0	0	0
9:00	14.124	41.216	0.6184	1.197	40.828	19.503	14.933	0	0	1.7718	0	1	512.1057346	61.4973	11.5598	-	-	-	-	-	-	0	0	0
9:15	16.227	39.292	0.8348	1.616	47.412	21.314	14.492	0	0	1.6537	0	1	557.0167582	66.0007	11.9141	-	1	-	-	-	-	0	1	0
9:30	18.631	40.041	1.0821	2.0948	38.806	23.383	15.154	0	0	1.8309	0	1	560.0370133	68.0786	11.6188	-	1	-	-	-	-	0	2	0
9:45	20.133	57.71	1.2367	2.394	37.735	24.677	16.918	0	0	2.3034	0	1	584.6555358	71.4795	11.6779	-	1	-	-	-	-	0	3	0
10:00	21.787	59.635	1.3295	2.5736	50.29	26.782	19.437	0	0	2.1262	0	1	579.5062417	75.7625	11.9732	-	1	-	-	-	-	0	4	0
10:15	16.079	54.966	0.742	1.4364	34.626	21.867	16.57	0	0	1.3584	0	1	585.5515804	75.8848	11.9732	-	1	-	-	-	-	0	1	0
10:30	22.989	45.814	1.4532	2.813	47.77	27.817	18.555	0	0	1.8899	0	1	610.8678449	77.5507	12.3866	-	1	-	-	-	-	0	2	0
10:45	19.985	47.384	1.144	2.2145	42.779	25.23	21.201	0	0	2.5987	0	1	590.634632	79.2166	12.8001	-	1	-	-	-	-	0	3	0
11:00	25.723	62.757	1.8551	3.591	45.404	29.112	19.559	0	0	2.1262	0	1	594.9155293	79.5594	12.8591	-	1	-	-	-	-	0	4	0
11:15	22.418	49.862	1.515	2.9327	52.038	26.267	18.236	0	0	1.7718	0	1	594.0476266	81.8386	14.5679	-	1	-	-	-	-	0	1	0
11:30	19.714	27.888	1.2367	2.394	53.252	23.938	20.221	0	0	2.3034	0	1	623.8230009	84.5587	15.3947	-	1	1	-	-	-	0	2	1
11:45	21.217	45.057	1.3913	2.6933	47.427	25.232	21.544	0	0	2.6577	0	1	680.1993058	84.8533	15.5719	-	1	1	-	-	-	0	3	2
12:00	21.566	45.864	1.4532	2.813	70.573	25.306	21.838	0	0	2.8349	0	2	719.8603576	86.6914	17.1625	-	1	1	-	-	-	0	4	3
12:15	20.064	74.786	1.2986	2.5137	62.134	24.012	20.956	0	0	2.5987	0	1	773.9330592	84.9032	15.7491	-	1	1	-	-	-	0	1	4
12:30	23.669	61.464	1.6696	3.2319	67.648	27.117	20.515	0	0	2.4806	0	1	795.0857974	85.3201	15.9263	-	1	1	-	-	-	0	2	1
12:45	28.176	78.955	2.1334	4.1297	38.286	30.997	23.382	0	0	3.2483	0	2	781.4275735	85.296	15.9853	-	1	1	-	-	-	0	3	2
13:00	29.644	81.238	2.3189	4.4888	71.999	31.959	20.05	0	0	2.4215	0	1	773.327012	83.0667	14.4538	-	1	-	-	-	-	0	4	3
13:15	28.442	72.763	2.1952	4.2494	67.388	30.924	21.373	0	0	2.7759	0	1	762.7711548	82.0124	14.0403	-	1	-	-	-	-	0	1	4
13:30	25.438	58.942	1.886	3.6509	52.888	28.337	20.491	0	0	2.5396	0	1	763.1874288	83.6043	15.3356	-	1	-	-	-	-	0	2	0
13:45	24.837	65.389	1.8242	3.5312	51.176	27.82	21.153	0	0	2.7168	0	1	803.005037	84.9756	15.5719	-	1	1	-	-	-	0	3	1
14:00	29.077	59.467	2.2261	4.3092	84.239	31.774	18.996	0	0	2.0081	0	1	839.3172631	87.0085	16.9853	-	1	1	-	-	-	0	4	2
14:15	28.476	76.782	2.1643	4.1895	63.509	31.256	22.965	0	0	3.0712	0	2	849.80136	92.0802	19.3437	-	1	1	-	-	-	0	1	3
14:30	32.982	71.26	2.6281	5.0873	63.864	35.137	21.862	0	0	2.7759	0	1	867.4984326	89.6546	17.694	-	1	1	-	-	-	0	2	4
14:45	30.279	91.279	2.3498	4.5486	49.625	32.808	23.185	0	0	3.1302	0	2	888.8342386	93.4033	19.6981	-	1	1	-	-	-	0	3	1
15:00	32.032	76.547	2.5044	4.8479	71.1	34.545	24.067	0	0	3.3665	0	2	905.5371812	92.0802	18.3437	-	1	1	-	-	-	0	4	2
15:15	35.036	78.253	2.8136	5.4464	65.394	37.132	20.539	0	0	2.4215	0	1	926.4688512	90.7588	18.2846	-	1	1	-	-	-	0	1	3
15:30	32.332	98.24	2.5353	4.9077	59.475	34.804	25.611	0	0	3.7799	0	2	895.6193245	88.7758	18.0484	-	1	1	-	-	-	0	2	4
15:45	34.135	79.75	2.7208	5.2668	69.364	36.356	21.862	0	0	2.7759	0	1	884.5221125	85.4698	17.4578	-	1	1	-	-	-	0	3	1
16:00	31.294	112.23	2.5662	4.9676	58.754	32.699	22.746	0	0	3.3074	0	2	869.7387086	87.4561	19.2846	-	1	1	-	-	-	0	4	2
16:15	26.788	78.991	2.1025	4.0698	52.456	28.818	18.556	0	0	2.1853	0	1	627.2309267	64.71	13.9772	-	1	-	-	-	-	0	1	3
16:30	32.496	86.083	2.6899	5.207	60.988	33.734	22.305	0	0	3.1893	0	2	434.0061084	46.1536	10.792	-	-	-	-	-	-	0	2	4
16:45	31.895	80.706	2.6281	5.0873	59.277	33.216	23.849	0	0	3.6027	0	2	212.8090633	23.8486	5.60271	-	-	-	-	-	-	0	3	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	4	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	RE YEAR	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	ekili Hwy	0	0	ekili Hwy	0	0	f Housin	0	0	au MP D\	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
																						Hours where condition met:	1	11	7
																						Signal Warranted?	Yes		
																						Notes			

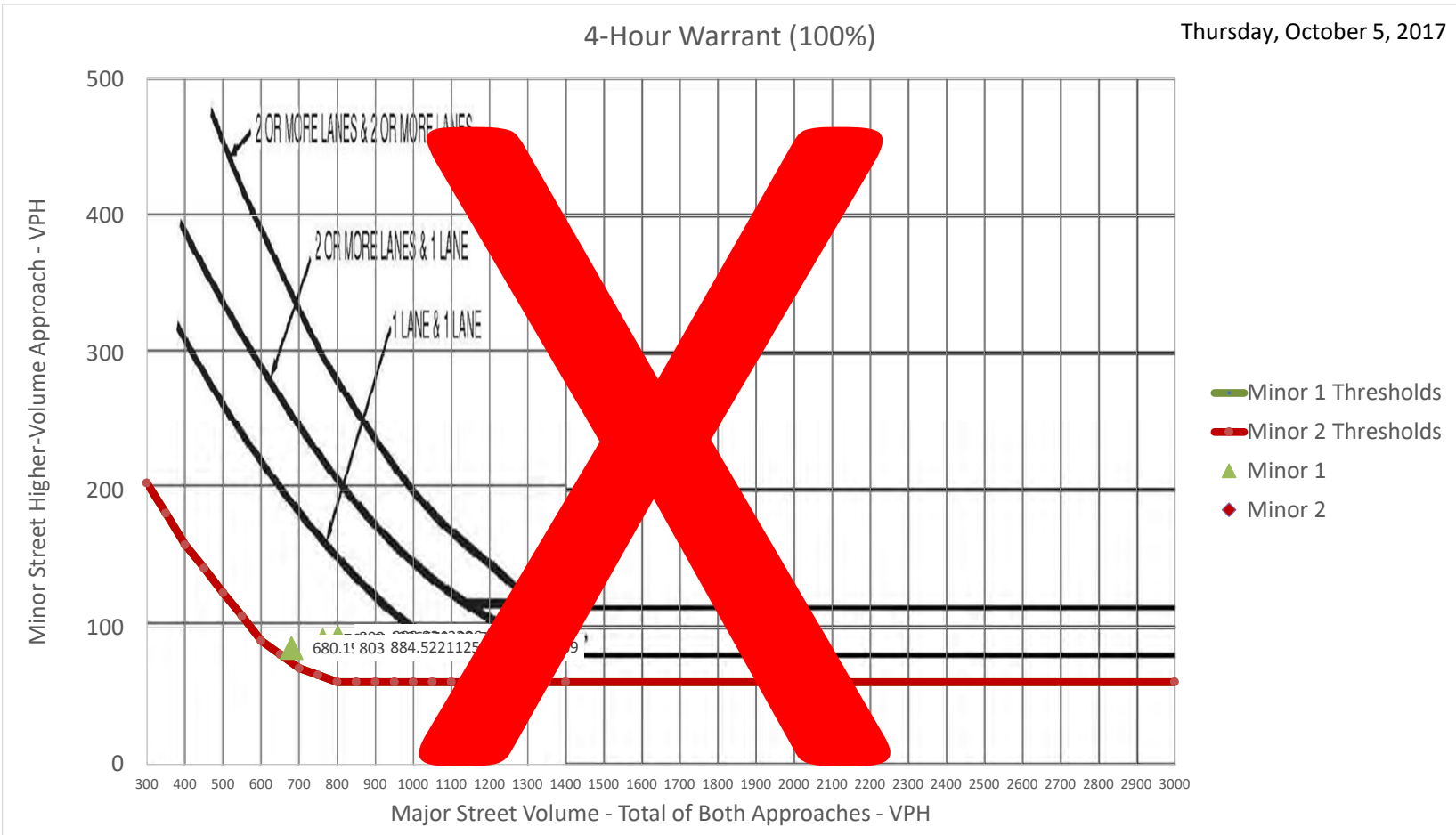
Weekday Kahekili Hwy/Waiehu MP DW 4-Hour Signal Warrant

Thursday, October 5, 2017

	Kahekili Hwy						Waiehu MP DW			ehu Aff Housing			70 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction: 100%			RT Reduction: 0%											
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	99.02040018	12.5674	5.07116			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	192.4636998	28.8835	11.1464			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	335.6700101	50.4919	19.639			0	0	0	0
5:00	4.1756	36.925	0.3092	0.5985	52.357	4.6551	12.567	0	0	3.0712	0	2	580.7133088	74.5258	28.7813			0	0	0	0
5:15	4.7764	35.469	0.371	0.7182	46.936	5.1725	16.316	0	0	4.0752	0	2	802.4086679	92.7443	31.9424	1		1	0	1	1
5:30	6.2785	48.582	0.5256	1.0175	80.337	6.466	21.608	0	0	5.4927	0	3	959.3385418	101.333	31.7253	1		2	0	1	2
5:45	13.489	86.946	1.2677	2.4539	128.21	12.675	24.034	0	0	6.1423	0	3	995.6131213	106.439	29.5135	1		3	0	1	3
6:00	11.029	101.77	0.5965	2.113	188.78	16.428	30.786	0	0	5.2322	0	3	947.9863434	108.893	26.5992	1		4	0	1	4
6:15	14.885	84.744	0.988	3.4996	126.17	20.084	24.905	0	0	3.8581	0	2	761.877283	91.3085	22.0838	1		1	0	1	1
6:30	13.783	43.75	0.8761	3.1034	98.928	19.04	26.714	0	0	4.2809	0	2	650.3231031	83.1336	21.8875	1		2	0	1	2
6:45	11.672	79.283	0.6618	2.3441	86.419	17.037	26.488	0	0	4.228	0	2	598.2878715	70.0619	20.4415			3	0	0	3
7:00	15.048	63.28	1.144	2.2145	36.405	16.515	13.202	0	0	2.7168	0	1	532.9530779	57.4369	19.1075			4	0	0	4
7:15	15.348	48.751	1.1749	2.2743	54.497	16.773	16.73	0	0	3.6618	0	2	532.3945703	59.3941	19.1075			0	0	0	0
7:30	10.241	40.983	0.6493	1.2569	61.94	12.376	13.643	0	0	2.8349	0	2	487.5938469	58.7051	18.3987			0	0	0	0
7:45	11.143	51.206	0.742	1.4364	54.403	13.152	13.863	0	0	2.894	0	2	474.4339775	58.0162	16.69			0	0	0	0
8:00	14.352	51.415	0.8657	1.6758	48.008	17.732	15.159	0	0	2.7168	0	1	465.2982587	56.8862	14.8632			0	0	0	0
8:15	11.949	35.316	0.6184	1.197	29.276	15.662	16.041	0	0	2.953	0	2	448.7367785	56.6608	13.9182			0	0	0	0
8:30	13.751	41.795	0.8039	1.5561	39.165	17.214	12.954	0	0	2.1262	0	1	*481.4148746*	55.1123	11.6188			0	0	0	0
8:45	16.455	45.82	1.0821	2.0948	37.951	19.543	12.733	0	0	2.0671	0	1	491.1665381	57.3125	11.3235			0	0	0	0
9:00	14.124	41.216	0.6184	1.197	40.828	19.503	14.933	0	0	1.7718	0	1	512.1057346	61.4973	11.5598			0	0	0	0
9:15	16.227	39.292	0.8348	1.616	47.412	21.314	14.492	0	0	1.6537	0	1	557.0167582	66.0007	11.9141			0	0	0	0
9:30	18.631	40.041	1.0821	2.0948	38.806	23.383	15.154	0	0	1.8309	0	1	560.0370133	68.0786	11.6188			0	0	0	0
9:45	20.133	57.71	1.2367	2.394	37.735	24.677	16.918	0	0	2.3034	0	1	584.6555358	71.4795	11.6779			0	0	0	0
10:00	21.787	59.635	1.3295	2.5736	50.29	26.782	19.437	0	0	2.1262	0	1	579.5062417	75.7625	11.9732			0	0	0	0
10:15	16.079	54.966	0.742	1.4364	34.626	21.867	16.57	0	0	1.3584	0	1	585.5515804	75.8848	11.9732			0	0	0	0
10:30	22.989	45.814	1.4532	2.813	47.77	27.817	18.555	0	0	1.8899	0	1	610.8678449	77.5507	12.3866			0	0	0	0
10:45	19.985	47.384	1.144	2.2145	42.779	25.23	21.201	0	0	2.5987	0	1	590.634632	79.2166	12.8001			0	0	0	0
11:00	25.723	62.757	1.8551	3.591	45.404	29.112	19.559	0	0	2.1262	0	1	594.9155293	79.5594	12.8591			0	0	0	0
11:15	22.418	49.862	1.515	2.9327	52.038	26.267	18.236	0	0	1.7718	0	1	594.0476266	81.8386	14.5679			0	0	0	0
11:30	19.714	27.888	1.2367	2.394	53.252	23.938	20.221	0	0	2.3034	0	1	623.8230009	84.5587	15.3947			0	0	0	0
11:45	21.217	45.057	1.3913	2.6933	47.427	25.232	21.544	0	0	2.6577	0	1	680.1993058	84.8533	15.5719	1		1	0	1	1
12:00	21.566	45.864	1.4532	2.813	70.573	25.306	21.838	0	0	2.8349	0	2	719.8603576	86.6914	17.1625	1		2	0	1	2
12:15	20.064	74.786	1.2986	2.5137	62.134	24.012	20.956	0	0	2.5987	0	1	773.9330592	84.9032	15.7491	1		3	0	1	3
12:30	23.669	61.464	1.6696	3.2319	67.648	27.117	20.515	0	0	2.4806	0	1	795.0857974	85.3201	15.9263	1		4	0	1	4
12:45	28.176	78.955	2.1334	4.1297	38.286	30.997	23.382	0	0	3.2483	0	2	781.4275735	85.296	15.9853	1		1	0	1	1
13:00	29.644	81.238	2.3189	4.4888	71.999	31.959	20.05	0	0	2.4215	0	1	773.327012	83.0667	14.4538	1		2	0	1	2
13:15	28.442	72.763	2.1952	4.2494	67.388	30.924	21.373	0	0	2.7759	0	1	762.7711548	82.0124	14.0403	1		3	0	1	3
13:30	25.438	58.942	1.886	3.6509	52.888	28.337	20.491	0	0	2.5396	0	1	763.1874288	83.6043	15.3356	1		4	0	1	4
13:45	24.837	65.389	1.8242	3.5312	51.176	27.82	21.153	0	0	2.7168	0	1	803.005037	84.9756	15.5719	1		1	0	1	1
14:00	29.077	59.467	2.2261	4.3092	84.239	31.774	18.996	0	0	2.0081	0	1	839.3172631	87.0085	16.9853	1		2	0	1	2
14:15	28.476	76.782	2.1643	4.1895	63.509	31.256	22.965	0	0	3.0712	0	2	849.80136	92.0802	19.3437	1		3	0	1	3
14:30	32.982	71.26	2.6281	5.0873	63.864	35.137	21.862	0	0	2.7759	0	1	867.4984326	89.6546	17.694	1		4	0	1	4
14:45	30.279	91.279	2.3498	4.5486	49.625	32.808	23.185	0	0	3.1302	0	2	888.8342386	93.4033	19.6981	1		1	0	1	1
15:00	32.032	76.547	2.5044	4.8479	71.1	34.545	24.067	0	0	3.3665	0	2	905.5371812	92.0802	18.3437	1		2	0	1	2
15:15	35.036	78.253	2.8136	5.4464	65.394	37.132	20.539	0	0	2.4215	0	1	926.4688512	90.7588	18.2846	1		3	0	1	3
15:30	32.332	98.24	2.5353	4.9077	59.475	34.804	25.611	0	0	3.7799	0	2	895.6193245	88.7758	18.0484	1		4	0	1	4
15:45	34.135	79.75	2.7208	5.2668	69.364	36.356	21.862	0	0	2.7759	0	1	884.5221125	85.4698	17.4578	1		1	0	1	1
16:00	31.294	112.23	2.5662	4.9676	58.754	32.699	22.746	0	0	3.3074	0	2	869.7387086	87.4561	19.2846	1		2	0	1	2
16:15	26.788	78.991	2.1025	4.0698	52.456	28.818	18.556	0	0	2.1853	0	1	627.2309267	64.71	13.9772			3	0	0	3
16:30	32.496	86.083	2.6899	5.207	60.988	33.734	22.305	0	0	3.1893	0	2	434.0061084	46.1536	10.792			4	0	0	4
16:45	31.895	80.706	2.6281	5.0873	59.277	33.216	23.849	0	0	3.6027	0	2	212.8090633	23.8486	5.60271			0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	RE YEAR	0	0	0	0	0	0	0			0	0	0	0
19:45	0	ekili Hwy	0	0	ekili Hwy	0	0	f Housin	0	0	u MP D\	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met: 7

Signal Warranted? Yes


4-Hour Warrant (100%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

Kahekili Highway/South Project Driveway
Future Year Without Imi Kala Street Extension

Weekday Kahekili Hwy/Waiehu MP DW 8-Hour Signal Warrant

Thursday, October 5, 2017

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	**70% ****	**56%**	100% *	80%	**70% ****	**56%**
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	**70% ****	**56%**	100% *	80%	**70% ****	**56%**
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

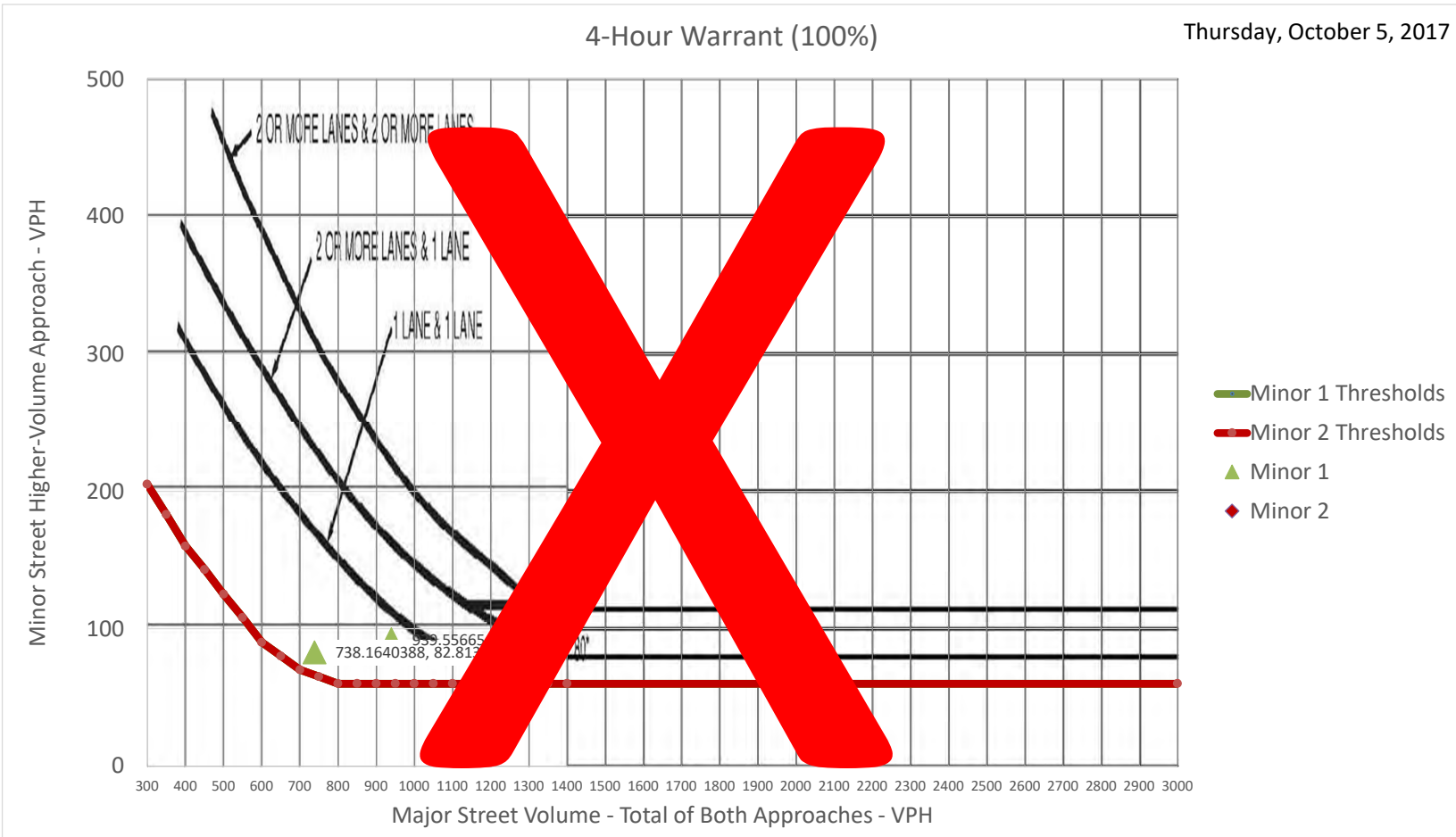
	Kahekili Hwy						Waiehu MP DW			ehu Aff Housing			**70 % Warrant**			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			350	525	420	350	525	420			
	1						1			1			Minor Threshold			105	53	84	105	53	84			
							RT Reduction: 100%			RT Reduction: 0%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	125.7060507	13.5419	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	253.2615695	31.5109	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	443.8343086	55.73	0	-	-	-	-	-	-	0	0	0
5:00	2.9384	51.35	0	0	68.759	2.6585	13.542	0	0	0	0	0	738.1640388	82.8137	0	-	1	-	-	-	-	0	1	0
5:15	3.5261	53.536	0	0	67.303	3.1903	17.969	0	0	0	0	0	937.7669863	96.6953	0	-	1	1	-	-	-	0	2	1
5:30	4.9953	72.561	0	0	108.5	4.5195	24.219	0	0	0	0	0	1054.133537	98.9476	0	-	1	1	-	-	-	0	3	2
5:45	12.047	115.27	0	0	156.11	10.9	27.084	0	0	0	0	0	1038.733481	97.1659	0	-	1	1	-	-	-	0	4	3
6:00	5.7328	90.899	0	0	222.94	5.7328	27.423	0	0	0	0	0	939.5566546	92.2425	0	-	1	1	-	-	-	0	1	4
6:15	9.4949	77.958	0	0	146.97	9.4949	20.221	0	0	0	0	0	759.197717	76.7984	0	-	1	-	-	-	-	0	2	0
6:30	8.42	36.288	0	0	122.04	8.42	22.437	0	0	0	0	0	672.6712041	72.7231	0	-	1	-	-	-	-	0	3	0
6:45	6.3598	71.524	0	0	110.91	6.3598	22.16	0	0	0	0	0	642.8256947	62.786	0	-	1	-	-	-	-	0	4	0
7:00	10.872	80.523	0	0	43.718	9.8366	11.979	0	0	0	0	0	597.0374952	53.3862	0	-	1	-	-	-	-	0	1	0
7:15	11.166	68.756	0	0	67.372	10.102	16.146	0	0	0	0	0	597.6171757	53.3862	0	-	1	-	-	-	-	0	2	0
7:30	6.1706	57.533	0	0	76.041	5.5829	12.5	0	0	0	0	0	548.606884	50.2611	0	-	-	-	-	-	-	0	3	0
7:45	7.0521	68.493	0	0	67.439	6.3805	12.761	0	0	0	0	0	523.6296435	47.1361	0	-	-	-	-	-	-	0	4	0
8:00	8.2275	70.088	0	0	59.771	7.4439	11.979	0	0	0	0	0	499.5647877	43.4902	0	-	-	-	-	-	-	0	0	0
8:15	5.8768	54.048	0	0	43.144	5.3171	13.021	0	0	0	0	0	474.7636462	39.3235	0	-	-	-	-	-	-	0	0	0
8:30	7.6398	57.795	0	0	48.003	6.9122	9.3751	0	0	0	0	0	*493.0699617*	33.5942	0	-	-	-	-	-	-	0	0	0
8:45	10.284	61.805	0	0	43.906	9.3049	9.1147	0	0	0	0	0	494.7664433	32.2921	0	-	-	-	-	-	-	0	0	0
9:00	5.8768	58.076	0	0	51.459	5.3171	7.8126	0	0	0	0	0	514.3876909	33.3338	0	-	-	-	-	-	-	0	0	0
9:15	7.9336	55.617	0	0	55.963	7.1781	7.2918	0	0	0	0	0	555.5458749	34.8963	0	-	-	-	-	-	-	0	0	0
9:30	10.284	57.06	0	0	45.398	9.3049	8.073	0	0	0	0	0	557.1886702	33.5942	0	-	-	-	-	-	-	0	0	0
9:45	11.754	77.373	0	0	45.161	10.634	10.156	0	0	0	0	0	578.9108981	33.8547	0	-	-	-	-	-	-	0	0	0
10:00	12.635	79.502	0	0	58.318	11.432	9.3751	0	0	0	0	0	577.3487613	35.1568	0	-	-	-	-	-	-	0	0	0
10:15	7.0521	71.754	0	0	43.147	6.3805	5.9897	0	0	0	0	0	578.850796	35.1568	0	-	-	-	-	-	-	0	0	0
10:30	13.81	64.106	0	0	53.357	12.495	8.3335	0	0	0	0	0	601.3197493	36.9797	0	-	-	-	-	-	-	0	0	0
10:45	10.872	68.379	0	0	54.271	9.8366	11.459	0	0	0	0	0	588.5962555	38.8026	0	-	-	-	-	-	-	0	0	0
11:00	17.63	81.597	0	0	48.21	15.951	9.3751	0	0	0	0	0	592.5403879	39.0631	0	-	-	-	-	-	-	0	0	0
11:15	14.398	66.737	0	0	56.642	13.027	7.8126	0	0	0	0	0	603.6621024	42.1881	0	-	-	-	-	-	-	0	0	0
11:30	11.754	45.616	0	0	63.042	10.634	10.156	0	0	0	0	0	645.3133932	45.834	0	-	-	-	-	-	-	0	0	0
11:45	13.223	64.967	0	0	57.15	11.963	11.719	0	0	0	0	0	700.9688598	46.6153	0	-	-	-	-	-	-	0	0	0
12:00	13.81	66.217	0	0	81.988	12.495	12.5	0	0	0	0	0	738.1681124	49.2195	0	-	-	-	-	-	-	0	0	0
12:15	12.341	95.73	0	0	73.217	11.166	11.459	0	0	0	0	0	780.6722853	47.3965	0	-	-	-	-	-	-	0	0	0
12:30	15.867	81.296	0	0	75.181	14.356	10.938	0	0	0	0	0	793.3172247	48.1778	0	-	-	-	-	-	-	0	0	0
12:45	20.275	102.52	0	0	43.367	18.344	14.323	0	0	0	0	0	776.8733443	48.4382	0	-	-	-	-	-	-	0	0	0
13:00	22.038	101.52	0	0	73.522	19.939	10.677	0	0	0	0	0	768.5323453	46.0944	0	-	-	-	-	-	-	0	0	0
13:15	20.863	93.922	0	0	71.439	18.876	12.24	0	0	0	0	0	754.9437117	44.2715	0	-	-	-	-	-	-	0	0	0
13:30	17.924	78.526	0	0	57.59	16.217	11.198	0	0	0	0	0	757.8719065	45.5736	0	-	-	-	-	-	-	0	0	0
13:45	17.336	85.956	0	0	57.183	15.685	11.979	0	0	0	0	0	791.8945525	46.6153	0	-	-	-	-	-	-	0	0	0
14:00	21.156	77.449	0	0	85.679	19.142	8.8543	0	0	0	0	0	826.3493466	48.4382	0	-	-	-	-	-	-	0	0	0
14:15	20.569	99.577	0	0	69.273	18.61	13.542	0	0	0	0	0	844.7259826	54.4279	0	-	1	-	-	-	-	0	1	0
14:30	24.976	92.682	0	0	64.024	22.598	12.24	0	0	0	0	0	848.8981913	51.5633	0	-	-	-	-	-	-	0	2	0
14:45	22.332	115.03	0	0	53.052	20.205	13.802	0	0	0	0	0	880.6208352	55.9904	0	-	1	-	-	-	-	0	3	0
15:00	23.801	100.68	0	0	75.791	21.534	14.844	0	0	0	0	0	890.2169584	54.4279	0	-	1	-	-	-	-	0	4	0
15:15	26.739	98.971	0	0	62.297	24.193	10.677	0	0	0	0	0	912.5386391	54.1675	0	-	1	-	-	-	-	0	1	0
15:30	24.095	125	0	0	65.107	21.8	16.667	0	0	0	0	0	888.9840645	53.1258	0	-	1	-	-	-	-	0	2	0
15:45	25.858	101.86	0	0	69.103	23.395	12.24	0	0	0	0	0	872.1323176	50.5216	0	-	-	-	-	-	-	0	3	0
16:00	24.389	136.59	0	0	61.077	22.066	14.584	0	0	0	0	0	866.576876	54.1675	0	-	1	-	-	-	-	0	4	0
16:15	19.981	97.518	0	0	53.069	18.078	9.6356	0	0	0	0	0	622.4524872	39.5839	0	-	-	-	-	-	-	0	0	0
16:30	25.564	108.69	0	0	61.771	23.129	14.063	0	0	0	0	0	433.8070994	29.9484	0	-	-	-	-	-	-	0	0	0
16:45	24.976	104.57	0	0	62.516	22.598	15.886	0	0	0	0	0	214.6568215	15.8856	0	-	-	-	-	-	-	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	RE YEAR	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	ekili Hwy	0	0	ekili Hwy	0	0	f Housin	0	0	u MP D\	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						0	5	1
															Signal Warranted?						No		
															Notes								

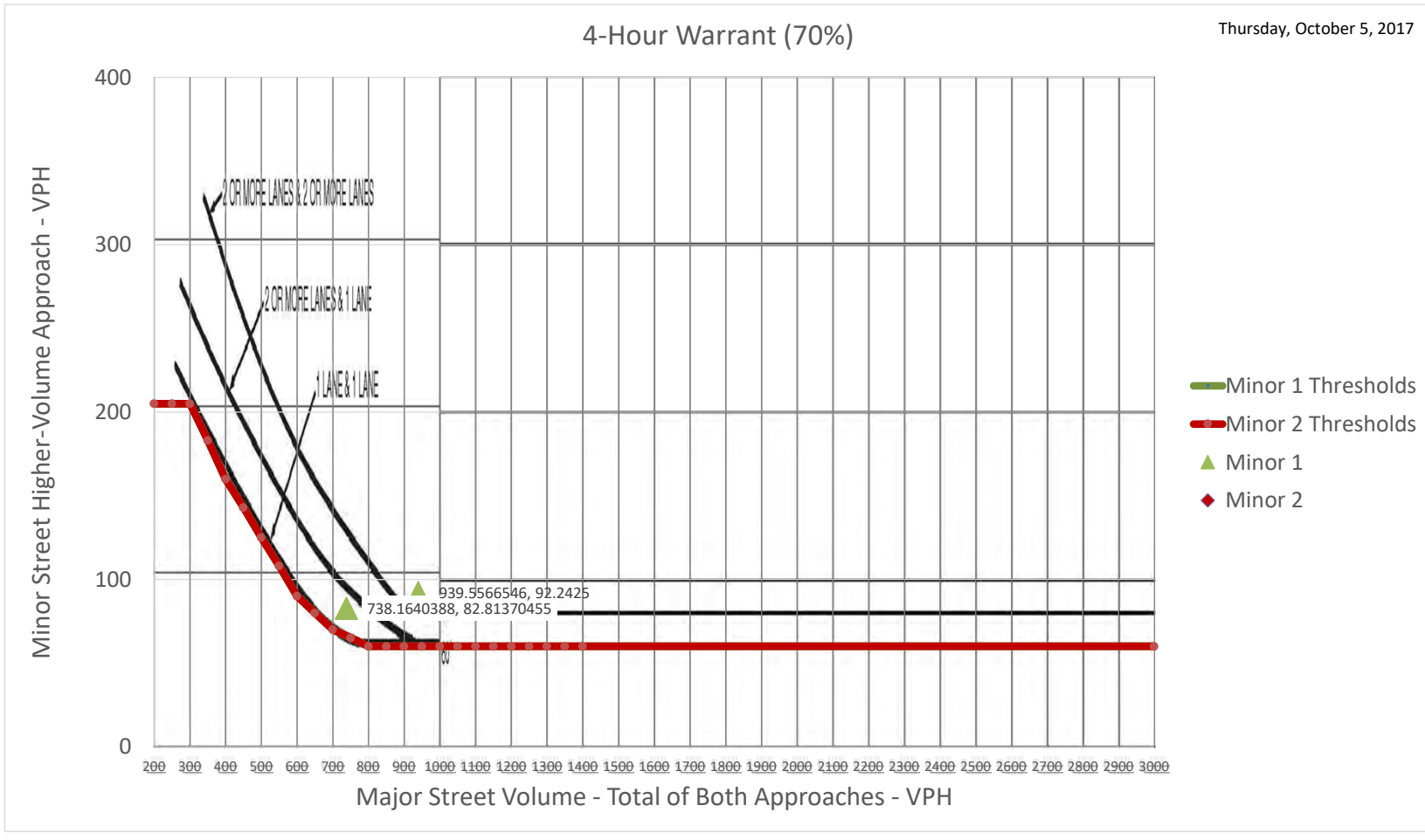
Weekday Kahekili Hwy/Waiehu MP DW 4-Hour Signal Warrant

Thursday, October 5, 2017

	Kahekili Hwy						Waiehu MP DW			ehu Aff Housing			70 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction: 100%			RT Reduction: 0%											
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	125.7060507	13.5419	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	253.2615695	31.5109	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	443.8343086	55.73	0			0	0	0	0
5:00	2.9384	51.35	0	0	68.759	2.6585	13.542	0	0	0	0	0	738.1640388	82.8137	0	1		1	0	1	1
5:15	3.5261	53.536	0	0	67.303	3.1903	17.969	0	0	0	0	0	937.7669863	96.6953	0	1		2	0	1	2
5:30	4.9953	72.561	0	0	108.5	4.5195	24.219	0	0	0	0	0	1054.133537	98.9476	0	1		3	0	1	3
5:45	12.047	115.27	0	0	156.11	10.9	27.084	0	0	0	0	0	1038.733481	97.1659	0	1		4	0	1	4
6:00	5.7328	90.899	0	0	222.94	5.7328	27.423	0	0	0	0	0	939.5566546	92.2425	0	1		1	0	1	1
6:15	9.4949	77.958	0	0	146.97	9.4949	20.221	0	0	0	0	0	759.197717	76.7984	0	1		2	0	1	2
6:30	8.42	36.288	0	0	122.04	8.42	22.437	0	0	0	0	0	672.6712041	72.7231	0			3	0	0	3
6:45	6.3598	71.524	0	0	110.91	6.3598	22.16	0	0	0	0	0	642.8256947	62.786	0			4	0	0	4
7:00	10.872	80.523	0	0	43.718	9.8366	11.979	0	0	0	0	0	597.0374952	53.3862	0			0	0	0	0
7:15	11.166	68.756	0	0	67.372	10.102	16.146	0	0	0	0	0	597.6171757	53.3862	0			0	0	0	0
7:30	6.1706	57.533	0	0	76.041	5.5829	12.5	0	0	0	0	0	548.606884	50.2611	0			0	0	0	0
7:45	7.0521	68.493	0	0	67.439	6.3805	12.761	0	0	0	0	0	523.6296435	47.1361	0			0	0	0	0
8:00	8.2275	70.088	0	0	59.771	7.4439	11.979	0	0	0	0	0	499.5647877	43.4902	0			0	0	0	0
8:15	5.8768	54.048	0	0	43.144	5.3171	13.021	0	0	0	0	0	474.7636462	39.3235	0			0	0	0	0
8:30	7.6398	57.795	0	0	48.003	6.9122	9.3751	0	0	0	0	0	*493.0699617*	33.5942	0			0	0	0	0
8:45	10.284	61.805	0	0	43.906	9.3049	9.1147	0	0	0	0	0	494.7664433	32.2921	0			0	0	0	0
9:00	5.8768	58.076	0	0	51.459	5.3171	7.8126	0	0	0	0	0	514.3876909	33.3338	0			0	0	0	0
9:15	7.9336	55.617	0	0	55.963	7.1781	7.2918	0	0	0	0	0	555.5458749	34.8963	0			0	0	0	0
9:30	10.284	57.06	0	0	45.398	9.3049	8.073	0	0	0	0	0	557.1886702	33.5942	0			0	0	0	0
9:45	11.754	77.373	0	0	45.161	10.634	10.156	0	0	0	0	0	578.9108981	33.8547	0			0	0	0	0
10:00	12.635	79.502	0	0	58.318	11.432	9.3751	0	0	0	0	0	577.3487613	35.1568	0			0	0	0	0
10:15	7.0521	71.754	0	0	43.147	6.3805	5.9897	0	0	0	0	0	578.850796	35.1568	0			0	0	0	0
10:30	13.81	64.106	0	0	53.357	12.495	8.3335	0	0	0	0	0	601.3197493	36.9797	0			0	0	0	0
10:45	10.872	68.379	0	0	54.271	9.8366	11.459	0	0	0	0	0	588.5962555	38.8026	0			0	0	0	0
11:00	17.63	81.597	0	0	48.21	15.951	9.3751	0	0	0	0	0	592.5403879	39.0631	0			0	0	0	0
11:15	14.398	66.737	0	0	56.642	13.027	7.8126	0	0	0	0	0	603.6621024	42.1881	0			0	0	0	0
11:30	11.754	45.616	0	0	63.042	10.634	10.156	0	0	0	0	0	645.3133932	45.834	0			0	0	0	0
11:45	13.223	64.967	0	0	57.15	11.963	11.719	0	0	0	0	0	700.9688598	46.6153	0			0	0	0	0
12:00	13.81	66.217	0	0	81.988	12.495	12.5	0	0	0	0	0	738.1681124	49.2195	0			0	0	0	0
12:15	12.341	95.73	0	0	73.217	11.166	11.459	0	0	0	0	0	780.6722853	47.3965	0			0	0	0	0
12:30	15.867	81.296	0	0	75.181	14.356	10.938	0	0	0	0	0	793.3172247	48.1778	0			0	0	0	0
12:45	20.275	102.52	0	0	43.367	18.344	14.323	0	0	0	0	0	776.8733443	48.4382	0			0	0	0	0
13:00	22.038	101.52	0	0	73.522	19.939	10.677	0	0	0	0	0	768.5323453	46.0944	0			0	0	0	0
13:15	20.863	93.922	0	0	71.439	18.876	12.24	0	0	0	0	0	754.9437117	44.2715	0			0	0	0	0
13:30	17.924	78.526	0	0	57.59	16.217	11.198	0	0	0	0	0	757.8719065	45.5736	0			0	0	0	0
13:45	17.336	85.956	0	0	57.183	15.685	11.979	0	0	0	0	0	791.8945525	46.6153	0			0	0	0	0
14:00	21.156	77.449	0	0	85.679	19.142	8.8543	0	0	0	0	0	826.3493466	48.4382	0			0	0	0	0
14:15	20.569	99.577	0	0	69.273	18.61	13.542	0	0	0	0	0	844.7259826	54.4279	0			0	0	0	0
14:30	24.976	92.682	0	0	64.024	22.598	12.24	0	0	0	0	0	848.8981913	51.5633	0			0	0	0	0
14:45	22.332	115.03	0	0	53.052	20.205	13.802	0	0	0	0	0	880.6208352	55.9904	0			0	0	0	0
15:00	23.801	100.68	0	0	75.791	21.534	14.844	0	0	0	0	0	890.2169584	54.4279	0			0	0	0	0
15:15	26.739	98.971	0	0	62.297	24.193	10.677	0	0	0	0	0	912.5386391	54.1675	0			0	0	0	0
15:30	24.095	125	0	0	65.107	21.8	16.667	0	0	0	0	0	888.9840645	53.1258	0			0	0	0	0
15:45	25.858	101.86	0	0	69.103	23.395	12.24	0	0	0	0	0	872.1323176	50.5216	0			0	0	0	0
16:00	24.389	136.59	0	0	61.077	22.066	14.584	0	0	0	0	0	866.576876	54.1675	0			0	0	0	0
16:15	19.981	97.518	0	0	53.069	18.078	9.6356	0	0	0	0	0	622.4524872	39.5839	0			0	0	0	0
16:30	25.564	108.69	0	0	61.771	23.129	14.063	0	0	0	0	0	433.8070994	29.9484	0			0	0	0	0
16:45	24.976	104.57	0	0	62.516	22.598	15.886	0	0	0	0	0	214.6568215	15.8856	0			0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	RE YEAR	0	0	0	0	0	0	0			0	0	0	0
19:45	0	ekili Hwy	0	0	ekili Hwy	0	0	f Housin	0	0	lu MP D\	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	2
Signal Warranted?	No


4-Hour Warrant (100%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
738.1640388, 82.81370455
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
939.5566546, 92.2425
738.1640388, 82.81370455
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Kahekili Hwy/Waiehu MP DW 8-Hour Signal Warrant

Thursday, October 5, 2017

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy						Waiehu MP DW			ehu Aff Housing			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 100%			RT Reduction: 0%														
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	125.7060507	13.5419	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	253.2615695	31.5109	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	443.8343086	55.73	0	-	-	-	-	-	-	0	0	0
5:00	2.9384	51.35	0	0	68.759	2.6585	13.542	0	0	0	0	0	738.1640388	82.8137	0	-	-	-	-	-	-	0	0	0
5:15	3.5261	53.536	0	0	67.303	3.1903	17.969	0	0	0	0	0	937.7669863	96.6953	0	-	1	-	-	-	-	0	1	0
5:30	4.9953	72.561	0	0	108.5	4.5195	24.219	0	0	0	0	0	1054.133537	98.9476	0	-	1	-	-	-	-	0	2	0
5:45	12.047	115.27	0	0	156.11	10.9	27.084	0	0	0	0	0	1038.733481	97.1659	0	-	1	-	-	-	-	0	3	0
6:00	5.7328	90.899	0	0	222.94	5.7328	27.423	0	0	0	0	0	939.5566546	92.2425	0	-	1	-	-	-	-	0	4	0
6:15	9.4949	77.958	0	0	146.97	9.4949	20.221	0	0	0	0	0	759.197717	76.7984	0	-	1	-	-	-	-	0	1	0
6:30	8.42	36.288	0	0	122.04	8.42	22.437	0	0	0	0	0	672.6712041	72.7231	0	-	-	-	-	-	-	0	2	0
6:45	6.3598	71.524	0	0	110.91	6.3598	22.16	0	0	0	0	0	642.8256947	62.786	0	-	-	-	-	-	-	0	3	0
7:00	10.872	80.523	0	0	43.718	9.8366	11.979	0	0	0	0	0	597.0374952	53.3862	0	-	-	-	-	-	-	0	4	0
7:15	11.166	68.756	0	0	67.372	10.102	16.146	0	0	0	0	0	597.6171757	53.3862	0	-	-	-	-	-	-	0	0	0
7:30	6.1706	57.533	0	0	76.041	5.5829	12.5	0	0	0	0	0	548.606884	50.2611	0	-	-	-	-	-	-	0	0	0
7:45	7.0521	68.493	0	0	67.439	6.3805	12.761	0	0	0	0	0	523.6296435	47.1361	0	-	-	-	-	-	-	0	0	0
8:00	8.2275	70.088	0	0	59.771	7.4439	11.979	0	0	0	0	0	499.5647877	43.4902	0	-	-	-	-	-	-	0	0	0
8:15	5.8768	54.048	0	0	43.144	5.3171	13.021	0	0	0	0	0	474.7636462	39.3235	0	-	-	-	-	-	-	0	0	0
8:30	7.6398	57.795	0	0	48.003	6.9122	9.3751	0	0	0	0	0	*493.0699617*	33.5942	0	-	-	-	-	-	-	0	0	0
8:45	10.284	61.805	0	0	43.906	9.3049	9.1147	0	0	0	0	0	494.7664433	32.2921	0	-	-	-	-	-	-	0	0	0
9:00	5.8768	58.076	0	0	51.459	5.3171	7.8126	0	0	0	0	0	514.3876909	33.3338	0	-	-	-	-	-	-	0	0	0
9:15	7.9336	55.617	0	0	55.963	7.1781	7.2918	0	0	0	0	0	555.5458749	34.8963	0	-	-	-	-	-	-	0	0	0
9:30	10.284	57.06	0	0	45.398	9.3049	8.073	0	0	0	0	0	557.1886702	33.5942	0	-	-	-	-	-	-	0	0	0
9:45	11.754	77.373	0	0	45.161	10.634	10.156	0	0	0	0	0	578.9108981	33.8547	0	-	-	-	-	-	-	0	0	0
10:00	12.635	79.502	0	0	58.318	11.432	9.3751	0	0	0	0	0	577.3487613	35.1568	0	-	-	-	-	-	-	0	0	0
10:15	7.0521	71.754	0	0	43.147	6.3805	5.9897	0	0	0	0	0	578.850796	35.1568	0	-	-	-	-	-	-	0	0	0
10:30	13.81	64.106	0	0	53.357	12.495	8.3335	0	0	0	0	0	601.3197493	36.9797	0	-	-	-	-	-	-	0	0	0
10:45	10.872	68.379	0	0	54.271	9.8366	11.459	0	0	0	0	0	588.5962555	38.8026	0	-	-	-	-	-	-	0	0	0
11:00	17.63	81.597	0	0	48.21	15.951	9.3751	0	0	0	0	0	592.5403879	39.0631	0	-	-	-	-	-	-	0	0	0
11:15	14.398	66.737	0	0	56.642	13.027	7.8126	0	0	0	0	0	603.6621024	42.1881	0	-	-	-	-	-	-	0	0	0
11:30	11.754	45.616	0	0	63.042	10.634	10.156	0	0	0	0	0	645.3133932	45.834	0	-	-	-	-	-	-	0	0	0
11:45	13.223	64.967	0	0	57.15	11.963	11.719	0	0	0	0	0	700.9688598	46.6153	0	-	-	-	-	-	-	0	0	0
12:00	13.81	66.217	0	0	81.988	12.495	12.5	0	0	0	0	0	738.1681124	49.2195	0	-	-	-	-	-	-	0	0	0
12:15	12.341	95.73	0	0	73.217	11.166	11.459	0	0	0	0	0	780.6722853	47.3965	0	-	-	-	-	-	-	0	0	0
12:30	15.867	81.296	0	0	75.181	14.356	10.938	0	0	0	0	0	793.3172247	48.1778	0	-	-	-	-	-	-	0	0	0
12:45	20.275	102.52	0	0	43.367	18.344	14.323	0	0	0	0	0	776.8733443	48.4382	0	-	-	-	-	-	-	0	0	0
13:00	22.038	101.52	0	0	73.522	19.939	10.677	0	0	0	0	0	768.5323453	46.0944	0	-	-	-	-	-	-	0	0	0
13:15	20.863	93.922	0	0	71.439	18.876	12.24	0	0	0	0	0	754.9437117	44.2715	0	-	-	-	-	-	-	0	0	0
13:30	17.924	78.526	0	0	57.59	16.217	11.198	0	0	0	0	0	757.8719065	45.5736	0	-	-	-	-	-	-	0	0	0
13:45	17.336	85.956	0	0	57.183	15.685	11.979	0	0	0	0	0	791.8945525	46.6153	0	-	-	-	-	-	-	0	0	0
14:00	21.156	77.449	0	0	85.679	19.142	8.8543	0	0	0	0	0	826.3493466	48.4382	0	-	-	-	-	-	-	0	0	0
14:15	20.569	99.577	0	0	69.273	18.61	13.542	0	0	0	0	0	844.7259826	54.4279	0	-	-	-	-	-	-	0	0	0
14:30	24.976	92.682	0	0	64.024	22.598	12.24	0	0	0	0	0	848.8981913	51.5633	0	-	-	-	-	-	-	0	0	0
14:45	22.332	115.03	0	0	53.052	20.205	13.802	0	0	0	0	0	880.6208352	55.9904	0	-	-	-	-	-	-	0	0	0
15:00	23.801	100.68	0	0	75.791	21.534	14.844	0	0	0	0	0	890.2169584	54.4279	0	-	-	-	-	-	-	0	0	0
15:15	26.739	98.971	0	0	62.297	24.193	10.677	0	0	0	0	0	912.5386391	54.1675	0	-	-	-	-	-	-	0	0	0
15:30	24.095	125	0	0	65.107	21.8	16.667	0	0	0	0	0	888.9840645	53.1258	0	-	-	-	-	-	-	0	0	0
15:45	25.858	101.86	0	0	69.103	23.395	12.24	0	0	0	0	0	872.1323176	50.5216	0	-	-	-	-	-	-	0	0	0
16:00	24.389	136.59	0	0	61.077	22.066	14.584	0	0	0	0	0	866.576876	54.1675	0	-	-	-	-	-	-	0	0	0
16:15	19.981	97.518	0	0	53.069	18.078	9.6356	0	0	0	0	0	622.4524872	39.5839	0	-	-	-	-	-	-	0	0	0
16:30	25.564	108.69	0	0	61.771	23.129	14.063	0	0	0	0	0	433.8070994	29.9484	0	-	-	-	-	-	-	0	0	0
16:45	24.976	104.57	0	0	62.516	22.598	15.886	0	0	0	0	0	214.6568215	15.8856	0	-	-	-	-	-	-	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	RE YEAR	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	ekili Hwy	0	0	ekili Hwy	0	0	f Housin	0	0	u MP D\	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:							0	2	0
															Signal Warranted?							No		
															Notes									

Weekday Kahekili Hwy/Waiehu MP DW 4-Hour Signal Warrant

Thursday, October 5, 2017

	Kahekili Hwy						Waiehu MP DW			ehu Aff Housing			100 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction: 100%			RT Reduction: 0%											
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	125.7060507	13.5419	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	253.2615695	31.5109	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	443.8343086	55.73	0			0	0	0	0
5:00	2.9384	51.35	0	0	68.759	2.6585	13.542	0	0	0	0	0	738.1640388	82.8137	0			0	0	0	0
5:15	3.5261	53.536	0	0	67.303	3.1903	17.969	0	0	0	0	0	937.7669863	96.6953	0			0	0	0	0
5:30	4.9953	72.561	0	0	108.5	4.5195	24.219	0	0	0	0	0	1054.133537	98.9476	0	1		1	0	1	1
5:45	12.047	115.27	0	0	156.11	10.9	27.084	0	0	0	0	0	1038.733481	97.1659	0	1		2	0	1	2
6:00	5.7328	90.899	0	0	222.94	5.7328	27.423	0	0	0	0	0	939.5566546	92.2425	0			3	0	0	3
6:15	9.4949	77.958	0	0	146.97	9.4949	20.221	0	0	0	0	0	759.197717	76.7984	0			4	0	0	4
6:30	8.42	36.288	0	0	122.04	8.42	22.437	0	0	0	0	0	672.6712041	72.7231	0			0	0	0	0
6:45	6.3598	71.524	0	0	110.91	6.3598	22.16	0	0	0	0	0	642.8256947	62.786	0			0	0	0	0
7:00	10.872	80.523	0	0	43.718	9.8366	11.979	0	0	0	0	0	597.0374952	53.3862	0			0	0	0	0
7:15	11.166	68.756	0	0	67.372	10.102	16.146	0	0	0	0	0	597.6171757	53.3862	0			0	0	0	0
7:30	6.1706	57.533	0	0	76.041	5.5829	12.5	0	0	0	0	0	548.606884	50.2611	0			0	0	0	0
7:45	7.0521	68.493	0	0	67.439	6.3805	12.761	0	0	0	0	0	523.6296435	47.1361	0			0	0	0	0
8:00	8.2275	70.088	0	0	59.771	7.4439	11.979	0	0	0	0	0	499.5647877	43.4902	0			0	0	0	0
8:15	5.8768	54.048	0	0	43.144	5.3171	13.021	0	0	0	0	0	474.7636462	39.3235	0			0	0	0	0
8:30	7.6398	57.795	0	0	48.003	6.9122	9.3751	0	0	0	0	0	*493.0699617*	33.5942	0			0	0	0	0
8:45	10.284	61.805	0	0	43.906	9.3049	9.1147	0	0	0	0	0	494.7664433	32.2921	0			0	0	0	0
9:00	5.8768	58.076	0	0	51.459	5.3171	7.8126	0	0	0	0	0	514.3876909	33.3338	0			0	0	0	0
9:15	7.9336	55.617	0	0	55.963	7.1781	7.2918	0	0	0	0	0	555.5458749	34.8963	0			0	0	0	0
9:30	10.284	57.06	0	0	45.398	9.3049	8.073	0	0	0	0	0	557.1886702	33.5942	0			0	0	0	0
9:45	11.754	77.373	0	0	45.161	10.634	10.156	0	0	0	0	0	578.9108981	33.8547	0			0	0	0	0
10:00	12.635	79.502	0	0	58.318	11.432	9.3751	0	0	0	0	0	577.3487613	35.1568	0			0	0	0	0
10:15	7.0521	71.754	0	0	43.147	6.3805	5.9897	0	0	0	0	0	578.850796	35.1568	0			0	0	0	0
10:30	13.81	64.106	0	0	53.357	12.495	8.3335	0	0	0	0	0	601.3197493	36.9797	0			0	0	0	0
10:45	10.872	68.379	0	0	54.271	9.8366	11.459	0	0	0	0	0	588.5962555	38.8026	0			0	0	0	0
11:00	17.63	81.597	0	0	48.21	15.951	9.3751	0	0	0	0	0	592.5403879	39.0631	0			0	0	0	0
11:15	14.398	66.737	0	0	56.642	13.027	7.8126	0	0	0	0	0	603.6621024	42.1881	0			0	0	0	0
11:30	11.754	45.616	0	0	63.042	10.634	10.156	0	0	0	0	0	645.3133932	45.834	0			0	0	0	0
11:45	13.223	64.967	0	0	57.15	11.963	11.719	0	0	0	0	0	700.9688598	46.6153	0			0	0	0	0
12:00	13.81	66.217	0	0	81.988	12.495	12.5	0	0	0	0	0	738.1681124	49.2195	0			0	0	0	0
12:15	12.341	95.73	0	0	73.217	11.166	11.459	0	0	0	0	0	780.6722853	47.3965	0			0	0	0	0
12:30	15.867	81.296	0	0	75.181	14.356	10.938	0	0	0	0	0	793.3172247	48.1778	0			0	0	0	0
12:45	20.275	102.52	0	0	43.367	18.344	14.323	0	0	0	0	0	776.8733443	48.4382	0			0	0	0	0
13:00	22.038	101.52	0	0	73.522	19.939	10.677	0	0	0	0	0	768.5323453	46.0944	0			0	0	0	0
13:15	20.863	93.922	0	0	71.439	18.876	12.24	0	0	0	0	0	754.9437117	44.2715	0			0	0	0	0
13:30	17.924	78.526	0	0	57.59	16.217	11.198	0	0	0	0	0	757.8719065	45.5736	0			0	0	0	0
13:45	17.336	85.956	0	0	57.183	15.685	11.979	0	0	0	0	0	791.8945525	46.6153	0			0	0	0	0
14:00	21.156	77.449	0	0	85.679	19.142	8.8543	0	0	0	0	0	826.3493466	48.4382	0			0	0	0	0
14:15	20.569	99.577	0	0	69.273	18.61	13.542	0	0	0	0	0	844.7259826	54.4279	0			0	0	0	0
14:30	24.976	92.682	0	0	64.024	22.598	12.24	0	0	0	0	0	848.8981913	51.5633	0			0	0	0	0
14:45	22.332	115.03	0	0	53.052	20.205	13.802	0	0	0	0	0	880.6208352	55.9904	0			0	0	0	0
15:00	23.801	100.68	0	0	75.791	21.534	14.844	0	0	0	0	0	890.2169584	54.4279	0			0	0	0	0
15:15	26.739	98.971	0	0	62.297	24.193	10.677	0	0	0	0	0	912.5386391	54.1675	0			0	0	0	0
15:30	24.095	125	0	0	65.107	21.8	16.667	0	0	0	0	0	888.9840645	53.1258	0			0	0	0	0
15:45	25.858	101.86	0	0	69.103	23.395	12.24	0	0	0	0	0	872.1323176	50.5216	0			0	0	0	0
16:00	24.389	136.59	0	0	61.077	22.066	14.584	0	0	0	0	0	866.576876	54.1675	0			0	0	0	0
16:15	19.981	97.518	0	0	53.069	18.078	9.6356	0	0	0	0	0	622.4524872	39.5839	0			0	0	0	0
16:30	25.564	108.69	0	0	61.771	23.129	14.063	0	0	0	0	0	433.8070994	29.9484	0			0	0	0	0
16:45	24.976	104.57	0	0	62.516	22.598	15.886	0	0	0	0	0	214.6568215	15.8856	0			0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	RE YEAR	0	0	0	0	0	0	0			0	0	0	0
19:45	0	ekili Hwy	0	0	ekili Hwy	0	0	f Housin	0	0	lu MP D\	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met: 1

Signal Warranted? No


4-Hour Warrant (100%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
115'
1054.133537, 98.94760432
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

Mill Street/Imi Kala Street
Existing Conditions

Weekday Mill Street/Imi Kala Street 4-Hour Signal Warrant

Thursday, October 5, 2017

	Mill Street						Imi Kala Street			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction: 0%			RT Reduction: 100%												
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	51	0	4			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	106	0	7			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	176	0	12			0	0	0	0
6:00	15	15	0	0	14	7	0	0	0	4	0	0	279	0	14			0	0	0	0
6:15	23	19	0	0	6	7	0	0	0	3	0	0	331	0	17			0	0	0	0
6:30	23	27	0	0	12	8	0	0	0	5	0	0	426	0	22			0	0	0	0
6:45	35	36	0	0	16	16	0	0	0	2	0	0	545	0	23			0	0	0	0
7:00	43	32	0	0	13	15	0	0	0	7	0	0	637	0	30			0	0	0	0
7:15	61	37	0	0	35	17	0	0	0	8	0	0	696	0	33			0	0	0	0
7:30	71	47	0	0	51	20	0	0	0	6	0	0	676	0	38			0	0	0	0
7:45	80	47	0	0	43	25	0	0	0	9	0	0	613	0	47			0	0	0	0
8:00	71	37	0	0	32	22	0	0	0	10	0	0	548	0	58			0	0	0	0
8:15	46	38	0	0	28	18	0	0	0	13	0	0	518	0	66			0	0	0	0
8:30	50	36	0	0	21	19	0	0	0	15	0	0	*530*	0	75			0	0	0	0
8:45	48	38	0	0	24	20	0	0	0	20	0	0	562	0	74			0	0	0	0
9:00	43	38	0	0	35	16	0	0	0	18	0	0	598	0	69			0	0	0	0
9:15	63	29	0	0	25	25	0	0	0	22	0	0	612	0	68			0	0	0	0
9:30	55	37	0	0	33	33	0	0	0	14	0	0	617	0	64			0	0	0	0
9:45	79	39	0	0	32	16	0	0	0	15	0	0	627	0	73			0	0	0	0
10:00	48	36	0	0	32	30	0	0	0	17	0	0	634	0	75			0	0	0	0
10:15	57	33	0	0	35	22	0	0	0	18	0	0	677	0	89			0	0	0	0
10:30	70	46	0	0	35	17	0	0	0	23	0	0	701	0	93			0	0	0	0
10:45	76	42	0	0	32	23	0	0	0	17	0	0	683	0	91			0	0	0	0
11:00	65	49	0	0	40	35	0	0	0	31	0	0	681	0	90			0	0	0	0
11:15	70	38	0	0	38	25	0	0	0	22	0	0	647	0	73			0	0	0	0
11:30	70	38	0	0	24	18	0	0	0	21	0	0	649	0	80			0	0	0	0
11:45	76	42	0	0	34	19	0	0	0	16	0	0	680	0	76			0	0	0	0
12:00	62	32	0	0	33	28	0	0	0	14	0	0	666	0	74			0	0	0	0
12:15	72	43	0	0	33	25	0	0	0	29	0	0	655	0	84			0	0	0	0
12:30	85	34	0	0	42	20	0	0	0	17	0	0	643	0	75			0	0	0	0
12:45	69	34	0	0	31	23	0	0	0	14	0	0	617	0	75			0	0	0	0
13:00	65	33	0	0	25	21	0	0	0	24	0	0	620	0	79			0	0	0	0
13:15	76	35	0	0	32	18	0	0	0	20	0	0	651	0	76			0	0	0	0
13:30	54	38	0	0	35	28	0	0	0	17	0	0	664	0	78			0	0	0	0
13:45	71	28	0	0	32	29	0	0	0	18	0	0	729	0	75			0	0	0	0
14:00	83	33	0	0	35	24	0	0	0	21	0	0	728	0	70			0	0	0	0
14:15	82	43	0	0	33	16	0	0	0	22	0	0	733	0	70			0	0	0	0
14:30	77	45	0	0	71	27	0	0	0	14	0	0	741	0	67			0	0	0	0
14:45	54	44	0	0	30	31	0	0	0	13	0	0	699	0	80			0	0	0	0
15:00	72	42	0	0	43	23	0	0	0	21	0	0	719	0	89			0	0	0	0
15:15	79	43	0	0	35	25	0	0	0	19	0	0	704	0	92			0	0	0	0
15:30	80	35	0	0	43	20	0	0	0	27	0	0	689	0	89			0	0	0	0
15:45	66	44	0	0	51	18	0	0	0	22	0	0	695	0	78			0	0	0	0
16:00	65	39	0	0	40	21	0	0	0	24	0	0	703	0	71			0	0	0	0
16:15	56	44	0	0	48	19	0	0	0	16	0	0	686	0	62			0	0	0	0
16:30	89	36	0	0	38	21	0	0	0	16	0	0	666	0	60			0	0	0	0
16:45	77	45	0	0	47	18	0	0	0	15	0	0	601	0	63			0	0	0	0
17:00	58	29	0	0	49	12	0	0	0	15	0	0	523	0	61			0	0	0	0
17:15	63	26	0	0	38	20	0	0	0	14	0	0	501	0	52			0	0	0	0
17:30	45	33	0	0	34	7	0	0	0	19	0	0	459	0	40			0	0	0	0
17:45	38	32	0	0	25	14	0	0	0	13	0	0	435	0	24			0	0	0	0
18:00	47	32	0	0	26	21	0	0	0	6	0	0	399	0	17			0	0	0	0
18:15	40	18	0	0	30	17	0	0	0	2	0	0	354	0	18			0	0	0	0
18:30	34	13	0	0	41	7	0	0	0	3	0	0	319	0	18			0	0	0	0
18:45	37	13	0	0	19	4	0	0	0	6	0	0	296	0	20			0	0	0	0
19:00	30	16	0	0	24	11	0	0	0	7	0	0	272	0	16			0	0	0	0
19:15	21	17	0	0	24	8	0	0	0	2	0	0	191	0	9			0	0	0	0
19:30	27	16	0	0	15	14	0	0	0	5	0	0	121	0	7			0	0	0	0
19:45	18	13	0	0	10	8	0	0	0	2	0	0	49	0	2			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	0
Signal Warranted?	No


4-Hour Warrant (100%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Mill Street/Imi Kala Street 8-Hour Signal Warrant

Thursday, October 5, 2017

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Mill Street						Imi Kala Street			0			100 % Warrant			Minor 1 (NB)			Minor 1 (SB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	51	0	4	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	106	0	7	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	176	0	12	-	-	-	-	-	-	0	0	0
6:00	15	15	0	0	14	7	0	0	0	4	0	0	279	0	14	-	-	-	-	-	-	0	0	0
6:15	23	19	0	0	6	7	0	0	0	3	0	0	331	0	17	-	-	-	-	-	-	0	0	0
6:30	23	27	0	0	12	8	0	0	0	5	0	0	426	0	22	-	-	-	-	-	-	0	0	0
6:45	35	36	0	0	16	16	0	0	0	2	0	0	545	0	23	-	-	-	-	-	-	0	0	0
7:00	43	32	0	0	13	15	0	0	0	7	0	0	637	0	30	-	-	-	-	-	-	0	0	0
7:15	61	37	0	0	35	17	0	0	0	8	0	0	696	0	33	-	-	-	-	-	-	0	0	0
7:30	71	47	0	0	51	20	0	0	0	6	0	0	676	0	38	-	-	-	-	-	-	0	0	0
7:45	80	47	0	0	43	25	0	0	0	9	0	0	613	0	47	-	-	-	-	-	-	0	0	0
8:00	71	37	0	0	32	22	0	0	0	10	0	0	548	0	58	-	-	-	-	-	-	0	0	0
8:15	46	38	0	0	28	18	0	0	0	13	0	0	518	0	66	-	-	-	-	-	-	0	0	0
8:30	50	36	0	0	21	19	0	0	0	15	0	0	530	0	75	-	-	-	-	-	-	0	0	0
8:45	48	38	0	0	24	20	0	0	0	20	0	0	562	0	74	-	-	-	-	-	-	0	0	0
9:00	43	38	0	0	35	16	0	0	0	18	0	0	598	0	69	-	-	-	-	-	-	0	0	0
9:15	63	29	0	0	25	25	0	0	0	22	0	0	612	0	68	-	-	-	-	-	-	0	0	0
9:30	55	37	0	0	33	33	0	0	0	14	0	0	617	0	64	-	-	-	-	-	-	0	0	0
9:45	79	39	0	0	32	16	0	0	0	15	0	0	627	0	73	-	-	-	-	-	-	0	0	0
10:00	48	36	0	0	32	30	0	0	0	17	0	0	634	0	75	-	-	-	-	-	-	0	0	0
10:15	57	33	0	0	35	22	0	0	0	18	0	0	677	0	89	-	-	-	-	-	-	0	0	0
10:30	70	46	0	0	35	17	0	0	0	23	0	0	701	0	93	-	-	-	-	-	-	0	0	0
10:45	76	42	0	0	32	23	0	0	0	17	0	0	683	0	91	-	-	-	-	-	-	0	0	0
11:00	65	49	0	0	40	35	0	0	0	31	0	0	681	0	90	-	-	-	-	-	-	0	0	0
11:15	70	38	0	0	38	25	0	0	0	22	0	0	647	0	73	-	-	-	-	-	-	0	0	0
11:30	70	38	0	0	24	18	0	0	0	21	0	0	649	0	80	-	-	-	-	-	-	0	0	0
11:45	76	42	0	0	34	19	0	0	0	16	0	0	680	0	76	-	-	-	-	-	-	0	0	0
12:00	62	32	0	0	33	28	0	0	0	14	0	0	666	0	74	-	-	-	-	-	-	0	0	0
12:15	72	43	0	0	33	25	0	0	0	29	0	0	655	0	84	-	-	-	-	-	-	0	0	0
12:30	85	34	0	0	42	20	0	0	0	17	0	0	643	0	75	-	-	-	-	-	-	0	0	0
12:45	69	34	0	0	31	23	0	0	0	14	0	0	617	0	75	-	-	-	-	-	-	0	0	0
13:00	65	33	0	0	25	21	0	0	0	24	0	0	620	0	79	-	-	-	-	-	-	0	0	0
13:15	76	35	0	0	32	18	0	0	0	20	0	0	651	0	76	-	-	-	-	-	-	0	0	0
13:30	54	38	0	0	35	28	0	0	0	17	0	0	664	0	78	-	-	-	-	-	-	0	0	0
13:45	71	28	0	0	32	29	0	0	0	18	0	0	729	0	75	-	-	-	-	-	-	0	0	0
14:00	83	33	0	0	35	24	0	0	0	21	0	0	728	0	70	-	-	-	-	-	-	0	0	0
14:15	82	43	0	0	33	16	0	0	0	22	0	0	733	0	70	-	-	-	-	-	-	0	0	0
14:30	77	45	0	0	71	27	0	0	0	14	0	0	741	0	67	-	-	-	-	-	-	0	0	0
14:45	54	44	0	0	30	31	0	0	0	13	0	0	699	0	80	-	-	-	-	-	-	0	0	0
15:00	72	42	0	0	43	23	0	0	0	21	0	0	719	0	89	-	-	-	-	-	-	0	0	0
15:15	79	43	0	0	35	25	0	0	0	19	0	0	704	0	92	-	-	-	-	-	-	0	0	0
15:30	80	35	0	0	43	20	0	0	0	27	0	0	689	0	89	-	-	-	-	-	-	0	0	0
15:45	66	44	0	0	51	18	0	0	0	22	0	0	695	0	78	-	-	-	-	-	-	0	0	0
16:00	65	39	0	0	40	21	0	0	0	24	0	0	703	0	71	-	-	-	-	-	-	0	0	0
16:15	56	44	0	0	48	19	0	0	0	16	0	0	686	0	62	-	-	-	-	-	-	0	0	0
16:30	89	36	0	0	38	21	0	0	0	16	0	0	666	0	60	-	-	-	-	-	-	0	0	0
16:45	77	45	0	0	47	18	0	0	0	15	0	0	601	0	63	-	-	-	-	-	-	0	0	0
17:00	58	29	0	0	49	12	0	0	0	15	0	0	523	0	61	-	-	-	-	-	-	0	0	0
17:15	63	26	0	0	38	20	0	0	0	14	0	0	501	0	52	-	-	-	-	-	-	0	0	0
17:30	45	33	0	0	34	7	0	0	0	19	0	0	459	0	40	-	-	-	-	-	-	0	0	0
17:45	38	32	0	0	25	14	0	0	0	13	0	0	435	0	24	-	-	-	-	-	-	0	0	0
18:00	47	32	0	0	26	21	0	0	0	6	0	0	399	0	17	-	-	-	-	-	-	0	0	0
18:15	40	18	0	0	30	17	0	0	0	2	0	0	354	0	18	-	-	-	-	-	-	0	0	0
18:30	34	13	0	0	41	7	0	0	0	3	0	0	319	0	18	-	-	-	-	-	-	0	0	0
18:45	37	13	0	0	19	4	0	0	0	6	0	0	296	0	20	-	-	-	-	-	-	0	0	0
19:00	30	16	0	0	24	11	0	0	0	7	0	0	272	0	16	-	-	-	-	-	-	0	0	0
19:15	21	17	0	0	24	8	0	0	0	2	0	0	191	0	9	-	-	-	-	-	-	0	0	0
19:30	27	16	0	0	15	14	0	0	0	5	0	0	121	0	7	-	-	-	-	-	-	0	0	0
19:45	18	13	0	0	10	8	0	0	0	2	0	0	49	0	2	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						0	0	0
															Signal Warranted?						No		
															Notes								

APPENDIX D

SIGNAL WARRANT ANALYSIS

Mill Street/Imi Kala Street
Base Year Without Imi Kala Street Extension

Weekday Mill Street/Imi Kala Street 8-Hour Signal Warrant

Thursday, October 5, 2017

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Mill Street						Imi Kala Street			0			100 % Warrant			Minor 1 (NB)			Minor 1 (SB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			600	900	720	600	900	720			
	2						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	70.51219217	0	5.63909	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	145.3486226	0	9.8684	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	241.9176725	0	16.9173	-	-	-	-	-	-	0	0	0
6:00	19.157	21.859	0	0	20.513	8.9828	0	0	0	5.6391	0	0	419.1155243	0	20.5996	-	-	-	-	-	-	0	0	0
6:15	29.375	27.687	0	0	8.7915	8.9828	0	0	0	4.2293	0	0	526.287507	0	27.8489	-	-	-	-	-	-	0	0	0
6:30	29.375	39.345	0	0	17.583	10.266	0	0	0	7.0489	0	0	717.0022336	0	38.3491	-	-	-	-	-	-	0	0	0
6:45	63.031	56.487	0	0	32.316	25.363	0	0	0	3.6824	0	0	956.7561079	0	42.3474	-	-	-	-	-	-	0	0	0
7:00	77.439	50.211	0	0	26.257	23.778	0	0	0	12.888	0	0	1045.308213	0	51.3529	-	-	-	-	-	-	0	0	0
7:15	109.85	58.056	0	0	70.692	26.948	0	0	0	14.73	0	0	1087.339703	0	52.5623	-	-	-	-	-	-	0	0	0
7:30	127.86	73.747	0	0	103.01	31.704	0	0	0	11.047	0	0	1000.038402	0	56.1598	-	-	-	-	-	-	0	0	0
7:45	102.17	68.49	0	0	63.006	32.081	0	0	0	12.688	0	0	835.1860234	0	66.2593	-	-	-	-	-	-	0	0	0
8:00	90.678	53.918	0	0	46.888	28.232	0	0	0	14.098	0	0	746.9457583	0	81.7668	-	-	-	-	-	-	0	0	0
8:15	58.749	55.375	0	0	41.027	23.099	0	0	0	18.327	0	0	709.3386967	0	93.045	-	-	-	-	-	-	0	0	0
8:30	63.858	52.46	0	0	30.77	24.382	0	0	0	21.147	0	0	*722.5223641*	0	105.733	-	-	-	-	-	-	0	0	0
8:45	61.304	55.375	0	0	35.166	25.665	0	0	0	28.195	0	0	765.9139451	0	104.323	-	-	-	-	-	-	0	0	0
9:00	54.918	55.375	0	0	51.284	20.532	0	0	0	25.376	0	0	813.552154	0	97.2743	-	-	-	-	-	-	0	0	0
9:15	80.461	42.26	0	0	36.631	32.081	0	0	0	31.015	0	0	830.5933027	0	95.8645	-	-	-	-	-	-	0	0	0
9:30	70.244	53.918	0	0	48.353	42.347	0	0	0	19.737	0	0	839.5619958	0	90.2254	-	-	-	-	-	-	0	0	0
9:45	100.9	56.832	0	0	46.888	20.532	0	0	0	21.147	0	0	854.2329565	0	102.913	-	-	-	-	-	-	0	0	0
10:00	61.304	52.46	0	0	46.888	38.498	0	0	0	23.966	0	0	863.7559532	0	105.733	-	-	-	-	-	-	0	0	0
10:15	72.798	48.089	0	0	51.284	28.232	0	0	0	25.376	0	0	922.5499998	0	125.47	-	-	-	-	1	1	0	1	1
10:30	89.401	67.033	0	0	51.284	21.815	0	0	0	32.425	0	0	954.6847761	0	131.109	-	-	-	-	1	1	0	2	2
10:45	97.064	61.204	0	0	46.888	29.515	0	0	0	23.966	0	0	928.1924215	0	128.289	-	-	-	-	1	1	0	3	3
11:00	83.015	71.404	0	0	58.61	44.914	0	0	0	43.703	0	0	925.9899028	0	126.879	-	-	-	-	1	1	0	4	4
11:15	89.401	55.375	0	0	55.679	32.081	0	0	0	31.015	0	0	878.1459188	0	102.913	-	-	-	-	-	-	0	0	0
11:30	89.401	55.375	0	0	35.166	23.099	0	0	0	29.605	0	0	880.6601692	0	112.782	-	-	-	-	-	-	0	0	0
11:45	97.064	61.204	0	0	49.818	24.382	0	0	0	22.556	0	0	922.9296363	0	107.143	-	-	-	-	1	-	0	1	0
12:00	79.184	46.631	0	0	48.353	35.931	0	0	0	19.737	0	0	903.0689036	0	104.323	-	-	-	-	1	-	0	2	0
12:15	91.956	62.661	0	0	48.353	32.081	0	0	0	40.883	0	0	887.6528545	0	118.421	-	-	-	-	-	-	0	3	0
12:30	108.56	49.546	0	0	61.54	25.665	0	0	0	23.966	0	0	870.6555995	0	105.733	-	-	-	-	-	-	0	4	0
12:45	88.124	49.546	0	0	45.423	29.515	0	0	0	19.737	0	0	836.9018263	0	105.733	-	-	-	-	-	-	0	0	0
13:00	83.015	48.089	0	0	36.631	26.948	0	0	0	33.835	0	0	839.8775167	0	111.372	-	-	-	-	-	-	0	0	0
13:15	97.064	51.003	0	0	46.888	23.099	0	0	0	28.195	0	0	881.3686694	0	107.143	-	-	-	-	-	-	0	0	0
13:30	68.967	55.375	0	0	51.284	35.931	0	0	0	23.966	0	0	899.5882515	0	109.962	-	-	-	-	-	-	0	0	0
13:45	90.678	40.803	0	0	46.888	37.214	0	0	0	25.376	0	0	990.629299	0	105.733	-	-	-	-	1	-	0	1	0
14:00	106	48.089	0	0	51.284	30.798	0	0	0	29.605	0	0	991.8693139	0	98.684	-	-	-	-	1	-	0	2	0
14:15	104.73	62.661	0	0	48.353	20.532	0	0	0	31.015	0	0	1001.374382	0	98.684	-	-	-	-	1	-	0	3	0
14:30	98.341	65.576	0	0	104.03	34.648	0	0	0	19.737	0	0	1012.022681	0	94.4547	-	-	-	-	1	-	0	4	0
14:45	68.967	64.118	0	0	43.957	39.781	0	0	0	18.327	0	0	951.2720833	0	112.782	-	-	-	-	1	-	0	1	0
15:00	91.956	61.204	0	0	63.006	29.515	0	0	0	29.605	0	0	980.6859388	0	125.47	-	-	-	-	1	1	0	2	1
15:15	100.9	62.661	0	0	51.284	32.081	0	0	0	26.786	0	0	960.4118528	0	129.699	-	-	-	-	1	1	0	3	2
15:30	102.17	51.003	0	0	63.006	25.665	0	0	0	38.064	0	0	943.8430844	0	125.47	-	-	-	-	1	1	0	4	3
15:45	84.293	64.118	0	0	74.728	23.099	0	0	0	31.015	0	0	950.7517815	0	109.962	-	-	-	-	1	-	0	1	4
16:00	83.015	56.832	0	0	58.61	26.948	0	0	0	33.835	0	0	960.3967958	0	100.094	-	-	-	-	1	-	0	2	0
16:15	71.521	64.118	0	0	70.332	24.382	0	0	0	22.556	0	0	938.5222762	0	87.4059	-	-	-	-	1	-	0	3	0
16:30	113.67	52.46	0	0	55.679	26.948	0	0	0	22.556	0	0	907.8629578	0	84.5863	-	-	-	-	1	-	0	4	0
16:45	98.341	65.576	0	0	68.867	23.099	0	0	0	21.147	0	0	823.4696052	0	88.8156	-	-	-	-	-	-	0	0	0
17:00	74.075	42.26	0	0	71.797	15.399	0	0	0	21.147	0	0	717.3477821	0	85.9961	-	-	-	-	-	-	0	0	0
17:15	80.461	37.888	0	0	55.679	25.665	0	0	0	19.737	0	0	685.5192772	0	73.3081	-	-	-	-	-	-	0	0	0
17:30	57.472	48.089	0	0	49.818	8.9828	0	0	0	26.786	0	0	628.9149416	0	56.3909	-	-	-	-	-	-	0	0	0
17:45	48.532	46.631	0	0	36.631	17.966	0	0	0	18.327	0	0	595.9782236	0	33.8345	-	-	-	-	-	-	0	0	0
18:00	60.027	46.631	0	0	38.096	26.948	0	0	0	8.4586	0	0	545.3895806	0	23.9661	-	-	-	-	-	-	0	0	0
18:15	51.086	26.23	0	0	43.957	21.815	0	0	0	2.8195	0	0	484.5990533	0	25.3759	-	-	-	-	-	-	0	0	0
18:30	43.423	18.944	0	0	60.075	8.9828	0	0	0	4.2293	0	0	438.5349755	0	25.3759	-	-	-	-	-	-	0	0	0
18:45	47.255	18.944	0	0	27.84	5.133	0	0	0	8.4586	0	0	404.852862	0	28.1954	-	-	-	-	-	-	0	0	0
19:00	38.315	23.316	0	0	35.166	14.116	0	0	0	9.8684	0	0	372.5325747	0	22.5564	-	-	-	-	-	-	0	0	0
19:15	26.82	24.773	0	0	35.166	10.266	0	0	0	2.8195	0	0	261.6202256	0	12.6879	-	-	-	-	-	-	0	0	0
19:30	34.483	23.316	0	0	21.979	17.966	0	0	0	7.0489	0	0	164.5948565	0	9.8684	-	-	-	-	-	-	0	0	0
19:45	22.989	18.944	0	0	14.652	10.266	0	0	0	2.8195	0	0	66.85146726	0	2.81954	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						0	5	2
															Signal Warranted?						No		
															Notes								

Weekday Mill Street/Imi Kala Street 4-Hour Signal Warrant

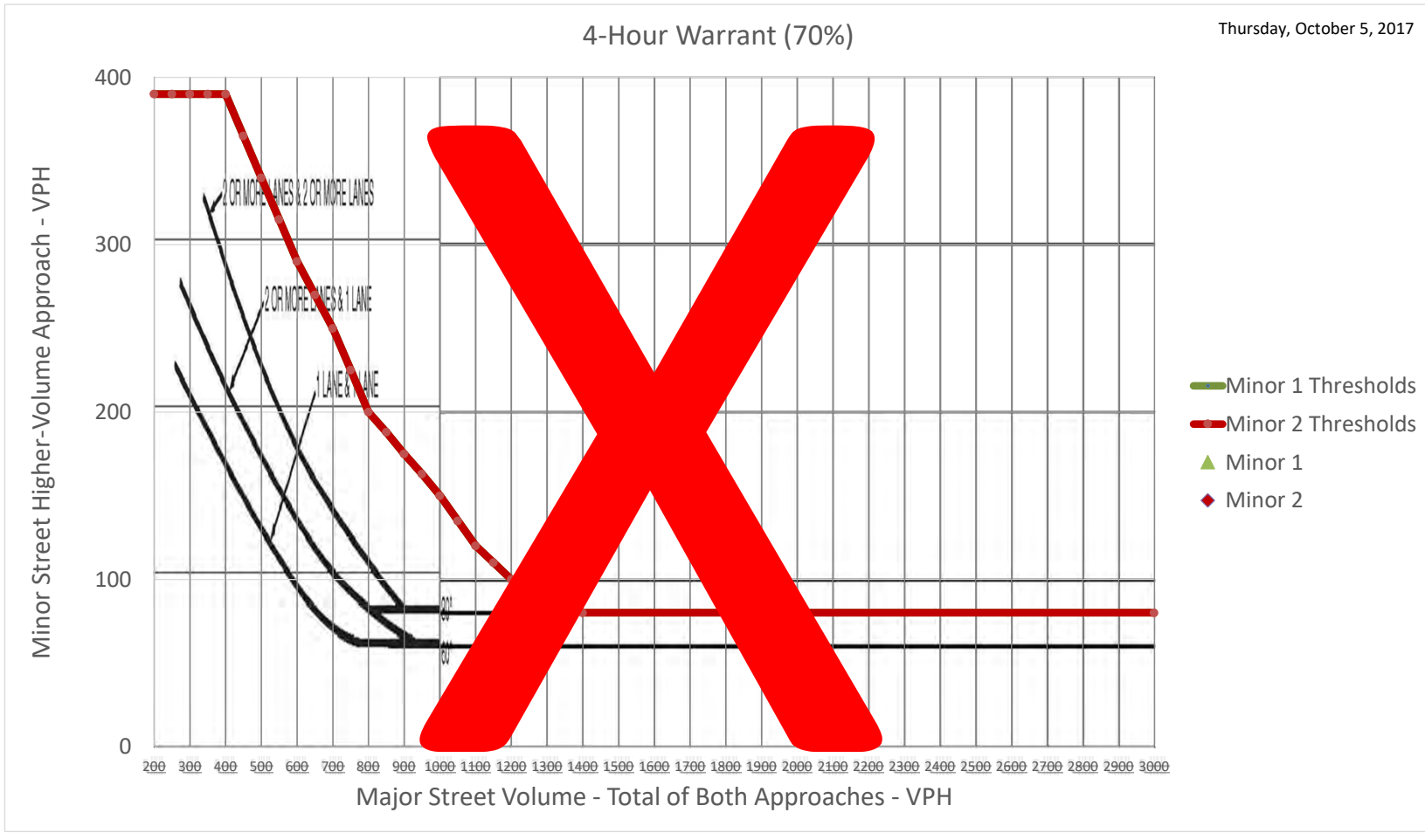
Thursday, October 5, 2017

	Mill Street						Imi Kala Street			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	2						1			1												
							RT Reduction: 0%			RT Reduction: 100%												
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	70.51219217	0	5.63909			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	145.3486226	0	9.8684			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	241.9176725	0	16.9173			0	0	0	0
6:00	19.157	21.859	0	0	20.513	8.9828	0	0	0	5.6391	0	0	419.1155243	0	20.5996			0	0	0	0
6:15	29.375	27.687	0	0	8.7915	8.9828	0	0	0	4.2293	0	0	526.287507	0	27.8489			0	0	0	0
6:30	29.375	39.345	0	0	17.583	10.266	0	0	0	7.0489	0	0	717.0022336	0	38.3491			0	0	0	0
6:45	63.031	56.487	0	0	32.316	25.363	0	0	0	3.6824	0	0	956.7561079	0	42.3474			0	0	0	0
7:00	77.439	50.211	0	0	26.257	23.778	0	0	0	12.888	0	0	1045.308213	0	51.3529			0	0	0	0
7:15	109.85	58.056	0	0	70.692	26.948	0	0	0	14.73	0	0	1087.339703	0	52.5623			0	0	0	0
7:30	127.86	73.747	0	0	103.01	31.704	0	0	0	11.047	0	0	1000.038402	0	56.1598			0	0	0	0
7:45	102.17	68.49	0	0	63.006	32.081	0	0	0	12.688	0	0	835.1860234	0	66.2593			0	0	0	0
8:00	90.678	53.918	0	0	46.888	28.232	0	0	0	14.098	0	0	746.9457583	0	81.7668			0	0	0	0
8:15	58.749	55.375	0	0	41.027	23.099	0	0	0	18.327	0	0	709.3386967	0	93.045			0	0	0	0
8:30	63.858	52.46	0	0	30.77	24.382	0	0	0	21.147	0	0	*722.5223641*	0	105.733			0	0	0	0
8:45	61.304	55.375	0	0	35.166	25.665	0	0	0	28.195	0	0	765.9139451	0	104.323			0	0	0	0
9:00	54.918	55.375	0	0	51.284	20.532	0	0	0	25.376	0	0	813.552154	0	97.2743			0	0	0	0
9:15	80.461	42.26	0	0	36.631	32.081	0	0	0	31.015	0	0	830.5933027	0	95.8645			0	0	0	0
9:30	70.244	53.918	0	0	48.353	42.347	0	0	0	19.737	0	0	839.5619958	0	90.2254			0	0	0	0
9:45	100.9	56.832	0	0	46.888	20.532	0	0	0	21.147	0	0	854.2329565	0	102.913			0	0	0	0
10:00	61.304	52.46	0	0	46.888	38.498	0	0	0	23.966	0	0	863.7559532	0	105.733			0	0	0	0
10:15	72.798	48.089	0	0	51.284	28.232	0	0	0	25.376	0	0	922.5499998	0	125.47			0	0	0	0
10:30	89.401	67.033	0	0	51.284	21.815	0	0	0	32.425	0	0	954.6847761	0	131.109			0	0	0	0
10:45	97.064	61.204	0	0	46.888	29.515	0	0	0	23.966	0	0	928.1924215	0	128.289			0	0	0	0
11:00	83.015	71.404	0	0	58.61	44.914	0	0	0	43.703	0	0	925.9899028	0	126.879			0	0	0	0
11:15	89.401	55.375	0	0	55.679	32.081	0	0	0	31.015	0	0	878.1459188	0	102.913			0	0	0	0
11:30	89.401	55.375	0	0	35.166	23.099	0	0	0	29.605	0	0	880.6601692	0	112.782			0	0	0	0
11:45	97.064	61.204	0	0	49.818	24.382	0	0	0	22.556	0	0	922.9296363	0	107.143			0	0	0	0
12:00	79.184	46.631	0	0	48.353	35.931	0	0	0	19.737	0	0	903.0689036	0	104.323			0	0	0	0
12:15	91.956	62.661	0	0	48.353	32.081	0	0	0	40.883	0	0	887.6528545	0	118.421			0	0	0	0
12:30	108.56	49.546	0	0	61.54	25.665	0	0	0	23.966	0	0	870.6555995	0	105.733			0	0	0	0
12:45	88.124	49.546	0	0	45.423	29.515	0	0	0	19.737	0	0	836.9018263	0	105.733			0	0	0	0
13:00	83.015	48.089	0	0	36.631	26.948	0	0	0	33.835	0	0	839.8775167	0	111.372			0	0	0	0
13:15	97.064	51.003	0	0	46.888	23.099	0	0	0	28.195	0	0	881.3686694	0	107.143			0	0	0	0
13:30	68.967	55.375	0	0	51.284	35.931	0	0	0	23.966	0	0	899.5882515	0	109.962			0	0	0	0
13:45	90.678	40.803	0	0	46.888	37.214	0	0	0	25.376	0	0	990.629299	0	105.733			0	0	0	0
14:00	106	48.089	0	0	51.284	30.798	0	0	0	29.605	0	0	991.8693139	0	98.684			0	0	0	0
14:15	104.73	62.661	0	0	48.353	20.532	0	0	0	31.015	0	0	1001.374382	0	98.684			0	0	0	0
14:30	98.341	65.576	0	0	104.03	34.648	0	0	0	19.737	0	0	1012.022681	0	94.4547			0	0	0	0
14:45	68.967	64.118	0	0	43.957	39.781	0	0	0	18.327	0	0	951.2720833	0	112.782			0	0	0	0
15:00	91.956	61.204	0	0	63.006	29.515	0	0	0	29.605	0	0	980.6859388	0	125.47			0	0	0	0
15:15	100.9	62.661	0	0	51.284	32.081	0	0	0	26.786	0	0	960.4118528	0	129.699			0	0	0	0
15:30	102.17	51.003	0	0	63.006	25.665	0	0	0	38.064	0	0	943.8430844	0	125.47			0	0	0	0
15:45	84.293	64.118	0	0	74.728	23.099	0	0	0	31.015	0	0	950.7517815	0	109.962			0	0	0	0
16:00	83.015	56.832	0	0	58.61	26.948	0	0	0	33.835	0	0	960.3967958	0	100.094			0	0	0	0
16:15	71.521	64.118	0	0	70.332	24.382	0	0	0	22.556	0	0	938.5222762	0	87.4059			0	0	0	0
16:30	113.67	52.46	0	0	55.679	26.948	0	0	0	22.556	0	0	907.8629578	0	84.5863			0	0	0	0
16:45	98.341	65.576	0	0	68.867	23.099	0	0	0	21.147	0	0	823.4696052	0	88.8156			0	0	0	0
17:00	74.075	42.26	0	0	71.797	15.399	0	0	0	21.147	0	0	717.3477821	0	85.9961			0	0	0	0
17:15	80.461	37.888	0	0	55.679	25.665	0	0	0	19.737	0	0	685.5192772	0	73.3081			0	0	0	0
17:30	57.472	48.089	0	0	49.818	8.9828	0	0	0	26.786	0	0	628.9149416	0	56.3909			0	0	0	0
17:45	48.532	46.631	0	0	36.631	17.966	0	0	0	18.327	0	0	595.9782236	0	33.8345			0	0	0	0
18:00	60.027	46.631	0	0	38.096	26.948	0	0	0	8.4586	0	0	545.3895806	0	23.9661			0	0	0	0
18:15	51.086	26.23	0	0	43.957	21.815	0	0	0	2.8195	0	0	484.5990533	0	25.3759			0	0	0	0
18:30	43.423	18.944	0	0	60.075	8.9828	0	0	0	4.2293	0	0	438.5349755	0	25.3759			0	0	0	0
18:45	47.255	18.944	0	0	27.84	5.133	0	0	0	8.4586	0	0	404.852862	0	28.1954			0	0	0	0
19:00	38.315	23.316	0	0	35.166	14.116	0	0	0	9.8684	0	0	372.5325747	0	22.5564			0	0	0	0
19:15	26.82	24.773	0	0	35.166	10.266	0	0	0	2.8195	0	0	261.6202256	0	12.6879			0	0	0	0
19:30	34.483	23.316	0	0	21.979	17.966	0	0	0	7.0489	0	0	164.5948565	0	9.8684			0	0	0	0
19:45	22.989	18.944	0	0	14.652	10.266	0	0	0	2.8195	0	0	66.85146726	0	2.81954			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met: 0

Signal Warranted? No


4-Hour Warrant (100%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Mill Street/Imi Kala Street 8-Hour Signal Warrant

Thursday, October 5, 2017

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Mill Street						Imi Kala Street			0			100 % Warrant			Minor 1 (NB)			Minor 1 (SB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	70.51219217	0	5.63909	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	145.3486226	0	9.8684	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	241.9176725	0	16.9173	-	-	-	-	-	-	0	0	0
6:00	19.157	21.859	0	0	20.513	8.9828	0	0	0	5.6391	0	0	419.1155243	0	20.5996	-	-	-	-	-	-	0	0	0
6:15	29.375	27.687	0	0	8.7915	8.9828	0	0	0	4.2293	0	0	526.287507	0	27.8489	-	-	-	-	-	-	0	0	0
6:30	29.375	39.345	0	0	17.583	10.266	0	0	0	7.0489	0	0	717.0022336	0	38.3491	-	-	-	-	-	-	0	0	0
6:45	63.031	56.487	0	0	32.316	25.363	0	0	0	3.6824	0	0	956.7561079	0	42.3474	-	-	-	-	-	-	0	0	0
7:00	77.439	50.211	0	0	26.257	23.778	0	0	0	12.888	0	0	1045.308213	0	51.3529	-	-	-	-	-	-	0	0	0
7:15	109.85	58.056	0	0	70.692	26.948	0	0	0	14.73	0	0	1087.339703	0	52.5623	-	-	-	-	-	-	0	0	0
7:30	127.86	73.747	0	0	103.01	31.704	0	0	0	11.047	0	0	1000.038402	0	56.1598	-	-	-	-	-	-	0	0	0
7:45	102.17	68.49	0	0	63.006	32.081	0	0	0	12.688	0	0	835.1860234	0	66.2593	-	-	-	-	-	-	0	0	0
8:00	90.678	53.918	0	0	46.888	28.232	0	0	0	14.098	0	0	746.9457583	0	81.7668	-	-	-	-	-	-	0	0	0
8:15	58.749	55.375	0	0	41.027	23.099	0	0	0	18.327	0	0	709.3386967	0	93.045	-	-	-	-	-	-	0	0	0
8:30	63.858	52.46	0	0	30.77	24.382	0	0	0	21.147	0	0	*722.5223641*	0	105.733	-	-	-	-	-	-	0	0	0
8:45	61.304	55.375	0	0	35.166	25.665	0	0	0	28.195	0	0	765.9139451	0	104.323	-	-	-	-	1	-	0	1	0
9:00	54.918	55.375	0	0	51.284	20.532	0	0	0	25.376	0	0	813.552154	0	97.2743	-	-	-	-	1	-	0	2	0
9:15	80.461	42.26	0	0	36.631	32.081	0	0	0	31.015	0	0	830.5933027	0	95.8645	-	-	-	-	1	-	0	3	0
9:30	70.244	53.918	0	0	48.353	42.347	0	0	0	19.737	0	0	839.5619958	0	90.2254	-	-	-	-	1	-	0	4	0
9:45	100.9	56.832	0	0	46.888	20.532	0	0	0	21.147	0	0	854.2329565	0	102.913	-	-	-	-	1	-	0	1	0
10:00	61.304	52.46	0	0	46.888	38.498	0	0	0	23.966	0	0	863.7559532	0	105.733	-	-	-	-	1	-	0	2	0
10:15	72.798	48.089	0	0	51.284	28.232	0	0	0	25.376	0	0	922.5499998	0	125.47	-	-	-	1	1	-	0	3	1
10:30	89.401	67.033	0	0	51.284	21.815	0	0	0	32.425	0	0	954.6847761	0	131.109	-	-	-	1	1	-	0	4	2
10:45	97.064	61.204	0	0	46.888	29.515	0	0	0	23.966	0	0	928.1924215	0	128.289	-	-	-	1	1	-	0	1	3
11:00	83.015	71.404	0	0	58.61	44.914	0	0	0	43.703	0	0	925.9899028	0	126.879	-	-	-	1	1	-	0	2	4
11:15	89.401	55.375	0	0	55.679	32.081	0	0	0	31.015	0	0	878.1459188	0	102.913	-	-	-	-	1	-	0	3	0
11:30	89.401	55.375	0	0	35.166	23.099	0	0	0	29.605	0	0	880.6601692	0	112.782	-	-	-	-	1	-	0	4	0
11:45	97.064	61.204	0	0	49.818	24.382	0	0	0	22.556	0	0	922.9296363	0	107.143	-	-	-	-	1	-	0	1	0
12:00	79.184	46.631	0	0	48.353	35.931	0	0	0	19.737	0	0	903.0689036	0	104.323	-	-	-	-	1	-	0	2	0
12:15	91.956	62.661	0	0	48.353	32.081	0	0	0	40.883	0	0	887.6528545	0	118.421	-	-	-	-	1	-	0	3	0
12:30	108.56	49.546	0	0	61.54	25.665	0	0	0	23.966	0	0	870.6555995	0	105.733	-	-	-	-	1	-	0	4	0
12:45	88.124	49.546	0	0	45.423	29.515	0	0	0	19.737	0	0	836.9018263	0	105.733	-	-	-	-	1	-	0	1	0
13:00	83.015	48.089	0	0	36.631	26.948	0	0	0	33.835	0	0	839.8775167	0	111.372	-	-	-	-	1	-	0	2	0
13:15	97.064	51.003	0	0	46.888	23.099	0	0	0	28.195	0	0	881.3686694	0	107.143	-	-	-	-	1	-	0	3	0
13:30	68.967	55.375	0	0	51.284	35.931	0	0	0	23.966	0	0	899.5882515	0	109.962	-	-	-	-	1	-	0	4	0
13:45	90.678	40.803	0	0	46.888	37.214	0	0	0	25.376	0	0	990.629299	0	105.733	-	-	-	-	1	-	0	1	0
14:00	106	48.089	0	0	51.284	30.798	0	0	0	29.605	0	0	991.8693139	0	98.684	-	-	-	-	1	-	0	2	0
14:15	104.73	62.661	0	0	48.353	20.532	0	0	0	31.015	0	0	1001.374382	0	98.684	-	-	-	-	1	-	0	3	0
14:30	98.341	65.576	0	0	104.03	34.648	0	0	0	19.737	0	0	1012.022681	0	94.4547	-	-	-	-	1	-	0	4	0
14:45	68.967	64.118	0	0	43.957	39.781	0	0	0	18.327	0	0	951.2720833	0	112.782	-	-	-	-	1	-	0	1	0
15:00	91.956	61.204	0	0	63.006	29.515	0	0	0	29.605	0	0	980.6859388	0	125.47	-	-	-	-	1	1	0	2	1
15:15	100.9	62.661	0	0	51.284	32.081	0	0	0	26.786	0	0	960.4118528	0	129.699	-	-	-	-	1	1	0	3	2
15:30	102.17	51.003	0	0	63.006	25.665	0	0	0	38.064	0	0	943.8430844	0	125.47	-	-	-	-	1	1	0	4	3
15:45	84.293	64.118	0	0	74.728	23.099	0	0	0	31.015	0	0	950.7517815	0	109.962	-	-	-	-	1	-	0	1	4
16:00	83.015	56.832	0	0	58.61	26.948	0	0	0	33.835	0	0	960.3967958	0	100.094	-	-	-	-	1	-	0	2	0
16:15	71.521	64.118	0	0	70.332	24.382	0	0	0	22.556	0	0	938.5222762	0	87.4059	-	-	-	-	1	-	0	3	0
16:30	113.67	52.46	0	0	55.679	26.948	0	0	0	22.556	0	0	907.8629578	0	84.5863	-	-	-	-	1	-	0	4	0
16:45	98.341	65.576	0	0	68.867	23.099	0	0	0	21.147	0	0	823.4696052	0	88.8156	-	-	-	-	1	-	0	1	0
17:00	74.075	42.26	0	0	71.797	15.399	0	0	0	21.147	0	0	717.3477821	0	85.9961	-	-	-	-	-	-	0	2	0
17:15	80.461	37.888	0	0	55.679	25.665	0	0	0	19.737	0	0	685.5192772	0	73.3081	-	-	-	-	-	-	0	3	0
17:30	57.472	48.089	0	0	49.818	8.9828	0	0	0	26.786	0	0	628.9149416	0	56.3909	-	-	-	-	-	-	0	4	0
17:45	48.532	46.631	0	0	36.631	17.966	0	0	0	18.327	0	0	595.9782236	0	33.8345	-	-	-	-	-	-	0	0	0
18:00	60.027	46.631	0	0	38.096	26.948	0	0	0	8.4586	0	0	545.3895806	0	23.9661	-	-	-	-	-	-	0	0	0
18:15	51.086	26.23	0	0	43.957	21.815	0	0	0	2.8195	0	0	484.5990533	0	25.3759	-	-	-	-	-	-	0	0	0
18:30	43.423	18.944	0	0	60.075	8.9828	0	0	0	4.2293	0	0	438.5349755	0	25.3759	-	-	-	-	-	-	0	0	0
18:45	47.255	18.944	0	0	27.84	5.133	0	0	0	8.4586	0	0	404.852862	0	28.1954	-	-	-	-	-	-	0	0	0
19:00	38.315	23.316	0	0	35.166	14.116	0	0	0	9.8684	0	0	372.5325747	0	22.5564	-	-	-	-	-	-	0	0	0
19:15	26.82	24.773	0	0	35.166	10.266	0	0	0	2.8195	0	0	261.6202256	0	12.6879	-	-	-	-	-	-	0	0	0
19:30	34.483	23.316	0	0	21.979	17.966	0	0	0	7.0489	0	0	164.5948565	0	9.8684	-	-	-	-	-	-	0	0	0
19:45	22.989	18.944	0	0	14.652	10.266	0	0	0	2.8195	0	0	66.85146726	0	2.81954	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						0	9	2
															Signal Warranted?						Yes		
															Notes								

Weekday Mill Street/Imi Kala Street 4-Hour Signal Warrant

Thursday, October 5, 2017

	Mill Street						Imi Kala Street			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction: 0%			RT Reduction: 100%												
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	70.51219217	0	5.63909			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	145.3486226	0	9.8684			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	241.9176725	0	16.9173			0	0	0	0
6:00	19.157	21.859	0	0	20.513	8.9828	0	0	0	5.6391	0	0	419.1155243	0	20.5996			0	0	0	0
6:15	29.375	27.687	0	0	8.7915	8.9828	0	0	0	4.2293	0	0	526.287507	0	27.8489			0	0	0	0
6:30	29.375	39.345	0	0	17.583	10.266	0	0	0	7.0489	0	0	717.0022336	0	38.3491			0	0	0	0
6:45	63.031	56.487	0	0	32.316	25.363	0	0	0	3.6824	0	0	956.7561079	0	42.3474			0	0	0	0
7:00	77.439	50.211	0	0	26.257	23.778	0	0	0	12.888	0	0	1045.308213	0	51.3529			0	0	0	0
7:15	109.85	58.056	0	0	70.692	26.948	0	0	0	14.73	0	0	1087.339703	0	52.5623			0	0	0	0
7:30	127.86	73.747	0	0	103.01	31.704	0	0	0	11.047	0	0	1000.038402	0	56.1598			0	0	0	0
7:45	102.17	68.49	0	0	63.006	32.081	0	0	0	12.688	0	0	835.1860234	0	66.2593			0	0	0	0
8:00	90.678	53.918	0	0	46.888	28.232	0	0	0	14.098	0	0	746.9457583	0	81.7668			0	0	0	0
8:15	58.749	55.375	0	0	41.027	23.099	0	0	0	18.327	0	0	709.3386967	0	93.045			0	0	0	0
8:30	63.858	52.46	0	0	30.77	24.382	0	0	0	21.147	0	0	*722.5223641*	0	105.733			0	0	0	0
8:45	61.304	55.375	0	0	35.166	25.665	0	0	0	28.195	0	0	765.9139451	0	104.323			0	0	0	0
9:00	54.918	55.375	0	0	51.284	20.532	0	0	0	25.376	0	0	813.552154	0	97.2743			0	0	0	0
9:15	80.461	42.26	0	0	36.631	32.081	0	0	0	31.015	0	0	830.5933027	0	95.8645			0	0	0	0
9:30	70.244	53.918	0	0	48.353	42.347	0	0	0	19.737	0	0	839.5619958	0	90.2254			0	0	0	0
9:45	100.9	56.832	0	0	46.888	20.532	0	0	0	21.147	0	0	854.2329565	0	102.913			0	0	0	0
10:00	61.304	52.46	0	0	46.888	38.498	0	0	0	23.966	0	0	863.7559532	0	105.733			0	0	0	0
10:15	72.798	48.089	0	0	51.284	28.232	0	0	0	25.376	0	0	922.5499998	0	125.47	1		0	1	1	1
10:30	89.401	67.033	0	0	51.284	21.815	0	0	0	32.425	0	0	954.6847761	0	131.109	1		0	2	1	2
10:45	97.064	61.204	0	0	46.888	29.515	0	0	0	23.966	0	0	928.1924215	0	128.289	1		0	3	1	3
11:00	83.015	71.404	0	0	58.61	44.914	0	0	0	43.703	0	0	925.9899028	0	126.879	1		0	4	1	4
11:15	89.401	55.375	0	0	55.679	32.081	0	0	0	31.015	0	0	878.1459188	0	102.913			0	0	0	0
11:30	89.401	55.375	0	0	35.166	23.099	0	0	0	29.605	0	0	880.6601692	0	112.782			0	0	0	0
11:45	97.064	61.204	0	0	49.818	24.382	0	0	0	22.556	0	0	922.9296363	0	107.143			0	0	0	0
12:00	79.184	46.631	0	0	48.353	35.931	0	0	0	19.737	0	0	903.0689036	0	104.323			0	0	0	0
12:15	91.956	62.661	0	0	48.353	32.081	0	0	0	40.883	0	0	887.6528545	0	118.421			0	0	0	0
12:30	108.56	49.546	0	0	61.54	25.665	0	0	0	23.966	0	0	870.6555995	0	105.733			0	0	0	0
12:45	88.124	49.546	0	0	45.423	29.515	0	0	0	19.737	0	0	836.9018263	0	105.733			0	0	0	0
13:00	83.015	48.089	0	0	36.631	26.948	0	0	0	33.835	0	0	839.8775167	0	111.372			0	0	0	0
13:15	97.064	51.003	0	0	46.888	23.099	0	0	0	28.195	0	0	881.3686694	0	107.143			0	0	0	0
13:30	68.967	55.375	0	0	51.284	35.931	0	0	0	23.966	0	0	899.5882515	0	109.962			0	0	0	0
13:45	90.678	40.803	0	0	46.888	37.214	0	0	0	25.376	0	0	990.629299	0	105.733	1		0	1	1	1
14:00	106	48.089	0	0	51.284	30.798	0	0	0	29.605	0	0	991.8693139	0	98.684			0	2	0	2
14:15	104.73	62.661	0	0	48.353	20.532	0	0	0	31.015	0	0	1001.374382	0	98.684			0	3	0	3
14:30	98.341	65.576	0	0	104.03	34.648	0	0	0	19.737	0	0	1012.022681	0	94.4547			0	4	0	4
14:45	68.967	64.118	0	0	43.957	39.781	0	0	0	18.327	0	0	951.2720833	0	112.782	1		0	1	1	1
15:00	91.956	61.204	0	0	63.006	29.515	0	0	0	29.605	0	0	980.6859388	0	125.47	1		0	2	1	2
15:15	100.9	62.661	0	0	51.284	32.081	0	0	0	26.786	0	0	960.4118528	0	129.699	1		0	3	1	3
15:30	102.17	51.003	0	0	63.006	25.665	0	0	0	38.064	0	0	943.8430844	0	125.47	1		0	4	1	4
15:45	84.293	64.118	0	0	74.728	23.099	0	0	0	31.015	0	0	950.7517815	0	109.962			0	0	0	0
16:00	83.015	56.832	0	0	58.61	26.948	0	0	0	33.835	0	0	960.3967958	0	100.094			0	0	0	0
16:15	71.521	64.118	0	0	70.332	24.382	0	0	0	22.556	0	0	938.5222762	0	87.4059			0	0	0	0
16:30	113.67	52.46	0	0	55.679	26.948	0	0	0	22.556	0	0	907.8629578	0	84.5863			0	0	0	0
16:45	98.341	65.576	0	0	68.867	23.099	0	0	0	21.147	0	0	823.4696052	0	88.8156			0	0	0	0
17:00	74.075	42.26	0	0	71.797	15.399	0	0	0	21.147	0	0	717.3477821	0	85.9961			0	0	0	0
17:15	80.461	37.888	0	0	55.679	25.665	0	0	0	19.737	0	0	685.5192772	0	73.3081			0	0	0	0
17:30	57.472	48.089	0	0	49.818	8.9828	0	0	0	26.786	0	0	628.9149416	0	56.3909			0	0	0	0
17:45	48.532	46.631	0	0	36.631	17.966	0	0	0	18.327	0	0	595.9782236	0	33.8345			0	0	0	0
18:00	60.027	46.631	0	0	38.096	26.948	0	0	0	8.4586	0	0	545.3895806	0	23.9661			0	0	0	0
18:15	51.086	26.23	0	0	43.957	21.815	0	0	0	2.8195	0	0	484.5990533	0	25.3759			0	0	0	0
18:30	43.423	18.944	0	0	60.075	8.9828	0	0	0	4.2293	0	0	438.5349755	0	25.3759			0	0	0	0
18:45	47.255	18.944	0	0	27.84	5.133	0	0	0	8.4586	0	0	404.852862	0	28.1954			0	0	0	0
19:00	38.315	23.316	0	0	35.166	14.116	0	0	0	9.8684	0	0	372.5325747	0	22.5564			0	0	0	0
19:15	26.82	24.773	0	0	35.166	10.266	0	0	0	2.8195	0	0	261.6202256	0	12.6879			0	0	0	0
19:30	34.483	23.316	0	0	21.979	17.966	0	0	0	7.0489	0	0	164.5948565	0	9.8684			0	0	0	0
19:45	22.989	18.944	0	0	14.652	10.266	0	0	0	2.8195	0	0	66.85146726	0	2.81954			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	3
Signal Warranted?	No


4-Hour Warrant (100%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
951.2720833, 112.7817621
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

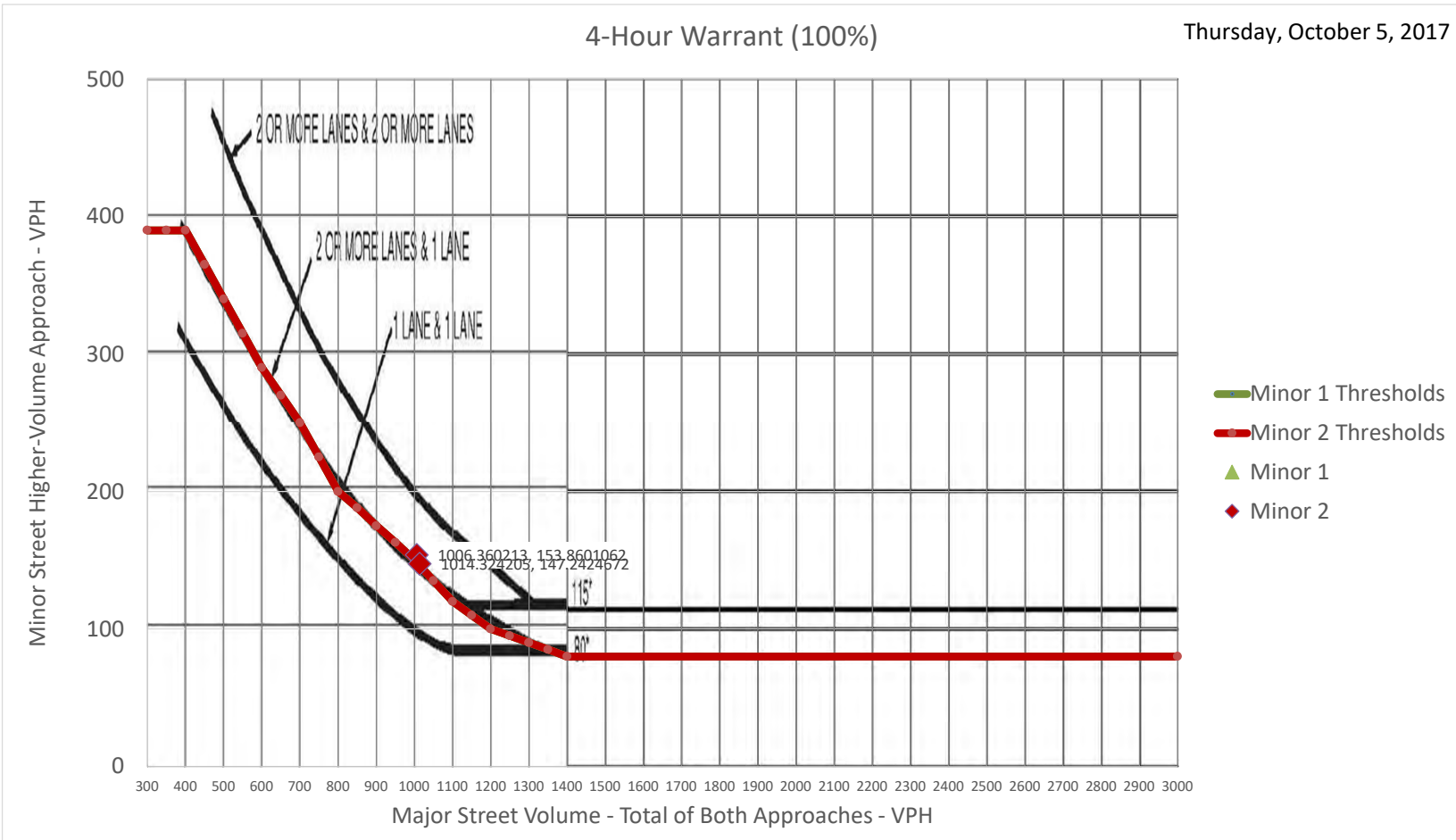
Mill Street/Imi Kala Street
Base Year With Imi Kala Street Extension

Weekday Mill Street/Imi Kala Street 4-Hour Signal Warrant

Thursday, October 5, 2017

	Mill Street						Imi Kala Street			0			100 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	2						1			1											
							RT Reduction: 0%			RT Reduction: 100%											
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	71.68881726	0	6.61764			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	151.4870186	0	11.5809			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	250.7418676	0	19.8529			0	0	0	0
6:00	21.424	20.27	0	0	15.264	14.731	0	0	0	6.6176	0	0	423.9745207	0	25.5498			0	0	0	0
6:15	32.851	25.675	0	0	6.5417	14.731	0	0	0	4.9632	0	0	526.5453699	0	38.8714			0	0	0	0
6:30	32.851	36.486	0	0	13.083	16.835	0	0	0	8.272	0	0	700.5832815	0	56.6959			0	0	0	0
6:45	60.772	51	0	0	26.845	34.616	0	0	0	5.6969	0	0	920.0302098	0	65.5146			0	0	0	0
7:00	74.662	45.333	0	0	21.812	32.452	0	0	0	19.939	0	0	1024.064589	0	74.7073			0	0	0	0
7:15	105.92	52.417	0	0	58.724	36.779	0	0	0	22.788	0	0	1082.397894	0	71.3122			0	0	0	0
7:30	123.28	66.583	0	0	85.569	43.27	0	0	0	17.091	0	0	1014.020193	0	70.0319			0	0	0	0
7:45	114.26	63.512	0	0	46.882	52.61	0	0	0	14.89	0	0	878.2597873	0	77.7573			0	0	0	0
8:00	101.41	49.999	0	0	34.889	46.297	0	0	0	16.544	0	0	789.1554247	0	95.9558			0	0	0	0
8:15	65.701	51.35	0	0	30.528	37.879	0	0	0	21.507	0	0	741.1591495	0	109.191			0	0	0	0
8:30	71.414	48.648	0	0	22.896	39.984	0	0	0	24.816	0	0	*764.738061*	0	124.081			0	0	0	0
8:45	68.558	51.35	0	0	26.167	42.088	0	0	0	33.088	0	0	815.7756735	0	122.426			0	0	0	0
9:00	61.416	51.35	0	0	38.16	33.67	0	0	0	29.779	0	0	861.7085582	0	114.154			0	0	0	0
9:15	89.982	39.188	0	0	27.257	52.61	0	0	0	36.397	0	0	892.3380459	0	112.5			0	0	0	0
9:30	78.556	49.999	0	0	35.979	69.445	0	0	0	23.162	0	0	893.7631987	0	105.882			0	0	0	0
9:45	112.83	52.702	0	0	34.889	33.67	0	0	0	24.816	0	0	895.8596701	0	120.772			0	0	0	0
10:00	68.558	48.648	0	0	34.889	63.132	0	0	0	28.125	0	0	910.3595417	0	124.081			0	0	0	0
10:15	81.412	44.594	0	0	38.16	46.297	0	0	0	29.779	0	0	971.4518361	0	147.242			0	0	0	0
10:30	99.98	62.161	0	0	38.16	35.775	0	0	0	38.051	0	0	1006.360213	0	153.86	1		0	1	1	1
10:45	108.55	56.756	0	0	34.889	48.401	0	0	0	28.125	0	0	985.6609711	0	150.551			0	2	0	2
11:00	92.839	66.215	0	0	43.611	73.654	0	0	0	51.287	0	0	979.4239458	0	148.897			0	3	0	3
11:15	99.98	51.35	0	0	41.431	52.61	0	0	0	36.397	0	0	929.8038734	0	120.772			0	4	0	4
11:30	99.98	51.35	0	0	26.167	37.879	0	0	0	34.743	0	0	933.9656847	0	132.353			0	0	0	0
11:45	108.55	56.756	0	0	37.069	39.984	0	0	0	26.471	0	0	973.8184804	0	125.735			0	0	0	0
12:00	88.554	43.242	0	0	35.979	58.923	0	0	0	23.162	0	0	958.1566219	0	122.426			0	0	0	0
12:15	102.84	58.107	0	0	35.979	52.61	0	0	0	47.978	0	0	940.3398313	0	138.97			0	0	0	0
12:30	121.4	45.945	0	0	45.792	42.088	0	0	0	28.125	0	0	919.421351	0	124.081			0	0	0	0
12:45	98.552	45.945	0	0	33.799	48.401	0	0	0	23.162	0	0	889.7529421	0	124.081			0	0	0	0
13:00	92.839	44.594	0	0	27.257	44.192	0	0	0	39.706	0	0	898.2182197	0	130.698			0	0	0	0
13:15	108.55	47.296	0	0	34.889	37.879	0	0	0	33.088	0	0	941.1433548	0	125.735			0	0	0	0
13:30	77.128	51.35	0	0	38.16	58.923	0	0	0	28.125	0	0	957.4051611	0	129.044			0	0	0	0
13:45	101.41	37.837	0	0	34.889	61.027	0	0	0	29.779	0	0	1036.860623	0	124.081			0	0	0	0
14:00	118.55	44.594	0	0	38.16	50.505	0	0	0	34.743	0	0	1036.229148	0	115.809			0	0	0	0
14:15	117.12	58.107	0	0	35.979	33.67	0	0	0	36.397	0	0	1039.297716	0	115.809			0	0	0	0
14:30	109.98	60.81	0	0	77.41	56.819	0	0	0	23.162	0	0	1056.132959	0	110.845			0	0	0	0
14:45	77.128	59.458	0	0	32.708	65.236	0	0	0	21.507	0	0	1001.646068	0	132.353			0	0	0	0
15:00	102.84	56.756	0	0	46.882	48.401	0	0	0	34.743	0	0	1014.324205	0	147.242	1		0	1	1	1
15:15	112.83	58.107	0	0	38.16	52.61	0	0	0	31.434	0	0	992.7925976	0	152.206	1		0	2	1	2
15:30	114.26	47.296	0	0	46.882	42.088	0	0	0	44.669	0	0	962.8405305	0	147.242			0	3	0	3
15:45	94.267	59.458	0	0	55.604	37.879	0	0	0	36.397	0	0	973.699456	0	129.044			0	4	0	4
16:00	92.839	52.702	0	0	43.611	44.192	0	0	0	39.706	0	0	986.4008393	0	117.463			0	0	0	0
16:15	79.984	59.458	0	0	52.333	39.984	0	0	0	26.471	0	0	953.7625233	0	102.573			0	0	0	0
16:30	127.12	48.648	0	0	41.431	44.192	0	0	0	26.471	0	0	930.6383336	0	99.2646			0	0	0	0
16:45	109.98	60.81	0	0	51.243	37.879	0	0	0	24.816	0	0	829.91706	0	104.228			0	0	0	0
17:00	82.841	39.188	0	0	53.424	25.253	0	0	0	24.816	0	0	724.2429505	0	100.919			0	0	0	0
17:15	89.982	35.134	0	0	41.431	42.088	0	0	0	23.162	0	0	706.4489406	0	86.0293			0	0	0	0
17:30	64.273	44.594	0	0	37.069	14.731	0	0	0	31.434	0	0	647.7523281	0	66.1764			0	0	0	0
17:45	54.275	43.242	0	0	27.257	29.462	0	0	0	21.507	0	0	612.6466201	0	39.7058			0	0	0	0
18:00	67.13	43.242	0	0	28.347	44.192	0	0	0	9.9265	0	0	557.9575682	0	28.125			0	0	0	0
18:15	57.132	24.324	0	0	32.708	35.775	0	0	0	3.3088	0	0	488.8309893	0	29.7794			0	0	0	0
18:30	48.562	17.567	0	0	44.701	14.731	0	0	0	4.9632	0	0	434.8609811	0	29.7794			0	0	0	0
18:45	52.847	17.567	0	0	20.715	8.4176	0	0	0	9.9265	0	0	415.3005027	0	33.0882			0	0	0	0
19:00	42.849	21.621	0	0	26.167	23.148	0	0	0	11.581	0	0	386.7681199	0	26.4706			0	0	0	0
19:15	29.994	22.973	0	0	26.167	16.835	0	0	0	3.3088	0	0	272.9833125	0	14.8897			0	0	0	0
19:30	38.564	21.621	0	0	16.354	29.462	0	0	0	8.272	0	0	177.0149566	0	11.5809			0	0	0	0
19:45	25.709	17.567	0	0	10.903	16.835	0	0	0	3.3088	0	0	71.01432036	0	3.30882			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	2
Signal Warranted?	No


4-Hour Warrant (100%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
1006.360213, 153.8601062
1014.324205, 147.2424672
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Mill Street/Imi Kala Street 8-Hour Signal Warrant

Thursday, October 5, 2017

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Mill Street						Imi Kala Street			0			100 % Warrant			Minor 1 (NB)				Minor 1 (SB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			600	900	720	600	900	720			
	2						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	71.68881726	0	6.61764	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	151.4870186	0	11.5809	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	250.7418676	0	19.8529	-	-	-	-	-	-	0	0	0
6:00	21.424	20.27	0	0	15.264	14.731	0	0	0	6.6176	0	0	423.9745207	0	25.5498	-	-	-	-	-	-	0	0	0
6:15	32.851	25.675	0	0	6.5417	14.731	0	0	0	4.9632	0	0	526.5453699	0	38.8714	-	-	-	-	-	-	0	0	0
6:30	32.851	36.486	0	0	13.083	16.835	0	0	0	8.272	0	0	700.5832815	0	56.6959	-	-	-	-	-	-	0	0	0
6:45	60.772	51	0	0	26.845	34.616	0	0	0	5.6969	0	0	920.0302098	0	65.5146	-	-	-	-	-	-	0	0	0
7:00	74.662	45.333	0	0	21.812	32.452	0	0	0	19.939	0	0	1024.064589	0	74.7073	-	-	-	-	-	-	0	0	0
7:15	105.92	52.417	0	0	58.724	36.779	0	0	0	22.788	0	0	1082.397894	0	71.3122	-	-	-	-	-	-	0	0	0
7:30	123.28	66.583	0	0	85.569	43.27	0	0	0	17.091	0	0	1014.020193	0	70.0319	-	-	-	-	-	-	0	0	0
7:45	114.26	63.512	0	0	46.882	52.61	0	0	0	14.89	0	0	878.2597873	0	77.7573	-	-	-	-	-	-	0	0	0
8:00	101.41	49.999	0	0	34.889	46.297	0	0	0	16.544	0	0	789.1554247	0	95.9558	-	-	-	-	-	-	0	0	0
8:15	65.701	51.35	0	0	30.528	37.879	0	0	0	21.507	0	0	741.1591495	0	109.191	-	-	-	-	-	-	0	0	0
8:30	71.414	48.648	0	0	22.896	39.984	0	0	0	24.816	0	0	*764.738061*	0	124.081	-	-	-	-	-	1	0	0	1
8:45	68.558	51.35	0	0	26.167	42.088	0	0	0	33.088	0	0	815.7756735	0	122.426	-	-	-	-	-	1	0	0	2
9:00	61.416	51.35	0	0	38.16	33.67	0	0	0	29.779	0	0	861.7085582	0	114.154	-	-	-	-	-	-	0	0	3
9:15	89.982	39.188	0	0	27.257	52.61	0	0	0	36.397	0	0	892.3380459	0	112.5	-	-	-	-	-	-	0	0	4
9:30	78.556	49.999	0	0	35.979	69.445	0	0	0	23.162	0	0	893.7631987	0	105.882	-	-	-	-	-	-	0	0	0
9:45	112.83	52.702	0	0	34.889	33.67	0	0	0	24.816	0	0	895.8596701	0	120.772	-	-	-	-	-	1	0	0	1
10:00	68.558	48.648	0	0	34.889	63.132	0	0	0	28.125	0	0	910.3595417	0	124.081	-	-	-	-	1	1	0	1	2
10:15	81.412	44.594	0	0	38.16	46.297	0	0	0	29.779	0	0	971.4518361	0	147.242	-	-	-	-	1	1	0	2	3
10:30	99.98	62.161	0	0	38.16	35.775	0	0	0	38.051	0	0	1006.360213	0	153.86	-	-	-	1	1	1	1	3	4
10:45	108.55	56.756	0	0	34.889	48.401	0	0	0	28.125	0	0	985.6609711	0	150.551	-	-	-	1	1	1	2	4	1
11:00	92.839	66.215	0	0	43.611	73.654	0	0	0	51.287	0	0	979.4239458	0	148.897	-	-	-	-	1	1	3	1	2
11:15	99.98	51.35	0	0	41.431	52.61	0	0	0	36.397	0	0	929.8038734	0	120.772	-	-	-	-	1	1	4	2	3
11:30	99.98	51.35	0	0	26.167	37.879	0	0	0	34.743	0	0	933.9656847	0	132.353	-	-	-	-	1	1	0	3	4
11:45	108.55	56.756	0	0	37.069	39.984	0	0	0	26.471	0	0	973.8184804	0	125.735	-	-	-	-	1	1	0	4	1
12:00	88.554	43.242	0	0	35.979	58.923	0	0	0	23.162	0	0	958.1566219	0	122.426	-	-	-	-	1	1	0	1	2
12:15	102.84	58.107	0	0	35.979	52.61	0	0	0	47.978	0	0	940.3398313	0	138.97	-	-	-	-	1	1	0	2	3
12:30	121.4	45.945	0	0	45.792	42.088	0	0	0	28.125	0	0	919.421351	0	124.081	-	-	-	-	1	1	0	3	4
12:45	98.552	45.945	0	0	33.799	48.401	0	0	0	23.162	0	0	889.7529421	0	124.081	-	-	-	-	-	1	0	4	1
13:00	92.839	44.594	0	0	27.257	44.192	0	0	0	39.706	0	0	898.2182197	0	130.698	-	-	-	-	-	1	0	0	2
13:15	108.55	47.296	0	0	34.889	37.879	0	0	0	33.088	0	0	941.1433548	0	125.735	-	-	-	-	1	1	0	1	3
13:30	77.128	51.35	0	0	38.16	58.923	0	0	0	28.125	0	0	957.4051611	0	129.044	-	-	-	-	1	1	0	2	4
13:45	101.41	37.837	0	0	34.889	61.027	0	0	0	29.779	0	0	1036.860623	0	124.081	-	-	-	-	1	1	0	3	1
14:00	118.55	44.594	0	0	38.16	50.505	0	0	0	34.743	0	0	1036.229148	0	115.809	-	-	-	-	1	-	0	4	2
14:15	117.12	58.107	0	0	35.979	33.67	0	0	0	36.397	0	0	1039.297716	0	115.809	-	-	-	-	1	-	0	1	3
14:30	109.98	60.81	0	0	77.41	56.819	0	0	0	23.162	0	0	1056.132959	0	110.845	-	-	-	-	1	-	0	2	4
14:45	77.128	59.458	0	0	32.708	65.236	0	0	0	21.507	0	0	1001.646068	0	132.353	-	-	-	-	1	1	0	3	1
15:00	102.84	56.756	0	0	46.882	48.401	0	0	0	34.743	0	0	1014.324205	0	147.242	-	-	-	-	1	1	0	4	2
15:15	112.83	58.107	0	0	38.16	52.61	0	0	0	31.434	0	0	992.7925976	0	152.206	-	-	-	1	1	1	1	1	3
15:30	114.26	47.296	0	0	46.882	42.088	0	0	0	44.669	0	0	962.8405305	0	147.242	-	-	-	-	1	1	2	2	4
15:45	94.267	59.458	0	0	55.604	37.879	0	0	0	36.397	0	0	973.699456	0	129.044	-	-	-	-	1	1	3	3	1
16:00	92.839	52.702	0	0	43.611	44.192	0	0	0	39.706	0	0	986.4008393	0	117.463	-	-	-	-	1	-	4	4	2
16:15	79.984	59.458	0	0	52.333	39.984	0	0	0	26.471	0	0	953.7625233	0	102.573	-	-	-	-	1	-	0	1	3
16:30	127.12	48.648	0	0	41.431	44.192	0	0	0	26.471	0	0	930.6383336	0	99.2646	-	-	-	-	1	-	0	2	4
16:45	109.98	60.81	0	0	51.243	37.879	0	0	0	24.816	0	0	829.91706	0	104.228	-	-	-	-	-	-	0	3	0
17:00	82.841	39.188	0	0	53.424	25.253	0	0	0	24.816	0	0	724.2429505	0	100.919	-	-	-	-	-	-	0	4	0
17:15	89.982	35.134	0	0	41.431	42.088	0	0	0	23.162	0	0	706.4489406	0	86.0293	-	-	-	-	-	-	0	0	0
17:30	64.273	44.594	0	0	37.069	14.731	0	0	0	31.434	0	0	647.7523281	0	66.1764	-	-	-	-	-	-	0	0	0
17:45	54.275	43.242	0	0	27.257	29.462	0	0	0	21.507	0	0	612.6466201	0	39.7058	-	-	-	-	-	-	0	0	0
18:00	67.13	43.242	0	0	28.347	44.192	0	0	0	9.9265	0	0	557.9575682	0	28.125	-	-	-	-	-	-	0	0	0
18:15	57.132	24.324	0	0	32.708	35.775	0	0	0	3.3088	0	0	488.8309893	0	29.7794	-	-	-	-	-	-	0	0	0
18:30	48.562	17.567	0	0	44.701	14.731	0	0	0	4.9632	0	0	434.8609811	0	29.7794	-	-	-	-	-	-	0	0	0
18:45	52.847	17.567	0	0	20.715	8.4176	0	0	0	9.9265	0	0	415.3005027	0	33.0882	-	-	-	-	-	-	0	0	0
19:00	42.849	21.621	0	0	26.167	23.148	0	0	0	11.581	0	0	386.7681199	0	26.4706	-	-	-	-	-	-	0	0	0
19:15	29.994	22.973	0	0	26.167	16.835	0	0	0	3.3088	0	0	272.9833125	0	14.8897	-	-	-	-	-	-	0	0	0
19:30	38.564	21.621	0	0	16.354	29.462	0	0	0	8.272	0	0	177.0149566	0	11.5809	-	-	-	-	-	-	0	0	0
19:45	25.709	17.567	0	0	10.903	16.835	0	0	0	3.3088	0	0	71.01432036	0	3.30882	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:							2	7	8
															Signal Warranted?							Yes		
															Notes							A+B Warrant requires remedial measures in avance of installation of signal.		

APPENDIX D

SIGNAL WARRANT ANALYSIS

Mill Street/Imi Kala Street
Future Year Without Imi Kala Street Extension

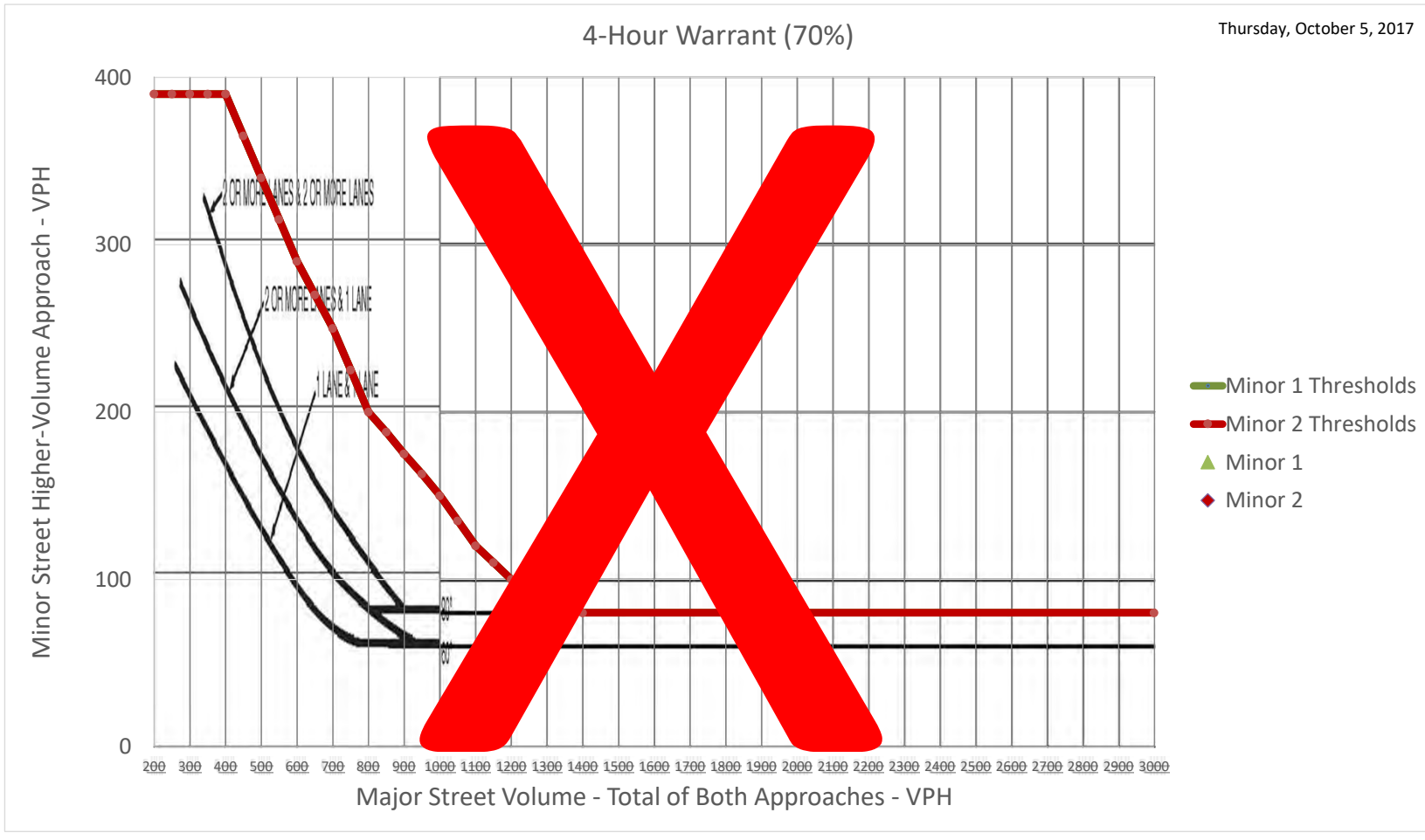
Weekday Mill Street/Imi Kala Street 4-Hour Signal Warrant

Thursday, October 5, 2017

	Mill Street						Imi Kala Street			0			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	2						1			1												
							RT Reduction:	0%		RT Reduction:	100%											
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	71.84627378	0	5.63909			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	148.0370995	0	9.8684			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	246.4051061	0	16.9173			0	0	0	0
6:00	19.555	22.269	0	0	21.04	8.9828	0	0	0	5.6391	0	0	426.6279721	0	20.5996			0	0	0	0
6:15	29.984	28.207	0	0	9.0172	8.9828	0	0	0	4.2293	0	0	535.6275578	0	27.8489			0	0	0	0
6:30	29.984	40.084	0	0	18.034	10.266	0	0	0	7.0489	0	0	729.560266	0	38.3491			0	0	0	0
6:45	64.503	57.686	0	0	32.671	25.363	0	0	0	3.6824	0	0	973.1955116	0	42.3474			0	0	0	0
7:00	79.246	51.276	0	0	26.545	23.778	0	0	0	12.888	0	0	1063.743728	0	51.3529			0	0	0	0
7:15	112.42	59.288	0	0	71.467	26.948	0	0	0	14.73	0	0	1106.709055	0	52.5623			0	0	0	0
7:30	130.85	75.312	0	0	104.14	31.704	0	0	0	11.047	0	0	1018.145984	0	56.1598			0	0	0	0
7:45	104.29	69.776	0	0	64.623	32.081	0	0	0	12.688	0	0	850.7117617	0	66.2593			0	0	0	0
8:00	92.558	54.93	0	0	48.092	28.232	0	0	0	14.098	0	0	760.66347	0	81.7668			0	0	0	0
8:15	59.967	56.415	0	0	42.08	23.099	0	0	0	18.327	0	0	722.4553713	0	93.045			0	0	0	0
8:30	65.182	53.445	0	0	31.56	24.382	0	0	0	21.147	0	0	*735.7299952*	0	105.733			0	0	0	0
8:45	62.574	56.415	0	0	36.069	25.665	0	0	0	28.195	0	0	779.7326629	0	104.323			0	0	0	0
9:00	56.056	56.415	0	0	52.6	20.532	0	0	0	25.376	0	0	828.5197965	0	97.2743			0	0	0	0
9:15	82.129	43.053	0	0	37.572	32.081	0	0	0	31.015	0	0	845.5257484	0	95.8645			0	0	0	0
9:30	71.7	54.93	0	0	49.594	42.347	0	0	0	19.737	0	0	854.8211805	0	90.2254			0	0	0	0
9:45	102.99	57.899	0	0	48.092	20.532	0	0	0	21.147	0	0	870.2107	0	102.913			0	0	0	0
10:00	62.574	53.445	0	0	48.092	38.498	0	0	0	23.966	0	0	879.7363584	0	105.733			0	0	0	0
10:15	74.307	48.992	0	0	52.6	28.232	0	0	0	25.376	0	0	939.6370307	0	125.47			0	0	0	0
10:30	91.254	68.291	0	0	52.6	21.815	0	0	0	32.425	0	0	972.3655939	0	131.109			0	0	0	0
10:45	99.076	62.353	0	0	48.092	29.515	0	0	0	23.966	0	0	945.24061	0	128.289			0	0	0	0
11:00	84.736	72.745	0	0	60.114	44.914	0	0	0	43.703	0	0	943.1133184	0	126.879			0	0	0	0
11:15	91.254	56.415	0	0	57.109	32.081	0	0	0	31.015	0	0	894.4615012	0	102.913			0	0	0	0
11:30	91.254	56.415	0	0	36.069	23.099	0	0	0	29.605	0	0	896.9774292	0	112.782			0	0	0	0
11:45	99.076	62.353	0	0	51.097	24.382	0	0	0	22.556	0	0	940.2115922	0	107.143			0	0	0	0
12:00	80.825	47.507	0	0	49.594	35.931	0	0	0	19.737	0	0	919.8338294	0	104.323			0	0	0	0
12:15	93.862	63.838	0	0	49.594	32.081	0	0	0	40.883	0	0	904.22365	0	118.421			0	0	0	0
12:30	110.81	50.476	0	0	63.12	25.665	0	0	0	23.966	0	0	887.0757926	0	105.733			0	0	0	0
12:45	89.951	50.476	0	0	46.589	29.515	0	0	0	19.737	0	0	852.3475083	0	105.733			0	0	0	0
13:00	84.736	48.992	0	0	37.572	26.948	0	0	0	33.835	0	0	855.2495978	0	111.372			0	0	0	0
13:15	99.076	51.961	0	0	48.092	23.099	0	0	0	28.195	0	0	897.5933962	0	107.143			0	0	0	0
13:30	70.396	56.415	0	0	52.6	35.931	0	0	0	23.966	0	0	916.2283086	0	109.962			0	0	0	0
13:45	92.558	41.569	0	0	48.092	37.214	0	0	0	25.376	0	0	1009.423838	0	105.733			0	0	0	0
14:00	108.2	48.992	0	0	52.6	30.798	0	0	0	29.605	0	0	1010.576349	0	98.684			0	0	0	0
14:15	106.9	63.838	0	0	49.594	20.532	0	0	0	31.015	0	0	1020.337365	0	98.684			0	0	0	0
14:30	100.38	66.807	0	0	106.7	34.648	0	0	0	19.737	0	0	1030.981473	0	94.4547			0	0	0	0
14:45	70.396	65.322	0	0	45.086	39.781	0	0	0	18.327	0	0	968.9835136	0	112.782			0	0	0	0
15:00	93.862	62.353	0	0	64.623	29.515	0	0	0	29.605	0	0	999.5049273	0	125.47			0	0	0	0
15:15	102.99	63.838	0	0	52.6	32.081	0	0	0	26.786	0	0	978.8506112	0	129.699			0	0	0	0
15:30	104.29	51.961	0	0	64.623	25.665	0	0	0	38.064	0	0	962.1893053	0	125.47			0	0	0	0
15:45	86.04	65.322	0	0	76.646	23.099	0	0	0	31.015	0	0	969.1755495	0	109.962			0	0	0	0
16:00	84.736	57.899	0	0	60.114	26.948	0	0	0	33.835	0	0	978.9886701	0	100.094			0	0	0	0
16:15	73.004	65.322	0	0	72.137	24.382	0	0	0	22.556	0	0	956.9937632	0	87.4059			0	0	0	0
16:30	116.02	53.445	0	0	57.109	26.948	0	0	0	22.556	0	0	925.6511385	0	84.5863			0	0	0	0
16:45	100.38	66.807	0	0	70.635	23.099	0	0	0	21.147	0	0	839.8604495	0	88.8156			0	0	0	0
17:00	75.611	43.053	0	0	73.64	15.399	0	0	0	21.147	0	0	731.5230096	0	85.9961			0	0	0	0
17:15	82.129	38.599	0	0	57.109	25.665	0	0	0	19.737	0	0	698.620272	0	73.3081			0	0	0	0
17:30	58.664	48.992	0	0	51.097	8.9828	0	0	0	26.786	0	0	640.887274	0	56.3909			0	0	0	0
17:45	49.538	47.507	0	0	37.572	17.966	0	0	0	18.327	0	0	607.3754505	0	33.8345			0	0	0	0
18:00	61.271	47.507	0	0	39.074	26.948	0	0	0	8.4586	0	0	556.0148133	0	23.9661			0	0	0	0
18:15	52.145	26.723	0	0	45.086	21.815	0	0	0	2.8195	0	0	494.2612617	0	25.3759			0	0	0	0
18:30	44.324	19.3	0	0	61.617	8.9828	0	0	0	4.2293	0	0	447.4411597	0	25.3759			0	0	0	0
18:45	48.234	19.3	0	0	28.554	5.133	0	0	0	8.4586	0	0	412.6778639	0	28.1954			0	0	0	0
19:00	39.109	23.754	0	0	36.069	14.116	0	0	0	9.8684	0	0	379.5160718	0	22.5564			0	0	0	0
19:15	27.376	25.238	0	0	36.069	10.266	0	0	0	2.8195	0	0	266.4690538	0	12.6879			0	0	0	0
19:30	35.198	23.754	0	0	22.543	17.966	0	0	0	7.0489	0	0	167.5199107	0	9.8684			0	0	0	0
19:45	23.465	19.3	0	0	15.029	10.266	0	0	0	2.8195	0	0	68.05979292	0	2.81954			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	0
Signal Warranted?	No


4-Hour Warrant (100%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Thursday, October 5, 2017
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Mill Street/Imi Kala Street 8-Hour Signal Warrant

Thursday, October 5, 2017

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Mill Street						Imi Kala Street			0			100 % Warrant			Minor 1 (NB)						Minor 1 (SB)						Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			600	900	720				600	900	720						
	2						1			1			Minor Threshold			150	75	120				150	75	120						
							RT Reduction: 0%			RT Reduction: 100%																				
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	71.84627378	0	5.63909	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	148.0370995	0	9.8684	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	246.4051061	0	16.9173	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
6:00	19.555	22.269	0	0	21.04	8.9828	0	0	0	5.6391	0	0	426.6279721	0	20.5996	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
6:15	29.984	28.207	0	0	9.0172	8.9828	0	0	0	4.2293	0	0	535.6275578	0	27.8489	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
6:30	29.984	40.084	0	0	18.034	10.266	0	0	0	7.0489	0	0	729.560266	0	38.3491	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
6:45	64.503	57.686	0	0	32.671	25.363	0	0	0	3.6824	0	0	973.1955116	0	42.3474	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
7:00	79.246	51.276	0	0	26.545	23.778	0	0	0	12.888	0	0	1063.743728	0	51.3529	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
7:15	112.42	59.288	0	0	71.467	26.948	0	0	0	14.73	0	0	1106.709055	0	52.5623	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
7:30	130.85	75.312	0	0	104.14	31.704	0	0	0	11.047	0	0	1018.145984	0	56.1598	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
7:45	104.29	69.776	0	0	64.623	32.081	0	0	0	12.688	0	0	850.7117617	0	66.2593	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
8:00	92.558	54.93	0	0	48.092	28.232	0	0	0	14.098	0	0	760.66347	0	81.7668	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
8:15	59.967	56.415	0	0	42.08	23.099	0	0	0	18.327	0	0	722.4553713	0	93.045	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
8:30	65.182	53.445	0	0	31.56	24.382	0	0	0	21.147	0	0	*735.7299952*	0	105.733	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
8:45	62.574	56.415	0	0	36.069	25.665	0	0	0	28.195	0	0	779.7326629	0	104.323	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
9:00	56.056	56.415	0	0	52.6	20.532	0	0	0	25.376	0	0	828.5197965	0	97.2743	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
9:15	82.129	43.053	0	0	37.572	32.081	0	0	0	31.015	0	0	845.5257484	0	95.8645	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
9:30	71.7	54.93	0	0	49.594	42.347	0	0	0	19.737	0	0	854.8211805	0	90.2254	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
9:45	102.99	57.899	0	0	48.092	20.532	0	0	0	21.147	0	0	870.2107	0	102.913	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
10:00	62.574	53.445	0	0	48.092	38.498	0	0	0	23.966	0	0	879.7363584	0	105.733	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
10:15	74.307	48.992	0	0	52.6	28.232	0	0	0	25.376	0	0	939.6370307	0	125.47	-	-	-	-	1	1	0	1	1	0	1	1	0	1	1
10:30	91.254	68.291	0	0	52.6	21.815	0	0	0	32.425	0	0	972.3655939	0	131.109	-	-	-	-	1	1	0	2	2	0	2	2	0	2	2
10:45	99.076	62.353	0	0	48.092	29.515	0	0	0	23.966	0	0	945.24061	0	128.289	-	-	-	-	1	1	0	3	3	0	3	3	0	3	3
11:00	84.736	72.745	0	0	60.114	44.914	0	0	0	43.703	0	0	943.1133184	0	126.879	-	-	-	-	1	1	0	4	4	0	4	4	0	4	4
11:15	91.254	56.415	0	0	57.109	32.081	0	0	0	31.015	0	0	894.4615012	0	102.913	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
11:30	91.254	56.415	0	0	36.069	23.099	0	0	0	29.605	0	0	896.9774292	0	112.782	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
11:45	99.076	62.353	0	0	51.097	24.382	0	0	0	22.556	0	0	940.2115922	0	107.143	-	-	-	-	1	-	0	1	0	0	1	0	0	1	0
12:00	80.825	47.507	0	0	49.594	35.931	0	0	0	19.737	0	0	919.8338294	0	104.323	-	-	-	-	1	-	0	2	0	0	2	0	0	2	0
12:15	93.862	63.838	0	0	49.594	32.081	0	0	0	40.883	0	0	904.22365	0	118.421	-	-	-	-	1	-	0	3	0	0	3	0	0	3	0
12:30	110.81	50.476	0	0	63.12	25.665	0	0	0	23.966	0	0	887.0757926	0	105.733	-	-	-	-	-	-	0	4	0	0	4	0	0	4	0
12:45	89.951	50.476	0	0	46.589	29.515	0	0	0	19.737	0	0	852.3475083	0	105.733	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
13:00	84.736	48.992	0	0	37.572	26.948	0	0	0	33.835	0	0	855.2495978	0	111.372	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
13:15	99.076	51.961	0	0	48.092	23.099	0	0	0	28.195	0	0	897.5933962	0	107.143	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
13:30	70.396	56.415	0	0	52.6	35.931	0	0	0	23.966	0	0	916.2283086	0	109.962	-	-	-	-	1	-	0	1	0	0	1	0	0	1	0
13:45	92.558	41.569	0	0	48.092	37.214	0	0	0	25.376	0	0	1009.423838	0	105.733	-	-	-	-	1	-	0	2	0	0	2	0	0	2	0
14:00	108.2	48.992	0	0	52.6	30.798	0	0	0	29.605	0	0	1010.576349	0	98.684	-	-	-	-	1	-	0	3	0	0	3	0	0	3	0
14:15	106.9	63.838	0	0	49.594	20.532	0	0	0	31.015	0	0	1020.337365	0	98.684	-	-	-	-	1	-	0	4	0	0	4	0	0	4	0
14:30	100.38	66.807	0	0	106.7	34.648	0	0	0	19.737	0	0	1030.981473	0	94.4547	-	-	-	-	1	-	0	1	0	0	1	0	0	1	0
14:45	70.396	65.322	0	0	45.086	39.781	0	0	0	18.327	0	0	968.9835136	0	112.782	-	-	-	-	1	-	0	2	0	0	2	0	0	2	0
15:00	93.862	62.353	0	0	64.623	29.515	0	0	0	29.605	0	0	999.5049273	0	125.47	-	-	-	-	1	1	0	3	1	0	3	1	0	3	1
15:15	102.99	63.838	0	0	52.6	32.081	0	0	0	26.786	0	0	978.8506112	0	129.699	-	-	-	-	1	1	0	4	2	0	4	2	0	4	2
15:30	104.29	51.961	0	0	64.623	25.665	0	0	0	38.064	0	0	962.1893053	0	125.47	-	-	-	-	1	1	0	1	3	0	1	3	0	1	3
15:45	86.04	65.322	0	0	76.646	23.099	0	0	0	31.015	0	0	969.1755495	0	109.962	-	-	-	-	1	-	0	2	4	0	2	4	0	2	4
16:00	84.736	57.899	0	0	60.114	26.948	0	0	0	33.835	0	0	978.9886701	0	100.094	-	-	-	-	1	-	0	3	0	0	3	0	0	3	0
16:15	73.004	65.322	0	0	72.137	24.382	0	0	0	22.556	0	0	956.9937632	0	87.4059	-	-	-	-	1	-	0	4	0	0	4	0	0	4	0
16:30	116.02	53.445	0	0	57.109	26.948	0	0	0	22.556	0	0	925.6511385	0	84.5863	-	-	-	-	1	-	0	1	0	0	1	0	0	1	0
16:45	100.38	66.807	0	0	70.635	23.099	0	0	0	21.147	0	0	839.8604495	0	88.8156	-	-	-	-	-	-	0	2	0	0	2	0	0	2	0
17:00	75.611	43.053	0	0	73.64	15.399	0	0	0	21.147	0	0	731.5230096	0	85.9961	-	-	-	-	-	-	0	3	0	0	3	0	0	3	0
17:15	82.129	38.599	0	0	57.109	25.665	0	0	0	19.737	0	0	698.620272	0	73.3081	-	-	-	-	-	-	0	4	0	0	4	0	0	4	0
17:30	58.664	48.992	0	0	51.097	8.9828	0	0	0	26.786	0	0	640.887274	0	56.3909	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
17:45	49.538	47.507	0	0	37.572	17.966	0	0	0	18.327	0	0	607.3754505	0	33.8345	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
18:00	61.271	47.507	0	0	39.074	26.948	0	0	0	8.4586	0	0	556.0148133	0	23.9661	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
18:15	52.145	26.723	0	0	45.086	21.815	0	0	0	2.8195	0	0	494.2612617	0	25.3759	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
18:30	44.324	19.3	0	0	61.617	8.9828	0	0	0	4.2293	0	0	447.4411597	0	25.3759	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
18:45	48.234	19.3	0	0	28.554	5.133	0	0	0	8.4586	0	0	412.6778639	0	28.1954	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
19:00	39.109	23.754	0	0	36.069	14.116	0	0	0	9.8684	0	0	379.5160718	0	22.5564	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
19:15	27.376	25.238	0	0	36.069	10.266	0	0	0	2.8195	0	0	266.4690538	0	12.6879	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
19:30	35.198	23.754	0	0	22.543	17.966	0	0	0	7.0489	0	0	167.5199107	0	9.8684	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
19:45	23.465	19.3	0	0	15.029	10.266	0	0	0	2.8195	0	0	68.05979292	0	2.81954	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
															Hours where condition met:												0	6	2
															Signal Warranted?												No		
															Notes														

APPENDIX D

SIGNAL WARRANT ANALYSIS

Market Street/Vineyard Street
Existing Conditions

Weekday Vineyard Street/Market Street/Market Street 8-Hour S

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Vineyard Street						Market Street			Market Street			100 % Warrant			Minor 1 (NB)			Minor 1 (SB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 100%														
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	24	21	4	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	49	45	7	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	98	74	15	-	-	-	-	-	-	0	0	0
6:00	9	4	0	0	8	3	1	17	3	4	0	0	140	123	31	-	-	-	-	-	-	0	0	0
6:15	15	4	0	0	3	3	3	18	3	3	0	0	193	147	36	-	-	-	-	-	-	0	0	0
6:30	21	10	0	0	13	5	3	23	3	8	0	0	241	178	43	-	-	-	-	-	-	0	0	0
6:45	20	6	0	0	12	4	4	40	5	16	0	0	271	206	49	-	-	-	-	-	-	0	0	0
7:00	35	11	0	0	24	7	2	42	1	9	0	0	331	218	41	-	-	-	-	-	-	0	0	0
7:15	29	14	0	0	20	10	4	50	1	10	0	0	360	232	42	-	-	-	-	-	-	0	0	0
7:30	25	9	0	0	37	8	6	43	8	14	0	0	389	237	44	-	-	-	-	-	-	0	0	0
7:45	45	11	0	0	36	10	7	45	9	8	0	0	365	238	38	-	-	-	-	-	-	0	0	0
8:00	50	13	0	0	34	9	5	47	7	10	0	0	334	240	40	-	-	-	-	-	-	0	0	0
8:15	48	10	0	0	37	7	6	46	8	12	0	0	293	246	41	-	-	-	-	-	-	0	0	0
8:30	24	10	0	0	16	5	12	41	5	8	0	0	259	251	34	-	-	-	-	-	-	0	0	0
8:45	30	12	0	0	20	9	10	44	9	10	0	0	272	267	33	-	-	-	-	-	-	0	0	0
9:00	27	8	0	0	22	8	9	50	6	11	0	0	260	274	31	-	-	-	-	-	-	0	0	0
9:15	29	14	0	0	18	7	6	42	17	5	0	0	252	277	30	-	-	-	-	-	-	0	0	0
9:30	26	16	0	0	20	6	11	48	15	7	0	0	255	274	34	-	-	-	-	-	-	0	0	0
9:45	22	18	0	0	14	5	11	38	21	8	0	0	254	269	36	-	-	-	-	-	-	0	0	0
10:00	20	14	0	0	15	8	10	40	18	10	0	0	261	270	39	-	-	-	-	-	-	0	0	0
10:15	34	12	0	0	18	7	9	39	14	9	0	0	272	273	37	-	-	-	-	-	-	0	0	0
10:30	28	16	0	0	16	7	8	44	17	9	0	0	270	282	35	-	-	-	-	-	-	0	0	0
10:45	25	16	0	0	18	7	9	49	13	11	0	0	283	285	36	-	-	-	-	-	-	0	0	0
11:00	24	15	0	0	20	9	10	46	15	8	0	0	280	289	37	-	-	-	-	-	-	0	0	0
11:15	27	15	0	0	20	7	9	45	17	7	0	0	284	290	39	-	-	-	-	-	-	0	0	0
11:30	30	18	0	0	22	10	12	42	18	10	0	0	285	277	45	-	-	-	-	-	-	0	0	0
11:45	25	16	0	0	14	8	14	45	16	12	0	0	276	272	50	-	-	-	-	-	-	0	0	0
12:00	26	18	0	0	18	10	16	42	14	10	0	0	279	271	48	-	-	-	-	-	-	0	0	0
12:15	29	17	0	0	19	5	16	34	8	13	0	0	274	282	50	-	-	-	-	-	-	0	0	0
12:30	31	15	0	0	16	9	17	38	12	15	0	0	278	278	49	-	-	-	-	-	-	0	0	0
12:45	33	8	0	0	20	5	14	47	13	10	0	0	283	276	43	-	-	-	-	-	-	0	0	0
13:00	28	14	0	0	18	7	20	46	17	12	0	0	295	268	47	-	-	-	-	-	-	0	0	0
13:15	30	10	0	0	25	9	11	30	13	12	0	0	291	265	44	-	-	-	-	-	-	0	0	0
13:30	32	14	0	0	22	8	14	35	16	9	0	0	303	299	41	-	-	-	-	-	-	0	0	0
13:45	35	16	0	0	21	6	16	38	12	14	0	0	308	330	43	-	-	-	-	-	-	0	0	0
14:00	27	11	0	0	16	9	11	55	14	9	0	0	321	357	41	-	-	-	-	-	-	0	0	0
14:15	38	17	0	0	22	9	7	68	13	9	0	0	376	346	42	-	-	-	-	-	-	0	0	0
14:30	37	15	0	0	15	14	15	70	11	11	0	0	376	330	45	-	-	-	-	-	-	0	0	0
14:45	40	18	0	0	17	16	11	67	15	12	0	0	397	303	48	-	-	-	-	-	-	0	0	0
15:00	55	23	0	0	31	9	12	49	8	10	0	0	419	296	48	-	-	-	-	-	-	0	0	0
15:15	47	15	0	0	16	8	6	48	18	12	0	0	415	309	53	-	-	-	-	-	-	0	0	0
15:30	51	20	0	0	20	11	8	46	15	14	0	0	421	307	54	-	-	-	-	-	-	0	0	0
15:45	52	25	0	0	22	14	7	62	17	12	0	0	419	311	57	-	-	-	-	-	-	0	0	0
16:00	48	27	0	0	24	15	10	58	14	15	0	0	412	299	53	-	-	-	-	-	-	0	0	0
16:15	45	18	0	0	21	8	8	53	9	13	0	0	418	300	50	-	-	-	-	-	-	0	0	0
16:30	50	21	0	0	19	10	11	51	11	17	0	0	413	307	50	-	-	-	-	-	-	0	0	0
16:45	44	24	0	0	23	15	14	50	10	8	0	0	386	292	42	-	-	-	-	-	-	0	0	0
17:00	48	27	0	0	27	18	17	52	14	12	0	0	347	272	45	-	-	-	-	-	-	0	0	0
17:15	46	15	0	0	18	8	8	60	9	13	0	0	227	189	33	-	-	-	-	-	-	0	0	0
17:30	42	10	0	0	16	5	8	45	5	9	0	0	140	112	20	-	-	-	-	-	-	0	0	0
17:45	32	17	0	0	7	11	7	40	7	11	0	0	67	54	11	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:						0	0	0
															Signal Warranted?						No		
															Notes								

Weekday Vineyard Street/Market Street/Market Street 4-Hour Signal

Wednesday, August 19, 2020

	Vineyard Street						Market Street			Market Street			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction: 0%			RT Reduction: 100%												
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	24	21	4			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	49	45	7			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	98	74	15			0	0	0	0
6:00	9	4	0	0	8	3	1	17	3	4	0	0	140	123	31			0	0	0	0
6:15	15	4	0	0	3	3	3	18	3	3	0	0	193	147	36			0	0	0	0
6:30	21	10	0	0	13	5	3	23	3	8	0	0	241	178	43			0	0	0	0
6:45	20	6	0	0	12	4	4	40	5	16	0	0	271	206	49			0	0	0	0
7:00	35	11	0	0	24	7	2	42	1	9	0	0	331	218	41			0	0	0	0
7:15	29	14	0	0	20	10	4	50	1	10	0	0	360	232	42			0	0	0	0
7:30	25	9	0	0	37	8	6	43	8	14	0	0	389	237	44			0	0	0	0
7:45	45	11	0	0	36	10	7	45	9	8	0	0	365	238	38			0	0	0	0
8:00	50	13	0	0	34	9	5	47	7	10	0	0	334	240	40			0	0	0	0
8:15	48	10	0	0	37	7	6	46	8	12	0	0	293	246	41			0	0	0	0
8:30	24	10	0	0	16	5	12	41	5	8	0	0	259	251	34			0	0	0	0
8:45	30	12	0	0	20	9	10	44	9	10	0	0	272	267	33			0	0	0	0
9:00	27	8	0	0	22	8	9	50	6	11	0	0	260	274	31			0	0	0	0
9:15	29	14	0	0	18	7	6	42	17	5	0	0	252	277	30			0	0	0	0
9:30	26	16	0	0	20	6	11	48	15	7	0	0	255	274	34			0	0	0	0
9:45	22	18	0	0	14	5	11	38	21	8	0	0	254	269	36			0	0	0	0
10:00	20	14	0	0	15	8	10	40	18	10	0	0	261	270	39			0	0	0	0
10:15	34	12	0	0	18	7	9	39	14	9	0	0	272	273	37			0	0	0	0
10:30	28	16	0	0	16	7	8	44	17	9	0	0	270	282	35			0	0	0	0
10:45	25	16	0	0	18	7	9	49	13	11	0	0	283	285	36			0	0	0	0
11:00	24	15	0	0	20	9	10	46	15	8	0	0	280	289	37			0	0	0	0
11:15	27	15	0	0	20	7	9	45	17	7	0	0	284	290	39			0	0	0	0
11:30	30	18	0	0	22	10	12	42	18	10	0	0	285	277	45			0	0	0	0
11:45	25	16	0	0	14	8	14	45	16	12	0	0	276	272	50			0	0	0	0
12:00	26	18	0	0	18	10	16	42	14	10	0	0	279	271	48			0	0	0	0
12:15	29	17	0	0	19	5	16	34	8	13	0	0	274	282	50			0	0	0	0
12:30	31	15	0	0	16	9	17	38	12	15	0	0	278	278	49			0	0	0	0
12:45	33	8	0	0	20	5	14	47	13	10	0	0	283	276	43			0	0	0	0
13:00	28	14	0	0	18	7	20	46	17	12	0	0	295	268	47			0	0	0	0
13:15	30	10	0	0	25	9	11	30	13	12	0	0	291	265	44			0	0	0	0
13:30	32	14	0	0	22	8	14	35	16	9	0	0	303	299	41			0	0	0	0
13:45	35	16	0	0	21	6	16	38	12	14	0	0	308	330	43	1		1	0	1	1
14:00	27	11	0	0	16	9	11	55	14	9	0	0	321	357	41	1		2	0	1	2
14:15	38	17	0	0	22	9	7	68	13	9	0	0	376	346	42	1		3	0	1	3
14:30	37	15	0	0	15	14	15	70	11	11	0	0	376	330	45	1		4	0	1	4
14:45	40	18	0	0	17	16	11	67	15	12	0	0	397	303	48			0	0	0	0
15:00	55	23	0	0	31	9	12	49	8	10	0	0	419	296	48			0	0	0	0
15:15	47	15	0	0	16	8	6	48	18	12	0	0	415	309	53	1		1	0	1	1
15:30	51	20	0	0	20	11	8	46	15	14	0	0	421	307	54	1		2	0	1	2
15:45	52	25	0	0	22	14	7	62	17	12	0	0	419	311	57	1		3	0	1	3
16:00	48	27	0	0	24	15	10	58	14	15	0	0	412	299	53			4	0	0	4
16:15	45	18	0	0	21	8	8	53	9	13	0	0	418	300	50			0	0	0	0
16:30	50	21	0	0	19	10	11	51	11	17	0	0	413	307	50	1		1	0	1	1
16:45	44	24	0	0	23	15	14	50	10	8	0	0	386	292	42			2	0	0	2
17:00	48	27	0	0	27	18	17	52	14	12	0	0	347	272	45			3	0	0	3
17:15	46	15	0	0	18	8	8	60	9	13	0	0	227	189	33			4	0	0	4
17:30	42	10	0	0	16	5	8	45	5	9	0	0	140	112	20			0	0	0	0
17:45	32	17	0	0	7	11	7	40	7	11	0	0	67	54	11			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	3
Signal Warranted?	No


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
308, 330
413, 307
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Market Street/Vineyard Street/Vineyard Street 8-Hour

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Market Street						Vineyard Street			Vineyard Street			100 % Warrant			Minor 1 (EB)			Minor 1 (WB)			Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction:		0%	RT Reduction:		0%												
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	97	13	11	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	199	32	17	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	316	63	35	-	-	-	-	-	-	0	0	0
6:00	1	17	3	4	0	72	9	4	0	0	8	3	494	89	51	-	-	-	-	-	-	0	0	0
6:15	3	18	3	3	0	75	15	4	0	0	3	3	561	122	71	-	-	-	-	-	-	0	0	0
6:30	3	23	3	8	0	80	21	10	0	0	13	5	632	146	95	-	-	1	-	-	-	0	0	1
6:45	4	40	5	16	0	113	20	6	0	0	12	4	653	149	122	-	-	1	-	-	1	0	0	2
7:00	2	42	1	9	0	110	35	11	0	0	24	7	592	179	152	1	-	-	1	-	-	1	0	3
7:15	4	50	1	10	0	108	29	14	0	0	20	10	549	196	164	1	-	-	1	-	-	2	0	4
7:30	6	43	8	14	0	67	25	9	0	0	37	8	508	211	178	1	-	-	1	-	-	3	0	0
7:45	7	45	9	8	0	48	45	11	0	0	36	10	498	211	154	-	-	-	-	-	-	4	0	0
8:00	5	47	7	10	0	52	50	13	0	0	34	9	512	197	137	1	-	-	-	-	-	1	0	0
8:15	6	46	8	12	0	60	48	10	0	0	37	7	523	169	124	1	-	-	-	-	-	2	0	0
8:30	12	41	5	8	0	62	24	10	0	0	16	5	506	154	105	1	-	-	-	-	-	3	0	0
8:45	10	44	9	10	0	58	30	12	0	0	20	9	509	162	110	1	-	-	-	-	-	4	0	0
9:00	9	50	6	11	0	56	27	8	0	0	22	8	490	160	100	-	-	-	-	-	-	0	0	0
9:15	6	42	17	5	0	45	29	14	0	0	18	7	472	159	93	-	-	-	-	-	-	0	0	0
9:30	11	48	15	7	0	50	26	16	0	0	20	6	457	162	93	-	-	-	-	-	-	0	0	0
9:45	11	38	21	8	0	34	22	18	0	0	14	5	436	164	90	-	-	-	-	-	-	0	0	0
10:00	10	40	18	10	0	36	20	14	0	0	15	8	454	165	96	-	-	-	-	-	-	0	0	0
10:15	9	39	14	9	0	29	34	12	0	0	18	7	463	170	102	-	-	-	-	-	-	0	0	0
10:30	8	44	17	9	0	32	28	16	0	0	16	7	479	166	104	-	-	-	-	-	-	0	0	0
10:45	9	49	13	11	0	48	25	16	0	0	18	7	487	170	113	-	-	-	-	-	-	0	0	0
11:00	10	46	15	8	0	44	24	15	0	0	20	9	486	170	110	-	-	-	-	-	-	0	0	0
11:15	9	45	17	7	0	38	27	15	0	0	20	7	483	175	109	-	-	-	-	-	-	0	0	0
11:30	12	42	18	10	0	36	30	18	0	0	22	10	478	179	106	-	-	-	-	-	-	0	0	0
11:45	14	45	16	12	0	42	25	16	0	0	14	8	479	177	99	-	-	-	-	-	-	0	0	0
12:00	16	42	14	10	0	38	26	18	0	0	18	10	478	177	102	-	-	-	-	-	-	0	0	0
12:15	16	34	8	13	0	40	29	17	0	0	19	5	493	175	99	-	-	-	-	-	-	0	0	0
12:30	17	38	12	15	0	37	31	15	0	0	16	9	490	169	109	-	-	-	-	-	-	0	0	0
12:45	14	47	13	10	0	44	33	8	0	0	20	5	483	169	114	-	-	-	-	-	-	0	0	0
13:00	20	46	17	12	0	40	28	14	0	0	18	7	478	179	116	-	-	-	-	-	-	0	0	0
13:15	11	30	13	12	0	42	30	10	0	0	25	9	492	175	116	-	-	-	-	-	-	0	0	0
13:30	14	35	16	9	0	38	32	14	0	0	22	8	540	190	113	1	-	-	-	-	-	1	0	0
13:45	16	38	12	14	0	43	35	16	0	0	21	6	582	196	112	1	-	-	-	-	-	2	0	0
14:00	11	55	14	9	0	60	27	11	0	0	16	9	618	203	118	1	-	1	-	-	-	3	0	1
14:15	7	68	13	9	0	59	38	17	0	0	22	9	595	243	133	1	-	-	-	-	-	4	0	2
14:30	15	70	11	11	0	47	37	15	0	0	15	14	561	250	126	1	-	-	-	-	-	1	0	3
14:45	11	67	15	12	0	54	40	18	0	0	17	16	525	269	128	1	-	-	-	-	-	2	0	4
15:00	12	49	8	10	0	47	55	23	0	0	31	9	509	288	131	1	-	-	-	-	-	3	0	0
15:15	6	48	18	12	0	38	47	15	0	0	16	8	522	285	130	1	-	-	-	-	-	4	0	0
15:30	8	46	15	14	0	35	51	20	0	0	20	11	533	286	135	1	-	-	-	-	-	1	0	0
15:45	7	62	17	12	0	45	52	25	0	0	22	14	553	286	133	1	-	-	-	-	-	2	0	0
16:00	10	58	14	15	0	42	48	27	0	0	24	15	543	277	135	1	-	-	-	-	-	3	0	0
16:15	8	53	9	13	0	50	45	18	0	0	21	8	552	277	141	1	-	-	-	-	-	4	0	0
16:30	11	51	11	17	0	48	50	21	0	0	19	10	552	275	138	1	-	-	-	-	-	1	0	0
16:45	14	50	10	8	0	51	44	24	0	0	23	15	530	256	130	1	-	-	-	-	-	2	0	0
17:00	17	52	14	12	0	53	48	27	0	0	27	18	514	237	110	1	-	-	-	-	-	3	0	0
17:15	8	60	9	13	0	43	46	15	0	0	18	8	366	162	65	-	-	-	-	-	-	4	0	0
17:30	8	45	5	9	0	49	42	10	0	0	16	5	233	101	39	-	-	-	-	-	-	0	0	0
17:45	7	40	7	11	0	52	32	17	0	0	7	11	117	49	18	-	-	-	-	-	-	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:							6	0	2
															Signal Warranted?							No		
															Notes									

Weekday Market Street/Vineyard Street/Vineyard Street 4-Hour Sign

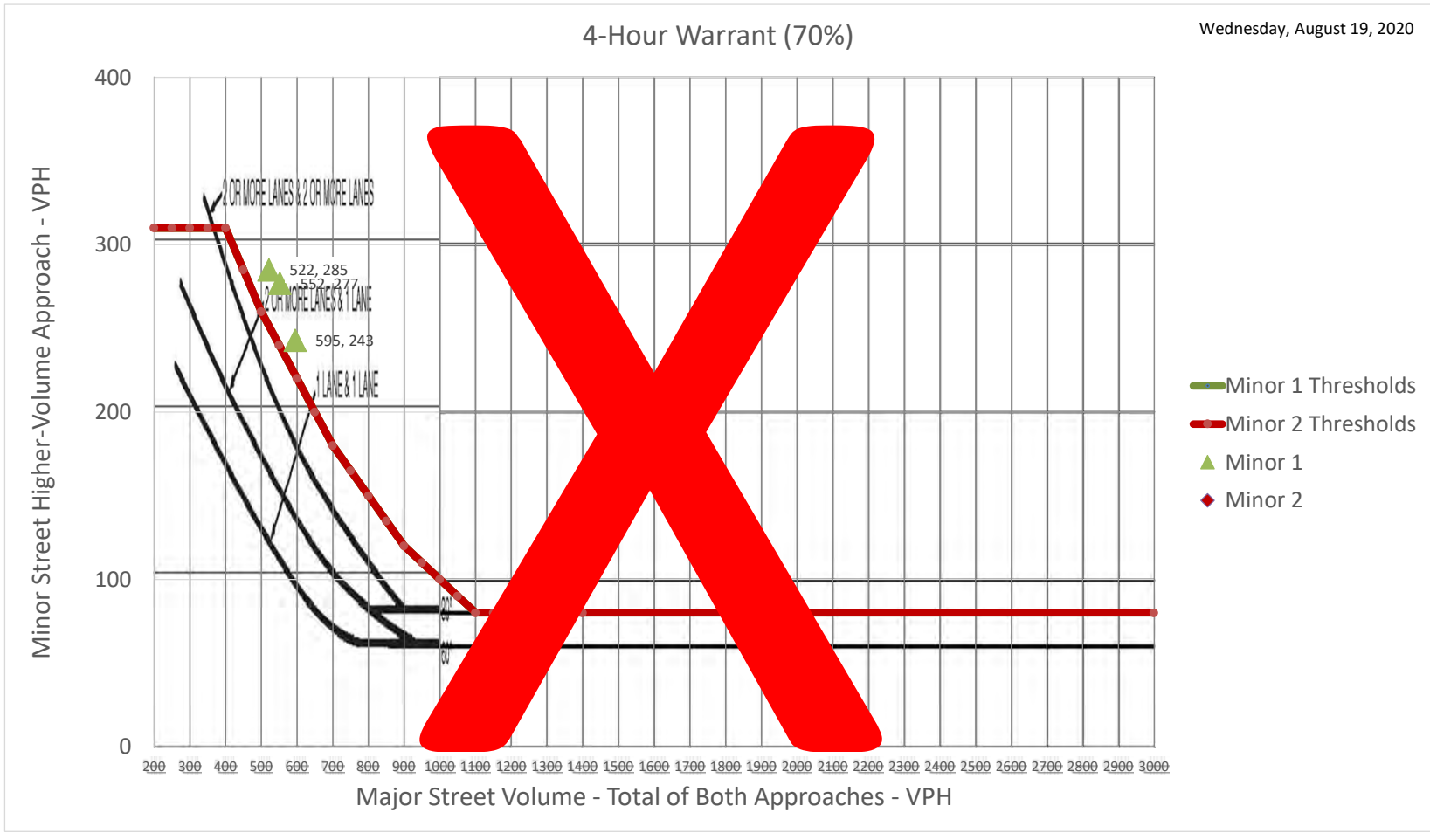
Wednesday, August 19, 2020

	Market Street						Vineyard Street			Vineyard Street			100 % Warrant									
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold									
	1						1			1												
							RT Reduction:		0%	RT Reduction:		0%										
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	97	13	11			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	199	32	17			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	316	63	35			0	0	0	0
6:00	1	17	3	4	0	72	9	4	0	0	8	3	494	89	51			0	0	0	0
6:15	3	18	3	3	0	75	15	4	0	0	3	3	561	122	71			0	0	0	0
6:30	3	23	3	8	0	80	21	10	0	0	13	5	632	146	95			0	0	0	0
6:45	4	40	5	16	0	113	20	6	0	0	12	4	653	149	122			0	0	0	0
7:00	2	42	1	9	0	110	35	11	0	0	24	7	592	179	152			0	0	0	0
7:15	4	50	1	10	0	108	29	14	0	0	20	10	549	196	164			0	0	0	0
7:30	6	43	8	14	0	67	25	9	0	0	37	8	508	211	178			0	0	0	0
7:45	7	45	9	8	0	48	45	11	0	0	36	10	498	211	154			0	0	0	0
8:00	5	47	7	10	0	52	50	13	0	0	34	9	512	197	137			0	0	0	0
8:15	6	46	8	12	0	60	48	10	0	0	37	7	523	169	124			0	0	0	0
8:30	12	41	5	8	0	62	24	10	0	0	16	5	*506*	154	105			0	0	0	0
8:45	10	44	9	10	0	58	30	12	0	0	20	9	509	162	110			0	0	0	0
9:00	9	50	6	11	0	56	27	8	0	0	22	8	490	160	100			0	0	0	0
9:15	6	42	17	5	0	45	29	14	0	0	18	7	472	159	93			0	0	0	0
9:30	11	48	15	7	0	50	26	16	0	0	20	6	457	162	93			0	0	0	0
9:45	11	38	21	8	0	34	22	18	0	0	14	5	436	164	90			0	0	0	0
10:00	10	40	18	10	0	36	20	14	0	0	15	8	454	165	96			0	0	0	0
10:15	9	39	14	9	0	29	34	12	0	0	18	7	463	170	102			0	0	0	0
10:30	8	44	17	9	0	32	28	16	0	0	16	7	479	166	104			0	0	0	0
10:45	9	49	13	11	0	48	25	16	0	0	18	7	487	170	113			0	0	0	0
11:00	10	46	15	8	0	44	24	15	0	0	20	9	486	170	110			0	0	0	0
11:15	9	45	17	7	0	38	27	15	0	0	20	7	483	175	109			0	0	0	0
11:30	12	42	18	10	0	36	30	18	0	0	22	10	478	179	106			0	0	0	0
11:45	14	45	16	12	0	42	25	16	0	0	14	8	479	177	99			0	0	0	0
12:00	16	42	14	10	0	38	26	18	0	0	18	10	478	177	102			0	0	0	0
12:15	16	34	8	13	0	40	29	17	0	0	19	5	493	175	99			0	0	0	0
12:30	17	38	12	15	0	37	31	15	0	0	16	9	490	169	109			0	0	0	0
12:45	14	47	13	10	0	44	33	8	0	0	20	5	483	169	114			0	0	0	0
13:00	20	46	17	12	0	40	28	14	0	0	18	7	478	179	116			0	0	0	0
13:15	11	30	13	12	0	42	30	10	0	0	25	9	492	175	116			0	0	0	0
13:30	14	35	16	9	0	38	32	14	0	0	22	8	540	190	113			0	0	0	0
13:45	16	38	12	14	0	43	35	16	0	0	21	6	582	196	112			0	0	0	0
14:00	11	55	14	9	0	60	27	11	0	0	16	9	618	203	118			0	0	0	0
14:15	7	68	13	9	0	59	38	17	0	0	22	9	595	243	133	1		1	0	1	1
14:30	15	70	11	11	0	47	37	15	0	0	15	14	561	250	126	1		2	0	1	2
14:45	11	67	15	12	0	54	40	18	0	0	17	16	525	269	128	1		3	0	1	3
15:00	12	49	8	10	0	47	55	23	0	0	31	9	509	288	131	1		4	0	1	4
15:15	6	48	18	12	0	38	47	15	0	0	16	8	522	285	130	1		1	0	1	1
15:30	8	46	15	14	0	35	51	20	0	0	20	11	533	286	135	1		2	0	1	2
15:45	7	62	17	12	0	45	52	25	0	0	22	14	553	286	133	1		3	0	1	3
16:00	10	58	14	15	0	42	48	27	0	0	24	15	543	277	135	1		4	0	1	4
16:15	8	53	9	13	0	50	45	18	0	0	21	8	552	277	141	1		1	0	1	1
16:30	11	51	11	17	0	48	50	21	0	0	19	10	552	275	138	1		2	0	1	2
16:45	14	50	10	8	0	51	44	24	0	0	23	15	530	256	130	1		3	0	1	3
17:00	17	52	14	12	0	53	48	27	0	0	27	18	514	237	110			4	0	0	4
17:15	8	60	9	13	0	43	46	15	0	0	18	8	366	162	65			0	0	0	0
17:30	8	45	5	9	0	49	42	10	0	0	16	5	233	101	39			0	0	0	0
17:45	7	40	7	11	0	52	32	17	0	0	7	11	117	49	18			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met: 3

Signal Warranted? No


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
552, 277
595, 243
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
522, 285
552, 277
2 OR MORE LANES & 1 LANE
595, 243
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Vineyard Street/Market Street/Market Street 8-Hour S

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Vineyard Street						Market Street			Market Street			100 % Warrant			Minor 1 (NB)						Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600	500	750	600			
	1						1			1			Minor Threshold			150	75	120	150	75	120			
							RT Reduction: 0%			RT Reduction: 0%														
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	24	21	76	-	-	-	-	-	-	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	49	45	154	-	-	-	-	-	-	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	98	74	242	-	-	-	-	-	-	0	0	0
6:00	9	4	0	0	8	3	1	17	3	4	0	72	140	123	371	-	-	-	-	-	-	0	0	0
6:15	15	4	0	0	3	3	3	18	3	3	0	75	193	147	414	-	-	-	-	-	-	0	0	0
6:30	21	10	0	0	13	5	3	23	3	8	0	80	241	178	454	-	-	-	-	-	-	0	0	0
6:45	20	6	0	0	12	4	4	40	5	16	0	113	271	206	447	-	-	-	-	-	-	0	0	0
7:00	35	11	0	0	24	7	2	42	1	9	0	110	331	218	374	-	-	-	-	-	-	0	0	0
7:15	29	14	0	0	20	10	4	50	1	10	0	108	360	232	317	-	-	-	-	-	-	0	0	0
7:30	25	9	0	0	37	8	6	43	8	14	0	67	389	237	271	-	-	-	-	-	-	0	0	0
7:45	45	11	0	0	36	10	7	45	9	8	0	48	365	238	260	-	-	-	-	-	-	0	0	0
8:00	50	13	0	0	34	9	5	47	7	10	0	52	334	240	272	-	-	-	-	-	-	0	0	0
8:15	48	10	0	0	37	7	6	46	8	12	0	60	293	246	277	-	-	-	-	-	-	0	0	0
8:30	24	10	0	0	16	5	12	41	5	8	0	62	259	251	255	-	-	-	-	-	-	0	0	0
8:45	30	12	0	0	20	9	10	44	9	10	0	58	272	267	242	-	-	-	-	-	-	0	0	0
9:00	27	8	0	0	22	8	9	50	6	11	0	56	260	274	216	-	-	-	-	-	-	0	0	0
9:15	29	14	0	0	18	7	6	42	17	5	0	45	252	277	195	-	-	-	-	-	-	0	0	0
9:30	26	16	0	0	20	6	11	48	15	7	0	50	255	274	183	-	-	-	-	-	-	0	0	0
9:45	22	18	0	0	14	5	11	38	21	8	0	34	254	269	167	-	-	-	-	-	-	0	0	0
10:00	20	14	0	0	15	8	10	40	18	10	0	36	261	270	184	-	-	-	-	-	-	0	0	0
10:15	34	12	0	0	18	7	9	39	14	9	0	29	272	273	190	-	-	-	-	-	-	0	0	0
10:30	28	16	0	0	16	7	8	44	17	9	0	32	270	282	197	-	-	-	-	-	-	0	0	0
10:45	25	16	0	0	18	7	9	49	13	11	0	48	283	285	202	-	-	-	-	-	-	0	0	0
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11:15	27	15	0	0	20	7	9	45	17	7	0	38	284	290	193	-	-	-	-	-	-	0	0	0
11:30	30	18	0	0	22	10	12	42	18	10	0	36	285	277	201	-	-	-	-	-	-	0	0	0
11:45	25	16	0	0	14	8	14	45	16	12	0	42	276	272	207	-	-	-	-	-	-	0	0	0
12:00	26	18	0	0	18	10	16	42	14	10	0	38	279	271	207	-	-	-	-	-	-	0	0	0
12:15	29	17	0	0	19	5	16	34	8	13	0	40	274	282	211	-	-	-	-	-	-	0	0	0
12:30	31	15	0	0	16	9	17	38	12	15	0	37	278	278	212	-	-	-	-	-	-	0	0	0
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16:00	48	27	0	0	24	15	10	58	14	15	0	42	412	299	244	-	-	-	-	-	-	0	0	0
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21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
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22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
															Hours where condition met:							0	0	0
															Signal Warranted?							No		
															Notes									

Weekday Vineyard Street/Market Street/Market Street 4-Hour Signal

Wednesday, August 19, 2020

	Vineyard Street						Market Street			Market Street			100 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction:		0%	RT Reduction:		0%									
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	24	21	76			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	49	45	154			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	98	74	242			0	0	0	0
6:00	9	4	0	0	8	3	1	17	3	4	0	72	140	123	371		1	0	1	1	1
6:15	15	4	0	0	3	3	3	18	3	3	0	75	193	147	414		1	0	2	1	2
6:30	21	10	0	0	13	5	3	23	3	8	0	80	241	178	454		1	0	3	1	3
6:45	20	6	0	0	12	4	4	40	5	16	0	113	271	206	447		1	0	4	1	4
7:00	35	11	0	0	24	7	2	42	1	9	0	110	331	218	374		1	0	1	1	1
7:15	29	14	0	0	20	10	4	50	1	10	0	108	360	232	317		1	0	2	1	2
7:30	25	9	0	0	37	8	6	43	8	14	0	67	389	237	271			0	3	0	3
7:45	45	11	0	0	36	10	7	45	9	8	0	48	365	238	260			0	4	0	4
8:00	50	13	0	0	34	9	5	47	7	10	0	52	334	240	272			0	0	0	0
8:15	48	10	0	0	37	7	6	46	8	12	0	60	293	246	277			0	0	0	0
8:30	24	10	0	0	16	5	12	41	5	8	0	62	259	251	255			0	0	0	0
8:45	30	12	0	0	20	9	10	44	9	10	0	58	272	267	242			0	0	0	0
9:00	27	8	0	0	22	8	9	50	6	11	0	56	260	274	216			0	0	0	0
9:15	29	14	0	0	18	7	6	42	17	5	0	45	252	277	195			0	0	0	0
9:30	26	16	0	0	20	6	11	48	15	7	0	50	255	274	183			0	0	0	0
9:45	22	18	0	0	14	5	11	38	21	8	0	34	254	269	167			0	0	0	0
10:00	20	14	0	0	15	8	10	40	18	10	0	36	261	270	184			0	0	0	0
10:15	34	12	0	0	18	7	9	39	14	9	0	29	272	273	190			0	0	0	0
10:30	28	16	0	0	16	7	8	44	17	9	0	32	270	282	197			0	0	0	0
10:45	25	16	0	0	18	7	9	49	13	11	0	48	283	285	202			0	0	0	0
11:00	24	15	0	0	20	9	10	46	15	8	0	44	280	289	197			0	0	0	0
11:15	27	15	0	0	20	7	9	45	17	7	0	38	284	290	193			0	0	0	0
11:30	30	18	0	0	22	10	12	42	18	10	0	36	285	277	201			0	0	0	0
11:45	25	16	0	0	14	8	14	45	16	12	0	42	276	272	207			0	0	0	0
12:00	26	18	0	0	18	10	16	42	14	10	0	38	279	271	207			0	0	0	0
12:15	29	17	0	0	19	5	16	34	8	13	0	40	274	282	211			0	0	0	0
12:30	31	15	0	0	16	9	17	38	12	15	0	37	278	278	212			0	0	0	0
12:45	33	8	0	0	20	5	14	47	13	10	0	44	283	276	207			0	0	0	0
13:00	28	14	0	0	18	7	20	46	17	12	0	40	295	268	210			0	0	0	0
13:15	30	10	0	0	25	9	11	30	13	12	0	42	291	265	227			0	0	0	0
13:30	32	14	0	0	22	8	14	35	16	9	0	38	303	299	241			0	0	0	0
13:45	35	16	0	0	21	6	16	38	12	14	0	43	308	330	252	1		1	0	1	1
14:00	27	11	0	0	16	9	11	55	14	9	0	60	321	357	261	1		2	0	1	2
14:15	38	17	0	0	22	9	7	68	13	9	0	59	376	346	249	1		3	0	1	3
14:30	37	15	0	0	15	14	15	70	11	11	0	47	376	330	231	1		4	0	1	4
14:45	40	18	0	0	17	16	11	67	15	12	0	54	397	303	222			0	0	0	0
15:00	55	23	0	0	31	9	12	49	8	10	0	47	419	296	213			0	0	0	0
15:15	47	15	0	0	16	8	6	48	18	12	0	38	415	309	213	1		1	0	1	1
15:30	51	20	0	0	20	11	8	46	15	14	0	35	421	307	226	1		2	0	1	2
15:45	52	25	0	0	22	14	7	62	17	12	0	45	419	311	242	1		3	0	1	3
16:00	48	27	0	0	24	15	10	58	14	15	0	42	412	299	244			4	0	0	4
16:15	45	18	0	0	21	8	8	53	9	13	0	50	418	300	252			0	0	0	0
16:30	50	21	0	0	19	10	11	51	11	17	0	48	413	307	245	1		1	0	1	1
16:45	44	24	0	0	23	15	14	50	10	8	0	51	386	292	238			2	0	0	2
17:00	48	27	0	0	27	18	17	52	14	12	0	53	347	272	242			3	0	0	3
17:15	46	15	0	0	18	8	8	60	9	13	0	43	227	189	177			4	0	0	4
17:30	42	10	0	0	16	5	8	45	5	9	0	49	140	112	121			0	0	0	0
17:45	32	17	0	0	7	11	7	40	7	11	0	52	67	54	63			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	5
Signal Warranted?	Yes


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
331, 374
308, 330
413, 307
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
331, 374
308, 330
413, 307
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

APPENDIX D

SIGNAL WARRANT ANALYSIS

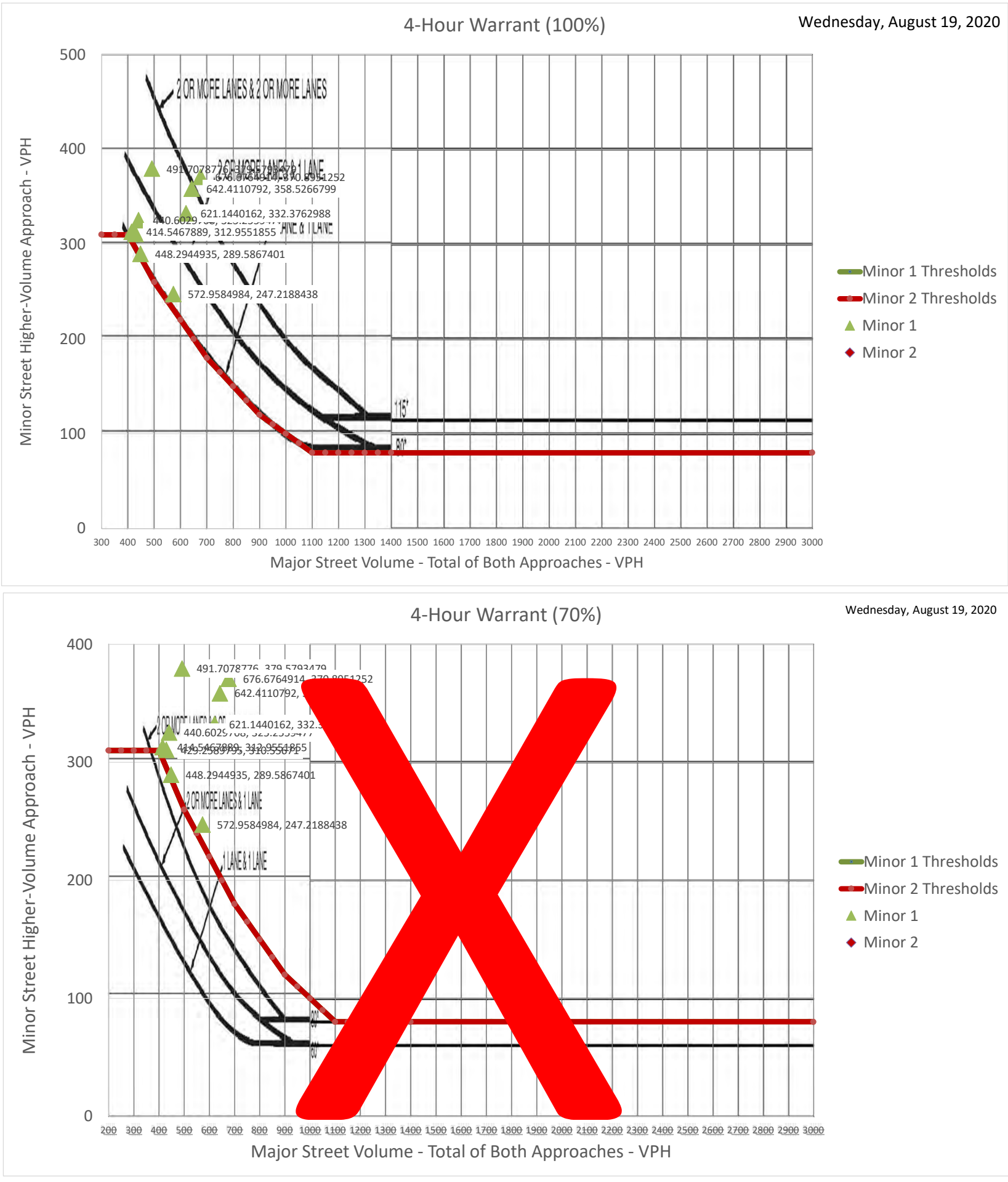
Market Street/Vineyard Street
Base Year Without Bridge Conditions

Weekday Vineyard Street/Market Street/Market Street 4-Hour Signal

Wednesday, August 19, 2020

	Vineyard Street						Market Street			Market Street			100 % Warrant								
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold								
	1						1			1											
							RT Reduction: 0%			RT Reduction: 100%											
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	37.28769585	27.5188	3.79436			0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	78.94917172	56.4211	6.64013			0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	157.0080642	92.2407	14.2288			0	0	0	0
6:00	16.474	6.4444	0	0	10.575	3.7941	0	23.519	4	3.7944	0	0	224.2054854	153.579	29.4063			0	0	0	0
6:15	27.457	6.4444	0	0	3.9655	3.7941	0	24.902	4	2.8458	0	0	291.682662	174.053	38.4046			0	0	0	0
6:30	38.44	16.111	0	0	17.184	6.3235	0	31.82	4	7.5887	0	0	346.8780463	202.286	49.773			0	0	0	0
6:45	36.61	9.6667	0	0	15.862	5.0588	0	55.338	6	15.177	0	0	372.4976438	215.602	62.084			0	0	0	0
7:00	55.864	11.733	0	0	29.333	7.8343	0	47.993	0	12.793	0	0	444.0504321	205.685	58.2779			0	0	0	0
7:15	46.287	14.933	0	0	24.444	11.192	0	57.135	0	14.214	0	0	508.079555	230.714	54.9711			0	0	0	0
7:30	39.903	9.6	0	0	45.222	8.9535	0	49.136	0	19.9	0	0	572.9584984	247.219	52.14	1		1	0	1	1
7:45	71.825	11.733	0	0	44	11.192	0	51.421	0	11.371	0	0	556.7959058	260.805	39.829	1		2	0	1	2
8:00	91.525	20.944	0	0	44.943	11.382	0	65.023	8	9.4859	0	0	530.1129153	281.256	37.9436	1		3	0	1	3
8:15	87.864	16.111	0	0	48.908	8.8528	0	63.639	10	11.383	0	0	462.8291931	284.406	38.8922	1		4	0	1	4
8:30	43.932	16.111	0	0	21.149	6.3235	0	56.722	6	7.5887	0	0	*409.3792728*	288.872	32.252			0	0	0	0
8:45	54.915	19.333	0	0	26.437	11.382	0	60.872	11	9.4859	0	0	429.2589795	310.557	31.3035	1		1	0	1	1
9:00	49.423	12.889	0	0	29.08	10.118	0	69.173	7	10.434	0	0	411.2918769	316.256	29.4063	1		2	0	1	2
9:15	53.084	22.556	0	0	23.793	8.8528	0	58.105	20	4.7429	0	0	398.8921987	317.421	28.4577	1		3	0	1	3
9:30	47.593	25.778	0	0	26.437	7.5882	0	66.406	18	6.6401	0	0	404.822456	310.271	32.252	1		4	0	1	4
9:45	40.271	29	0	0	18.506	6.3235	0	52.571	25	7.5887	0	0	404.4607834	306.737	34.1492			0	0	0	0
10:00	36.61	22.556	0	0	19.828	10.118	0	55.338	22	9.4859	0	0	414.5467889	312.955	36.995	1		1	0	1	1
10:15	62.237	19.333	0	0	23.793	8.8528	0	53.955	17	8.5373	0	0	431.353771	317.256	35.0978	1		2	0	1	2
10:30	51.254	25.778	0	0	21.149	8.8528	0	60.872	20	8.5373	0	0	426.0173111	328.557	33.2006	1		3	0	1	3
10:45	45.762	25.778	0	0	23.793	8.8528	0	67.79	16	10.434	0	0	444.6256353	327.79	34.1492	1		4	0	1	4
11:00	43.932	24.167	0	0	26.437	11.382	0	63.639	18	7.5887	0	0	440.6029708	325.256	35.0978	1		1	0	1	1
11:15	49.423	24.167	0	0	26.437	8.8528	0	62.256	20	6.6401	0	0	447.7183097	318.722	36.995	1		2	0	1	2
11:30	54.915	29	0	0	29.08	12.647	0	58.105	22	9.4859	0	0	450.7503009	293.504	42.6865	1		3	0	1	3
11:45	45.762	25.778	0	0	18.506	10.118	0	62.256	19	11.383	0	0	438.5517371	279.97	47.4295			4	0	0	4
12:00	47.593	29	0	0	23.793	12.647	0	58.105	17	9.4859	0	0	444.4437743	279.737	45.5323			0	0	0	0
12:15	53.084	27.389	0	0	25.115	6.3235	0	47.038	10	12.332	0	0	437.866246	288.271	47.4295			0	0	0	0
12:30	56.745	24.167	0	0	21.149	11.382	0	52.571	14	14.229	0	0	441.4087661	288.737	46.4809			0	0	0	0
12:45	60.406	12.889	0	0	26.437	6.3235	0	65.023	16	9.4859	0	0	448.2944935	289.587	40.7893	1		1	0	1	1
13:00	51.254	22.556	0	0	23.793	8.8528	0	63.639	20	11.383	0	0	467.4309052	275.136	44.5837			2	0	0	2
13:15	54.915	16.111	0	0	33.046	11.382	0	41.504	16	11.383	0	0	460.6527815	284.587	41.7379	1		3	0	1	3
13:30	58.576	22.556	0	0	29.08	10.118	0	48.421	19	8.5373	0	0	482.6090093	337.158	38.8922	1		4	0	1	4
13:45	64.067	25.778	0	0	27.759	7.5882	0	52.571	14	13.28	0	0	491.7078776	379.579	40.7893	1		1	0	1	1
14:00	49.423	17.722	0	0	21.149	11.382	0	76.09	17	8.5373	0	0	511.4421418	423.7	38.8922	1		2	0	1	2
14:15	69.559	27.389	0	0	29.08	11.382	0	94.075	16	8.5373	0	0	601.8569466	408.399	39.8408	1		3	0	1	3
14:30	67.728	24.167	0	0	19.828	17.706	0	96.842	13	10.434	0	0	605.9134612	386.73	42.6865	1		4	0	1	4
14:45	73.22	29	0	0	22.471	20.235	0	92.692	18	11.383	0	0	642.4110792	358.527	45.5323	1		1	0	1	1
15:00	100.68	37.056	0	0	40.977	11.382	0	67.79	10	9.4859	0	0	679.7346194	353.609	45.5323	1		2	0	1	2
15:15	86.033	24.167	0	0	21.149	10.118	0	66.406	22	11.383	0	0	671.7008703	373.061	50.2752	1		3	0	1	3
15:30	93.355	32.222	0	0	26.437	13.912	0	63.639	18	13.28	0	0	679.4824072	368.978	51.2238	1		4	0	1	4
15:45	95.186	40.278	0	0	29.08	17.706	0	85.775	20	11.383	0	0	676.6764914	370.895	54.0696	1		1	0	1	1
16:00	87.864	43.5	0	0	31.724	18.97	0	80.241	17	14.229	0	0	663.0079441	346.294	50.2752	1		2	0	1	2
16:15	82.372	29	0	0	27.759	10.118	0	73.323	11	12.332	0	0	670.7675369	337.993	47.4295	1		3	0	1	3
16:30	91.525	33.833	0	0	25.115	12.647	0	70.556	13	16.126	0	0	663.7991823	347.677	47.4295	1		4	0	1	4
16:45	80.542	38.667	0	0	30.402	18.97	0	69.173	12	7.5887	0	0	621.1440162	332.376	39.8408	1		1	0	1	1
17:00	87.864	43.5	0	0	35.69	22.764	0	71.94	17	11.383	0	0	561.6920948	314.542	42.6865	1		2	0	1	2
17:15	84.203	24.167	0	0	23.793	10.118	0	83.008	11	12.332	0	0	371.8741824	225.602	31.3035			3	0	0	3
17:30	76.881	16.111	0	0	21.149	6.3235	0	62.256	6	8.5373	0	0	229.5940657	131.594	18.9718			4	0	0	4
17:45	58.576	27.389	0	0	9.2529	13.912	0	55.338	8	10.434	0	0	109.129242	63.3384	10.4345			0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	9
Signal Warranted?	Yes


4-Hour Warrant (100%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
491.7078776, 379.5793479
676.6764914, 379.8951252
642.4110792, 358.5266799
621.1440162, 332.3762988
414.5467889, 312.9551855
448.2944935, 289.5867401
572.9584984, 247.2188438
115'
80'
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2
4-Hour Warrant (70%)
Wednesday, August 19, 2020
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
491.7078776, 379.5793479
676.6764914, 379.8951252
642.4110792,
621.1440162, 332.3
440.6029768, 323.2339477
414.5467889, 312.9551855
429.2589793, 310.5567115
448.2944935, 289.5867401
2 OR MORE LANES & 1 LANE
572.9584984, 247.2188438
1 LANE & 1 LANE
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

Weekday Vineyard Street/Market Street/Market Street 8-Hour S

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Vineyard Street						Market Street			Market Street			100 % Warrant			Minor 1 (NB)						Minor 1 (SB)						Combination		
	Major Lanes						Minor 1 Lanes			Minor 2 Lanes			Major Threshold			500	750	600				500	750	600						
	1						1			1			Minor Threshold			150	75	120				150	75	120						
							RT Reduction: 0%			RT Reduction: 100%																				
Time	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0	0	0	37.28769585	27.5188	3.79436	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	78.94917172	56.4211	6.64013	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
5:45	0	0	0	0	0	0	0	0	0	0	0	0	157.0080642	92.2407	14.2288	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
6:00	16.474	6.4444	0	0	10.575	3.7941	0	23.519	4	3.7944	0	0	224.2054854	153.579	29.4063	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
6:15	27.457	6.4444	0	0	3.9655	3.7941	0	24.902	4	2.8458	0	0	291.682662	174.053	38.4046	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
6:30	38.44	16.111	0	0	17.184	6.3235	0	31.82	4	7.5887	0	0	346.8780463	202.286	49.773	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
6:45	36.61	9.6667	0	0	15.862	5.0588	0	55.338	6	15.177	0	0	372.4976438	215.602	62.084	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
7:00	55.864	11.733	0	0	29.333	7.8343	0	47.993	0	12.793	0	0	444.0504321	205.685	58.2779	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
7:15	46.287	14.933	0	0	24.444	11.192	0	57.135	0	14.214	0	0	508.079555	230.714	54.9711	1	-	-	-	-	-	1	0	0	1	0	0	0	0	0
7:30	39.903	9.6	0	0	45.222	8.9535	0	49.136	0	19.9	0	0	572.9584984	247.219	52.14	1	-	-	-	-	-	2	0	0	2	0	0	0	0	0
7:45	71.825	11.733	0	0	44	11.192	0	51.421	0	11.371	0	0	556.7959058	260.805	39.829	1	-	-	-	-	-	3	0	0	3	0	0	0	0	0
8:00	91.525	20.944	0	0	44.943	11.382	0	65.023	8	9.4859	0	0	530.1129153	281.256	37.9436	1	-	-	-	-	-	4	0	0	4	0	0	0	0	0
8:15	87.864	16.111	0	0	48.908	8.8528	0	63.639	10	11.383	0	0	462.8291931	284.406	38.8922	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
8:30	43.932	16.111	0	0	21.149	6.3235	0	56.722	6	7.5887	0	0	*409.3792728*	288.872	32.252	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
8:45	54.915	19.333	0	0	26.437	11.382	0	60.872	11	9.4859	0	0	429.2589795	310.557	31.3035	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
9:00	49.423	12.889	0	0	29.08	10.118	0	69.173	7	10.434	0	0	411.2918769	316.256	29.4063	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
9:15	53.084	22.556	0	0	23.793	8.8528	0	58.105	20	4.7429	0	0	398.8921987	317.421	28.4577	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
9:30	47.593	25.778	0	0	26.437	7.5882	0	66.406	18	6.6401	0	0	404.822456	310.271	32.252	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
9:45	40.271	29	0	0	18.506	6.3235	0	52.571	25	7.5887	0	0	404.4607834	306.737	34.1492	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
10:00	36.61	22.556	0	0	19.828	10.118	0	55.338	22	9.4859	0	0	414.5467889	312.955	36.995	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
10:15	62.237	19.333	0	0	23.793	8.8528	0	53.955	17	8.5373	0	0	431.353771	317.256	35.0978	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
10:30	51.254	25.778	0	0	21.149	8.8528	0	60.872	20	8.5373	0	0	426.0173111	328.557	33.2006	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
10:45	45.762	25.778	0	0	23.793	8.8528	0	67.79	16	10.434	0	0	444.6256353	327.79	34.1492	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
11:00	43.932	24.167	0	0	26.437	11.382	0	63.639	18	7.5887	0	0	440.6029708	325.256	35.0978	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
11:15	49.423	24.167	0	0	26.437	8.8528	0	62.256	20	6.6401	0	0	447.7183097	318.722	36.995	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
11:30	54.915	29	0	0	29.08	12.647	0	58.105	22	9.4859	0	0	450.7503009	293.504	42.6865	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
11:45	45.762	25.778	0	0	18.506	10.118	0	62.256	19	11.383	0	0	438.5517371	279.97	47.4295	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
12:00	47.593	29	0	0	23.793	12.647	0	58.105	17	9.4859	0	0	444.4437743	279.737	45.5323	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
12:15	53.084	27.389	0	0	25.115	6.3235	0	47.038	10	12.332	0	0	437.866246	288.271	47.4295	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
12:30	56.745	24.167	0	0	21.149	11.382	0	52.571	14	14.229	0	0	441.4087661	288.737	46.4809	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
12:45	60.406	12.889	0	0	26.437	6.3235	0	65.023	16	9.4859	0	0	448.2944935	289.587	40.7893	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
13:00	51.254	22.556	0	0	23.793	8.8528	0	63.639	20	11.383	0	0	467.4309052	275.136	44.5837	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
13:15	54.915	16.111	0	0	33.046	11.382	0	41.504	16	11.383	0	0	460.6527815	284.587	41.7379	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
13:30	58.576	22.556	0	0	29.08	10.118	0	48.421	19	8.5373	0	0	482.6090093	337.158	38.8922	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
13:45	64.067	25.778	0	0	27.759	7.5882	0	52.571	14	13.28	0	0	491.7078776	379.579	40.7893	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
14:00	49.423	17.722	0	0	21.149	11.382	0	76.09	17	8.5373	0	0	511.4421418	423.7	38.8922	1	-	-	-	-	-	1	0	0	1	0	0	0	0	0
14:15	69.559	27.389	0	0	29.08	11.382	0	94.075	16	8.5373	0	0	601.8569466	408.399	39.8408	1	-	1	-	-	-	2	0	1	2	0	1	0	0	0
14:30	67.728	24.167	0	0	19.828	17.706	0	96.842	13	10.434	0	0	605.9134612	386.73	42.6865	1	-	1	-	-	-	3	0	2	3	0	2	0	0	0
14:45	73.22	29	0	0	22.471	20.235	0	92.692	18	11.383	0	0	642.4110792	358.527	45.5323	1	-	1	-	-	-	4	0	3	4	0	3	0	0	0
15:00	100.68	37.056	0	0	40.977	11.382	0	67.79	10	9.4859	0	0	679.7346194	353.609	45.5323	1	-	1	-	-	-	1	0	4	1	0	4	0	0	0
15:15	86.033	24.167	0	0	21.149	10.118	0	66.406	22	11.383	0	0	671.7008703	373.061	50.2752	1	-	1	-	-	-	2	0	1	2	0	1	0	0	0
15:30	93.355	32.222	0	0	26.437	13.912	0	63.639	18	13.28	0	0	679.4824072	368.978	51.2238	1	-	1	-	-	-	3	0	2	3	0	2	0	0	0
15:45	95.186	40.278	0	0	29.08	17.706	0	85.775	20	11.383	0	0	676.6764914	370.895	54.0696	1	-	1	-	-	-	4	0	3	4	0	3	0	0	0
16:00	87.864	43.5	0	0	31.724	18.97	0	80.241	17	14.229	0	0	663.0079441	346.294	50.2752	1	-	1	-	-	-	1	0	4	1	0	4	0	0	0
16:15	82.372	29	0	0	27.759	10.118	0	73.323	11	12.332	0	0	670.7675369	337.993	47.4295	1	-	1	-	-	-	2	0	1	2	0	1	0	0	0
16:30	91.525	33.833	0	0	25.115	12.647	0	70.556	13	16.126	0	0	663.7991823	347.677	47.4295	1	-	1	-	-	-	3	0	2	3	0	2	0	0	0
16:45	80.542	38.667	0	0	30.402	18.97	0	69.173	12	7.5887	0	0	621.1440162	332.376	39.8408	1	-	1	-	-	-	4	0	3	4	0	3	0	0	0
17:00	87.864	43.5	0	0	35.69	22.764	0	71.94	17	11.383	0	0	561.6920948	314.542	42.6865	1	-	-	-	-	-	1	0	4	1	0	4	0	0	0
17:15	84.203	24.167	0	0	23.793	10.118	0	83.008	11	12.332	0	0	371.8741824	225.602	31.3035	-	-	-	-	-	-	2	0	0	2	0	0	0	0	0
17:30	76.881	16.111	0	0	21.149	6.3235	0	62.256	6	8.5373	0	0	229.5940657	131.594	18.9718	-	-	-	-	-	-	3	0	0	3	0	0	0	0	0
17:45	58.576	27.389	0	0	9.2529	13.912	0	55.338	8	10.434	0	0	109.129242	63.3384	10.4345	-	-	-	-	-	-	4	0	0	4	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
																									Hours where condition met:			5	0	3
																									Signal Warranted?			No		
																									Notes					

Appendix 10

Draft 201H Exemption List

201H Exemption Requests
for the proposed
Waiehu 100% Affordable Housing Community

The project proposes to include 184 affordable multi-family units for sale and 568 single family units for sale. The project is seeking the following exemptions pursuant to Section 201H-38, Hawaii Revised Statutes.

These exemptions will automatically terminate if the Waiehu 100% Affordable Housing Community has not commenced construction within four (4) years of the date of the 201H Approval. For this purpose, construction commencement will be defined as when the owner has obtained grading permits and has executed a construction contract for the project. Extensions to this termination will be granted at the discretion of the County Council and passed by Resolution.

As an affordable housing project, the project will seek to reduce fees as per Chapter 2.96.20 of the Maui County Code.

A. Exemption from Title 2, Maui County Code (MCC) Administration and Personnel

1. An exemption from Section 2.80B, MCC, General Plan and Community Plans, shall be granted to permit the project without obtaining a Community Plan Amendment.
2. An exemption from Section 2.80B.030, MCC, General Plan, shall be granted to permit the project to be built outside a designated urban growth boundary.
3. An exemption from Section 2.96.040.C.1, MCC, Residential Workforce Housing Requirements, shall be granted to exempt the project from the required income group distribution requirements. The Applicant is proposing the following income group distribution requirements.

# of affordable MF Units	# of affordable SF Units	Percent of Median Income
37	114	121-140% (Above Moderate)
92	284	101-120% (Moderate)
55	170	81-100% (Below Moderate)
184	**568**	**TOTAL**

B. Exemption from Title 8, MCC, Health and Safety

1. An exemption from Section 8.04, MCC, Refuse Collection and Landfills, shall be granted to exempt the project from construction waste disposal permit

and fees during the construction phase of the project but not long-term ongoing operations.

C. Exemption from Title 12, Streets, Sidewalks and Public Places

1. An exemption from Chapter 12.08, MCC, Driveways, shall be granted to exempt the project from driveway permit and inspection fees.

2. An exemption from Chapter 12.16.010, MCC, Placement of Utility Poles, shall be granted to exempt the project from the requirement to obtain a resolution from the Maui County Council to install taller utility poles or more than six (6) new utility poles along Kahekili Highway.

D. Exemption from Title 14, MCC, Public Services

1. An exemption from Section 14.70, MCC, Impact Fees for Traffic and Roadway Improvements in Wailuku Maui, Hawaii, shall be granted to exempt the project from traffic impact fees.

E. Exemptions from Title 16, MCC, Buildings and Construction

1. The project shall conform to Section 16.04C, MCC, Fire Code; Section 16.18B, MCC, Electrical Code; Section 16.20B, MCC, Plumbing Code; and Section 16.26B, MCC, Building Code; as stated at the time of the filing of the 201H-38 application, despite any subsequent amendments to these sections, or any updates to these sections adopted prior to the issuance of the last building permit for the project. This does not pertain to future renovations of buildings or units, only to new construction.

2. An exemption from Section 16.26.B.3600, MCC, Chapter 36: Improvements to Public Streets, shall be granted to exempt the project from the timing of offsite traffic improvements. If the project is required to participate in offsite traffic improvements with other private or government entities, the Applicant will request that the project be allowed to fully and immediately satisfy its obligation by making a cash payment to Maui County that is equivalent in value to the projects pro-rata share of those improvements plus reasonable administrative costs instead of having to await the completion of design, permitting and construction of those shared offsite traffic improvements prior to receiving permits for and occupancy of any phase of development.

3. An exemption from Section 16.26.B.3600, MCC, Chapter 36: Improvements to Public Streets, shall be granted to exempt the project from the requirement to

relocate the existing overhead power and telecom lines along its Kahekili frontage underground.

4. An exemption from Section 16.26.B.3600, MCC, Chapter 36: Improvements to Public Streets, and Maui County Administrative Rules Section 15-04-06.a.10 **(Storm Drainage Design Standards)** shall be granted to exempt the project from replacing the existing 48-inch culvert crossing Kahekili Highway with a larger culvert to meet current County drainage standards.

5. An exemption from Maui County Administrative Rules Section 16-201-05 **(Daily water usage)** shall be granted to exempt the undeveloped portions of the project parcel which will remain in open space use under agricultural zoning from water source requirement when subdividing.

F. Exemptions from Title 18, MCC, Subdivisions

1. An exemption from Section 18.04.030, MCC, Administration, and related land use consistency and conformity requirements of Title 18, shall be granted to exempt the project from obtaining a change in zoning or Community Plan Amendment to enable subdivision approval.

2. An exemption from Section 18.16.220, Lots-Size and Shape, shall be granted to allow lot sizes, widths, shapes, and orientation, and minimum building setback lines with the Project that are not in conformance with the provisions of Title 19, Chapter 19.30A, MCC, Agricultural District.

3. An exemption from Section 18.16.230, Lots-Minimum Sizes, shall be granted to allow lot sizes within the Project that are not in conformance with the provisions of Title 19, Chapter 19.30A, MCC, Agricultural District.

4. An exemption from Section 18.16.310.B Utilities, shall be granted to allow the project pump station and sewer force main to be dedicated to the County of Maui in the pumping station and force main are:
    a. Constructed to County Standards
    b. Located within a dedicated lot or easement conforming to MCC 18.16.310.B, and
    c. Provided reasonable provision to accommodate future wastewater contributions from TMK (2) 3-3-001:105 and TMK (2) 3-3-001:106.

5. An exemption from Section 18.16.310.C Utilities, shall be granted to allow sanitary sewer lines constructed to County standards and located within sewer line easements across private property conforming to MCC 18.16.310.C to be dedicated to the County of Maui.

6. An exemption from Section 18.16.320, Parks and Playgrounds, shall be granted to allow the project to be exempt from Parks assessment fees.

7. An exemption from Section 18.20.40B, Existing Streets, shall be granted to allow the project to be exempt the project from having to install concrete, curbs, gutters and sidewalks along Kahekili Highway where the abutting lands will remain in open space or agricultural use.

8. An exemption from Section 18.20.140B, Utility lines and facilities, shall be granted in order to not limit the ability of the Public Works Director to require the underground installation of any new electric, telephone, street lighting, and cable television services elsewhere within the project area.

G. Exemptions from Title 19, MCC, Zoning

1. An exemption from Section 19.30A.030A, MCC, District Standards, shall be granted to exempt the project from the minimum lot area of two acres. The minimum lot area shall be one thousand (1,000) square feet.

2. Section 19.30A.030B – District Standards, shall be granted to exempt the project from the minimum lot width of two hundred feet. The minimum lot width shall be twenty-five (25) feet.

3. An exemption from Section 19.510.010, MCC, Application and Procedures, A, Applications shall be granted to exempt the project from the change in zoning application requirements.

4. An exemption from Section 19.510.010, MCC, Application and Procedures, B, Fees, shall be granted to exempt the project from the filing fee requirements.

5. An exemption from Section 19.510.020, MCC, Applications which require a public hearing, A.3, shall be granted to exempt the project from the timing requirement for newspaper notification.

6. An exemption from Section 19.510.040, MCC, Change of Zoning, A, Applications, shall be granted to exempt the project from a change in zoning.

H. Exemptions from Title 20, MCC, Environmental Protection

1. An exemption from Section 20.08.090, MCC, Grubbing and Grading Permit Fees shall be granted to exempt the project from payment of grading, grubbing, and excavation permit fees, as well as inspection fees.

I. Exemption from the State General Excise Tax

1. The County of Maui does not object to the Developer seeking an exemption for the State of Hawaii's General Excise Tax in accordance with Section 201H-37, HRS.

Appendix 11

Draft Environmental Assessment (DEA) Comment Letters with Responses

DAVID Y. IGE
GOVERNOR

CURT T. OTAGURO
COMPTROLLER

AUDREY HIDANO
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)21.229

JAN - 4 2022

RECEIVED
JAN 10 2022
CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

CC: Brett - Helen
1/9/005

Buddy Almeida
Department of Housing and Human Concerns
2200 Main Street, Suite 546
Wailuku, Hawaii 96793

Dear Mr. Almeida:

Subject: Draft Environment Assessment for
Waiehu Residential Community
Waiehu, Maui, Hawaii
TMK: (2) 3-3-002: 031

Thank you for the opportunity to comment on the subject project. We have no comments to offer at this time as the proposed project does not impact any of the Department of Accounting and General Services' projects or existing facilities.

If you have any questions, your staff may call Ms. Gayle Takasaki of the Planning Branch at 586-0584.

Sincerely,

CHRISTINE L. KINIMAKA
Public Works Administrator

GT:mo
c: Brett A. Davis, Chris Hart & Partners, Inc.
Brad Cook, Genova Construction Development

CHRIS HART & PARTNERS, INC.

May 3, 2022

Ms. Christine Kinimaka, Public Works Administrator
Hawaii State Department of Accounting and General Services
P. O. Box 119
Honolulu, HI 96810-0119

ATTN: Ms. Gayle Takasaki

Dear Ms. Kinimaka,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your letter of January 04, 2022, indicating that your department has no comments or recommendations to offer at this time.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely yours,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

Institute for Astronomy
Office of the Director

UNIVERSITY of HAWAI'I MĀNOA

January 14, 2022

Via email:

County of Maui, Department of Housing & Human Concerns
2200 Main Street, Suite 546
Wailuku, HI 96793

Attention: Mr. Buddy Almeida (Buddy.Almeida@co.maui.hi.us)

Re: Waiehu Residential Community—Draft EA (AFNSI)
TMK: (2) 3-3-002:031
Wailuku District, Island of Maui

Dear Mr. Almeida:

Thank you for the opportunity to comment on the draft environmental assessment (EA) for the proposed Waiehu Residential Community project (published December 23, 2021), specifically with respect to issues and concerns regarding light pollution.

The University of Hawai'i Institute for Astronomy (IfA) conducts research in astronomy using telescopes located on Haleakalā and Maunakea and operated by IfA and our partner institutions. Both Haleakalā and Maunakea are among the best sites in the world for astronomical facilities because of their elevation, clear skies, favorable atmospheric conditions, and low levels of light pollution. Hawai'i-based observatories have played major roles in the advancement of astronomy and astrophysics for over 50 years and are well positioned to remain at the forefront of astronomical research for decades to come.

Because of the outstanding quality and productivity of these facilities, IfA is acutely concerned about negative impacts on astronomy from increased light pollution. Our work to combat light pollution has also brought us into contact with parties concerned about light pollution for other reasons, including impacts on wildlife (particularly seabirds) and on human health. While IfA's comments focus on the impacts of light pollution on astronomy, appropriate mitigation measures also help to reduce non-astronomy impacts.

With that background, we offer the following comments:

Any new or additional artificial light at night has an adverse effect on astronomical observations by increasing the night sky brightness. All observations performed by the Pan-STARRS observatories, the ATLAS telescope, and the Faulkes telescope on Haleakalā are sky-background

2680 Woodlawn Drive
Honolulu, Hawai'i 96822

limited. This means that there is a natural sky brightness coming from airflow and zodiacal light. Artificial light increases the sky brightness, thereby decreasing the sensitivity of the telescopes.

Some of the observations performed by the Air Force telescopes atop Haleakalā are also sky-background limited, so those observations, performed for national defense purposes, will also be adversely affected.

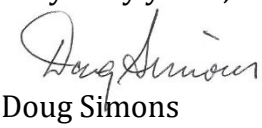
IfA appreciates the Draft EA's discussion of the project in the context of the Maui County General Plan. Consistent with that discussion, we reiterate the important steps to reduce the impact on the observatories:

1. The minimum possible amount of outdoor lighting should be used. Motion sensor activated lighting is strongly preferred.
2. Any outdoor lighting must follow the Maui County lighting ordinance: all lighting must be fully shielded, i.e., all lighting fixtures must emit zero light above the horizontal plane. While the biological survey cited in the EA did not observe any native birds on the property, shielded lighting will minimize adverse effects on both overflying seabirds and on the astronomical conditions.
3. Blue light is particularly damaging to astronomy, so blue-deficient lighting should be exclusively selected. The best choices are filtered LED lights, or amber LED lights.
4. White light should be avoided because the blue component of white light is very damaging to astronomy. White light should always have a Correlated Color Temperature of 2700 K or below.

Finally, we note that there is a strong need for further dialog with the University regarding light pollution in Maui County, and a strong need for revision of the present lighting ordinance to properly address the impacts of changes in lighting technology including LED lighting.

Thank you for your consideration of these comments and attention to IfA's concerns. If you have questions or need further detail regarding these comments, please do not hesitate to contact the undersigned or Richard Wainscoat (rjw@hawaii.edu).

Very truly yours,



Doug Simons
Director

cc: Mr. Brad Cook, Genova Construction Development (brad@genovacd.com)
Mr. Brett Davis, Chris Hart & Partners, Inc. (Bdavis@chpmaui.com)

June 28, 2022

Mr. Doug Simons, Director
University of Hawaii at Manoa
Institute for Astronomy
2680 Woodlawn Drive
Honolulu, HI 96822-1839

ATTN: Mr. Richard Wainscoat

Dear Mr. Simons,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your memorandum of January 20, 2022, providing the department's comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

Airports Division (HDOT-A)

Any new or additional artificial light at night has an adverse effect on astronomical observations by increasing the night sky brightness. All observations performed by the Pan-STARRS observatories, the ATLAS telescope, and the Faulkes telescope on Haleakalā are sky-background limited. This means that there is a natural sky brightness coming from airflow and zodiacal light. Artificial light increases the sky brightness, thereby decreasing the sensitivity of the telescopes.

Some of the observations performed by the Air Force telescopes atop Haleakalā are also sky-background limited, so those observations, performed for national defense purposes, will also be adversely affected.

IfA appreciates the Draft EA's discussion of the project in the context of the Maui County General Plan. Consistent with that discussion, we reiterate the important steps to reduce the impact on the observatories:

1. *The minimum possible amount of outdoor lighting should be used. Motion sensor activated lighting is strongly preferred.*
2. *Any outdoor lighting must follow the Maui County lighting ordinance: all lighting must be fully shielded, i.e., all lighting fixtures must emit zero light above the horizontal plane. While the biological*

survey cited in the EA did not observe any native birds on the property, shielded lighting will minimize adverse effects on both overflying seabirds and on the astronomical conditions.

3. *Blue light is particularly damaging to astronomy, so blue-deficient lighting should be exclusively selected. The best choices are filtered LED lights, or amber LED lights.*
4. *White light should be avoided because the blue component of white light is very damaging to astronomy. White light should always have a Correlated Color Temperature of 2700 K or below.*

Response.

1. The Applicant will ensure minimum possible amount of outdoor lighting to be used. The use of motion sensor activated lighting will be used if applicable.
2. The Applicant will comply with the Maui County ordinance about outdoor lighting as regulated under chapter 20.35.
3. The use of blue and white outdoor lights will be avoided when applicable and filtered LED lights, or amber LED lights will be considered.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

DAVID Y. IGE
GOVERNOR OF HAWAII

ELIZABETH A. CHAR, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
Maui District Health Office
54 South High St. Rm. #301
Wailuku, HI 96793

Lorrin W. Pang, M.D., M.P.H.
District Health Officer

January 12, 2022

Mr. Buddy Almeida
Assistant Housing Administrator
Department of Housing and Human Concerns
2200 Main Street, Suite 546
Wailuku, Hawaii 96793

Dear Mr. Almeida:

Subject: Draft Environmental Assessment
Waiehu Residential Community
TMK: (2) 3-3-002:031

Thank you for the opportunity to review this project. We have no comments to offer.

It is strongly recommended that you review the department's website at https://health.hawaii.gov/epo/landuse/ and contact the appropriate program that concerns your project.

Should you have any questions, please contact me at 808 984-8230 or email me at patricia.kitkowski@doh.hawaii.gov.

Sincerely,

Patti Kitkowski

Patti Kitkowski
District Environmental Health Program Chief

c Brad Cook
Brett A. Davis
Joanna L. Seto

CHRIS HART & PARTNERS, INC.

May 4, 2022

Ms. Patti Kitkowski, District Environmental Health Program Chief
Hawaii State Department of Health
Maui District Health Office
54 South High Street Room 301
Wailuku, HI 96793

Dear Ms. Kitkowski,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your letter of January 04, 2022, indicating that your department has no comments or recommendations to offer at this time. The Applicant has reviewed the department's website and will follow any applicable recommendations for the proposed project.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

2200 Main Street, Suite 527, Wailuku, Maui, Hawaii 96793• Ph 808 242-1955• Fax 808 242-1956
www.chpmaui.com

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

From:	Brett Davis
To:	Helen Pratiwi; Sharon Yamada
Subject:	FW: OHA Comments Re: DEA for Waiehu Residential Community
Date:	Thursday, January 13, 2022 7:55:25 AM

FYI

From: Kamakana Ferreira <kamakanaf@oha.org>
Sent: Wednesday, January 12, 2022 3:38 PM
To: Brett Davis <BDavis@chpmaui.com>; brad@genovacd.com
Cc: buddy.almeida@co.maui.hi.us; Kai Markell <kaim@oha.org>
Subject: OHA Comments Re: DEA for Waiehu Residential Community

Aloha Mr. Davis,

The Office of Hawaiian Affairs (OHA) is in receipt of the draft environmental assessment (DEA) for the Waiehu Residential Community project in Wailuku, Maui. Chris Hart & Partners, Inc., has prepared this DEA on behalf of Genova Construction Development pursuant to Hawai'i Revised Statutes (HRS) Chapter 343. This is said to be a 100% affordable housing project, with 752 residential units with associated infrastructure, roadways, and amenities (i.e., park space, walking trails, landscaping) across 158 acres of an undeveloped 238 acre parcel. HRS 343 has been triggered as 1) the residential use of the area will require a change in zoning use (from agricultural to urban) in the Wailuku-Kahaului Community Plan, and 2) some off-site infrastructure work will affect State and County rights-of-way along Kahekili Highway.

OHA provides the following comments on HRS 6E-42 review and cultural impact assessment (CIA) recommendations.

HRS 6E-42 Review

The DEA indicates that the project has been submitted to the State Historic Preservation Division (SHPD) pursuant to HRS 6E-42 (historic preservation) review. An older archaeological inventory survey (AIS) with subsurface testing done within the project area is referenced as being completed by SCS in 2005 as part of Final EA for a prior Hale Mua Affordable Housing project that fell through. At the time, 13 historic properties were identified that included mostly plantation historic remnants, but also isolated marine shell and lithic finds, and a terrace complex from the early historic period. While SCS recommended no further work, archaeological monitoring was recommended.

OHA does support archaeological monitoring. However, we respectfully request to be provided with any SHPD comments as part of their HRS 6E-42 review. As it has been quite some time since the last AIS, there could be newer studies that took place in nearby or adjacent areas that could better inform SHPD on their determination. SHPD's review will further allow them to evaluate if prior testing methods were appropriate to depths where cultural deposits could be located and the current project footprint.

CIA Recommendations

The DEA indicates that Honua Consulting conducted the CIA for this project in 2021. The study did note native plant species in the area and that endangered birds (i.e., Newell Shearwater and Hawaiian petrel) fly over the project area to more mauka locations. Honua conducted two interviews as part of the current CIA, and further included a summary of 6 other interviews from the 2004 CIA done for the Hale Mua Final EA. Most interviewees noted sugarcane activity on the parcels, without specific reference to cultural practices occurring in the project area.

However, Honua did acknowledge the abundance of kalo farmers in surrounding areas. As such, recommendations were made for the applicant to take steps to ensure that its resource usage does not adversely impact kalo farmers by monitoring usage to ensure that it does not exceed the water usage projected in the DEA. Additional recommendations further include seeking experts out for proper naming and landscaping selection, and to continue working with cultural practitioners from the area. The CIA goes on to state that best management practices (BMPs) are in place and that the landscaping has been redesigned to incorporate native plants.

OHA does acknowledge and appreciate the BMPs in place and landscaping redesign to incorporate native plants. However, it is not currently apparent to OHA how the applicant intends to monitor water usage and maintain work with cultural practitioners for the area as recommended by Honua. As water usage is certainly a sensitive topic on Maui with many areas having to comply with water usage restrictions, OHA recommends that the applicant consider a means to ensure that water usage is being monitored in some way. Further, solid commitments to continue communication with cultural practitioners from the area could help build and enhance existing relationships in a manner that is perhaps beneficial to the ongoing maintenance/operations of the housing project and the developing neighborhood.

Closing Remarks

Mahalo for the opportunity to comment. We hope to be provided with any SHPD comments and to see our comments on CIA recommendations addressed in some way. Please let me know if you have any questions.

Mahalo,

Kamakana C. Ferreira, M.A.
Lead Compliance Specialist
Office of Hawaiian Affairs
560 N. Nimitz Hwy
Honolulu, Hi. 96817

(808)594-0227

June 29, 2022

Mr. Kamakana C. Ferreira, Lead Compliance Specialist
Office of Hawaiian Affairs
560 N. Nimitz Hwy
Honolulu, Hi. 96817

Dear Mr. Ferreira,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.) (EAC 2022/0001)

Thank you for your email of January 12, 2022, providing the department's comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

OHA provides the following comments on HRS 6E-42 review and cultural impact assessment (CIA) recommendations.

HRS 6E-42 Review
The DEA indicates that the project has been submitted to the State Historic Preservation Division (SHPD) pursuant to HRS 6E-42 (historic preservation) review. An older archaeological inventory survey (AIS) with subsurface testing done within the project area is referenced as being completed by SCS in 2005 as part of Final EA for a prior Hale Mua Affordable Housing project that fell through. At the time, 13 historic properties were identified that included mostly plantation historic remnants, but also isolated marine shell and lithic finds, and a terrace complex from the early historic period. While SCS recommended no further work, archaeological monitoring was recommended.

OHA does support archaeological monitoring. However, we respectfully request to be provided with any SHPD comments as part of their HRS 6E-42 review. As it has been quite some time since the last AIS, there could be newer studies that took place in nearby or adjacent areas that could better inform SHPD on their determination. SHPD's review will further allow them to evaluate if prior testing methods were appropriate to depths where cultural deposits could be located and the current project footprint.

CIA Recommendations
The DEA indicates that Honua Consulting conducted the CIA for this project in 2021. The study did note native plant species in the area and that endangered birds (i.e., Newell Shearwater and Hawaiian petrel)

fly over the project area to more mauka locations. Honua conducted two interviews as part of the current CIA, and further included a summary of 6 other interviews from the 2004 CIA done for the Hale Mua Final EA. Most interviewees noted sugarcane activity on the parcels, without specific reference to cultural practices occurring in the project area.

However, Honua did acknowledge the abundance of kalo farmers in surrounding areas. As such, recommendations were made for the applicant to take steps to ensure that its resource usage does not adversely impact kalo farmers by monitoring usage to ensure that it does not exceed the water usage projected in the DEA. Additional recommendations further include seeking experts out for proper naming and landscaping selection, and to continue working with cultural practitioners from the area. The CIA goes on to state that best management practices (BMPs) are in place and that the landscaping has been redesigned to incorporate native plants.

OHA does acknowledge and appreciate the BMPs in place and landscaping redesign to incorporate native plants. However, it is not currently apparent to OHA how the applicant intends to monitor water usage and maintain work with cultural practitioners for the area as recommended by Honua. As water usage is certainly a sensitive topic on Maui with many areas having to comply with water usage restrictions, OHA recommends that the applicant consider a means to ensure that water usage is being monitored in some way. Further, solid commitments to continue communication with cultural practitioners from the area could help build and enhance existing relationships in a manner that is perhaps beneficial to the ongoing maintenance/operations of the housing project and the developing neighborhood.

Closing Remarks

Mahalo for the opportunity to comment. We hope to be provided with any SHPD comments and to see our comments on CIA recommendations addressed in some way. Please let me know if you have any questions.

Response. The Applicant's consultant will provide your office with any comments received from SHPD.

The proposed project is expected to receive water from the Maui County Department of Water Supply and will not exceed the water usage projected in the DEA. Water usage in the area for other property owners including kalo famers in the area have been allocated water under a State Commission on Water Resource Management (CWRM) valid use permit which is administered by the State of Hawaii. The Applicant has been in communication with CWRM and will continue to coordinate with that office to ensure the project is in compliance with applicable regulations.

Further, the Applicant is seeking experts out for proper naming and landscaping selection, and to continue working with cultural practitioners from the area.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

DAVID Y. IGE
GOVERNOR

JADE T. BUTAY
DIRECTOR

Deputy Directors
ROSS M. HIGASHI
EDUARDO P. MANGLALLAN
PATRICK H. MCCAIN
EDWIN H. SNIFFEN

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
DIR 1208
STP 8.3336

January 20, 2022

VIA EMAIL: buddy.almeida@co.maui.hi.us

Mr. Buddy Almeida
Department of Housing and Human Concerns
2200 Main Street, Suite 546
Wailuku, Hawaii 96793

Dear Mr. Almeida:

Subject: Draft Environmental Assessment (EA)
Waiehu Residential Community
Waiehu, Maui, Hawaii
Tax Map Key: (2) 3-3-002: 031

Thank you for your letter dated December 22, 2021 requesting the State of Hawaii, Department of Transportation's (HDOT) review and comments on the Draft EA for the Waiehu Residential Community. HDOT understands Genova Development Construction is proposing to develop a 100% affordable residential community on a 158-acre portion of a 238-acre lot in the Waihee-Waiehu area. The project will include approximately 752 dwelling units (184 multi-family, 568 single-family units), retail space of approximately 17,400 square feet, and three parks totaling 6.3 acres. Access to the project will be via two driveways on Kahekili Highway (State Route 340 and Count Route 330)

HDOT has the following comments:

Airports Division (HDOT-A)

1. The proposed project site is approximately four miles from Kahului Airport (OGG). All projects within five miles from Hawaii State airports are advised to read the Technical Assistance Memorandum (TAM) for guidance with development and activities that may require further review and permits. The TAM can be viewed at this link: http://files.hawaii.gov/dbedt/op/docs/TAM-FAA-DOT-Airports_08-01-2016.pdf.

2. Federal Aviation Administration (FAA) regulation requires the submittal of FAA Form 7460-1 Notice of Proposed Construction or alteration pursuant to the Code of Federal Regulations, Title 14, Part 77.9, if the construction or alteration is within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 feet. Construction

equipment and staging area heights, including heights of temporary construction cranes, shall be included in the submittal. The form and criteria for submittal can be found at the following website: https://oeaaa.faa.gov/oeaaa/external/portal.jsp.

3. Although the project is located outside of the 55 DNL (Day-Night Average Sound Level) noise contours on the 1998 Noise Exposure Map for OGG, the applicant and future residents should be aware of the proximity of the airport flight paths and potential single event noise from aircraft operations. There is also a potential for fumes, smoke, vibrations, odors, etc., resulting from occasional aircraft flight operations over the project location. These impacts may increase or decrease over time depending on airport operations.

4. The HDOT-A requires that the developer incorporates measures to minimize hazardous wildlife attractants in compliance with the FAA Advisory Circular 150/5200-33C, Hazardous Wildlife Attractants On Or Near Airports. If the project results in a wildlife attractant, these effects shall be immediately mitigated by the developer upon notification by the HDOT-A and/or FAA.

5. If a solar energy photovoltaic (PV) system is going to be installed, be aware that PV systems located in or near the approach path of aircrafts can create a hazardous condition for pilots due to possible glint and glare reflected from the PV panel array. If glint or glare from the PV array creates a hazardous condition for pilots, the owner of the PV system shall be prepared to immediately mitigate the hazard upon notification by the HDOT-A and/or FAA.

   The FAA requires a glint and glare analysis for all solar energy PV systems near airports. The www.sandia.gov/glare website has information and guidance with the preparation of a glint and glare analysis. A separate FAA Form 7460-1 will be necessary for the solar energy PV system. After the FAA determination of the Form 7460-1 glint and glare analysis, a copy shall be provided to the HDOT-A by the owner of the solar energy PV system.

   Solar energy PV systems have also been known to emit radio frequency interference (RFI) to aviation-dedicated radio signals, thereby disrupting the reliability of air-to-ground communications. Again, the owner of the solar energy PV system shall be prepared to immediately mitigate the RFI hazard upon notification by the HDOT-A and/or FAA.

Highways Division (HDOT-HWY)

The project is located on the same site as the former Hale Mua residential subdivision which had a Memorandum of Agreement with the HDOT.

1. The DEA should clarify whether the Developer will own the entire parcel of land out of the 238 acres since only a portion is proposed to be developed.

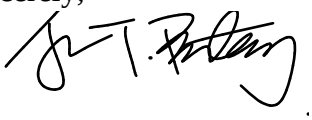
2. We find that the project will contribute additional traffic impact to the State Kahekili Highway/Waiehu Beach Road intersection. Therefore, the Applicant should meet and coordinate with the HDOT-HWY to allocate fair share and identify set-aside land for Right-of-Way (ROW) for future improvements along Kahekili Highway.

3. As a recommended condition to the Maui County Council, the Developer should work with the HDOT-HWY to execute a formal agreement that commits this project within two years of final subdivision approval, to provide an acceptable conceptual design, and to dedicate required ROW for HDOT-HWY improvements to Waiehu Beach Road's intersection with Kahekili Highway. The conceptual design shall include preliminary engineering analysis work, widening, grading, ROW, and cost estimates. The above is consistent with the past agreement with the former Hale Mua project.

4. The recommendations listed on page 84 of the Traffic Impact Analysis Report should clarify that the developer will be monitoring the need for traffic signals or a Roundabout at both intersections: Kahekili Highway/Waiehu Beach Road and Kahekili Highway/Makalaa Drive. The monitoring and annual reports shall be submitted to the HDOT-HWY, Maui District Engineer. If either traffic signalization or roundabout improvements are warranted in the future, a construction feasibility analysis and cost estimates will also be required.

If there are any questions, please contact Mr. Blayne Nikaido of the HDOT Statewide Transportation Planning Office at (808) 831-7979 or via email at blayne.h.nikaido@hawaii.gov.

Sincerely,



JADE T. BUTAY
Director of Transportation

c: Mr. Brett Davis – Chris Hart & Partners, Inc. (VIA Email: bdavis@chpmaui.com)

June 30, 2022

Mr. Jade Butay, Director of Transportation
Hawaii State Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813-5097

ATTN: Mr. Blayne Nikaido

Dear Mr. Butay,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your letter of January 20, 2022, providing the department's comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

Airports Division (HDOT-A)

1. *The proposed project site is approximately four miles from Kahului Airport (OGG). All projects within five miles from Hawaii State airports are advised to read the Technical Assistance Memorandum (TAM) for guidance with development and activities that may require further review and permits. The TAM can be viewed at this link: http://files.hawaii.gov/dbedt/op/docs/TAM-FAA-DOT-Airports_08-01-2016.pdf.*

Response. The Applicant will review the TAM for guidance with development at the site.

2. *Federal Aviation Administration (FAA) regulation requires the submittal of FAA Form 7460-1 Notice of Proposed Construction or alteration pursuant to the Code of Federal Regulations, Title 14, Part 77.9, if the construction or alteration is within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 feet. Construction equipment and staging area heights, including heights of temporary construction cranes, shall be included in the submittal. The form and criteria for submittal can be found at the following website: https://oeaaa.faa.gov/oeaaa/external/portal.jsp.*

Response. The proposed project is not situated within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 feet. The project site is situated over 4 miles from the nearest airport, i.e., the Kahului Airport.

3. *Although the project is located outside of the 55 DNL (Day-Night Average Sound Level) noise contours on the 1998 Noise Exposure Map for OGG, the applicant and future residents should be aware of the proximity of the airport flight paths and potential single event noise from aircraft operations. There is also a potential for fumes, smoke, vibrations, odors, etc., resulting from occasional aircraft flight operations over the project location. These impacts may increase or decrease over time depending on airport operations.*

Response. The Applicant acknowledges the above comment and will ensure the future residents of Waiehu Residential Community would be aware of those potential impacts.

4. *The HDOT-A requires that the developer incorporates measures to minimize hazardous wildlife attractants in compliance with the FAA Advisory Circular 150/5200-33C, Hazardous Wildlife Attractants On Or Near Airports. If the project results in a wildlife attractant, these effects shall be immediately mitigated by the developer upon notification by the HDOT-A and/or FAA.*

Response. As previously discussed, the project site is situated over 4 miles from the nearest airport, i.e., the Kahului Airport. However, the Applicant will incorporate the above measures to minimize hazardous wildlife attractants and mitigate any impacts should the project resulting in a wildlife attractant.

5. *If a solar energy photovoltaic (PV) system is going to be installed, be aware that PV systems located in or near the approach path of aircrafts can create a hazardous condition for pilots due to possible glint and glare reflected from the PV panel array. If glint or glare from the PV array creates a hazardous condition for pilots, the owner of the PV system shall be prepared to immediately mitigate the hazard upon notification by the HDOT-A and/or FAA.*

   The FAA requires a glint and glare analysis for all solar energy PV systems near airports. The www.sandia.gov/glare website has information and guidance with the preparation of a glint and glare analysis. A separate FAA Form 7460-1 will be necessary for the solar energy PV system. After the FAA determination of the Form 7460-1 glint and glare analysis, a copy shall be provided to the HDOT-A by the owner of the solar energy PV system.

   Solar energy PV systems have also been known to emit radio frequency interference (RFI) to aviation-dedicated radio signals, thereby disrupting the reliability of air-toground communications. Again, the owner of the solar energy PV system shall be prepared to immediately mitigate the RFI hazard upon notification by the HDOT-A and/or FAA.

Response. Should the proposed project incorporate PV system, the Applicant will provide a glint and glare analysis and comply with any applicable FAA regulations with regard to PV system.

Highways Division (HDOT-HWY)

The project is located on the same site as the former Hale Mua residential subdivision which had a Memorandum of Agreement with the HDOT.

1. *The DEA should clarify whether the Developer will own the entire parcel of land out of the 238 acres since only a portion is proposed to be developed.*

Response. The Developer will own the entire 238 acre parcel of land. The undeveloped land will remain in agricultural designation.

2. *We find that the project will contribute additional traffic impact to the State Kahekili Highway/Waiehu Beach Road intersection. Therefore, the Applicant should meet and coordinate with the HDOT-HWY to allocate fair share and identify set-aside land for Right-of-Way (ROW) for future improvements along Kahekili Highway.*

Response. The Final Draft of Traffic Impact Analysis Report (TIAR) for the proposed project has included the above-referenced intersection as one of the study intersections. Please refer to Appendix 9 of the DEA for detailed analysis. The Applicant will meet and coordinate with HDOT-HWY to allocate fair share and identify set-aside land for ROW for future improvements along Kahekili Highway.

3. *As a recommended condition to the Maui County Council, the Developer should work with the HDOT-HWY to execute a formal agreement that commits this project within two years of final subdivision approval, to provide an acceptable conceptual design, and to dedicate required ROW for HDOT-HWY improvements to Waiehu Beach Road's intersection with Kahekili Highway. The conceptual design shall include preliminary engineering analysis work, widening, grading, ROW, and cost estimates. The above is consistent with the past agreement with the former Hale Mua project.*

Response. The Applicant will coordinate with HDOT-HWY to execute a formal agreement as recommended in your comment.

4. *The recommendations listed on page 84 of the Traffic Impact Analysis Report should clarify that the developer will be monitoring the need for traffic signals or a Roundabout at both intersections: Kahekili Highway/Waiehu Beach Road and Kahekili Highway/Makalaa Drive. The monitoring and annual reports shall be submitted to the HDOT-HWY, Maui District Engineer. If either traffic signalization or roundabout improvements are warranted in the future, a construction feasibility analysis and cost estimates will also be required.*

Response. The Applicant will comply with the above comment should the above-referenced recommendations are implemented.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

Helen Pratiwi

From: Brett Davis
Sent: Wednesday, January 26, 2022 10:54 AM
To: Helen Pratiwi
Subject: FW: Waiehu Residential Community--Draft EA (AFNSI)

fyi

From: Balanay, Rana K <rana.balanay@doh.hawaii.gov>
Sent: Wednesday, January 26, 2022 10:53 AM
To: brad@genovacd.com; Brett Davis <BDavis@chpmaui.com>
Subject: Waiehu Residential Community--Draft EA (AFNSI)

Aloha

Thank you for the opportunity to provide comments on the subject project. I apologize for sending this past the deadline.
Please see our standard comments at:

https://health.hawaii.gov/cab/files/2019/08/Standard-Comments-Clean-Air-Branch-2019.pdf

Please let me know if you have any Questions

Lisa M.M. Wallace
EHS QA Officer
Clean Air Branch
Environmental Health Office
Hilo, Hawaii 96720

Standard Comments for Land Use Reviews
Clean Air Branch
Hawaii State Department of Health

If your proposed project:

Requires an Air Pollution Control Permit

You must obtain an air pollution control permit from the Clean Air Branch and comply with all applicable conditions and requirements. If you do not know if you need an air pollution control permit, please contact the Permitting Section of the Clean Air Branch.

Includes construction or demolition activities that involve asbestos

You must contact the Asbestos Abatement Office in the Indoor and Radiological Health Branch.

Has the potential to generate fugitive dust

You must control the generation of all airborne, visible fugitive dust. Note that construction activities that occur near to existing residences, business, public areas and major thoroughfares exacerbate potential dust concerns. It is recommended that a dust control management plan be developed which identifies and mitigates all activities that may generate airborne, visible fugitive dust. The plan, which does *not* require Department of Health approval, should help you recognize and minimize potential airborne, visible fugitive dust problems.

Construction activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust. In addition, for cases involving mixed land use, we strongly recommend that buffer zones be established, wherever possible, in order to alleviate potential nuisance complaints.

You should provide reasonable measures to control airborne, visible fugitive dust from the road areas and during the various phases of construction. These measures include, but are not limited to, the following:

a) Planning the different phases of construction, focusing on minimizing the amount of airborne, visible fugitive dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact;
b) Providing an adequate water source at the site prior to start-up of construction activities;
c) Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase;
d) Minimizing airborne, visible fugitive dust from shoulders and access roads;
e) Providing reasonable dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
f) Controlling airborne, visible fugitive dust from debris being hauled away from the project site.

If you have questions about fugitive dust, please contact the Enforcement Section of the Clean Air Branch

Clean Air Branch (808) 586-4200 cab@doh.hawaii.gov	Indoor Radiological Health Branch (808) 586-4700

April 1, 2019

May 3, 2022

Ms. Lisa M.M. Wallace, EHS QA Officer
Hawaii State Department of Health
Clean Air Branch
Environmental Health Office
Hilo, HI 96720

Dear Ms. Wallace,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your email of January 26, 2022, providing the department's comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

If your proposed project:

Requires an Air Pollution Control Permit

You must obtain an air pollution control permit from the Clean Air Branch and comply with all applicable conditions and requirements. If you do not know if you need an air pollution control permit, please contact the Permitting Section of the Clean Air Branch.

Response. The Applicant will obtain an air pollution control permit for the proposed project and ensure compliance with all applicable conditions and requirements.

If your proposed project:
Includes construction or demolition activities that involve asbestos
You must contact the Asbestos Abatement Office in the Indoor and Radiological Health Branch.

Response. The Applicant acknowledges the above comment.

If your proposed project:
Has the potential to generate fugitive dust

You must control the generation of all airborne, visible fugitive dust. Note that construction activities that occur near to existing residences, business, public areas and major thoroughfares exacerbate potential dust concerns. It is recommended that a dust control management plan be developed which identifies and mitigates all activities that may generate airborne, visible fugitive dust. The plan, which does not require Department of Health approval, should help you recognize and minimize potential airborne, visible fugitive dust problems.

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b) Providing an adequate water source at the site prior to start-up of construction activities;
c) Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase;
d) Minimizing airborne, visible fugitive dust from shoulders and access roads;
e) Providing reasonable dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
f) Controlling airborne, visible fugitive dust from debris being hauled away from the project site.

If you have questions about fugitive dust, please contact the Enforcement Section of the Clean Air Branch

Response. The Applicant will ensure compliance with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust as well as the implementation of the above-referenced measures to control airborne, visible fugitive dust from the road areas and during the various phases of construction.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Ms. Rana K Balanay, HDOH
Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

Helen Pratiwi

From: Brett Davis
Sent: Wednesday, January 26, 2022 12:57 PM
To: Helen Pratiwi
Cc: Sharon Yamada
Subject: FW: RFD.5507.6 Waiehu Residential Community
Attachments: 24662.pdf

FYI

From: Yoda, Kathy S <kathy.s.yoda@hawaii.gov>
Sent: Wednesday, January 26, 2022 12:49 PM
To: buddy.almeida@co.maui.hi.us
Cc: brad@genovacd.com; Brett Davis <BDavis@chpmaui.com>
Subject: RFD.5507.6 Waiehu Residential Community

Our apologies for the late response
Please find attached the Commission on Water Resource Management's comments regarding the subject project

Kathy
Department of Land and Natural Resources
Commission on Water Resource Management
1151 Punchbowl Street, #227
Honolulu, HI 96813

p: 808.587.0234
f: 808.587.0219

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

January 24, 2022

REF: RFD.5507.6

TO: Buddy Almeida
Department of Housing and Human Concerns

FROM: M. Kaleo Manuel, Deputy Director
Commission on Water Resource Management

SUBJECT: Waiehu Residential Community

FILE NO.: RFD.5507.6
TMK NO.: (2) 3-3-002:031

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at http://dlnr.hawaii.gov/cwrm.

Our comments related to water resources are checked off below.

- [X] 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.
- [ ] 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.
- [ ] 3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.
- [X] 4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EAP as having high water efficiency can be found at http://www.epa.gov/watersense.
- [X] 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://planning.hawaii.gov/czm/initiatives/low-impact-development/
- [ ] 6. We recommend the use of alternative water sources, wherever practicable.
- [X] 7. We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at http://energy.hawaii.gov/green-business-program.
- [X] 8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf.

[X] 9. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

[X] 10. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the requirement to use dual line water supply systems for new industrial and commercial developments.

[ ] 11. The Hawaii Water Plan is directed toward the achievement of the utilization of reclaimed water for uses other than drinking and for potable water needs in one hundred per cent of State and County facilities by December 31, 2045 (§174C-31(g)(6), Hawaii Revised Statutes). We strongly recommend that this project consider using reclaimed water for its non-potable water needs, such as irrigation. Reclaimed water may include, but is not limited to, recycled wastewater, gray water, and captured rainwater/stormwater. Please contact the Hawai'i Department of Health, Wastewater Branch, for more information on their reuse guidelines and the availability of reclaimed water in the project area.

[ ] 12. A Well Construction Permit(s) is (are) are required before the commencement of any well construction work.

[ ] 13. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

[ ] 14. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.

[ ] 15. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

[ ] 16. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a steam channel.

[ ] 17. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.

[ ] 18. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.

[ ] 19. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

[X] OTHER: Planning - As noted above, the Commission supports the use of alternative resources wherever practicable to conserve natural supplies. It is the policy of the Water Commission to promote the viable and appropriate reuse of reclaimed water insofar as it does not compromise beneficial uses of existing water resources.

Groundwater & Surface Water - The proposed water supply for this development is Maui Department of Water Supply (MDWS). Estimated demand ranges from 0.376 mgd - 0.490 mgd. MDWS sources are within the Iao Groundwater Management area and the Na Wai Eha Surface Water Management Areas. Coordination is required with the Commission to determine any potential impacts that this project will have on MDWS water use permit allocations.

If you have any questions, please contact Neal Fujii of the Planning Branch at 587-0216 or Ryan Imata of the Regulation Branch at 587-0225.

c: Brad Cook, Genova Construction Development
Brett A. Davis, Chris Hart & Partners, Inc.

May 4, 2022

Mr. M. Kaleo Manuel, Deputy Director
Hawaii State Department of Land and Natural Resources
Commission on Water Resource Management
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Manuel,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your email of January 26, 2022, providing the department's comments dated January 24, 2022, on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

1. *We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.*

Response. The Applicant will coordinate with the Planning Department and Department of Water Supply to discuss the projects incorporation into the County's Water Use and Development Plan.

4. *We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EAP as having high water efficiency can be found at http://www.epa.gov/watersense.*

Response. The proposed project will incorporate water efficient fixtures and water efficient practices were practical to reduce demand on freshwater resources. The Applicant will review the *watersense* reference provided above.

5. *We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://planning.hawaii.gov/czm/initiatives/low-impact-development/*

Response. The proposed project will incorporate the use of BMP's for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events.

7. *We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at http://energy.hawaii.gov/green-business-program.*

Response. The Applicant acknowledges the comment.

8. *We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at http://www.hawaiiscape.com/wp-ontent/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf.*

Response. The proposed project will incorporate the said BMP for landscape irrigation conservation as endorsed by the Landscape Industry Council of Hawaii.

9. *There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.*

Response. The Applicant acknowledges the comment and will cooperate with HDOH to ensure water quality.

10. *The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the requirement to use dual line water supply systems for new industrial and commercial developments.*

Response. The Applicant will obtain a Water Use Permit prior to use of water for the proposed Waiehu Residential Community.

OTHER:
Planning - As noted above, the Commission supports the use of alternative resources wherever practicable to conserve natural supplies. It is the policy of the Water Commission to promote the viable and appropriate reuse of reclaimed water insofar as it does not compromise beneficial uses of existing water resources.

Groundwater & Surface Water - The proposed water supply for this development is Maui Department of Water Supply (MDWS). Estimated demand ranges from 0.376 mgd - 0.490 mgd. MDWS sources are within the Iao Groundwater Management area and the Na Wai Eha Surface Water Management Areas.

Coordination is required with the Commission to determine any potential impacts that this project will have on MDWS water use permit allocations.

Response. The Applicant acknowledges the comment and will coordinate with the Commission to determine any potential impacts that this project will have on MDWS water use permit allocations.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 27, 2022

County of Maui
Department of Housing and Human Concerns
Attn: Mr. Buddy Almeida
2200 Main Street, Suite 546
Wailuku, Hawaii 96793

via email: buddy.almeida@co.maui.hi.us

Dear Mr. Almeida:

SUBJECT: Draft Environmental Assessment for the Proposed **Waiehu Residential Community** located at Kahului, Island of Maui; TMK: (2) 3-3-002:031 on behalf of Genova Construction Development

Thank you for the opportunity to review and comment on the subject matter. In addition to our previous comments dated January 21, 2022, enclosed are comments from the Division of Forestry & Wildlife on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: darlene.k.nakamura@hawaii.gov. Thank you.

Sincerely,

Russell Tsuji

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Chris Hart & Partners, Inc. (w/copies)
Attn: Mr. Brett A. Davis, Senior Planner (via email: bdavis@chpmaui.com)
Genova Construction Development (w/copies)
Attn: Mr. Brad Cook (via email: brad@genovacd.com)
Central Files

CHRIS HART & PARTNERS, INC.

June 27, 2022

Mr. Russell Y. Tsuji, Land Administrator
Hawaii State Department of Land and Natural Resource
Land Division
P. O. Box 621
Honolulu, HI 96809

ATTN: Ms. Darlene Nakamura

Dear Mr. Tsuji,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.) (EAC 2022/0001)

Thank you for your letter of January 27, 2022, enclosing a comment letter from the Division of Forestry & Wildlife as well as informing about your department's letter dated January 21, 2022.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Office of Environmental and Quality Control website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely yours,

Brett Davis, Senior Planner

2200 Main Street, Suite 527, Wailuku, Maui, Hawaii 96793• Ph 808 242-1955• Fax 808 242-1956

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 28, 2021

MEMORANDUM

TO: **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
_X_ Engineering Division (DLNR.ENGR@hawaii.gov)
_X_ Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks
_X_ Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
___Office of Conservation & Coastal Lands
_X_ Land Division – Maui District (daniel.l.ornellas@hawaii.gov)

FROM: *for* Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Assessment for the Proposed **Waiehu Residential Community**
LOCATION: Kahului, Island of Maui; TMK: (2) 3-3-002:031
APPLICANT: Christ Hart Partners Inc. on behalf of Genova Construction Development

Transmitted for your review and comment is information on the above-referenced subject matter. The DEA was published on December 23, 2021 by the State Environmental Review Program (formerly the Office of Environmental Quality Control) at the Office of Planning and Sustainable Development in the periodic bulletin, The Environmental Notice, available at the following link:

http://oeqc2.doh.hawaii.gov/The_Environmental_Notice/2021-12-23-TEN.pdf

Please submit any comments by January 20, 2022. If no response is received by this date, we will assume your agency has no comments. Should you have any questions, please contact Darlene Nakamura directly via email at darlene.k.nakamura@hawaii.gov. Thank you.

BRIEF COMMENTS:

( ) We have no objections.
( ) We have no comments.
( ) We have no additional comments.
(☑) Comments are included/attached.

Signed: DGS
Print Name: DAVID G. SMITH, Administrator
Division: Division of Forestry and Wildlife
Date: Jan 26, 2022

Attachments
cc: Central Files

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

January 26, 2022

MEMORANDUM *Log no. 3472 (2)*

TO: RUSSELL Y. TSUJI, Land Administrator
Land Division

FROM: DAVID G. SMITH, Administrator
Division of Forestry and Wildlife

SUBJECT: **Division of Forestry and Wildlife Comments for the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Maui**

The Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) has received your request for comment on the DEA for the proposed Waiehu Residential Community project in Kahului on the island of Maui, TMK: (2) 3-3-002:031. The proposed project would consist of developing 158 acres of land as a new 100% affordable, 752-unit residential community. Work project would also include the development of associated infrastructure, roadways, and amenities such as a retail space of approximately 17,400 square feet, three park spaces totaling 6.3 acres, walking trails, and landscaping.

DOFAW initially provided comments on an early or pre-consultation for this project in a letter to Mr. Brett Davis dated December 7, 2020. Mr. Davis responded to these comments in a letter dated September 20, 2021. We concur with these responses and have no additional concerns regarding the proposed avoidance and minimization measures and any potential project impacts on State-listed species.

We appreciate your efforts to work with our office for the conservation of our native species. Should the scope of the project change significantly, or should it become apparent that threatened or endangered species may be impacted, please contact our staff as soon as possible. If you have any questions, please contact Paul Radley, Protected Species Habitat Conservation Planning Coordinator at (808) 295-1123 or paul.m.radley@hawaii.gov.

Sincerely,

DAVID G. SMITH
Administrator

June 27, 2022

Mr. David G. Smith, Administrator
Hawaii State Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl Street, Room 325
Honolulu, Hawaii 96813

ATTN: Mr. Paul Radley

Dear Mr. Smith,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your letter of January 26, 2022, providing the department's comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

DOFAW initially provided comments on an early or pre-consultation for this project in a letter to Mr. Brett Davis dated December 7, 2020. Mr. Davis responded to these comments in a letter dated September 20, 2021. We concur with these responses and have no additional concerns regarding the proposed avoidance and minimization measures and any potential project impacts on State-listed species.

We appreciate your efforts to work with our office for the conservation of our native species. Should the scope of the project change significantly, or should it become apparent that threatened or endangered species may be impacted, please contact our staff as soon as possible. If you have any questions, please contact Paul Radley, Protected Species Habitat Conservation Planning Coordinator at (808) 295-1123 or paul.m.radley@hawaii.gov.

Response. The Applicant acknowledges that your department does not have any additional concerns regarding the proposed avoidance and minimization measures as well as any potential project impacts on State-listed species. The Applicant will coordinate with your department should there be a significant change to project scope.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 21, 2022

County of Maui
Department of Housing and Human Concerns
Attn: Mr. Buddy Almeida
2200 Main Street, Suite 546
Wailuku, Hawaii 96793

via email: buddy.almeida@co.maui.hi.us

Dear Mr. Almeida:

SUBJECT: Draft Environmental Assessment for the Proposed **Waiehu Residential Community** located at Kahului, Island of Maui; TMK: (2) 3-3-002:031 on behalf of Genova Construction Development

Thank you for the opportunity to review and comment on the subject matter. The Land Division of the Department of Land and Natural Resources (DLNR) distributed or made available a copy of your request pertaining to the subject matter to DLNR's Divisions for their review and comments.

At this time, enclosed are comments from the (a) Engineering Division and (b) Land Division-Maui District on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: darlene.k.nakamura@hawaii.gov. Thank you.

Sincerely,

Russell Tsuji

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Chris Hart & Partners, Inc. (w/copies)
Attn: Mr. Brett A. Davis, Senior Planner (via email: bdavis@chpmaui.com)
Genova Construction Development (w/copies)
Attn: Mr. Brad Cook (via email: brad@genovacd.com)
Central Files

May 3, 2022

Mr. Russell Y. Tsuji, Land Administrator
Hawaii State Department of Land and Natural Resources
Land Division
PO Box 621
Honolulu, Hawaii 96809

ATTN: Ms. Darlene Nakamura

Dear Mr. Tsuji,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii; TMK: (2) 3-3-002:031 (por.)

Thank you for your letter of January 21, 2022. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

Thank you for the opportunity to review and comment on the subject matter. The Land Division of the Department of Land and Natural Resources (DLNR) distributed or made available a copy of your request pertaining to the subject matter to DLNR's Divisions for their review and comments.

At this time, enclosed are comments from the (a) Engineering Division and (b) Land Division-Maui District on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: darlene.k.nakamura@hawaii.gov. Thank you.

Response. Thank you for transmitting the comments from Engineering Division and Land Division-Maui District on the proposed project.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 28, 2021

MEMORANDUM

TO: **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
_X_ Engineering Division (DLNR.ENGR@hawaii.gov)
_X_ Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks
_X_ Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
___Office of Conservation & Coastal Lands
_X_ Land Division – Maui District (daniel.l.ornellas@hawaii.gov)

FROM: *for* Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Assessment for the Proposed Waiehu Residential Community
LOCATION: Kahului, Island of Maui; TMK: (2) 3-3-002:031
APPLICANT: Christ Hart Partners Inc. on behalf of Genova Construction Development

Transmitted for your review and comment is information on the above-referenced subject matter. The DEA was published on December 23, 2021 by the State Environmental Review Program (formerly the Office of Environmental Quality Control) at the Office of Planning and Sustainable Development in the periodic bulletin, The Environmental Notice, available at the following link:

http://oeqc2.doh.hawaii.gov/The_Environmental_Notice/2021-12-23-TEN.pdf

Please submit any comments by January 20, 2022. If no response is received by this date, we will assume your agency has no comments. Should you have any questions, please contact Darlene Nakamura directly via email at darlene.k.nakamura@hawaii.gov. Thank you.

BRIEF COMMENTS:

( ) We have no objections.
(X) We have no comments.
( ) We have no additional comments.
( ) Comments are included/attached.

Signed: _____
Print Name: Daniel Ornellas
Division: MDLO
Date: 1/7/22

Attachments
cc: Central Files

CHRIS HART & PARTNERS, INC.

May 3, 2022

Mr. Daniel Ornellas, District Land Agent
Hawaii State Department of Land and Natural Resources
Land Division – Maui District Office
130 Mahalani Street
Wailuku, HI 96793

ATTN: Ms. Darlene Nakamura

Dear Mr. Ornellas,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your memorandum of January 07, 2021, indicating that your department has no comments or recommendations to offer at this time.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely yours,

Brett Davis, Senior Planner

Cc: Mr. Russell Y. Tsuji, Hawaii DLNR
Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-06

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 28, 2021

MEMORANDUM

FROM:

~~TO:~~ **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
_X_ Engineering Division (DLNR.ENGR@hawaii.gov)
_X_ Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks
_X_ Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
___Office of Conservation & Coastal Lands
_X_ Land Division – Maui District (daniel.l.ornellas@hawaii.gov)

TO:

~~FROM:~~ *for* Russell Y. Tsuji, Land Administrator

SUBJECT: Draft Environmental Assessment for the Proposed **Waiehu Residential Community**

LOCATION: Kahului, Island of Maui; TMK: (2) 3-3-002:031

APPLICANT: Chris Hart Partners Inc. on behalf of Genova Construction Development

Transmitted for your review and comment is information on the above-referenced subject matter. The DEA was published on December 23, 2021 by the State Environmental Review Program (formerly the Office of Environmental Quality Control) at the Office of Planning and Sustainable Development in the periodic bulletin, The Environmental Notice, available at the following link:

http://oeqc2.doh.hawaii.gov/The_Environmental_Notice/2021-12-23-TEN.pdf

Please submit any comments by January 20, 2022. If no response is received by this date, we will assume your agency has no comments. Should you have any questions, please contact Darlene Nakamura directly via email at darlene.k.nakamura@hawaii.gov. Thank you.

BRIEF COMMENTS:

( ) We have no objections.
( ) We have no comments.
(✓) We have no additional comments.
( ) Comments are included/attached.

Signed: _____

Print Name: Carty S. Chang, Chief Engineer

Division: Engineering Division

Date: Jan 14, 2022

Attachments
cc: Central Files

CHRIS HART & PARTNERS, INC.

May 3, 2022

Mr. Carty S. Chang, Chief Engineer
Hawaii State Department of Land and Natural Resources
Engineering Division
Kalanimoku Building
1151 Punchbowl Street, Room 221
Honolulu, Hawaii 96813

ATTN: Ms. Darlene Nakamura

Dear Mr. Chang,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii; TMK: (2) 3-3-002:031 (por.)

Thank you for your memorandum of January 14, 2021, indicating that your department has no additional comments or recommendations to offer at this time.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely yours,

Brett Davis, Senior Planner

Cc: Mr. Russell Y. Tsuji, Hawaii DLNR
Mr. Buddy Almeida, Maui DHHC

Mr. Brad Cook, Genova Construction Development
Project File 19-06

DAVID Y. IGE
GOVERNOR

KEITH T. HAYASHI
INTERIM SUPERINTENDENT

STATE OF HAWAI`I

DEPARTMENT OF EDUCATION

P.O. BOX 2360

HONOLULU, HAWAI`I 96804

OFFICE OF FACILITIES AND OPERATIONS

RECEIVED

JAN 26 2022

CHRIS HART & PARTNERS, INC.
Landscape Architecture and Planning

CC: Brett + Helen
19/065

January 21, 2022

Mr. Buddy Almeida
County of Maui
Department of Housing and Human Concerns
2200 Main Street, Suite 546
Wailuku, Maui 96793

Re: Draft Environmental Assessment for the Proposed Waiehu Residential Community Project, Kahului, Maui, Hawaii, TMK 3-3-002:031

Dear Mr. Almeida:

Thank you for your letter dated December 22, 2021. The Hawaii State Department of Education (Department) previously provided the enclosed comments dated December 4, 2020, and has the following additional comments.

The Department anticipates that approximately 319 public school students will reside in the project. This number may increase if accessory dwelling units are allowed on the larger single-family lots.

Thank you for the opportunity to comment. Should you have questions, contact Robyn Loudermilk, Planner of the Facilities Development Branch, Planning Section, at (808) 784-5093 or via email at robyn.loudermilk@k12.hi.us

Sincerely,

Roy Ikeda
Interim Public Works Manager
Planning Section

RI:rll
Enclosure

c: Jaimie Yap, Complex Area Superintendent, Baldwin/Kekaulike/Maui Complex
Brett Davis, Chris Hart & Partners, Inc.

DAVID Y. IGE
GOVERNOR

DR. CHRISTINA M. KISHIMOTO
SUPERINTENDENT

STATE OF HAWAI`I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI`I 96804

OFFICE OF FACILITIES AND OPERATIONS

December 4, 2020

Mr. Brett Davis, Senior Planner
Chris Hart & Partners, Inc.
115 N. Market Street
Wailuku, Maui 96793-1717

Re: Early Consultation Request for the Proposed Waiehu Residential Community Project, Kahului, Maui, Hawaii, TMK 3-3-002:031

Dear Mr. Davis:

The Hawaii State Department of Education (HIDOE) has the following early consultation comments in the preparation of a consolidated application for the proposed Waiehu Residential Community (Project) on approximately 241 acres located at TMK 3-3-002:031, Kahului, Island of Maui. This consolidated application will include a Draft Environmental Assessment, State Land Use District Boundary Amendment, Community Plan Amendment, Change in Zoning, and 201H-38, Hawaii Revised Statutes.

The HIDOE schools servicing the proposed Project are Waihee Elementary, Iao Middle, and Baldwin High. Waihee Elementary has capacity and will continue to have capacity during the next five years. Both Iao Middle and Baldwin High are over capacity. This over capacity is expected to remain over the next five years.

The Project is located within the Central Maui School Impact District with fee amounts of $2,371 for multi-family residential units and $5,373 for single family residential units. The Project developer is encouraged to meet with the HIDOE as early as possible to discuss executing and Educational Contribution Agreement.

The combined application should identify whether the Project will include accessory dwelling units.

Thank you for the opportunity to comment. Should you have questions, please contact Robyn Loudermilk, Planner with the Facilities Development Branch, Planning Section, at (808) 784-5093 or via email at robyn.loudermilk@k12.hi.us

Respectfully,

Brenda Lowrey
for Public Works Manager
Planning Section

BL:rll

c: Kathleen Dimino, Complex Area Superintendent, Baldwin/Kekaulike/Maui Complex Area

May 3, 2022

Mr. Roy Ikeda, Interim Public Works Manager
Planning Section
Hawaii State Department of Education
P. O. Box 2360
Honolulu, HI 96804

ATTN: Ms. Robyn Loudermilk

Dear Mr. Ikeda,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii; TMK: (2) 3-3-002:031 (por.) (EAC 2022/0001)

Thank you for your letter of January 21, 2022, providing the department's comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

The Hawaii State Department of Education (Department) previously provided the enclosed comments dated December 4, 2020 and has the following additional comments.

The Department anticipates that approximately 319 public school students will reside in the project. This number may increase if accessory dwelling units are allowed on the larger single-family lots.

Response. The Applicant has responded the previous comment letter through a letter dated September 29, 2021. The response letter has been attached along with other response letters as Appendix 3 of the DEA.

As discussed in Table 2 of the DEA, the proposed project will comply with any impact fee ordinances for public schools. The Applicant will coordinate further with your department on the school impact fees.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

DAVID Y. IGE
GOVERNOR

KENNETH S. HARA
MAJOR GENERAL
ADJUTANT GENERAL

STEPHEN F. LOGAN
BRIGADIER GENERAL
DEPUTY ADJUTANT GENERAL

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

January 25, 2022

CC: Brett + Helen

Department of Housing and Human Concerns
Attn: Mr. Buddy Almeida
2200 Main Street, Suite 546
Wailuku, Hawaii 96793

SUBJECT: Environmental Assessment for the Waiehu Residential Community TMK (2) 3-3-002:031 19/065

Dear Mr. Almeida:

Thank you for the opportunity to comment on the above project. The State of Hawaii Department of Defense has no comments to offer relative to the project.

Should you have any questions, please contact Mr. Scott J. Kawamoto at 808-369-3500 or scott.j.kawamoto@hawaii.gov.

Sincerely,

Shaoyu L. Lee
Captain, Hawaii National Guard
Chief Engineering Officer

c: Chris Hart &Partners, Inc.
Attn: Mr. Brett A. Davis
2200 Main Street, Suite 527
Wailuku, Hawaii 96793

c: Genova Construction Development
Attn: Mr. Brad Cook
555 Corporate Drive, Suite 120
Ladera Ranch, California 92694

May 3, 2022

Shaoyu L. Lee, Captain
Hawaii National Guard, Chief Engineering Officer
Hawaii State Department of Defense
3949 Diamond Head Road
Honolulu, HI 96816-4495

ATTN: Mr. Scott J. Kawamoto

Dear Captain Lee,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii; TMK: (2) 3-3-002:031 (por.)

Thank you for your letter of January 25, 2022, indicating that your department has no comments or recommendations to offer at this time.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely yours,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

MICHAEL P. VICTORINO
Mayor

KARLA H. PETERS
Director

MARCI M. SATO
Deputy Director

DEPARTMENT OF PARKS AND RECREATION
700 Hali'a Nakoa Street, Unit 2, Wailuku, Hawai'i 96793
Main Line (808) 270-7230 / Facsimile (808) 270-7942

MEMORANDUM

TO: Lori Tsuhako, Director
Department of Housing and Human Concerns

FROM: Karla H. Peters, Director

DATE: January 10, 2022

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE WAIEHU RESIDENTIAL COMMUNITY PROJECT AT TMK: (2) 3-3-002:031, WAILUKU, MAUI, HAWAII

Thank you for the opportunity to review and comment on the proposed Waiehu Residential Community Project.

In review of the project, we note that the applicant is currently proposing to develop 752 affordable housing units, along with a connected trail and open space network with parks and a small commercial center. As a result, should this project satisfy requirements as set by Maui County Code (MCC) 2.96 Residential Workforce Housing Policy, and remain 100% workforce housing, the project would be exempted from MCC 18.16.320 Parks and Playgrounds requirements. We have no further comments at this time.

Should you have any questions or concerns, please feel free to contact me or Samual Marvel, Chief of Planning and Development, at (808) 270-6173.

c: Buddy Almeida, Housing Administrator
Samual Marvel, Chief of Planning and Development
Brett Davis, Christ Hart & Partners, Inc.
Brad Cook, Genova Construction Development

KHP:SM:csa

May 4, 2022

Ms. Karla H. Peters, Director
County of Maui, Department of Parks and Recreation
700 Hali'a Nakoa Street, Unit 2
Wailuku, HI 96793

ATTN: Mr. Samuel Marvel

Dear Ms. Peters,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your memorandum of January 10, 2022, providing the department's comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

In review of the project, we note that the applicant is currently proposing to develop 752 affordable housing units, along with a connected trail and open space network with parks and a small commercial center. As a result, should this project satisfy requirements as set by Maui County Code (MCC) 2.96 Residential Workforce Housing Policy, and remain 100% workforce housing, the project would be exempted from MCC 18.16.320 Parks and Playgrounds requirements. We have no further comments at this time.

Response. The Applicant confirms that the above description reflects the proposed project and that the project would be exempted from MCC 18.16.320 Parks and Playgrounds requirements.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely yours,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

MICHAEL P. VICTORINO
Mayor

BRADFORD K. VENTURA
Fire Chief

GAVIN L.M. FUJIOKA
Deputy Fire Chief

DEPARTMENT OF FIRE & PUBLIC SAFETY
FIRE PREVENTION BUREAU
COUNTY OF MAUI
313 MANEA PLACE
WAILUKU, HI 96793

January 14, 2022

VIA EMAIL: Buddy.Almeida@co.maui.hi.us
bdavis@chpmaui.com

Department of Housing and Human Concerns
Attn: Buddy Almeida
2200 Main Street, Suite 546
Wailuku, HI 96793

SUBJECT: WAIEHU RESIDENTIAL COMMUNITY

Dear Buddy,

Thank you for the opportunity to review your project. At this time Fire Prevention Bureau has no comments in regards to the Draft Environmental Assessment.

Our office does reserve the right to comment on the proposed project during the building permit review process when detailed plans for this project are routed to our office for review. At that time, fire apparatus access, water supply for the fire protection, and fire and life safety requirements associated with the subject project will be formally reviewed.

Note: Pertaining to subdivision design – dead end roads may serve no more than 20 parcels in accordance with the fire code.

If there are any questions or comments, please feel free to contact our office at (808) 876-4690 or by email at fire.prevention@mauicounty.gov.

Sincerely,

Plans Review - Fire Prevention Bureau

June 28, 2022

Mr. Bradford Ventura, Director
County of Maui, Department of Fire & Public Safety
200 Dairy Road
Kahului, HI 96732-2978

Dear Mr. Ventura,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your memorandum of January 10, 2022, providing the department's comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

Thank you for the opportunity to review your project. At this time Fire Prevention Bureau has no comments in regards to the Draft Environmental Assessment.

Our office does reserve the right to comment on the proposed project during the building permit review process when detailed plans for this project are routed to our office for review. At that time, fire apparatus access, water supply for the fire protection, and fire and life safety requirements associated with the subject project will be formally reviewed.

Note: Pertaining to subdivision design – dead-end roads may serve no more than 20 parcels in accordance with the fire code.

Response. The Applicant acknowledges the above comments and that your office will review future building permits for the proposed project.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

MICHAEL P. VICTORINO
Mayor

MICHELE CHOUTEAU MCLEAN, AICP
Director

JORDAN E. HART
Deputy Director

DEPARTMENT OF PLANNING
COUNTY OF MAUI
ONE MAIN PLAZA
2200 MAIN STREET, SUITE 315
WAILUKU, MAUI, HAWAII 96793

January 28, 2022

MEMORANDUM

TO: Christian Tackett, Chair
Members of the Maui Planning Commission

FROM: Michele McLean, AICP, Planning Director

SUBJECT: REQUEST FOR COMMENTS ON THE DRAFT ENVIRONMENTAL ASSESSMENT (DEA) FOR THE PROPOSED WAIEHU RESIDENTIAL COMMUNITY, TO BE PROCESSED FOR COMPLIANCE WITH HAWAII REVISED STATUTES (HRS) CHAPTER 201H, A 100% AFFORDABLE HOUSING PROJECT ON A 158-ACRE PORTION OF A 238-ACRE PARCEL LOCATED ADJACENT TO KAHEKILI HIGHWAY, WAILUKU, MAUI, HAWAII; TMK: (2) 3-3-002:031 (POR.) (EAC 2022/0001)

The Department of Planning (Department) is transmitting to the Maui Planning Commission (Commission) the DEA for the proposed Waiehu Residential Community to be processed as a 100% affordable housing project in compliance with HRS, Chapter 201H. The application was prepared by Chris Hart and Partners on behalf of Genova Development Construction. The DEA is available as a hyperlink on the Commission's agenda for the February 8, 2022, meeting and is available on the State of Hawaii's Office of Planning and Sustainable Development's Environmental Review Program, formerly known as the OEQC, located in the December 23, 2021, edition of *The Environmental Notice* as a hyperlink http://oeqc2.doh.hawaii.gov/Doc_Library/2021-10-08-MA-DEA-Kuikahi-Affordable-Housing-Project.pdf. The triggers for the Waiehu Community are to amend the Wailuku-Kahului Community Plan from Agricultural to Urban and off-site infrastructure work affecting State and County rights-of-way along Kahekili Highway. The approving agency for the EA is the Department of Housing and Human Concerns, County of Maui.

The proposed action is to develop a portion of the existing undeveloped 238-acre parcel of land situated west of Kahekili Highway. Approximately 158 acres of land will be developed as a 100% affordable, 752-unit residential community along with associated infrastructure, roadways, and amenities such as park space, walking trails, and landscaping. All units within the proposed community are for sale at prices determined by the Housing and Urban Development (HUD) annual price guidelines.

Out of the proposed 752 dwelling units, 184 will be multi-family units and 568 will be single-family units. The proposed plan includes six different types of single-family development to provide a variety of housing options to future residents. The proposed project also includes a retail space of approximately 17,400 square feet and three parks totaling 6.3 acres.

Action by the Commission

The Department requests comments from the Commission on the proposed project, to be included in a letter to the Applicant, Consultant, and the Department of Housing and Human Concerns.

If you have any questions regarding this proposed project and the Draft EA process, please contact the Planning Department at planning@mauicounty.gov or at (808) 270-8205.

Copy to: Michele McLean, AICP, Planning Director (PDF)
Clayton Yoshida, Planning Program Administrator (PDF)
Jared Burkett, Staff Planner (PDF)
Carolyn Takayama-Corden, Secretary, Maui Planning Commission (PDF)
Buddy Almeida, Department of Housing and Human Concerns (PDF)
Brett Davis, Consultant (PDF)
Project File

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MICHAEL P. VICTORINO
Mayor

MICHELE CHOUTEAU MCLEAN, AICP
Director

JORDAN E. HART
Deputy Director

DEPARTMENT OF PLANNING
COUNTY OF MAUI
ONE MAIN PLAZA
2200 MAIN STREET, SUITE 315
WAILUKU, MAUI, HAWAII 96793

January 28, 2022

MEMORANDUM

TO: Christian Tackett, Chair
Members of the Maui Planning Commission

FROM: Michele McLean, AICP, Planning Director

SUBJECT: REQUEST FOR COMMENTS ON THE DRAFT ENVIRONMENTAL ASSESSMENT (DEA) FOR THE PROPOSED WAIEHU RESIDENTIAL COMMUNITY, TO BE PROCESSED FOR COMPLIANCE WITH HAWAII REVISED STATUTES (HRS) CHAPTER 201H, A 100% AFFORDABLE HOUSING PROJECT ON A 158-ACRE PORTION OF A 238-ACRE PARCEL LOCATED ADJACENT TO KAHEKILI HIGHWAY, WAILUKU, MAUI, HAWAII; TMK: (2) 3-3-002:031 (POR.) (EAC 2022/0001)

The Department of Planning (Department) is transmitting to the Maui Planning Commission (Commission) the DEA for the proposed Waiehu Residential Community to be processed as a 100% affordable housing project in compliance with HRS, Chapter 201H. The application was prepared by Chris Hart and Partners on behalf of Genova Development Construction. The DEA is available as a hyperlink on the Commission's agenda for the February 8, 2022, meeting and is available on the State of Hawaii's Office of Planning and Sustainable Development's Environmental Review Program, formerly known as the OEQC, located in the December 23, 2021, edition of *The Environmental Notice* as a hyperlink http://oeqc2.doh.hawaii.gov/Doc_Library/2021-10-08-MA-DEA-Kuikahi-Affordable-Housing-Project.pdf. The triggers for the Waiehu Community are to amend the Wailuku-Kahului Community Plan from Agricultural to Urban and off-site infrastructure work affecting State and County rights-of-way along Kahekili Highway. The approving agency for the EA is the Department of Housing and Human Concerns, County of Maui.

The proposed action is to develop a portion of the existing undeveloped 238-acre parcel of land situated west of Kahekili Highway. Approximately 158 acres of land will be developed as a 100% affordable, 752-unit residential community along with associated infrastructure, roadways, and amenities such as park space, walking trails, and landscaping. All units within the proposed community are for sale at prices determined by the Housing and Urban Development (HUD) annual price guidelines.

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Action by the Commission

The Department requests comments from the Commission on the proposed project, to be included in a letter to the Applicant, Consultant, and the Department of Housing and Human Concerns.

If you have any questions regarding this proposed project and the Draft EA process, please contact the Planning Department at planning@mauicounty.gov or at (808) 270-8205.

Copy to: Michele McLean, AICP, Planning Director (PDF)
Clayton Yoshida, Planning Program Administrator (PDF)
Jared Burkett, Staff Planner (PDF)
Carolyn Takayama-Corden, Secretary, Maui Planning Commission (PDF)
Buddy Almeida, Department of Housing and Human Concerns (PDF)
Brett Davis, Consultant (PDF)
Project File

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MICHAEL P. VICTORINO
Mayor

MICHELE CHOUTEAU MCLEAN, AICP
Director

JORDAN E. HART
Deputy Director

DEPARTMENT OF PLANNING
COUNTY OF MAUI
ONE MAIN PLAZA
2200 MAIN STREET, SUITE 315
WAILUKU, MAUI, HAWAII 96793

March 1, 2022

Mr. Buddy Almeida
County of Maui
Department of Housing and Human Concerns
2200 Main Street, Suite 546
Wailuku, Hawaii 96793

Dear Mr. Almeida:

SUBJECT: REQUEST FOR COMMENT ON THE DRAFT ENVIRONMENTAL ASSESSMENT (DEA) FOR THE PROPOSED WAIEHU RESIDENTIAL COMMUNITY, LOCATED IN WAILUKU, MAUI, HAWAII; TMK: (2) 3-3-002:031 (POR.) (EAC 2022/0001)

The Department of Planning (Department) is in receipt of the Applicant's December 21, 2021, Request for Comment on the Draft Environmental Assessment (DEA) for the proposed Waiehu Residential Community (Project) to be processed pursuant to Chapter 201H, Hawaii Revised Statutes (HRS). The Project as represented in the DEA was also reviewed by the Urban Design Review Board on March 1, 2022, where the UDRB offered comments on the design elements and the layout of the Project. The Department will provide a separate letter that includes the UDRB's comments as well as final comments from the Department, if applicable.

The Maui Planning Commission (Commission) reviewed the Project as represented in the DEA and the Applicant's presentation on February 8, 2022. After hearing public testimony and deliberation, the Commission offered comments, as detailed below.

Commission Comments:

1. The Project must retain all surface water runoff onsite, to ensure no affect to any properties downhill of the Project.

2. Please provide community gardens either within the Project or on the parcel, and provide any necessary access and utilities for residents to utilize at the community gardens.

3. Consider adding an agricultural buffer between the Project and all surrounding homes. There is a farm with active farming practices nearby. Placing a community garden between that farm and the Project would be ideal.

4. The aquifer is reaching its maximum consumption capacity. The rainwater falling on the Project area is a key resource in recharging the aquifer. Impervious surfaces will impede the aquifer recharge. Use materials that are permeable as much as possible and limit impervious surfaces where possible. In order to recharge the aquifer, rainwater must be retained onsite and allowed to percolate within the watershed.

5. The Hale Mua Draft EA said that proposed project was .1% of all Ag land on Maui. Please indicate what percentage of the useable inventory of Prime Ag land this Project would be removing from that inventory. This includes Land Study Bureau soils classed as A and B, indicating lands that are classed as the most conducive for farming. Also, please indicate what the cumulative impacts are from taking the highest quality Ag land out of the inventory available for use.

6. Reach out to special interest groups who have an interest in the development of this project to ensure community support of the Project early on.

7. Indicate to what extent the two drainage areas identified in the site plan can also be utilized as parks for recreation. Consider the viability of using the parks for drainage purposes as well.

8. Ensure all unit sales will include deed restrictions to require the owner to live in the dwelling for at least 20 years before resale at market rates. If sold before 20 years, the property must be sold at affordable housing rates.

9. Include terms of sale that only Maui County residents are eligible to purchase a newly listed unit. Give priority to first-time home buyers.

10. The Project area already has congested traffic, so the Project will add considerably more congestion. Consult the Hele Mai Maui 2040 Long Range Transportation Plan. The intersections in the Project area were indicated as FLOS rated intersections needing improvements. Work with DOT to ensure those improvements have been implemented as well as any remaining traffic calming solutions needed due to the Project.

11. The Project may include excavation and removal of topsoil for construction. Limit the removal of resources from the site, and keep the topsoil on site if possible.

12. Please include a landscaping plan in the Final EA. Ensure that the plan includes as many native plants and edible plants as possible and no invasive species. Implement landscaping that increases the percolation rate of runoff and landscaping that incorporates native plants.

13. The ground water resources section, pages 60-61, states that there may not be sufficient water resources to build the entire development, so the project will be developed in phases. Please provide a detailed description of the development phases for this Project.

14. The Population and Housing section does not provide enough information on the future residents of this community. Please indicate whether this Project will increase the population on Maui.

15. The demographics of the target buyers should be indicated. Indicate what impacts this Project could have to the neighborhoods where those people move from.

16. Indicate where the children will attend school and what the traffic impacts will be, not only from the buses, but also from the parents driving their children to school.

17. Indicate what commercial aspects and local service businesses will be located in the Project.

18. In the Significance Criteria Section, Item F talks about secondary impacts on population levels since there is no residential component, but there is a residential component. Please correct that typo.

19. The Project will be converting Prime Ag land, with LSB soil grades A and B, to urban use. The drinking water resources and inventory usage will be affected. Please include a discussion on the cumulative and secondary impacts on agricultural resources and drinking water resources.

20. The Project must provide a transit center to be incorporated within the commercial area of the Project.

21. This project will have significant impacts to traffic. The project must provide signaling of intersections or roundabouts to Kahekili Highway. Wherever feasible, provide roundabouts at intersections to improve traffic flow.

22. When any Project unit is initially placed on the market, the Project must at first limit sales to only Maui County residents for a six month period.

23. Reach out to the West Maui Mountains Watershed Partnership, Mauna Kahalawai watershed, Mauna Kahalawai chapter of the Hawaii Farmers Union United, Hui o Na Wai Eha, and any other stakeholders for comments or concerns.

24. Many environmental concerns have been identified by the Commissioners. Run the LEED certified scorecards in the design phase to minimize environmental impacts.

25. PA-1 is outside of the limits of the urban area making it an ideal area for farming. In place of PA-1, designate the area along the stream for farming and community gardens.

26. To ensure all homes will be equipped with solar systems and to align with LEED certification, please equip the units with solar systems prior to listing the properties on the market for sale.

27. Consider how to maintain the character of Waiheu as much as possible. Defining this will require consulting with kupuna.

28. The architectural character and design of the housing in the DEA only shows sample housing developments. Ensure the architectural character is in keeping with Hawaii, as close to the character of Waiehu as possible.

29. Maui County Code (MCC), Section 2.96.050(4), states, "Notwithstanding the foregoing, for those developments developed pursuant to Chapter 201H, Hawaii Revised Statutes, only those developments comprised of one hundred percent residential workforce housing units shall be eligible to receive credits. Credits may only be issued for those residential workforce housing units sold or rented to income eligible individuals in the appropriate income groups, in excess of fifty percent of the total number of residential workforce housing units constructed." You indicated during the public hearing that this is 100 percent affordable housing processed under HRS, Chapter 201H, but will also be processed under MCC, Chapter 2.96. In the Final EA, please indicate this process and what additional MCC, Chapter 2.96 review will be involved so the public is aware what regulations this project will be reviewed under.

Thank you for the opportunity to comment on the DEA for the Project. Should you require further clarification, please contact Staff Planner Jared Burkett at jared.burkett@mauicounty.gov or at (808) 270-7378.

Sincerely,

MICHELE MCLEAN, AICP
Planning Director

Copy to: Clayton Yoshida, Planning Program Administrator (PDF)
Jacky Takakura, Acting Planning Program Administrator (PDF)
Jared Burkett, Staff Planner (PDF)
Genova Construction Development, Applicant (PDF)
Brett Davis, Consultant (PDF)
Project File

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June 30, 2022

Ms. Michele Chouteau McLean, AICP, Director
County of Maui, Department of Planning
2200 Main Street
One Main Plaza, Suite 315
Wailuku, HI 96793

ATTN: Mr. Jared Burkett

Dear Ms. McLean,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your letter of March 01, 2022, providing the Maui Planning Commission's comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

1. *The Project must retain all surface water runoff onsite, to ensure no affect to any properties downhill of the Project.*

Response. The proposed project includes mitigation of the storm water runoff as a result of the project to ensure no effect to any properties downhill of the project. A drainage plan has been developed by a civil engineer to calculate estimated drainage and mitigation measures.

2. *Please provide community gardens either within the Project or on the parcel, and provide any necessary access and utilities for residents to utilize at the community gardens.*

Response. The proposed project will support community garden space within the open areas and of the Waiehu Community Design.

3. *Consider adding an agricultural buffer between the Project and all surrounding homes. There is a farm with active farming practices nearby. Placing a community garden between that farm and the Project would be ideal.*

Response. The project site plan proposes to use 158 acres of the 238 acre parcel. The 80 acres mauka of the project site will remain designated agricultural land. This will serve as a buffer between existing neighbors and the new community.

4. *The aquifer is reaching its maximum consumption capacity. The rainwater falling on the Project area is a key resource in recharging the aquifer. Impervious surfaces will impede the aquifer recharge. Use materials that are permeable as much as possible and limit impervious surfaces where possible. In order to recharge the aquifer, rainwater must be retained onsite and allowed to percolate within the watershed.*

Response. The design of the project site incorporates the central drainage feature and various parks and open spaces that will allow for rainwater to percolate on site and recharge the watershed. The Applicant will limit pervious surfaces as plausible and will explore the use of permeable materials.

5. *The Hale Mua Draft EA said that proposed project was .1% of all Ag land on Maui. Please indicate what percentage of the useable inventory of Prime Ag land this Project would be removing from that inventory. This includes Land Study Bureau soils classed as A and B, indicating lands that are classed as the most conducive for farming. Also, please indicate what the cumulative impacts are from taking the highest quality Ag land out of the inventory available for use.*

Response. The proposed project will result in a loss of agricultural land. The previously approved project proposed to utilize the entire property. This project is proposing to leave 80 acres of the project site as agricultural. This 80 acres will buffer existing residents from the new community and may provide an opportunity to support future agricultural use on the property.

The proposed site plan provides an opportunity for the creation of active agricultural and therefore could help increase the capacity for farming opportunities in the area.

6. *Reach out to special interest groups who have an interest in the development of this project to ensure community support of the Project early on.*

Response. The Applicants consultant team is continuously engaging the public on this proposed affordable housing project.

7. *Indicate to what extent the two drainage areas identified in the site plan can also be utilized as parks for recreation. Consider the viability of using the parks for drainage purposes as well.*

Response. The Applicant is proposing utilizing the drainage areas as park spaces as permitted by the County.

8. *Ensure all unit sales will include deed restrictions to require the owner to live in the dwelling for at least 20 years before resale at market rates. If sold before 20 years, the property must be sold at affordable housing rates.*

Response. The project will be developed within the requirements of Chapter 2.96 including deed restrictions.

9. *Include terms of sale that only Maui County residents are eligible to purchase a newly listed unit. Give priority to first-time home buyers.*

Response. The project will be developed within the requirements of Chapter 2.96 and Maui County residents will be the priority.

10. *The Project area already has congested traffic, so the Project will add considerably more congestion. Consult the Hele Mai Maui 2040 Long Range Transportation Plan. The intersections in the Project area were indicated as FLOS rated intersections needing improvements. Work with DOT to ensure those improvements have been implemented as well as any remaining traffic calming solutions needed due to the Project.*

Response. The applicant acknowledges this comment and will work with DOT to ensure improvements have been implemented as well as any other traffic calming solutions needed due to the Project.

11. *The Project may include excavation and removal of topsoil for construction. Limit the removal of resources from the site, and keep the topsoil on site if possible.*

Response. The Applicant agrees with this comment.

12. *Please include a landscaping plan in the Final EA. Ensure that the plan includes as many native plants and edible plants as possible and no invasive species. Implement landscaping that increases the percolation rate of runoff and landscaping that incorporates native plants.*

Response. Landscape planting is provided in the conceptual site plan and incorporated throughout the site and open spaces. The overall landscape design will incorporate native trees and plants as possible.

13. *The ground water resources section, pages 60-61, states that there may not be sufficient water resources to build the entire development, so the project will be developed in phases. Please provide a detailed description of the development phases for this Project.*

Response. The project is estimated to be built in phases from 2024 -2032. The 100% affordable project will include construction of affordable housing during all phases and will be

dependent upon the real estate market demand at the time of sales. Supporting infrastructure such as roadways, water, installing sewer, drainage, roadways and utilities would happen concurrently with the housing construction.

14. *The Population and Housing section does not provide enough information on the future residents of this community. Please indicate whether this Project will increase the population on Maui.*

Response. The proposed project is anticipated to provide housing for Maui County residents and therefore not increase the resident population on Maui.

15. *The demographics of the target buyers should be indicated. Indicate what impacts this Project could have to the neighborhoods where those people move from.*

Response. The proposed project is targeted to Maui residents who qualify under Chapter 2.96 Maui County Code. This project could have a positive impact on existing, overcrowded neighborhoods by reducing the amount of people and vehicles in the neighborhood.

16. *Indicate where the children will attend school and what the traffic impacts will be, not only from the buses, but also from the parents driving their children to school.*

Response. Children are anticipated to attend school in Wailuku. The Department of Education will make that determination should the project land use entitlements be approved.

17. *Indicate what commercial aspects and local service businesses will be located in the Project.*

Response. The Applicant has not determined what services or businesses would be located within the project at this time. The Applicant will ask for ideas from the community.

18. *In the Significance Criteria Section, Item F talks about secondary impacts on population levels since there is no residential component, but there is a residential component. Please correct that typo.*

Response. Thank you, the typo will be corrected.

19. *The Project will be converting Prime Ag land, with LSB soil grades A and B, to urban use. The drinking water resources and inventory usage will be affected. Please include a discussion on the cumulative and secondary impacts on agricultural resources and drinking water resources.*

Response. The Final EA section 4.3 includes a discussion on cumulative and secondary impacts.

20. *The Project must provide a transit center to be incorporated within the commercial area of the Project.*

Response. The Applicant is coordinating with Maui DOT on proper locations for public transportation to service the project site. The Applicant will share this comment with Maui DOT.

21. *This project will have significant impacts to traffic. The project must provide signaling of intersections or roundabouts to Kahekili Highway. Wherever feasible, provide roundabouts at intersections to improve traffic flow.*

Response. The State DOT and our project team engineers are exploring the options and coordinating final traffic recommendations for the area. The Applicant will enter into an agreement with the State DOT on required infrastructure improvements.

22. *When any Project unit is initially placed on the market, the Project must at first limit sales to only Maui County residents for a six month period.*

Response. The Applicant acknowledges this comment. The project will comply with the requirements of Chapter 2.96 Maui County Code.

23. *Reach out to the West Maui Mountains Watershed Partnership, Mauna Kahalawai watershed, Mauna Kahalawai chapter of the Hawaii Farmers Union United, Hui o Na Wai Eha, and any other stakeholders for comments or concerns.*

Response. The Applicant acknowledges this comment and will reach out to stakeholders listed above and others.

24. *Many environmental concerns have been identified by the Commissioners. Run the LEED certified scorecards in the design phase to minimize environmental impacts.*

Response. The Applicant's architect will review the LEED scorecard and incorporate energy savings materials and conservation measures where possible to reduce overall impacts to the environment.

25. *PA-1 is outside of the limits of the urban area making it an ideal area for farming. In place of PA-1, designate the area along the stream for farming and community gardens.*

Response. The Applicant acknowledges this comment and will continue dialogue with the community to discuss the overall project density and scale. The open space and landscape areas will provide opportunities for community gardens.

26. *To ensure all homes will be equipped with solar systems and to align with LEED certification, please equip the units with solar systems prior to listing the properties on the market for sale.*

Response. The Applicant acknowledges the above comment and will explore the feasibility of providing solar systems on homes prior to sale.

27. *Consider how to maintain the character of Waiehu as much as possible. Defining this will require consulting with kupuna.*

Response. The Applicant acknowledges the above comment and will request feedback on defining the character of Waiehu.

28. *The architectural character and design of the housing in the DEA only shows sample housing developments. Ensure the architectural character is in keeping with Hawaii, as close to the character of Waiehu as possible.*

Response. The Applicant acknowledges the above comment and will review the Country Town Guidelines for guidance.

29. *Maui County Code (MCC), Section 2.96.050(4), states, "Notwithstanding the foregoing, for those developments developed pursuant to Chapter 201H, Hawaii Revised Statutes, only those developments comprised of one hundred percent residential workforce housing units shall be eligible to receive credits. Credits may only be issued for those residential workforce housing units sold or rented to income eligible individuals in the appropriate income groups, in excess of fifty percent of the total number of residential workforce housing units constructed." You indicated during the public hearing that this is 100 percent affordable housing processed under HRS, Chapter 201H, but will also be processed under MCC, Chapter 2.96. In the Final EA, please indicate this process and what additional MCC, Chapter 2.96 review will be involved so the public is aware what regulations this project will be reviewed under.*

Response. The Final EA will indicate that project is subject to MCC, Chapter 2.96 review so the public is aware what regulations this project will be reviewed under.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

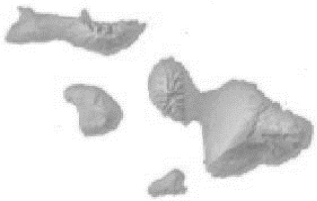
Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

MICHAEL P. VICTORINO
Mayor

JEFFREY T. PEARSON, P.E.
Director

HELENE KAU
Deputy Director



DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAIʻI 96793

February 7, 2022

Buddy Almeida
DEPARTMENT OF HOUSING AND HUMAN CONCERNS
via email: buddy.almeida@co.maui.hi.us

Dear Buddy Almeida:

SUBJECT: PROPOSED WAIEHU RESIDENTIAL COMMUNITY DRAFT EA
TMK: (2) 3-3-002:031, Wailuku, Maui, Hawaii

Thank you for the opportunity to review and comment on the subject project, which includes the construction of 752 total affordable housing units (184 multi-family and 568 single-family), 17,400 square feet of retail space, and three parks to be developed in phases on approximately 158-acres of the 238-acre property.

The subdivider shall comply with all rules, regulations, and procedures, as amended, of the Department of Water Supply, at the time of the Department's final subdivision approval, including, but not limited to the following:

- Maui County Code, Chapter 14.04 – Water Services
- Maui County Code, Chapter 14.05 – Subdivision Water System Requirements
- Maui County Code, Chapter 14.07 – Water System Development Fees
- Maui County Code, Chapter 14.12 – Water Availability
- Administrative Rules
- Water System Standards 2002

<u>MCC, Chapter 14.05 – Subdivision Water System Requirements</u>

- MCC 14.05.020 – Reservoirs/storage tanks, as amended. For "Residential" districts, storage capacity shall be determined on the basis of fire flow duration, maximum daily flow or 1,000 gallons per lot, whichever basis is greater. In this instance, maximum daily flow governs, thereby requiring construction of a new concrete 1,000,000-gallon tank.

  Page 4-3 of the Preliminary Engineering Report (PER), indicates that the tank would be at an elevation compatible with the Waiehu Kou and the Waiehu Heights Tanks and filled by the Central Maui Water Transmission System or Waiehu wells.

If the proposed new tank shall be filled by the Central Maui Water Transmission System, the subdivider shall provide evidence as to whether the existing 1,000,000-gallon Waihee Tank could manage the additional water demand. The PER is correct that the Waiehu Heights Well 2 fills the Waiehu Kou and the Waiehu Heights Tanks. However, Waiehu Heights Well 1 has been offline since October 2012; therefore, an increasing in daily pumping at this location is not ideal.

- MCC 14.05.060 – Laterals, as amended. There are no existing water laterals and no existing water meters assigned to the subject property, therefore, the subdivider shall install a water service lateral for each subdivision lot, including installation of a Department approved backflow prevention device on the consumer side of the water meter, where applicable.

- MCC 14.05.090 – Fire Protection, as amended. The existing water system is not adequate in providing the minimum fire flow for the subdivision, therefore the subdivider shall install new waterlines along the proposed internal roads and existing Kahekili Highway at a size sufficient to provide 2,000 gallons per minute (gpm) for "Commercial" districts, 1,250 gpm for "Residential" multi-family districts, and 1,000 gpm for "Residential" single-family districts at a maximum velocity of 10 feet per second, in accordance with Section 111.06 – Pipeline Sizing of the Water System Standards 2002. Fire hydrants shall be installed at spacing of 250 feet for "Commercial" districts and 350 feet for "Residential" multi-family and single-family districts.

- MCC 14.05.120 – Construction plans, as amended. Prior to commencement of construction, all water system improvements require submittal of construction plans (24"x36") stamped and signed by a licensed engineer for the Department's review and approval, in accordance with Section 112 – Construction Plans of the Water System Standards 2002. Construction work shown on the approved plans shall be completed by a licensed contractor at the property owner's expense.

- MCC 14.05.140 – Installation of water service, as amended. No water service shall be approved or provided by the Department for the subdivision until the subdivision water system improvements have been completed and accepted by the Department. Upon the completion and our acceptance of the water system improvements, the subdivider may apply for water service for each lot. Payment shall be made in accordance with MCC, Chapter 14.07 – Water System Development Fees and the applicable fees set forth in the Department's annual budget, in effect at the time of approval of water service.

- MCC 14.05.170 – Ownership of installed water system improvements, as amended. The subdivider shall provide perpetual easements for all portions of the water system improvements installed in other than publicly owned right-of-ways.

<u>MCC, Chapter 14.12 – Water Availability</u>

The applicant is required to obtain a written confirmation of long-term reliable supply of water from the Director of the Department of Water Supply.

<u>Administrative Rules, Title 16, Chapter 201 – Relating to Water Service</u>

The project will need to meet the criteria for water service outlined in the Administrative Rules, as amended. The Administrative Rules clarify large quantity of water usage and the tiers for an

applicant's request for new or additional water service from the Department. The 2022 Central Maui Water System currently allows an applicant to request up to 120,000 gallons per day (gpd) of new or additional water service. Please be advised that the requested amount is updated at the beginning of each year.

- Affordable Housing Units: These lots may qualify as an exception to the Administrative Rules by submitting to the Department a copy of an executed, recorded, and valid residential workforce housing agreement between the developer and the County. If the subdivision is not able to provide this agreement, the subdivider shall provide source.
- Retail Space, Parks and Remaining Acreage: These lots do not qualify as an exemption to the Administrative Rules.

Administrative Rules, Title 16, Chapter 202 – Relating to Water Meter Reservations

Since the project is not ready for water service, the subdivider may reserve an allocation of water during the County's subdivision process.

If you have any questions, please contact Tammy Yeh of our Engineering Division at (808) 270-7682 or at tammy.yeh@co.maui.hi.us. Engineering Division's main number is (808) 270-7835.

Sincerely,

WENDY TAOMOTO, P.E.
Engineering Program Manager

TY

cc: Applicant – Genova Construction Development, Brad Cook (brad@genovacd.com)
DWS – Water Resources and Planning (DWS.Planning@mauicounty.gov)
Planning Consultant – Chris Hart & Partners, Inc., Brett A. Davis (bdavis@chpmaui.com)

May 3, 2022

Ms. Wendy Taomoto, P.E.
Engineering Program Manager
Maui County Department of Water Supply
Engineering Division
200 South High Street
Wailuku, Maui, Hawaii 96793

ATTN: Ms. Tammy Yeh

Dear Ms. Taomoto,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii; TMK: (2) 3-3-002:031 (por.)

Thank you for your letter of February 07, 2022. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

The subdivider shall comply with all rules, regulations, and procedures, as amended, of the Department of Water Supply, at the time of the Department's final subdivision approval, including, but not limited to the following:

- *Maui County Code, Chapter 14.04 – Water Services*
- *Maui County Code, Chapter 14.05 – Subdivision Water System Requirements*
- *Maui County Code, Chapter 14.07 – Water System Development Fees*
- *Maui County Code, Chapter 14.12 – Water Availability*
- *Administrative Rules*
- *Water System Standards 2002*

Response. The Applicant will comply with applicable rules and regulations of the Department of Water Supply.

MCC, Chapter 14.05 – Subdivision Water System Requirements

- *MCC 14.05.020 – Reservoirs/storage tanks, as amended. For "Residential" districts, storage capacity shall be determined on the basis of fire flow duration, maximum daily flow or 1,000 gallons*

per lot, whichever basis is greater. In this instance, maximum daily flow governs, thereby requiring construction of a new concrete 1,000,000-gallon tank.

Page 4-3 of the Preliminary Engineering Report (PER), indicates that the tank would be at an elevation compatible with the Waiehu Kou and the Waiehu Heights Tanks and filled by the Central Maui Water Transmission System or Waiehu wells.
If the proposed new tank shall be filled by the Central Maui Water Transmission System, the subdivider shall provide evidence as to whether the existing 1,000,000-gallon Waihee Tank could manage the additional water demand. The PER is correct that the Waiehu Heights Well 2 fills the Waiehu Kou and the Waiehu Heights Tanks. However, Waiehu Heights Well 1 has been offline since October 2012; therefore, an increasing in daily pumping at this location is not ideal.

- *MCC 14.05.060 – Laterals, as amended. There are no existing water laterals and no existing water meters assigned to the subject property, therefore, the subdivider shall install a water service lateral for each subdivision lot, including installation of a Department approved backflow prevention device on the consumer side of the water meter, where applicable.*

- *MCC 14.05.090 – Fire Protection, as amended. The existing water system is not adequate in providing the minimum fire flow for the subdivision, therefore the subdivider shall install new waterlines along the proposed internal roads and existing Kahekili Highway at a size sufficient to provide 2,000 gallons per minute (gpm) for "Commercial" districts, 1,250 gpm for "Residential" multi-family districts, and 1,000 gpm for "Residential" single-family districts at a maximum velocity of 10 feet per second, in accordance with Section 111.06 – Pipeline Sizing of the Water System Standards 2002. Fire hydrants shall be installed at spacing of 250 feet for "Commercial" districts and 350 feet for "Residential" multi-family and single-family districts.*

- *MCC 14.05.120 – Construction plans, as amended. Prior to commencement of construction, all water system improvements require submittal of construction plans (24"x36") stamped and signed by a licensed engineer for the Department's review and approval, in accordance with Section 112 – Construction Plans of the Water System Standards 2002. Construction work shown on the approved plans shall be completed by a licensed contractor at the property owner's expense.*

- *MCC 14.05.140 – Installation of water service, as amended. No water service shall be approved or provided by the Department for the subdivision until the subdivision water system improvements have been completed and accepted by the Department. Upon the completion and our acceptance of the water system improvements, the subdivider may apply for water service for each lot. Payment shall be made in accordance with MCC, Chapter 14.07 – Water System Development Fees and the applicable fees set forth in the Department's annual budget, in effect at the time of approval of water service.*

- *MCC 14.05.170 – Ownership of installed water system improvements, as amended. The subdivider shall provide perpetual easements for all portions of the water system improvements installed in other than publicly owned right-of-ways.*

Response. The Applicant acknowledges that the project is subject to Maui County Code, Chapter 14.05 – Subdivision Water System Requirements.

MCC, Chapter 14.12 – Water Availability
The applicant is required to obtain a written confirmation of long-term reliable supply of water from the Director of the Department of Water Supply.

Response. At the appropriate time after the County and State land use entitlement process, the Applicant will coordinate with the Director for written confirmation.

Administrative Rules, Title 16, Chapter 201 – Relating to Water Service
The project will need to meet the criteria for water service outlined in the Administrative Rules, as amended. The Administrative Rules clarify large quantity of water usage and the tiers for an applicant's request for new or additional water service from the Department. The 2022 Central Maui Water System currently allows an applicant to request up to 120,000 gallons per day (gpd) of new or additional water service. Please be advised that the requested amount is updated at the beginning of each year.

- *Affordable Housing Units: These lots may qualify as an exception to the Administrative Rules by submitting to the Department a copy of an executed, recorded, and valid residential workforce housing agreement between the developer and the County. If the subdivision is not able to provide this agreement, the subdivider shall provide source.*
- *Retail Space, Parks and Remaining Acreage: These lots do not qualify as an exemption to the Administrative Rules.*

Response. The Applicant acknowledges he comments related to water service. The Applicant intends to enter into a workforce housing agreement with the County and understands that Retail space do not qualify for exemption from the administrative rules.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC

Mr. Brad Cook, Genova Construction Development
Project File 19-065

MICHAEL P. VICTORINO
Mayor

JEFFREY T. PEARSON, P.E.
Director

HELENE KAU
Deputy Director

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAI`I 96793

www.mauicounty.gov/water

January 28, 2022

Mr. Buddy Almeida
Maui County Department of Housing and Human Concerns
2200 Main Street, Suite 546
Wailuku, Hawaii 96793

Re: Waiehu Residential Community Draft Environmental Assessment (DEA), Waiehu, Maui, Hawai'i
TMK: (2)-3-3-002:031

Dear Mr. Almeida:

The County of Maui Department of Water Supply's (MDWS) Water Resources and Planning Division appreciates the opportunity to comment on the proposed Waiehu Residential Community DEA. The MDWS Engineering Division may elect to submit a separate letter.

Water Source
According to the Commission on Water Resource Management (CWRM), the project overlies the 'Īao Aquifer, which has a sustainable yield of 20 million gallons per day.

Project Alignment with the Draft Maui Island Water Use and Development Plan (WUDP)
Stormwater Drainage Management to Supplement Irrigation Sources
The proposed project may have potential to accomplish stormwater management within the proposed project footprint, which could be used for stormwater mitigation and retention for irrigation reuse (WUDP Wailuku Aquifer Sector Area [ASEA] Strategy #10). The CWRM promotes the protection of ground water and the value of treating stormwater as a resource, including groundwater recharge capability when contained onsite, described in its document titled *A Handbook for Stormwater Reclamation and Reuse Best Management Practices in Hawai'i*, December, 2008: http://files.hawaii.gov/dlnr/cwrm/planning/hsrar_handbook.pdf. We

recommend implementing Best Management Practices (BMPs) contained in the document, such as permeable surfaces to reduce storm water loss (for example, permeable detention ponds and vegetated filter strips), and bio-retention rain gardens.

Potential Project Alignment with the Draft Maui Island WUDP

WUDP Strategy	WUDP Planning Objective	WUDP Strategy Type, Strategy #
Reduce *non-potable* use of Wailuku Aquifer Sector basal and high level water to the extent feasible.	1. Maximize water quality 2. Manage water equitably 3. Maintain consistency with General and Community Plans	Wailuku ASEA Conventional Water Resource Strategy, #6
The Maui Island WUDP focuses on specific projects with a strategy to explore *stormwater drainage* to *supplement irrigation sources* in Central Maui.	1. Minimize adverse environmental impacts 2. Maximize efficiency of water use 3. Maintain sustainable resources	WUDP Addendum, Wailuku ASEA, Alternative Water Source Strategy #10
Consider *alternative sources* of irrigation water including *wastewater reuse, recycled stormwater runoff, and brackish well water* in land use permitting to mitigate low-flow stream conditions. Require *alternative sources for irrigation* when reasonably available in county discretionary land use permitting.	1. Maintain sustainable resources 2. Protect and restore streams 3. Minimize adverse environmental impacts 4. Maximize efficiency of water use 5. Maintain consistency with General and Community Plans	Central ASEA Conventional Water Resource Strategy, #8

MDWS Wellhead Protection Areas

Approximately 2.2 acres of the project footprint is within the MDWS wells' 2-year time of travel zone (please see attached map); therefore, non-pathogen-related chemicals and pathogens from septic systems can potentially contaminate MDWS wells.

Design Guidelines BMPs

Considering the project footprint's inclusion in a Wellhead Protection Zone, the following design guidelines should be considered for subdivisions that create four or more developable lots, and to the construction of three or more dwelling units on a single lot, parcel, or site:

1. Proposed development and uses shall be located as far from the wellhead as feasible.
2. Storm-water infiltration basins shall be located outside the Wellhead Protection Overlay District (WPOD) where feasible, provided that if this is not feasible, then the basins shall be located as far from the wellhead as feasible.
3. Active parks and schools shall implement integrated pest management.
4. If a development or use is proposed on property which is partially within a WPOD, the proposed development or use shall be located to the maximum extent feasible on the portion of the property that is outside the WPOD.

Construction Best Management Practices (BMPs) for Pollution Prevention

In order to protect ground and surface water resources, we recommend that in addition to any required BMPs, the following measures designed to minimize infiltration and runoff be implemented during construction:

1. Prevent cement products, oil, fuel and other toxic substances from falling or leaching into the ground.
2. Properly and promptly dispose of all loosened and excavated soil and debris material from drainage structure work.
3. Maintain vehicles and equipment to prevent oil or other fluids from leaking.
4. Concrete trucks and tools used for construction should be rinsed off-site.
5. Properly install and maintain erosion control barriers such as silt fencing or straw bales.
6. Disturb the smallest area possible.
7. Retain ground cover until the last possible date.
8. Stabilize denuded areas by sodding or planting as soon as possible.
9. Use high seeding rates to ensure rapid establishment of stands of plants.
10. In order to minimize chemical run-off, apply biocides (e.g. Glyphosate/Roundup) only during dry periods of low rainfall.
11. Replanting of denuded areas should include soil amendments and temporary irrigation.
12. Keep runoff on-site.

Conservation BMPs

Indoor

- Use EPA WaterSense labeled plumbing fixtures.
- Install dual flush toilets with high-efficiency models that use 1.28 gallons per flush, or less.
- Install bathroom sink faucets with fixtures that do not exceed 1 gallon per minute at 60 psi.

Outdoor

- Dust Control: reclaimed water for dust control is available from the Kīhei Wastewater Treatment Plant at a reasonable cost. If feasible, it should be considered as an alternative source of water for dust control during construction.
- Use Smart Approved WaterMark irrigation products. Examples include evapotranspiration irrigation controllers, drip irrigation, and water saving spray heads.
- After plants are established, in order to avoid stimulating excessive growth, avoid

  fertilizing and pruning. Time watering to occur in the early morning or evening to limit

evaporation. Limit the use of turf.

- Use native Hawaiian climate-adapted plants for landscaping. Native Hawaiian plants adapted to the area conserve water and protect the watershed from degradation due to invasive species.
- We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawai'i.

We hope you find this information useful. Should you have any questions, please contact staff planner Alex Buttaro at (808) 463-3103 or alex.buttaro@mauicounty.gov.

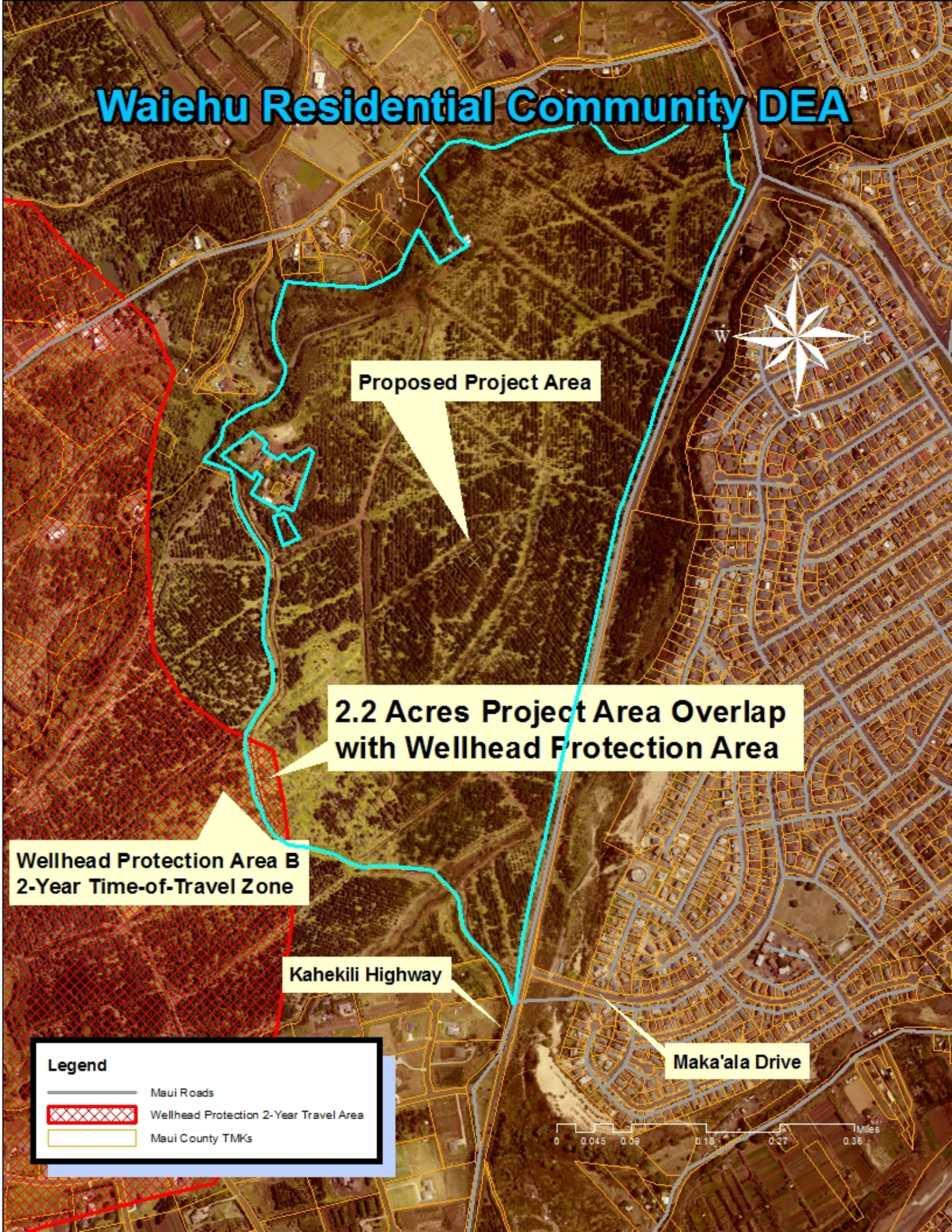
Sincerely,

Jeffrey T. Pearson, P.E.
Director
BAB

Cc: MDWS Engineering
Brett Davis, Chris Hart and Partners (bdavis@chpmaui.com)

Attachment: Waiehu-Residential-Community DEA Wellhead Protection Zone Map

Located at S:\PLANNING\Permit_Review\Projects Review\planning review\EA-EIS\233002031_DEA-Waiehu-Residential-Community


Waiehu Residential Community DEA
Proposed Project Area
2.2 Acres Project Area Overlap with Wellhead Protection Area
Wellhead Protection Area B 2-Year Time-of-Travel Zone
Kahekili Highway
Maka'ala Drive
N
W
E
S
Legend
Maui Roads
Wellhead Protection 2-Year Travel Area
Maui County TMKs
0 0.045 0.09 0.18 0.27 0.36
Miles

May 3, 2022

Mr. Jeffrey T. Pearson, P.E.
Director
Maui County Department of Water Supply
Engineering Division
200 South High Street
Wailuku, Maui, Hawaii 96793

ATTN: Mr. Alex Buttaro

Dear Mr. Pearson,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii; TMK: (2) 3-3-002:031 (por.)

Thank you for your letter of January 28, 2022. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

The County of Maui Department of Water Supply's (MDWS) Water Resources and Planning Division appreciates the opportunity to comment on the proposed Waiehu Residential Community DEA. The MDWS Engineering Division may elect to submit a separate letter.

Water Source
According to the Commission on Water Resource Management (CWRM), the project overlies the 'Īao Aquifer, which has a sustainable yield of 20 million gallons per day.

Response. The Applicant acknowledges this statement.

Project Alignment with the Draft Maui Island Water Use and Development Plan (WUDP)
Stormwater Drainage Management to Supplement Irrigation Sources The proposed project may have potential to accomplish stormwater management within the proposed project footprint, which could be used for stormwater mitigation and retention for irrigation reuse (WUDP Wailuku Aquifer Sector Area [ASEA] Strategy #10). The CWRM promotes the protection of ground water and the value of treating stormwater as a resource, including groundwater recharge capability when contained onsite, described in its document titled A Handbook for Stormwater Reclamation and Reuse Best Management Practices in Hawai'i,

December, 2008: http://files.hawaiis.gov/dlnr/cwrm/planning/hsrar_handbook.pdf. We recommend implementing Best Management Practices (BMPs) contained in the document, such as permeable surfaces to reduce storm water loss (for example, permeable detention ponds and vegetated filter strips), and bio-retention rain gardens.

Response. The Applicant will review the resources provided and coordinate with the department on potential Project Alignment with the Draft Maui Island WUDP. The project site plan has been designed with the topography to limit grading. BMP's will be incorporated throughout the project site as listed in the Final EA.

MDWS Wellhead Protection Areas
Approximately 2.2 acres of the project footprint is within the MDWS wells' 2-year time of travel zone (please see attached map); therefore, non-pathogen-related chemicals and pathogens from septic systems can potentially contaminate MDWS wells.

Response. The Applicant acknowledges this comment and will review the wellhead protection area map and coordinate with the Department to ensure the project is designed to not impact MDWS wells.

Design Guidelines BMPs
Considering the project footprint's inclusion in a Wellhead Protection Zone, the following design guidelines should be considered for subdivisions that create four or more developable lots, and to the construction of three or more dwelling units on a single lot, parcel, or site:

1. Proposed development and uses shall be located as far from the wellhead as feasible.
2. Storm-water infiltration basins shall be located outside the Wellhead Protection Overlay District (WPOD) where feasible, provided that if this is not feasible, then the basins shall be located as far from the wellhead as feasible.
3. Active parks and schools shall implement integrated pest management.
4. If a development or use is proposed on property which is partially within a WPOD, the proposed development or use shall be located to the maximum extent feasible on the portion of the property that is outside the WPOD.

Response. The Applicant acknowledges these Design Guidelines BMP's for the Wellhead Protection Zone. The Applicant will coordinate with the Department and explore the options available for this development.

Construction Best Management Practices (BMPs) for Pollution Prevention
In order to protect ground and surface water resources, we recommend that in addition to any required BMPs, the following measures designed to minimize infiltration and runoff be implemented during construction:

1. Prevent cement products, oil, fuel and other toxic substances from falling or leaching into the ground.

2. Properly and promptly dispose of all loosened and excavated soil and debris material from drainage structure work.
3. Maintain vehicles and equipment to prevent oil or other fluids from leaking.
4. Concrete trucks and tools used for construction should be rinsed off-site.
5. Properly install and maintain erosion control barriers such as silt fencing or straw bales.
6. Disturb the smallest area possible.
7. Retain ground cover until the last possible date.
8. Stabilize denuded areas by sodding or planting as soon as possible.
9. Use high seeding rates to ensure rapid establishment of stands of plants.
10. In order to minimize chemical run-off, apply biocides (e.g. Glyphosate/Roundup) only during dry periods of low rainfall.
11. Replanting of denuded areas should include soil amendments and temporary irrigation.
12. Keep runoff on-site.

Response. The Applicant acknowledges and supports these additional BMP's. The Applicant will coordinate with the County to ensure BMP's are in place during construction.

Conservation BMPs
Indoor

- Use EPA WaterSense labeled plumbing fixtures.
- Install dual flush toilets with high-efficiency models that use 1.28 gallons per flush, or less.
- Install bathroom sink faucets with fixtures that do not exceed 1 gallon per minute at 60 psi.

Response. The Applicant supports and will implement indoor conservation measures. The Applicant will explore the available options as the land use entitle process progresses.

Outdoor

- Dust Control: reclaimed water for dust control is available from the Kīhei Wastewater
- Treatment Plant at a reasonable cost. If feasible, it should be considered as an alternative source of water for dust control during construction.
- Use Smart Approved WaterMark irrigation products. Examples include evapotranspiration irrigation controllers, drip irrigation, and water saving spray heads.
- After plants are established, in order to avoid stimulating excessive growth, avoid fertilizing and pruning. Time watering to occur in the early morning or evening to limit evaporation. Limit the use of turf.
- Use native Hawaiian climate-adapted plants for landscaping. Native Hawaiian plants adapted to the area conserve water and protect the watershed from degradation due to invasive species.
- We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawai'i.

Response. The Applicant supports and will implement outdoor conservation measures. The project will incorporate native plantings and water conservation measures.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

MICHAEL P. VICTORINO
Mayor

MICHELE CHOUTEAU MCLEAN, AICP
Director

JORDAN E. HART
Deputy Director

DEPARTMENT OF PLANNING
COUNTY OF MAUI
ONE MAIN PLAZA
2200 MAIN STREET, SUITE 315
WAILUKU, MAUI, HAWAII 96793

April 4, 2022

Mr. Buddy Almeida
County of Maui
Department of Housing and Human Concerns
2200 Main Street, Suite 546
Wailuku, Hawaii 96793

Dear Mr. Almeida:

SUBJECT: REQUEST FOR COMMENT ON THE DRAFT ENVIRONMENTAL ASSESSMENT (DEA) FOR THE PROPOSED WAIEHU RESIDENTIAL COMMUNITY, LOCATED IN WAILUKU, MAUI, HAWAII; TMK: (2) 3-3-002:031 (POR.) (EAC 2022/0001)

The Department of Planning (Department) is in receipt of the Applicant's December 21, 2021, Request for Comment on the Draft Environmental Assessment (DEA) for the proposed Waiehu Residential Community (Project) to be processed pursuant to Chapter 201H, Hawaii Revised Statutes (HRS). The Project as represented in the DEA was also reviewed by the Maui Planning Commission (Commission) on February 8, 2022, where they provided comments on the Project. The Department provided a separate letter with the Commission's comments.

The Urban Design Review Board (UDRB) reviewed the Project as represented in the DEA and the Applicant's presentation on March 1, 2022. After hearing public testimony and deliberation, the UDRB offered comments, as detailed below.

UDRB Comments:

1. This project is better suited in a location closer to the majority of the jobs so the residents of the affordable housing are not removed from their work locations. Consider a land swap to a location that is better suited to accommodate the largest workforce.

2. This project increases urban sprawl. Infill within existing urban areas would be a better alternative, because the impacts to the infrastructure and the community have already been anticipated to some degree.

3. Because there are likely to be unanticipated impacts to the community as a result of the project being located in a previously undeveloped area, be sure to maintain open communication with the community and adjust to their needs as they arise.

4. This project will obscure the sense of place for the area. Currently, the public leaves the urban center and enters a rural countryside that then transitions to a country town. This project should preserve that transition, that sense of place, and implement strategies to maintain that rural character.

5. Provide a greenbelt along Kahekili highway and either move the existing power lines away from the highway or bury the lines to clear up the view.

6. Ensure all new power lines are installed underground.

7. Keep the unused 80 acre portion of the project parcel in agriculture and include it as a design element in the master plan.

8. The landscaping is well conceived to be a livable community. The number and variety of native trees proposed for the project is appreciated. This project must be commended for offering wide open spaces and street trees, and proposing a development that is both affordable and livable.

9. Incorporating multimodal transportation into the project is appreciated.

10. Ensure the green space can accommodate stream overflow during storm events.

11. Beyond the retention basins, incorporate other water retention measures throughout the project, such as rain gardens.

12. Design the parks and basins within the project to be multipurpose, so that the limited space is utilized as much as possible by the community.

13. The bungalows and duplexes have good design elements, but the other units are not representing the sense of place with the local context. Look to the Country Town Design Guidelines for guidance.

14. Refer to the Country Town Design Guidelines for guidance on designs for commercial typologies and ensure the commercial structures will also maintain the local sense of place.

15. The retail on site should promote a sense of community. Consider "Mom and Pop" type stores and community oriented commerce like a farmer's market, and prohibit big box stores.

16. Continue discussions with agencies and the community to address potential traffic concerns caused by the project.

17. Work with existing and future developments in the area to ensure multimodal connectivity and to ensure connectivity to future developments is accounted for.

18. Incorporate precautionary measures so that this project does not result in requiring high maintenance fees for the parks and basins, the sewage lift station, the walking and biking paths, roads, etc. Ensure the roads will be deeded to the County so that the community will not have to maintain them. Please consider other ways to reduce those maintenance costs and ensure maintenance fees remain affordable in perpetuity.

19. Look to the Lanai project to build 150 affordable homes. They are proposed to be two or three bedroom pre-fabricated homes. Qualified applicants will lease the units. All utilities and maintenance expenses are included in the affordable monthly rent. Consider what Mr. Ellison has done to reduce costs and maintenance expenses to keep the units rented affordably in perpetuity and mirror that.

20. The community already suffers from traffic congestion, so further analysis must be provided and the added traffic must be better addressed.

21. Further analysis on the impacts this project will have to schools, traffic, infrastructure, stream flooding, and to the outdoor recreation areas must be provided.

22. Ensure pet parks are incorporated and are accessible by foot from all areas of the project.

23. The project will impact the local beach parks. Coordinate with state and county agencies to increase the number and size of beach parks in the area.

Thank you for the opportunity to comment on the DEA for the Project. Should you require further clarification, please contact Staff Planner Jared Burkett at jared.burkett@mauicounty.gov or at (808) 270-7378.

Sincerely,

MICHELE MCLEAN, AICP
Planning Director

Copy to: Clayton Yoshida, Planning Program Administrator (PDF)
Jacky Takakura, Acting Planning Program Administrator (PDF)
Jared Burkett, Staff Planner (PDF)
Genova Construction Development, Applicant (PDF)
Brett Davis, Consultant (PDF)
Project File

MCM:CIY:JLB:rma
K:\WP_DOCS\Planning\EAC\2022\0001_WaichuResidentialCommunity\UDRB\UDRB Comment Letter.docx

June 28, 2022

Ms. Michele McLean, Director
County of Maui, Department of Planning
2200 Main Street, Suite 315
Wailuku, HI 96793

ATTN: Mr. Jared Burkett

Dear Ms. McLean,

Subject: Response to the Urban Design Review Board (UDRB) comments on the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your comment letter of April 4, 2022, providing the UDRB comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

1. *The project is better suited in a location closer to the majority of the jobs, so the residents of the affordable housing are not removed from their work locations. Consider a land swap to a location that is better suited to accommodate the largest workforce.*

2. *This project increases urban sprawl. Infill with existing urban areas would be a better alternative, because the impacts to the infrastructure and the community have already been anticipated to some degree.*

Response. The Applicant acknowledges the comments. However, the proposed Waiehu Residential Community is located within an existing urban growth boundary identified in the Maui Island Plan as a preferred location for future residential development. The project site is near Wailuku town and a short distance from Kahului providing housing for residents. The project will include supporting infrastructure as required by the County and State.

3. *Because there are likely to be unanticipated impacts to the community as a result of the project being located in a previously undeveloped area, be sure to maintain open communication with the community and adjust to their needs as they arise.*

Response. The Applicant will continue to work with the County, City, and stakeholders to address the community's concerns.

4. *This project will obscure the sense of place for the area. Currently, the public leaves the urban center and enters a rural countryside that then transitions to a country town. This project should preserve that transition, that sense of place and implement strategies to maintain that rural character.*

Response. The proposed project uses those same principles, i.e., having the higher density homes near the existing development on the east side, then transitioning to lower density, and then finally undeveloped lands as we head towards the west. The project is preserving approximately 80 acres of undeveloped lands, with park and trails in addition.

5. *Provie greenbelt along Kahekili highway and either move the existing power lines away from the highway or bury the lines to clear up the view.*

Response. The Applicant is proposing a new bike lane and walking path along Kahekili Hwy. The Applicant will explore the feasibility of moving the power lines away from the highway.

6. *Ensure all new power lines are installed underground.*

Response. The Applicant acknowledges the above comment and will take it under advisement.

7. *Keep the unused 80-acre portion of the project in agriculture and include it as a design element in the master plan.*

Response. The Applicant acknowledges that the proposed project is intended to include the above comment. The Applicant also recognizes that more study is needed.

8. *The landscaping is well conceived to be a livable community. The number and variety of native trees proposed for the project is appreciated. This project must be commended for offering wide open spaces and street trees and proposing a development that is both affordable and livable.*

Response. The Applicant acknowledges the above comment.

9. *Incorporating multimodal transportation into the project is appreciated.*

Response. The Applicant acknowledges the above comment.

10. *Ensure the green space can accommodate stream overflow during storm events.*

Response. The Applicant will work with the Department of Public Works to meet County's standards.

11. *Beyond the retention basins, incorporate other water retention measures throughout the project, such as rain gardens.*

Response. The Applicant acknowledges the above comment and will take it under advisement.

12. *Design the parks and basins within the project to be multipurpose, so that the limited space is utilized as much as possible by the community.*

Response. The Applicant acknowledges the above comment.

13. *The bungalows and duplexes have good design elements, but the other units are not representing the sense of place with the local context. Look to the Country Town Guidelines for guidance.*

Response. The Applicant acknowledges the above comment and will review the Country Town Guidelines for guidance.

14. *Refer to the Country Town Design Guidelines for guidance on designs for commercial typologies and ensure the commercial structures will also maintain the local sense of place.*

Response. The Applicant acknowledges the above comment.

15. *The retail on site should promote a sense of community. Consider "Mom and Pop" type stores and community-oriented commerce like a farmer's market, and prohibit big box stores.*

Response. The Applicant acknowledges that the proposed project is intended to include the scale of development as described above. The Applicant also recognizes that more study is needed on the final design layout.

16. *Continue discussions with agencies and the community to address potential traffic concerns caused by the project.*

Response. The Applicant will continue to coordinate with State and County agencies to address traffic concerns.

17. *Work with existing and future developments in the area to ensure multimodal connectivity and to ensure connectivity to future developments is accounted for.*

Response. The proposed project is intended to include bike paths, sidewalks and locations for the Maui Bus to create future transit stops within the community. The Applicant also recognizes that more study is needed and coordination with Maui DOT.

18. *Incorporate precautionary measures so that this project does not result in requiring high maintenance fees for the parks and basins, the sewage lift station, the walking and biking paths, roads, etc. Ensure the roads will be deeded to the County of Maui so that the community will not have to maintain then. Please consider other ways to reduce those maintenance costs and ensure maintenance fees remain affordable in perpetuity.*

Response. The Applicant will enter into a workforce housing agreement with the County of Maui that will define commitments to infrastructure and maintenance for infrastructure and items listed above.

19. *Look to the Lanai project to build 150 affordable homes. They are proposed to be two or three bedroom pre-fabricated homes. Qualified applicants will lease the units. All utilities and maintenance expenses are included in the affordable monthly rent. Consider what Mr. Ellison has done to reduce costs and maintenance expenses to keep the units rented affordably in perpetuity and mirror that.*

Response. The Applicant acknowledges the above comment.

20. *The community already suffers from traffic congestion, so further analysis must be provided and the added traffic must be better addressed.*

Response. The Applicant acknowledges the existing traffic congestion and will work with the Department of Transportation to meet County's standards.

21. *Further analysis on the impacts this project will have to schools, traffic, infrastructure, stream flooding, and to the outdoor recreation areas must be provided.*

Response. The environmental assessment documents included studies identifying the potential impacts related to schools, traffic and infrastructure as result of the proposed action.

22. *Ensure pet parks are incorporated and are accessible by foot from all areas of the project.*

Response. Parks have been incorporated throughout the community and are open to the public.

23. *The project will impact the local beach parks. Coordinate with state and county agencies to increase the number and size of beach parks in the area.*

Response. The Applicant acknowledges the comment, and the Applicants consultant will coordinate with Department of Parks and Recreation on the feasibility of beach park expansion in the area.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

From:	Brett Davis
To:	Helen Pratiwi
Subject:	FW: Daniel, I appreciate the heads up on this, yet another Mega Construction Project in our moku. The Draft Environmental Assessment is now up on our website.
Date:	Thursday, January 20, 2022 8:40:01 AM
Attachments:	Construction.png

Add to Waiehu matrix and comments as OTHER

From: Waiehu Kou Phase 3 Association <waiehukouphase3association@hotmail.com>
Sent: Wednesday, January 5, 2022 10:46 AM
To: Daniel Ornellas <daniel.l.ornellas@hawaii.gov>; Daniel Ornellas <daniel.l.ornellas@gmail.com>
Cc: Chris Sugidono <chris@munekiyohiraga.com>; Lynne Hiromoto <lynne@munekiyohiraga.com>; Brett Davis <BDavis@chpmaui.com>; shersherwood <shersherwood@hotmail.com>; r-k-o <r-k-o@msn.com>; Daniel Ornellas <daniel.l.ornellas@hawaii.gov>; EdmundAuwae <boilerm03@yahoo.com>; skhozaki <skhozaki@gmail.com>; Calvin Ahloy <ahloyc001@hawaii.rr.com>; Cranston Kapoi <mauiboyinc@yahoo.com>; Annie Au-Hoon <aauhoon7@gmail.com>; Darrell Yagodich <darrell.yagodich@gmail.com>; Kainoa Kaauamo <kainoa402@gmail.com>; Kanani Kan Hai <jb_kanani@yahoo.com>; Naha S. AuHoon-Huckaba <naha.auhoon@mauihigh.org>; William Anana Jr. <pjanana@gmail.com>; Isaac de la Nux <isaac.delanux@gmail.com>; kaponol004 <kaponol004@hawaii.rr.com>; kekahunakeaweiwi <kekahunakeaweiwi@yahoo.com>; jb_kanani@yahoo.com; Kalani Hueu <hueuj@yahoo.com>; John Kaneakua <malia96768@yahoo.com>; William Anana Jr. <AnanaJr@gmail.com>
Subject: Daniel, I appreciate the heads up on this, yet another Mega Construction Project in our moku. The Draft Environmental Assessment is now up on our website.

1/5/22

Aloha Daniel,

The documents you have sent are somewhat troubling to say the least. I have cc'd, Chris Sugidono of Munekiyo and Hiraga with this, as we are still awaiting feedback from them concerning our email sent on 10/25/21 of a similar and now a compounding issue of development in Waiehu. I will question our Board VP William Anana to see if he has had any response from Chris. As an interested community in this affected choke point of these developing populations, I hope all our Board members can begin to review these documents in order to let these developers know what the Hawaiian residents of this moku feel is prudent to development here. I hope to relay our consolidated concerns to:

Chris Hart & Partners, Inc.

2200 Main Street, Suite 527

Wailuku, HI 96793

Contact: Brett Davis, Senior Planner

Phone:808-242-1955

Email: Bdavis@chpmaui.com

Roy Oliveira, President

Waiehu Kou Phase 3, Hawaiian Homelands, Maui

Federally Registered NHO (Native Hawaiian Organization)

49 Kaulana Na Pua Circle

Wailuku, HI 96793

808-760-8374

https://waiehukouphase3.org/

Waiehu Kou Phase 3 - Hawaiian Homes Homestead, Resilient Community

The Department of Hawaiian Home Lands (DHHL) is developing an update for the 2002 DHHL General Plan, which will establish a vision and policies that guide statewide land management and DHHL programs for the next 20 years.

waiehukouphase3.org

June 30, 2022

Mr. Roy Oliveira, President
Waiehu Kou Phase 3, Hawaiian Homelands, Maui
Federally Registered NHO (Native Hawaiian Organization)
49 Kaulana Na Pua Circle
Wailuku, HI 96793
(808) 760-8374

Dear Mr. Oliveira,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for copying us on your email of January 05, 2022, to Danile Ornellas, providing comments on the proposed affordable housing projects in Waiehu. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

The documents you have sent are somewhat troubling to say the least. I have cc'd, Chris Sugidono of Munekiyo and Hiraga with this, as we are still awaiting feedback from them concerning our email sent on 10/25/21 of a similar and now a compounding issue of development in Waiehu. I will question our Board VP William Anana to see if he has had any response from Chris. As an interested community in this affected choke point of these developing populations, I hope all our Board members can begin to review these documents in order to let these developers know what the Hawaiian residents of this moku feel is prudent to development here. I hope to relay our consolidated concerns to:
Chris Hart & Partners, Inc.
2200 Main Street, Suite 527
Wailuku, HI 96793
Contact: Brett Davis, Senior Planner
Phone:808-242-1955
Email: Bdavis@chpmaui.com

Response. The Applicant acknowledges the concerns about development, and the planning consultant will coordinate a meeting with you and the board to discuss the proposed Waiehu Residential Community.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Daniel Ornellas, DLNR
Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

January 26, 2022

Department of Housing and Human Concerns via email: Buddy.Almeida@co.maui.hi.us
Attn: Mr. Buddy Almeida
2200 Main Street, Suite 546
Wailuku, Hawaii 96793

Subject: Waiehu Residential Community
Draft Environmental Assessment (DEA)
Kahekili Highway
Wailuku, Maui, Hawaii
Tax Map Key: (2) 3-3-002:031

Dear Mr. Almeida,

Thank you for allowing us to comment on the subject project.

In reviewing our records and the information received, Hawaiian Electric Company has no objection to the project at this time. However, we highly encourage the customer's electrical consultant to submit the electrical demand requirements, electrical site layout and project time schedule as soon as practical so that any service upgrade or new line extension service can be provided on a timely basis.

Should you have any questions or concerns, please feel free to contact me at ray.okazaki@hawaiianelectric.com (as we continue to work remotely) or leave a message at 808-871-2340 (office).

Sincerely,

Ray Okazaki

Ray Okazaki
Engineer II, Engineering
Hawaiian Electric Company – Maui County

C: Mr. Brett A. Davis, Senior Planner – Chris Hart & Partners, Inc. (via email: bdavis@chpmaui.com)

May 3, 2022

Mr. Ray Okazaki, Engineer II
Hawaiian Electric Company, Engineering
PO Box 398
Kahului, HI 96733-6898
ray.okazaki@hawaiianelectric.com

Dear Mr. Okazaki,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your letter of January 26, 2022, providing the department's comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

In reviewing our records and the information received, Hawaiian Electric Company has no objection to the project at this time. However, we highly encourage the customer's electrical consultant to submit the electrical demand requirements, electrical site layout and project time schedule as soon as practical so that any service upgrade or new line extension service can be provided on a timely basis.

Response. The Applicant will submit the electrical demand requirements, electrical site layout and project time schedule as soon as practical to ensure the any service upgrade or new line extension service can be provided on a timely basis.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely yours,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

From: Gail Nagasako
To: director hhc
Subject: 752 unit development proposed for Waiehu
Date: Saturday, February 19, 2022 3:18:09 PM

Dear Director Tsuhako,

I oppose the housing unit for this site. https://www.mauinews.com/news/local-news/2022/02/752-unit-affordable-housing-project-proposed-in-waiehu/

We have a beautiful green corridor from the Waiehu/Waihe'e area up to Happy Valley and it should be preserved. My understanding of the county plan is that we have pockets of development separated by preserved green areas. To develop the Waiehu corridor will destroy the sense of "country" that we have in Waiehu and Waihee.

There are many practical reasons to locate this housing project elsewhere: water, sewers. traffic, the fact that the highway there turns into a river in big rains. A roundabout will do nothing to alleviate traffic as cars will just be lined up in the roundabout during the morning rush to school and there will be more of them.

Don't get me wrong, I am all for affordable housing and especially for some sort of housing to help the sorry people living on the streets. But with so much land between Haleakalā and the West Maui Mountains, surely this subdivision could be located there with no impact on the beauty of our island or traffic and convenient to everything for the people who would live there.

If there is someone else I should be sending my objections to, please let me know.

Thank you for all you do.

Aloha,

Gail Nagasako

1360 Hiahia Street

Wailuku, HI 96793

Ocean View Estates

(808) 2811549

June 28, 2022

Ms. Gail Nagasako
Ocean View Estates
1360 Hiahia Street
Wailuku, HI 96793
beachhouse808@gmail.com

Dear Ms. Nagasako,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your letter (n.d.), providing your comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

I object to this project for the following reasons:

1. *It would ruin the sense of being rural for the folks out here in Waiehu and Waihe'e. We have green spaces leading to us from both Waiehu Beach Road and along the "Mac nut road." To develop that land would make us a continuous town with Wailuku. Maui must preserve open spaces between developments or risk becoming like O'ahu.*

   Response. As discussed throughout the DEA, the proposed Waiehu Residential Community includes the provision of three (3) parks within the subject property, totaling approximately 6.3 acres. In addition, as previously discussed, only approximately 158 acres of the total acreage on the subject property (i.e., 238 acres) will be developed. The remaining portion of the land will be preserved as open space. Therefore, the proposed project will not only achieve the provision of affordable housings but also preservation of open spaces.

2. *That road turns into a river during heavy rains. It is treacherous to drive on.*

   Response. The Applicant acknowledges the above comment. Roadways to be built within the proposed Waiehu Residential Community will meet the State and County's standards for access and safety.

3. *The school traffic is ridiculous. If one has to go to the airport, for example, we have to leave 45 minutes earlier than usual to be ahead of the traffic. Adding 752 units would further exasperate that no matter how much one tries to control the traffic with superficial fixes like a roundabout.*

   Response. The Applicant acknowledges the above comment. Traffic analysis for the proposed Waiehu Residential Community is included within the environmental assessment and the project will comply with the State and County's requirements and standards for access and safety.

4. *We have empty retail space all over Maui and plenty in the old Sack and Save strip mall. Why do we keep building more rather than revitalizing empty properties?*

   Response. The Applicant acknowledges the above comment. Comprehensive studies will be needed to assess the feasibility of building affordable housing over properties that used to be commercial or non-residential — as well as the surrounding environment and the existing land use designations. While such studies are currently nonexistent for other properties or locations, the proposed Waiehu Residential Community has involved various studies to ensure the proposed project site and its immediate environment to be suitable and appropriate for affordable housings.

5. *Large areas of Maui are lying fallow and unsightly on the south side of Honoapi'ilani Highway and west of E. Waiko road. This would be a much better place to locate affordable housing. A set-back of green space would make an attractive green belt. Further, that location would have far less impact on traffic and folks living there would have much easier access to all the services Central Maui has to offer.*

   Response. The Applicant acknowledges the above comment. The project site has been identified in the Maui Island Plan as a location for future residential development. There are proposed development plans for expansion around the Maui Tropical Plantation, which is in the vicinity of Waiko Road and Honoapi'ilani Highway.

In summary, I am all for affordable housing and this is not a case of NIMBY even though it is in my backyard. I just feel there are far better sites that aren't in anyone's backyard and would be better for the people living in the new project.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

Regarding https://www.mauinews.com/news/local-news/2022/02/752-unit-affordable-housing-project-proposed-in-waiehu/

I object to this project for the following reasons:

1. It would ruin the sense of being rural for the folks out here in Waiehu and Waihe'e. We have green spaces leading to us from both Waiehu Beach Road and along the "Mac nut road." To develop that land would make us a continuous town with Wailuku. Maui must preserve open spaces between developments or risk becoming like O'ahu.
2. That road turns into a river during heavy rains. It is treacherous to drive on.
3. The school traffic is ridiculous. If one has to go to the airport, for example, we have to leave 45 minutes earlier than usual to be ahead of the traffic. Adding 752 units would further exasperate that no matter how much one tries to control the traffic with superficial fixes like a roundabout.
4. We have empty retail space all over Maui and plenty in the old Sack and Save strip mall. Why do we keep building more rather than revitalizing empty properties?
5. Large areas of Maui are lying fallow and unsightly on the south side of Honoapi'ilani Highway and west of E. Waiko road. This would be a much better place to locate affordable housing. A set-back of green space would make an attractive green belt. Further, that location would have far less impact on traffic and folks living there would have much easier access to all the services Central Maui has to offer.

In summary, I am all for affordable housing and this is not a case of NIMBY even though it is in my backyard. I just feel there are far better sites that aren't in anyone's backyard and would be better for the people living in the new project.

Aloha,
Gail Nagasako
1360 Hiahia Street
Wailuku, HI 96793
Beachhouse808@gmail.com

June 30, 2022

Ms. Gail Nagasako
Ocean View Estates
1360 Hiahia Street
Wailuku, HI 96793
beachhouse808@gmail.com

Dear Ms. Nagasako,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your email of February 19, 2022, providing your comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

I oppose the housing unit for this site. https://www.mauinews.com/news/local-news/2022/02/752 unitaffordable-housing-project-proposed-in-waiehu/

We have a beautiful green corridor from the Waiehu/Waihe'e area up to Happy Valley and it should be preserved. My understanding of the county plan is that we have pockets of development separated by preserved green areas. To develop the Waiehu corridor will destroy the sense of "country" that we have in Waiehu and Waihee.

There are many practical reasons to locate this housing project elsewhere: water, sewers. traffic, the fact that the highway there turns into a river in big rains. A roundabout will do nothing to alleviate traffic as cars will just be lined up in the roundabout during the morning rush to school and there will be more of them.

Don't get me wrong, I am all for affordable housing and especially for some sort of housing to help the sorry people living on the streets. But with so much land between Haleakalā and the West Maui Mountains, surely this subdivision could be located there with no impact on the beauty of our island or traffic and convenient to everything for the people who would live there.

Response. The project site has been identified in the Maui Island Plan as a location for future residential development. The proposed Waiehu Residential Community has involved various

studies to ensure the proposed project site and its immediate environment to be suitable and appropriate for affordable housings.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

From: kathrenbade@gmail.com <kathrenbade@gmail.com>
Sent: Monday, February 28, 2022 8:18 PM
To: planning@mauicounty.gov; Jared.Burkett@co.maui.hi.us; 'Alice L. Lee' <Alice.Lee@mauicounty.us>; 'Kayna M. Yoneda' <Kayna.Yoneda@mauicounty.us>; 'Mona A. Perry' <Mona.Perry@mauicounty.us>; Mayors.Office@co.maui.hi.us; 'Tyson Miyake' <Tyson.Miyake@co.maui.hi.us>; director.hhc@mauicounty.gov; Buddy.Almeida@co.maui.hi.us
Cc: 'Gayle Long' <gayle@longfinancialservices.com>; 'Gail Nagasako' <beachhouse808@gmail.com>
Subject: Urban sprawl in the name of "affordable housing": Proposed Waiehu Residential Community at TMK: (2) 3-3-002:031 and Hale Mahaolu

Dear Planning dept, Urban Design Review Board, Maui County elected officials, and Ms. Lori Tsuhako,

Re: Proposed Waiehu Residential Community at TMK: (2) 3-3-002:031 **AND Hale Mahaolu combined**

I live in the area proposed to build this project. I am completely opposed for multiple reasons:

- The area is prone to flooding from nearby streams and rivers on Kahekili highway and Waiehu beach roads, which completely shuts these two artery roads to this area down multiple times a year. Why would the county allow this to be built with annual flooding in the area?
- The addition of 3 – 6 cars per household (as is evidenced in Kahului neighborhoods) to this location would not only completely choke the two artery roads coming into and out of but would literally turn Waiehu into Honolulu traffic and make a five minute drive a 45-minute drive to Wailuku town, Kahului and beyond.
- Current parks in the area are already heavily used by local residents; adding additional residents and not adding additional BEACH PARKS which is the DRAW for people moving to Hawaii is irresponsible.
- There are no additional dog parks in Wailuku, Waiehu, Waihee and Kahakuloa and with the additional inhabitants proposed that means that many more people and their pets utilizing the undersized existing parks and very limited parking at these parks.
- There is NO grocery store in the area, with Sac n Save closing.
- There is no pharmacy near this area at all.
- Schools: additional auto and school bus traffic with residents taking their children via auto to school, further adding to the congestion at peak travel times; there needs to be more elementary and middle schools in the area to support this number of proposed residents to the very limited schools in Waihee.
- The developer who obviously wants to eventually be granted permission to further develop the macadamia fields mauka of this project on Kahekili and is not proposing additional roads to the area at their cost. The developer is obviously depending on the residential tax-payers of Maui to foot the bill for that infrastructure.
- The location is "Prime" agricultural land; keep it that way; keeping Hawaii green with small family farming from Wailuku country estates all the way to Kahakuloa will maintain the Hawaiian lifestyle, not urban crowded rental units and expensive future luxury housing units that local people can't afford to purchase.
- Alternative Suggestion: there is an overabundance of vacated commercial space in Maui that can be revitalized into affordable housing. These locations already have in place adequate parking, access to surface streets, employment-shopping centers, and are centrally located. Instead of letting the ever-growing homeless community inhabit these abandoned commercial

spaces and destroy the beauty of Maui with their accumulation of filth, trash, junked and burned-out cars, plus make them scare and violent locations should you happen to accidently be there by yourself, turn these existing buildings into affordable housing units for families, mental health apartments with appropriate staff, elderly affordable units, etc. The land and building owners can be compensated fairly for their investment and the buildings can be adequately maintained instead of letting them become dilapidated and an eyesore for everyone: tourists to locals.

I previously worked for Times Mirror Cable TV engineering in California prior to moving to Hawaii in the 1980's. When a community was designed, the infrastructure of roads, schools, parks, medical and shopping centers was built first by the developer before any permits were issued for housing. I am recommending that the county reject this plan for affordable rental housing because there are plenty of other areas within Maui with access to roads, schools, central parks that are better suited right now to build and or revitalize existing infrastructure to affordable housing. The developer is not seeking to contribute to the local area of Waiehu and the Hawaii lifestyle but seeking future profits with the additional lands they own or seek to own and further develop by offering token amounts of “affordable housing.”

Sincerely,
Kathy Rosales
Direct: 808-250-7077

June 30, 2022

Ms. Kathy Rosales
kathrenbade@gmail.com
(808) 250-7077

Dear Ms.Rosales,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your email of February 28, 2022, providing your comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

I live in the area proposed to build this project. I am completely opposed for multiple reasons:

- *The area is prone to flooding from nearby streams and rivers on Kahekili highway and Waiehu beach roads, which completely shuts these two artery roads to this area down multiple times a year. Why would the county allow this to be built with annual flooding in the area?*

  Response. As discussed in the DEA of the proposed project, most of the project site has a flood zone classification of Zone X—characterized as an area of minimal flooding, specifically areas determined to be outside the 0.2 percent annual chance flood plain. Mitigation measures have been analyzed for the proposed project and will be implemented with regards to flooding. Please refer to the DEA and Appendix 5 of the DEA for a more comprehensive discussion about project impact analysis and mitigation measures with regard to the runoff and drainage as well as flooding.

- *The addition of 3 – 6 cars per household (as is evidenced in Kahului neighborhoods) to this location would not only completely choke the two artery roads coming into and out of but would literally turn Waiehu into Honolulu traffic and make a five minute drive a 45-minute drive to Wailuku town, Kahului and beyond.*

Response. The Applicant acknowledges the comment. Please refer to Appendix 9 of the DEA for the Traffic Impact Analysis Report which includes a detailed analysis of existing conditions and mitigation measures with regard to roadway and traffic.

- *Current parks in the area are already heavily used by local residents; adding additional residents and not adding additional BEACH PARKS which is the DRAW for people moving to Hawaii is irresponsible.*

  Response. The Applicant acknowledges the comment. The State of Hawaii and the County of Maui have worked hard to preserve public beaches, provide public parks, and take care of the rainforests as well as other green and open space available on the island of Maui. In addition, the proposed Waiehu Residential Community includes provision of 3 parks and preservation of open space within the project site.

- *There are no additional dog parks in Wailuku, Waiehu, Waihee and Kahakuloa and with the additional inhabitants proposed that means that many more people and their pets utilizing the undersized existing parks and very limited parking at these parks.*

  Response. The Applicant acknowledges the comment. The proposed parks associated with Waiehu Residential Community and the preserved open space within the project site can be multifunctional spaces for future residents to play, workout, and do any activities with their family including their canine friend.

- *There is NO grocery store in the area, with Sac n Save closing.*

  Response. As a part of the Wailuku area, the proposed Waiehu Residential Community benefits from proximity with stores such as Tamura's Market Wailuku, Takamiya market, Tj's Warehouse Outlet, and a variety of minimarts, Asian stores, and convenience stores.

- *There is no pharmacy near this area at all.*

  Response. The Applicant acknowledges the comment. The proposed project is situated within 2 miles from the Wailuku town and 3 miles from the business hub of Kahului where pharmacies are available with pickup or delivery services. In addition, grocery stores or convenience stores within Central Maui also provide pharmaceutical products available for purchase.

- *Schools: additional auto and school bus traffic with residents taking their children via auto to school, further adding to the congestion at peak travel times; there needs to be more elementary and middle schools in the area to support this number of proposed residents to the very limited schools in Waihee.*

  Response. The Applicant acknowledges the comment. Please refer to Appendix 9 of the DEA for the Traffic Impact Analysis Report for more discussion regarding traffic.

- *The developer who obviously wants to eventually be granted permission to further develop the macadamia fields mauka of this project on Kahekili and is not proposing additional roads to the area at*

their cost. The developer is obviously depending on the residential tax-payers of Maui to foot the bill for that infrastructure.

Response. The Applicant acknowledges the comment. The proposed project is a new 100% affordable 752-unit residential community along with associated infrastructure, roadways, and amenities such as park space, walking trails, and landscaping. All units within the proposed community are for sale at prices determined by the Housing and Urban Development (HUD) annual price guidelines. This project will directly support the County's ongoing efforts to provide affordable housing in Maui.

- *The location is "Prime" agricultural land; keep it that way; keeping Hawaii green with small family farming from Wailuku country estates all the way to Kahakuloa will maintain the Hawaiian lifestyle, not urban crowded rental units and expensive future luxury housing units that local people can't afford to purchase.*

  Response. The Applicant acknowledges the comment. The proposed project is a new 100% affordable housing project.

- *Alternative Suggestion: there is an overabundance of vacated commercial space in Maui that can be revitalized into affordable housing. These locations already have in place adequate parking, access to surface streets, employment-shopping centers, and are centrally located. Instead of letting the ever-growing homeless community inhabit these abandoned commercial spaces and destroy the beauty of Maui with their accumulation of filth, trash, junked and burned-out cars, plus make them scare and violent locations should you happen to accidently be there by yourself, turn these existing buildings into affordable housing units for families, mental health apartments with appropriate staff, elderly affordable units, etc. The land and building owners can be compensated fairly for their investment and the buildings can be adequately maintained instead of letting them become dilapidated and an eyesore for everyone: tourists to locals.*

  Response. The Applicant acknowledges the above comment. The applicant does not own commercial property and studies will be needed to assess the feasibility of building affordable housing over properties that used to be commercial or non-residential — as well as the surrounding environment and the existing land use designations. The proposed project site is suitable and appropriate for affordable housing.

  The project site has been identified in the Maui Island Plan as a location for future residential development.

I previously worked for Times Mirror Cable TV engineering in California prior to moving to Hawaii in the 1980's. When a community was designed, the infrastructure of roads, schools, parks, medical and shopping centers was built first by the developer before any permits were issued for housing. I am recommending that the county reject this plan for affordable rental housing because there are plenty of other areas within Maui with access to roads, schools, central parks that are better suited right now to build and or revitalize existing infrastructure to affordable housing. The developer is not seeking to contribute to the local area of Waiehu and the Hawaii lifestyle but seeking future profits with the additional lands they own or seek to own and further develop by offering token amounts of "affordable housing."

Response. The Applicant acknowledges the comment. The proposed project is a new 100% affordable housing project and will be constructed in compliance with State and Cunty rules and regulations.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

From: Buddy Almeida <Buddy.Almeida@co.maui.hi.us>
Sent: Wednesday, March 2, 2022 10:33 AM
To: Brett Davis <BDavis@chpmaui.com>
Cc: Jessica Crouse <Jessica.Crouse@co.maui.hi.us>
Subject: RE: Urban sprawl in the name of "affordable housing": Proposed Waiehu Residential Community at TMK: (2) 3-3-002:031 and Hale Mahaolu

This was a follow up…Mahalo!
>>> <kathrenbade@gmail.com> 3/1/2022 11:12 AM >>>
After listening to the developer and the few public commenters who could make time while working to make their concerns heard, here are my further comments:

- Adding parklands to deal with flooding within the project; what studies are provided to prove that this works?
    - What are the developers offering to fix and address the current flooding issues with Waiehu beach road and Kahekili highway
- Infrastructure: no mention of additional roads into and out of the area; no mention of additional schools
- Good neighbors: developer talks about being good neighbors; building Kapolei style bungalows with nearly ZERO outdoor space for families to utilize on their own property just makes urban sprawl, congestion, and exceptionally poor quality of life for residents; there is what appears to be zero space to even have a container garden on a proposed residents own property from the pictures of the proposed homes/bungalo's, townhomes, row homes.
- Multimodal transportation: what is that? Within the subject location or surrounding surface areas? Adding to the current bus line? What about adding bike lanes, walking pathways off Kahekili highway for safe pedestrian passage from Wailuku to the subject location.
- 100% affordable housing; yet Mr. Larner discusses future plots that will not be offered at affordable rates or "attainable" prices, lotteries, etc; let's get the WHOLE PICTURE from this developer first before approving their "affordable housing" plan that is truly not 100% transparent about what their intent is with additional acreage they own and want to develop in the future most likely at unaffordable prices.
    - Why is the affordable being offered by the highway, less desirable location near highway noise. The better view plane properties are not being offered at this time as affordable but as something else, "attainable" possibly, not 100% determined at this time from Mr. Larner.

What I didn't get to testify on is Jobs: why is this being located here; the jobs are in Kihei, Wailea and Lahaina; why is the developer offering 100% affordable housing here; why not where people work and make it more convenient for people to LIVE AND WORK where they live.

Finally, to the county: more public commenting needs to be made when the public is not working during business hours. The county needs to make this type of public testimony and developer comments available to the community in the evening and weekends.

Sincerely,

Kathren Rosales

June 30, 2022

Ms. Kathy Rosales
kathrenbade@gmail.com
(808) 250-7077

Dear Ms.Rosales,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your email of March 02, 2022, providing your comments on the proposed affordable housing project. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

After listening to the developer and the few public commenters who could make time while working to make their concerns heard, here are my further comments:

- *Adding parklands to deal with flooding within the project; what studies are provided to prove that this works?*
  - *What are the developers offering to fix and address the current flooding issues with Waiehu beach road and Kahekili highway Infrastructure: no mention of additional roads into and out of the area; no mention of additional schools*

Response. As discussed in the DEA of the proposed project, most of the project site has a flood zone classification of Zone X—characterized as an area of minimal flooding, specifically areas determined to be outside the 0.2 percent annual chance flood plain. Mitigation measures have been analyzed for the proposed project and will be implemented with regards to flooding. Provision of parks and open space within the proposed project are intended to the commitment of not utilizing the entire project site for development, rather preserving a sufficient amount of land and using the buildable areas for affordable housing.

Please refer Appendix 5 of the FEA for a more comprehensive discussion about project impact analysis and mitigation measures with regard to the runoff and drainage as well as flooding. In addition, please refer to Appendix 9 of the FEA for the Traffic Impact Analysis Report

which includes a detailed analysis of existing conditions and mitigation measures with regard to roadway and traffic.

- *Good neighbors: developer talks about being good neighbors; building Kapolei style bungalows with nearly ZERO outdoor space for families to utilize on their own property just makes urban sprawl, congestion, and exceptionally poor quality of life for residents; there is what appears to be zero space to even have a container garden on a proposed residents own property from the pictures of the proposed homes/bungalo's, townhomes, row homes.*

  Response. Please refer to Appendix 2 for more detailed information about the Waiehu Community Design. The proposed development follows County requirements for setbacks, hence providing open space for each type of residential unit. Parks and open space outside of the residential units are also included to ensure the provision of green space and a livable community.

- *Multimodal transportation: what is that? Within the subject location or surrounding surface areas? Adding to the current bus line? What about adding bike lanes, walking pathways off Kahekili highway for safe pedestrian passage from Wailuku to the subject location.*

  Response. Please refer to page 13 of the TIAR (Appendix 9 of the FEA) for the discussion of multimodal facilities. The proposed project benefits from the proximity of the project site to existing bus stops, future signed-shared roadways as described in the HDOT Bike Plan Hawaii Master Plan, and future improvements of Maui Bus routes — as studies are done to improve the public transit service in Maui.

- *100% affordable housing; yet Mr. Larner discusses future plots that will not be offered at affordable rates or "attainable" prices, lotteries, etc; let's get the WHOLE PICTURE from this developer first before approving their "affordable housing" plan that is truly not 100% transparent about what their intent is with additional acreage they own and want to develop in the future most likely at unaffordable prices.*
  - *Why is the affordable being offered by the highway, less desirable location near highway noise. The better view plane properties are not being offered at this time as affordable but as something else, "attainable" possibly, not 100% determined at this time from Mr. Larner.*

  Response. The proposed Waiehu Residential Community will satisfy the requirements of 201H, Hawaii Revised Statutes as well as Chapter 2.96 of the Maui County Code.

  The proposed project includes landscaping and large setbacks from the Highway to reduce highway noise. The proposed project has been analyzed and consulted to meet State and County requirements for affordable housing.

What I didn't get to testify on is Jobs: why is this being located here; the jobs are in Kihei, Wailea and Lahaina; why is the developer offering 100% affordable housing here; why not where people work and make it more convenient for people to LIVE AND WORK where they live.

Response. The Applicant acknowledges the comment. The proposed project site is within 2 miles from the commercial areas of Wailuku and within 3 miles of Kahului.

Finally, to the county: more public commenting needs to be made when the public is not working during business hours. The county needs to make this type of public testimony and developer comments available to the community in the evening and weekends.

Response. The Applicant acknowledges the comment to the County.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

>>> Gayle Long <gayle@longfinancialservices.com> 2/16/2022 10:24 AM >>>
Issue with limited or no shoulder space on Highway and Beach Road:

Thanks David-
These are very appropriate remarks and what is not noted is that *Kahekili Highway is normally closed* when there is an accident or flash flood- there is just not enough room for emergency services, etc. These roads are also heavily used by school bus transportation which also burdens traffic – stop and start- during the day.

Thanks much for impact reminders to those of us who need transportation via these routes as well as past identified and unresolved issues.

Best regards,
Gayle

Gayle Long, AWMA ®

gayle@longfinancialservices.com
tel: 808-873-8773
fax: 888-848-4497
www.longfinancialservices.com
395C Dairy Road #103
Kahului, Hawaii 96732

May 3, 2022

Ms. Gayle Long, AWMA
gayle@longfinancialservices.com
395C Dairy Road #103
Kahului, Hawaii 96732

Dear Ms. Long,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your email of February 16, 2022. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

Issue with limited or no shoulder space on Highway and Beach Road:
Thanks David-

These are very appropriate remarks and what is not noted is that Kahekili Highway is normally closed when there is an accident or flash flood- there is just not enough room for emergency services, etc. These roads are also heavily used by school bus transportation which also burdens traffic – stop and start- during the day.

Thanks much for impact reminders to those of us who need transportation via these routes as well as past identified and unresolved issues.

Response. The Applicant acknowledges that there is traffic congestion in the area and that a public partnership to improve the infrastructure in the area is needed. The Applicant is taking into consideration the community need for a bridge and roadway extension. The Applicant is committed to working with the County on a fair share contribution agreement towards traffic improvements in the area.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

From: David Hoffman <david@nexxtstep.com>
Sent: Wednesday, February 16, 2022 9:06 AM
To: mtanji@mauinews.com
Cc: 'Michele McLean' <Michele.McLean@co.maui.hi.us>
Subject: FW: RE: Waiehu Residential Community discussion Feb 8th

Aloha Melisa Tanji,

Thank you for citing my concerns in your article in today's (2/16/22) paper. I'd like to ask you if you do any additional follow-up articles that you look into the history of a proposed Imi Kala overpass I also cited. If I recall correctly, it was included in the original Wailuku County Estates development proposals and dropped as some point. Then it was to be included in the Hale Mua project also. In this new proposal for the same area it was not mentioned to my recollection. The Imi Kala overpass and subsequent additional needed extension of Imi Kala to Lower Main St is the only other outlet to alleviate the increasing traffic from the Waiehu/Waihee area. I remember asking Alan Arakawa when he was running for one of his 3 terms and he told me " The Imi Kala overpass will be built." Then of course it was immediately forgotten.

There is no way adding the number of homes in this proposal will only affect the intersections adjacent to the development but the backups in Happy Valley and Kahului Beach Road going into town will most likely exceed critical mass with the increased population in the area. I would hope further discussion of this project address the additional overpass project or it's just another exercise in how to avoid responsible development in the name of development at undo cost to the community.

As I closed my letter below: " Development without infrastructure development is irresponsible". And importantly, that doesn't mean the infrastructure that is part of or next to the proposed development, but the entire area's concerns.

Thank you again for covering the story and gong the extra mile to include citizen input.

Best regards,

David Hoffman
Next Step Marketing LLC
P.O. Box 327
Wailuku, HI 96793

808.244.1909 office
808.283.2002 cell-text

From: David Hoffman <david@nexxtstep.com>
Sent: Friday, February 4, 2022 11:28 AM
To: 'planning@mauicounty.gov' <planning@mauicounty.gov>
Subject: RE: Waiehu Residential Community discussion Feb 8th

Dear planning commission.

While I am not opposed to affordable housing. I am extremely concerned with the traffic study and conclusions of "No significant impact" of the Waiehu Residential Community proposal.

I believe their estimated addition trips per day, especially during traditional commute hours for school and work are an underestimate by a considerable amount.

First off, they correctly identified that crucial intersections to access this area are at a critical mass or close to at this time. Any additional development will severely impair those intersections. One merely drive into town in either of the two optional directions from the proposed development in Waiehu in the 7am hour or 4-6pm hour to see that the backups are significant.

The Imi Kala overpass is one option that has been pushed to the back burner over and over. The overpass and subsequent extension of Imi Kala to Lower Main St/ Waiale Ave is one way to mitigate this. Please takes this into consideration. Development without infrastructure development is irresponsible.

David Hoffman

P.O. Box 327
Wailuku, HI 96793

808.244.1909 office
808.283.2002 cell-text

June 28, 2022

Mr. David Hoffman
david@nexxtstep.com
PO Box 327
Wailuku,HI 96793

Dear Mr. Hoffman,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your email of February 04, 2022. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

Dear planning commission.

While I am not opposed to affordable housing. I am extremely concerned with the traffic study and conclusions of "No significant impact" of the Waiehu Residential Community proposal.

I believe their estimated addition trips per day, especially during traditional commute hours for school and work are an underestimate by a considerable amount.

First off, they correctly identified that crucial intersections to access this area are at a critical mass or close to at this time. Any additional development will severely impair those intersections. One merely drive into town in either of the two optional directions from the proposed development in Waiehu in the 7am hour or 4-6pm hour to see that the backups are significant.

The Imi Kala overpass is one option that has been pushed to the back burner over and over. The overpass and subsequent extension of Imi Kala to Lower Main St/ Waiale Ave is one way to mitigate this. Please takes this into consideration. Development without infrastructure development is irresponsible.

Response. The Applicant acknowledges that there is traffic congestion in the area and that a public partnership to improve the infrastructure in the area is needed. The Applicant is taking into consideration the community need for a bridge and roadway extension. The Applicant is committed to working with the County on a fair share contribution agreement towards traffic improvements in the area.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Maui Planning Commission
Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

From David Hoffman, 25 year plus resident of Waiehu. (1312 Kilou St, Wailuku) 808.283.2002

Subject: Written Testimony submitted to the Urban Design Review Board regarding proposed: **Wailuku Residential Community.** For UDRB meeting 3/1/22 10 am HST.

1. Location: I recommend you revise the concept of a "land swap." It is in this proposal but is dismissed as they claim it would delay the project too much. A land swap for land more centrally located where infrastructure is more easily assimilated. This would allow the College, Maui Pono, or a County supported ag project to grow things like Ulu Avocado, and/or other foods and keep prime ag land for ag. Sustainability has become crucial to all of the County's planning. Pleases don't sacrifice prime ag land in exchange for asphalt and cement in this historically ag area.

2. Infrastructure. Prior to when Wailuku Country Estates was proposed and possibly before that traffic in the area needed to be addressed. If I recall correctly, The "Imi Kala Extension" was attached to the original Wailuku County Estates proposal. It was also part of the Hale Mau project (the current proposed site under discussion). In both cases it was eliminated. I speculate it was to save the developer money at a cost of congestion to the local community. I also challenge their traffic studies, completed in 2017. They will be 15 years old by projected full build out in 2032. Not only is this study dated, more importantly I believe it greatly underestimates the additional vehicular traffic, especially during commute hours, 700+ homes will generate. Their own proposal includes studies with and without the Imi Kala Extension, so it's already been identified as critical infrastructure needed in the area. I recommend it be a requirement from this developer, offer a private public partnership, or seek some of the new infrastructure funding. To ignore a crucial element of urban planning will lead to a failed planning process. I suggest you reject any new development until it is under construction.

3. Green belt setbacks: Scenic roads and vistas are one of Maui's great resources. This Hwy could or should be nominated as a historic scenic route. Therefore, it should set back off the Hwy to maintain the view planes and rural sense of the HWY. Having just a row of trees before large cement walls or homes blocking the views create a sense of crowdedness that can easily be avoided by simply reallocating some of the parkland they propose adjacent to the HWY or adding additional green belt land as a requirement of this development. Wailuku Heights, just across the Hwy has such a set back and while the land is fallow, it's a de-facto green belt. Please don't let this soul soothing drive be defiled when it can so easily be preserved.

Thank you for your time and consideration…

May 3, 2022

Mr. David Hoffman
david@nexxtstep.com
PO Box 327
Wailuku,HI 96793

Dear Mr. Hoffman,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your written testimony submitted to the Urban Design Review Board (UDRB) with regard to the UDRB meeting on March 01, 2022. Chris Hart and Partners, Inc. (CH&P) has provided the following responses to the comments.

1. *Location: I recommend you revise the concept of a "land swap." It is in this proposal but is dismissed as they claim it would delay the project too much. A land swap for land more centrally located where infrastructure is more easily assimilated. This would allow the College, Maui Pono, or a County supported ag project to grow things like Ulu Avocado, and/or other foods and keep prime ag land for ag. Sustainability has become crucial to all of the County's planning. Pleases don't sacrifice prime ag land in exchange for asphalt and cement in this historically ag area.*

   Response. The proposed project site is identified as a location for future residential development in the Maui Island Plan and is therefore an appropriate location for the proposed project. The project site will utilize a portion of the property, the remaining land will be left as agricultural designated land and could be used for future agricultural purposes.

2. *Infrastructure. Prior to when Wailuku Country Estates was proposed and possibly before that traffic in the area needed to be addressed. If I recall correctly, The "Imi Kala Extension" was attached to the original Wailuku County Estates proposal. It was also part of the Hale Mau project (the current proposed site under discussion). In both cases it was eliminated. I speculate it was to save the developer money at a cost of congestion to the local community. I also challenge their traffic studies, completed in 2017. They will be 15 years old by projected full build out in 2032. Not only is this study dated, more importantly I believe it greatly underestimates the additional vehicular traffic, especially during commute hours, 700+ homes will generate. Their own proposal includes studies with and without the Imi Kala Extension, so it's already been identified as critical infrastructure needed in the area. I*

recommend it be a requirement from this developer, offer a private public partnership, or seek some of the new infrastructure funding. To ignore a crucial element of urban planning will lead to a failed planning process. I suggest you reject any new development until it is under construction.

Response. The Applicant acknowledges that there is traffic congestion in the area and that a public partnership to improve the infrastructure in the area is needed. The Applicant is taking into consideration the community need for a bridge and roadway extension. The Applicant is committed to working with the County on a fair share contribution agreement towards traffic improvements in the area.

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Response. The proposed project site plan calls for generous setbacks from the highway that will create a buffer between the road and the residential development. Sidewalks and bike paths are proposed along the frontage of the property.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Urban Design Review Board (UDRB)
Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065

Helen Pratiwi

From: Brett Davis
Sent: Tuesday, June 21, 2022 11:23 AM
To: Helen Pratiwi
Subject: FW: proposed Waihee housing

From: Diana Kaaihue <dkaaihue@mauigateway.com>
Sent: Monday, February 28, 2022 11:21 PM
To: Brett Davis <BDavis@chpmaui.com>
Subject: Fwd: proposed Waihee housing

--- Begin forwarded message:

From: "Diana Kaaihue" <dkaaihue@mauigateway.com>
To: <Jared.Burkett@co.maui.hi.us>
Subject: proposed Waihee housing
Date: Tue, 1 Mar 2022 01:17:41 -0800

Writing to express my dismay at the proposed low income development in Waihee. I wrote earlier to the "community input"

site and received no response. More students at already overcrowded Waihee and Iao Schools? Worse traffic through Happy Valley and on Beach Road? Installation of a traffic light at that intersection, where traffic currently moves smoothly, except for major backup for families coming and going to Waihee School. Have any of you been on that road before and after school? There are fewer and fewer services back here; they are all over in Maui Lani.. Why isn't this housing being built where all the new development of Wailuku Town is occurring? Markets, services of all kinds, access to county, state and federal building, are all better on the Maui Lani side. Everyone agrees affordable housing is a necessity, but out here, AG lands? Open green spaces? That entire area, down by the

new sports park in Maui Lani, all the new schools , easier access to shopping centers, two markets within a mile of each other, gas stations, even a Starbucks.. Kaiser and other medical practices right there by the Parkway. Signals on the two main Hiways at

both ends of Waiko Road and Maui Lani parkway, providing quick access to shopping and services on Puunene. Most of the workforce drive to Kihei/Wailea and Lahaina for resort employment. That location is at least 15 minutes closer than way back here in Waihee.

Makes no sense to put all that housing in this area when none of the above are available. Hawaiian Homes already built three increments in Waihee, adding to the traffic, not to mention adding students to the one little school. I work on the corner of Vineyard and Market,

cars are backed up with no other way to go to get out of it. What about the impact of the actual construction, big trucks going back and forth on the little two lane roads that are the only access to this area? What happens to little Waihee Stream that has been known to overflow the highway during heavy rains? Where is the water coming from anyway? It rains very little over here anymore. It used to rain every night, but climate change has impacted that. Cutting down trees is one of the worst things to hasten climate change. Sorry, but this is just crazy and egregious. There are definitely other and better areas for so-called "affordable" housing anywhere but in this last bit of country. Incredibly disturbing. What has happened to Maui? Development is crushing our once lovely island.

Sincerely Diana Kaaihue

May 3, 2022

Ms. Diana Kaaihue
dkaaihue@mauigateway.com

Dear Ms. Kaaihue,

Subject: Response to the Draft Environmental Assessment (DEA) for the Proposed Waiehu Residential Community, Wailuku, Maui, Hawaii;
TMK: (2) 3-3-002:031 (por.)

Thank you for your email of March 01, 2022. Chris Hart and Partners, Inc. (CH&P) has provided the following response to the comments.

Writing to express my dismay at the proposed low income development in Waihee. I wrote earlier to the "community input" site and received no response. More students at already overcrowded Waihee and Iao Schools? Worse traffic through Happy Valley and on Beach Road? Installation of a traffic light at that intersection, where traffic currently moves smoothly, except for major backup for families coming and going to Waihee School. Have any of you been on that road before and after school? There are fewer and fewer services back here; they are all over in Maui Lani.. Why isn't this housing being built where all the new development of Wailuku Town is occurring? Markets, services of all kinds, access to county, state and federal building, are all better on the Maui Lani side. Everyone agrees affordable housing is a necessity, but out here, AG lands? Open green spaces? That entire area, down by the new sports park in Maui Lani, all the new schools , easier access to shopping centers, two markets within a mile of each other, gas stations, even a Starbucks.. Kaiser and other medical practices right there by the Parkway. Signals on the two main Hiways at both ends of Waiko Road and Maui Lani parkway, providing quick access to shopping and services on Puunene. Most of the workforce drive to Kihei/Wailea and Lahaina for resort employment. That location is at least 15 minute closer than way back here in Waihee. Makes no sense to put all that housing in this area when none of the above are available. Hawaiian Homes already built three increments in Waihee, adding to the traffic, not to mention adding students to the one little school. I work on the corner of Vineyard and Market, cars are backed up with no other way to go to get out of it. What about the impact of the actual construction, big trucks going back and forth on the little two lane roads that are the only access to this area? What happens to little Waihee Stream that has been known to overflow the highway during heavy rains? Where is the water coming from anyway? It rains very little over here anymore. It used to rain every night, but climate change has impacted that. Cutting down trees is one of the worst things to hasten climate change. Sorry, but this is just crazy and egregious. There are definitely other and better areas for so-called "affordable" housing anywhere but in this last bit of country. Incredibly disturbing. What has happened to Maui? Development is crushing our once lovely island.

Response. The Applicant acknowledges that there is traffic congestion in the area and that a public partnership to improve the infrastructure in the area is needed. The Applicant is taking into consideration the community need for a bridge and roadway extension. The Applicant is committed to working with the County on a fair share contribution agreement towards traffic improvements in the area.

Most of the project site has a flood zone classification of Zone X — characterized as an area of minimal flooding, specifically areas determined to be outside the 0.2 percent annual chance flood plain. Mitigation measures have been analyzed for the proposed project and will be implemented with regards to flooding. Provision of parks and open space within the proposed project are intended to the commitment of not utilizing the entire project site for development, rather preserving enough land and using the buildable areas for affordable housing.

Your comments, along with this response, will be reproduced and included in the forthcoming Final EA. The Final EA, including the various technical studies associated with it, will be available for review on the Environmental Review Program website following its publication in *The Environmental Notice*.

Thank you for participating in the environmental review process. Please feel free to call me at (808) 242-1955 or e-mail me at bdavis@chpmaui.com should you have any questions.

Sincerely,

Brett Davis, Senior Planner

Cc: Mr. Buddy Almeida, Maui DHHC
Mr. Brad Cook, Genova Construction Development
Project File 19-065